Freelander

Workshop Manual
Service Procedures

Werkplaatshandboek
Onderhoudsprocedures

Manual d'Atelier
Procédures de service

Werkstatthandbuch
Wartungsanleitungen

Manuale d'Officina
Procedure di servizio

Manual de Taller
Procedimientos de servicio

Manual de Oficina
Processos de Serviço

LAND ROVER

WORKSHOP MANUAL - SERVICE PROCEDURES

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How To Use This Manual

General
To assist in the use of this Manual, it is divided into sections and sub-sections. The section title is given at the top of each page and the relevant sub-section is given at the bottom.

There is a single contents section at the front of the Manual, which is divided by section and sub-section. Each section is numbered from page 1.

The individual items comprising repair operations are to be followed in the sequence in which they appear. Item numbers shown in illustrations are referred to in the associated text.

Adjustment, Repair and Overhaul operations include reference to Service tool numbers and the associated illustration depicts the tool in use. Adjustment and repair operations also include reference to wear limits, relevant data, torque figures, specialist information and useful assembly details. Each adjustment or repair operation is given a Service Repair Operation (SRO) number.

WARNINGS, CAUTIONS and **NOTES** have the following meanings:

WARNING: Procedures which must be followed precisely to avoid the possibility of injury.

CAUTION: Calls attention to procedures which must be followed to avoid damage to components.

NOTE: Gives helpful information.

References
References to the LH or RH side given in this Manual are made when viewing the vehicle from the rear. With the engine and gearbox assembly removed, the crankshaft pulley end of the engine is referred to as the front.

Operations covered in this Manual do not include reference to testing the vehicle after repair. It is essential that work is inspected and tested after completion and if necessary a road test of the vehicle is carried out. This is of particular importance where safety related items are concerned.

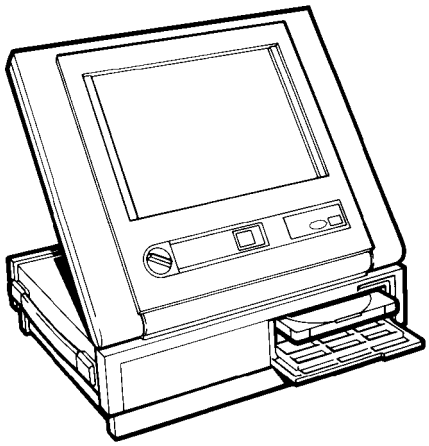
Dimensions
The dimensions quoted are to design engineering specification. Service limits are included where applicable.

Electrical Reference Library (ERL) and Circuit Diagrams
The Electrical Reference Library (ERL) and Circuit Diagrams are separate publications intended for use by trained Land Rover technicians and should be referred to when attempting to diagnose electrically related concerns.

The ERL contains descriptions of how the circuits operate, fuse details, earth point locations, and a definitive guide to the attributes and location of every connector on the vehicle.

The ERL is used in conjunction with the Circuit Diagrams. Both publications are designed to support all aspects of electrical fault diagnosis.

TESTBOOK (Fault Diagnostic Equipment)



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Freelander is equipped with a number of electronic control systems to provide optimum performance of the vehicle's systems.

Diagnostic equipment (TESTBOOK) is available to assist with the fault diagnostic abilities of the dealer workshop. In particular, TESTBOOK can be used to interrogate the Engine Control Module (ECM) for diagnosis of emissions related faults which may become evident by the illumination of the Malfunction Indicator Lamp (MIL) in the instrument pack. This feature is included in compliance with the latest emissions legislation pertinent to a particular market (e.g. EU3 for Europe, OBDII for North America etc.).

This repair manual is produced as a reference source to supplement Testbook. When available, Testbook should be used as the primary means of fault diagnosis on electronically controlled systems.

Features of Testbook include:

- Fully upgradable support for the technician
- Structured diagnostics to accommodate all skill levels.
- Touch screen operation.
- Direct print out of screen information and test results.

Repairs and Replacements

When replacement parts are required it is essential that only Land Rover recommended parts are used.

Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories:

- Safety features and corrosion prevention treatments embodied in the vehicle may be impaired if other than Land Rover recommended parts are fitted.
- In certain territories, legislation prohibits the fitting of parts which are not compliant with the manufacturer's specification.
- Torque wrench setting figures given in this Manual must be used where specified.
- Locking devices (circlips, split pins etc.) must be fitted where specified.
- If a locking device is damaged during removal, or its efficiency is impaired, it must be renewed.
- Owners purchasing accessories while travelling abroad should ensure that the accessory and its fitted location on the car conform to the legal requirements of the territory.
- The terms of the vehicle Warranty may be invalidated by the fitting of parts other than Land Rover recommended parts.
- All Land Rover recommended parts have the full backing of the vehicle Warranty.
- Land Rover Dealers are obliged to supply only Land Rover recommended parts.

Specifications

Land Rover are constantly seeking to improve the specification, design and production of their vehicles and alterations take place accordingly. Whilst every effort has been made to ensure the accuracy of this Manual, it should not be regarded as an infallible guide to current specifications of any particular vehicle.

This Manual does not constitute an offer for sale of any particular vehicle. Land Rover Dealers are not agents of Land Rover and have no authority to bind the manufacturer by any expressed or implied undertaking or representation.

Abbreviations and Symbols

A	Amperes
AAP	Ambient Air Pressure
AAT	Ambient Air Temperature
ABDC	After Bottom Dead Centre
ABS	Anti-Lock Brake System
ABS / TC	Anti-lock Brake System / Traction Control
ac	Alternating current
A/C	Air Conditioning
ACE	Active Cornering Enhancement
ACEA	Association of Constructors of European Automobiles
AFR	Air Fuel Ratio
AP	Ambient Pressure
ASC	Anti-shunt Control
ATC	Air Temperature Control
ATDC	After Top Dead Centre
AUX	Auxiliary
AVC	Automatic Volume Control
BBDC	Before Bottom Dead Centre
BBUS	Battery Backed Up Sounder
BCU	Body Control Unit
BDC	Bottom Dead Centre
bhp	Brake Horse Power
BP	Boost Pressure
BPP	Brake Pedal Position
BS	British Standard
BTDC	Before Top Dead Centre
BWD	Backward
C	Celsius
CAN	Controller Area Network
CD	Compact Disc
CDC	Centre Differential Control
CDL	Central Door Locking
CD - ROM	Compact Disc - Read Only Memory
CFC	Chlorofluorocarbon
CHMSL	Centre High Mounted Stop Lamp
CKP	Crankshaft Position
CLV	Calculated Load Value
cm	Centimetre
cm^2	Square centimetre
cm^3	Cubic centimetre
CMP	Camshaft Position
CPP	Clutch Pedal Position
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COB	Clear Over Base
CR	Common Rail
CVS	Canister Vent Solenoid
dB	Decibels
DDM	Driver's Door Module
deg.	Degree, angle or temperature
DI	Direct Injection
dia.	Diameter
DIN	Deutsche Industrie Normen (German Industrial Standards)
dc	Direct current
DCV	Directional Control Valve
DOHC	Double Overhead Camshaft
DSP	Digital Signal Processing
DTI	Dial Test Indicator
DMF	Dual Mass Flywheel
DVD	Digital Versatile Disc
EACV	Electronic Air Control Valve
EAT	Electronic Automatic Transmission
EBD	Electronic Brake pressure Distribution
ECD	European Community Directive
ECM	Engine Control Module
ECT	Engine Coolant Temperature
ECU	Electronic Control Unit
EDC	Electronic Diesel Control
EEPROM	Electronic Erasable Programmable Read Only Memory
EGR	Exhaust Gas Recirculation
EKA	Emergency Key Access
ELR	Emergency Locking Retractor
EN	European Norm
EOBD	European On Board Diagnostics
EON	Enhanced Other Network
ERL	Electrical Reference Library
ETC	Electronic Traction Control
EUI	Electronic Unit Injector
EVAP	Evaporative Emission
EVR	Electronic Vacuum Regulator
F	Fahrenheit
ft.	Feet
FBH	Fuel Burning Heater
FET	Field Effect Transistor
FIP	Fuel Injection Pump
FTC	Fast Throttle Control
FWD	Forward
>	Greater than
g	Gramme or Gravity
gal.	Gallons
GMT	Greenwich Mean Time
GPS	Global Positioning System
h	Hour
hc	High compression
HC	Hydro Carbons
HDC	Hill Descent Control
HDOP	Height Dilation Of Precision
HDPE	High Density Polyethylene
HFS	Heated Front Screen
Hg	Mercury
HO_2S	Heated Oxygen Sensor
HMW	High Molecular Weight

HRW	Heated Rear Window
ht/HT	High tension
HSLA	High Strength Low Alloy
IACV	Idle Air Control Valve
IAT	Intake Air Temperature
ICE	In-Car Entertainment
i.dia.	Internal diameter
IDM	Intelligent Driver Module
IF	Intermediate Frequency
in	Inch
in^2	Square inch
in^3	Cubic inch
ILT	Inlet Throttle
ISO	International Organisation for Standardisation
ITS	Inflatable Tubular Structure
k	Thousand
kg	Kilogramme
kg/h	Kilogrammes per hour
km	Kilometre
km/h	Kilometres per hour
kPa	KiloPascal
KS	Knock Sensor
<	Less than
l	Litre
lb(s)	Pounds
lbf	Pounds force
lbf.in	Pounds force inches
lbf/in^2	Pounds per square inch
lbf.ft	Pounds force feet
λ	Lambda
lc	Low compression
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEV	Low Emission Vehicle
LH	Left-Hand
LHD	Left-Hand Drive
LSM	Light Switch Module
LVS	Liquid Vapour Separator
m	Metre
µ	Micro
MAF	Mass Air Flow
MAP	Manifold Absolute Pressure
MFU	Multi-Function Unit
MFL	Multi-Function Logic
max.	Maximum
MEMS	Modular Engine Management System
MIG	Metal/Inert Gas
MIL	Malfunction Indicator Lamp
MPa	MegaPascal
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
min.	Minimum
-	Minus (tolerance)
'	Minute (angle)
mm	Millimetre
mph	Miles per hour
MPi	Multi-Point injection
MV	Motorised Valve
MY	Model Year
NAS	North American Specification
(-)	Negative (electrical)
Nm	Newton metre
No.	Number
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NTC	Negative Temperature Coefficient
NRV	Non Return Valve
OBD	On Board Diagnostics
OBM	On Board Monitoring
o.dia.	Outside diameter
OAT	Organic Acid Technology
ORM	Off-road Mode
Ω	Ohm
PAS	Power Assisted Steering
PCB	Printed Circuit Board
PCV	Positive Crankcase Ventilation
PDC	Parking Distance Control
PDOP	Position Dilation Of Precision
PI	Programme Information
PPS	Pulse Per Second
PS	Programme Service
psi	Pounds per square inch
pts.	Pints
%	Percentage
+	Plus (tolerance) or Positive (electrical)
±	Plus or minus (tolerance)
PTC	Positive Temperature Coefficient
PTFE	Polytetrafluorethylene
PWM	Pulse Width Modulation
RDS	Radio Data Service
r	Radius
:	Ratio
ref	Reference
REG	Regionalisation
RES	Rover Engineering Standards
rev/min	Revolutions per minute
RF	Radio Frequency
RGB	Red / Green / Blue
RH	Right-Hand
RHD	Right-Hand Drive
ROM	Read Only Memory
RON	Research Octane Number
ROV	Roll Over Valve
ROW	Rest Of World
SAE	Society of Automotive Engineers
SAI	Secondary Air Injection
"	Second (angle)
SLABS	Self Levelling and Anti-Lock Brake System
SLS	Self Levelling Suspension
SOHC	Single Overhead Camshaft
SPE	Single Point Entry

sp.gr	Specific gravity
SRS	Supplementary Restraint System
std.	Standard
synchro	Synchronizer or synchromesh
TA	Traffic Announcement
TDC	Top Dead Centre
TM	Thermostat Monitoring
TMAP	Temperature, Manifold Absolute Pressure
TMC	Traffic Management Channel
TP	Throttle Position
TPS	Throttle Position Sensor
TV	Torsional Vibration
TWC	Three-way Catalyst
TXV	Thermostatic Expansion Valve
UK	United Kingdom
US	United States
US galls/h	US gallons per hour
V	Volt
Var.	Variable
VDOP	Velocity Dilation Of Precision
VICS	Vehicle Information Communications System
VIN	Vehicle Identification Number
VIS	Variable Intake System
VRS	Variable Reluctance Sensor
VSS	Vehicle Speed Signal
W	Watt
WOT	Wide Open Throttle

General precautions

Dangerous substances
Modern vehicles contain many materials and liquids which if not handled with care can be hazardous to both personal health and the environment.

WARNING: Many liquids and other substances used in motor vehicles are poisonous and should under no circumstances be consumed and should, as far as possible, be kept from contact with the skin. These liquids and substances include acid, anti-freeze, asbestos, brake fluid, fuel, windscreen washer additives, lubricants, refrigerants and various adhesives.

Always read carefully the instructions printed on labels or stamped on components and obey them implicitly. Such instructions are included for reasons of your health and personal safety. Never disregard them.

WARNING: Many of the fluids used in motor vehicles, such as coolant, brake fluid and power steering fluid, are inflammable. Take care not to spill fluids when topping-up, a fire may result. If spillage does occur, ensure the area is thoroughly cleaned before starting the engine.

Synthetic rubber
Many 'O' rings, seals, hoses, flexible pipes and other similar items which appear to be natural rubber, are in fact, made of synthetic materials called Fluoroelastomers.

Under normal operating conditions this material is safe and does not present a health hazard. However, if the material is damaged by fire or excessive heating, it can break down and produce highly corrosive Hydrofluoric acid which can cause serious burns on contact with skin.

If skin contact does occur:
- Remove any contaminated clothing immediately.
- Irrigate effected area of skin with a copious amount of cold water or limewater for 15 to 60 minutes.
- Obtain medical assistance immediately.

Should any material be in a burnt or over-heated condition, handle with extreme caution and wear protective clothing (seamless industrial gloves, protective apron etc.). Decontaminate and dispose of gloves immediately after use.

Lubricating oils
WARNING: Avoid excessive skin contact with used engine oil. Used engine oil contains potentially harmful contaminants which may cause skin cancer or other serious skin disorders.

WARNING: Avoid excessive skin contact with mineral oil. Mineral oils remove the natural fats from the skin, leading to dryness, irritation and dermatitis.

Health protection precautions
The following precautions should be observed at all times:
- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes (particularly those next to the skin) with oil.
- Overalls must be cleaned regularly. Discard heavily soiled clothing and oil impregnated footwear.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams: apply before each work period to help prevent lubricating oil from contaminating the skin.
- Wash with soap and water to ensure all oil is removed (propriety skin cleansers and nail brushes will help).
- Use moisturisers after cleaning; preparations containing lanolin help replace the skin's natural oils which have been removed.
- Do not use petrol, kerosene, diesel fuel, gas, oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practicable, degrease components prior to handling.
- Wear eye protection (e.g. goggles or face shield) if there is a risk of eye contamination. Eye wash facilities should be provided in the close vicinity of the work area.

Environmental Protection Precautions
It is illegal to pour used oil on to the ground, down sewers or drains, or into water courses.

Burning of used engine oil in small space heaters or boilers should only be considered for units of approved design and in compliance with the equipment manufacturer's recommendations. The heating system must meet the regulatory standards of HMIP for small burners of less than 0.4 MW. If in doubt check with the appropriate local authority and/ or manufacturer of the approved appliance.

Dispose of used oil and filters through authorised waste disposal contractors and licensed waste disposal sites, or through the waste oil reclamation trade. If in doubt, contact the Local Authority for advice on disposal facilities.

Safety instructions

Whenever possible, use a lift or pit when working beneath vehicle, in preference to jacking. Chock wheels as well as applying parking brake.

Jacking
Always use the recommended jacking points. The recommended jacking points are shown in the**LIFTING AND TOWING** sub-section of the INFORMATION section.

Always ensure that any lifting apparatus has sufficient load capacity for the weight to be lifted.

Ensure the vehicle is standing on level ground prior to lifting or jacking.

Apply the handbrake and chock the wheels.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Do not leave tools, lifting equipment, spilt oil, etc., around or on the work bench area. Always keep a clean and tidy work area.

Brake shoes and pads
Always fit the correct grade and specification of brake linings. When renewing brake pads and brake shoes always replace as complete axle sets only.

Brake hydraulics
Observe the following recommendations when working on the brake system:

- Always use two spanners when loosening or tightening brake pipe or hose connections.
- Ensure that hoses run in a natural curve and are not kinked or twisted.
- Fit brake pipes securely in their retaining clips and ensure that the pipe run cannot contact a potential chafing point.
- Containers used for hydraulic brake fluid must be kept absolutely clean.
- Do not store hydraulic brake fluid in an unsealed container, it will absorb water and in this condition would be dangerous to use due to a lowering of its boiling point.
- Do not allow hydraulic brake fluid to be contaminated with mineral oil, or put new hydraulic brake fluid in a container which has previously contained mineral oil.
- Do not re-use hydraulic brake fluid previously removed from the system.
- Always use clean brake fluid or a recommended alternative to clean hydraulic components.
- Fit a blanking cap to a hydraulic union and a plug to its socket, immediately after disconnection of pipes and hoses to prevent the ingress of dirt.
- Absolute cleanliness must be observed when working with hydraulic components.
- It is imperative that the correct brake fittings are used and that threads of components are compatible.

Cooling system caps and plugs
Extreme care is necessary when removing engine cooling system expansion tank caps and coolant drain or bleed screws when the engine is hot, and especially if it is overheated.

To avoid the possibility of scalding allow the engine to cool before attempting coolant cap or plug removal.

Environmental Precautions

General
This section provides general information which can help to reduce adverse environmental impacts incurred through the activities carried out in workshops.

Emissions to air
Many of the activities that are carried out in workshops emit gases and fumes which contribute to global warming, depletion of the ozone layer and/or the formation of photo-chemical smog at ground level. By considering and controlling how the workshop activities are carried out, these gases and fumes can be minimised, thus reducing the damage to the environment.

Exhaust fumes
Running car engines is an essential part of workshop activities and exhaust fumes need to be ventilated to atmosphere. However, the amount of time engines are running and the position of the vehicle should be carefully considered at all times, to reduce the release of poisonous gases and minimise the inconvenience to people living nearby.

Solvents
Some of the cleaning agents used are solvent based and will evaporate to atmosphere if used carelessly, or if cans are left unsealed. All solvent containers should be firmly closed when not needed and solvent should be used sparingly. Suitable alternative materials may be available to replace some of the commonly used solvents. Similarly, many paints are solvent based and the spray should be minimised to reduce solvent emissions.

Refrigerant
It is illegal to release any refrigerants into the atmosphere. Discharge and replacement of these materials from air conditioning units should only be carried out using the correct equipment.

Checklist
Always adhere to the following:

Engines –
- don't leave engines running unnecessarily;
- minimise testing times and check where the exhaust fumes are being blown.

Materials –
- keep lids on containers of solvents;
- only use the minimum quantity;
- consider alternative materials;
- minimise over-spray when painting.

Gases –
- use the correct equipment for collecting refrigerants;
- don't burn rubbish on site.

Discharges to water
Most sites will have two systems for discharging water: storm drains and foul drains. Storm drains should only receive clean water, foul drains will take dirty water.

The foul drain will accept many of the normal waste waters such as washing water, detergents and domestic type wastes, but oil, petrol, solvent, acids, hydraulic oil, antifreeze and other such substances should never be poured down the drain. If in any doubt, speak to the local Water Company first.

Every precaution must be taken to prevent spillage of oil, fuel, solvents etc. reaching the drains. All handling of such materials must take place well away from the drains and preferably in an area with a kerb or wall around it, to prevent discharge into the drain. If a spillage occurs, it should be soaked up immediately. Having a spill kit available will make this easier.

Additional precautions
Check whether the surface water drains are connected to an oil/water separator, this could reduce the pollution if an incident was to occur. Oil/water separators require regular maintenance to ensure effectiveness.

Checklist
Always adhere to the following:

Disposal –
- never pour anything down a drain without first checking that it is environmentally safe to do so, and that it does not contravene any local regulations or bye-laws;
- have oil traps emptied regularly.

Spillage prevention –
- store liquids in a walled area;
- make sure the taps on liquid containers are secure and cannot be accidentally turned on;
- protect bulk storage tanks from vandalism by locking the valves;
- transfer liquids from one container to another in an area away from open drains;
- ensure lids are replaced securely on containers;
- have spill kits available near to points of storage and handling of liquids.

Spill kits
Special materials are available to absorb a number of different substances. They can be in granular form, ready to use and bought in convenient containers for storage. Disposal of used spill-absorbing material is dealt with in the 'Waste Management' section.

Land contamination
Oils, fuels and solvents etc. can contaminate any soil that they are allowed to contact. Such materials should never be disposed of by pouring onto soil and every precaution must be taken to prevent spillage reaching soil. Waste materials stored on open ground could also leak, or have polluting substances washed off them that would contaminate the land. Always store these materials in suitable skips or other similarly robust containers.

Checklist
Always adhere to the following:
- don't pour or spill anything onto the soil or bare ground;
- don't store waste materials on bare ground, see 'Spillage prevention' list.

Legal compliance
Some sites may have a discharge consent for effluent discharge to the foul drain for a car wash etc. It is important to know what materials are allowed in the drain and to check the results of any monitoring carried out by the Water Company.

Where paint spraying operations are carried out it may be necessary to apply to the Local Authority for an air emissions licence to operate the plant. If such a licence is in operation, additional precautions will be necessary to comply with the requirements, and the results of any air quality monitoring must be checked regularly.

Checklist
Always adhere to the following:
- know what legal consents and licences apply to the operations;
- check that the emissions and discharges comply with legal requirements.

Local issues
A number of environmental issues will be of particular concern to residents and other neighbours close to the site. The sensitivity of these issues will depend on the proximity of the site and the layout and amount of activity carried on at the site.

Noise is a major concern and therefore consideration should be given to the time spent carrying out noisy activities and the location of those activities that can cause excessive noise.

Car alarm testing, panel beating, hammering and other such noisy activities should, whenever possible, be carried out indoors with doors and windows shut, or as far away from houses as possible.

Running vehicle engines may be an outside activity which could cause nuisance to neighbours because of both noise and smell.

Be sensitive to the time of day when these activities are carried out and minimise the time of the noisy operation, particularly in the early morning and late evening.

Another local concern will be the smell from the various materials used. Using less solvent, paint and petrol could help prevent this annoyance.

Local residents and other business users will also be concerned about traffic congestion, noise and exhaust fumes, be sensitive to these concerns and try to minimise inconvenience from deliveries, customers and servicing operations.

Checklist
Always adhere to the following:
- identify where the neighbours who are likely to be affected are situated;
- minimise noise, smells and traffic nuisance;
- prevent litter by putting waste in the correct containers;
- have waste skips emptied regularly.

Use of resource
Another environmental concern is the waste of materials and energy that can occur in day to day activities.

Electricity for heating, lighting and compressed air uses resources and releases pollution during its generation.

Fuel used for heating, running cars or vans and mobile plant is another limited resource which consumes large amounts of energy during its extraction and refining processes.

Water has to be cleaned, piped to site and disposed of, all of which creates more potential pollution;

Oil, spares, paint etc., have all produced pollution in the process of manufacture and they become a waste disposal problem if discarded.

Checklist
Always adhere to the following:

Electricity and heating –
- keep doors and windows closed in the winter;
- switch off machinery or lights when not needed;
- use energy efficient heating systems;
- switch off computers and photocopiers when not needed.

Fuel –
- don't run engines unnecessarily;
- think about whether journeys are necessary and drive to conserve fuel.

Water –
- don't leave taps and hose pipes running;
- mend leaks quickly, don't be wasteful.

Compressed air –
- don't leave valves open;
- mend leaks quickly;
- don't leave the compressor running when not needed.

Use of environmentally damaging materials –
- check whether a less toxic material is available.

Handling and storage of materials –
- have the correct facilities available for handling liquids to prevent spillage and wastage as listed above;
- provide suitable locations for storage to prevent frost damage or other deterioration.

Waste Management
One of the major ways that pollution can be reduced is by the careful handling, storage and disposal of all waste materials that occur on sites. Legislation makes it illegal to dispose of waste materials other than to licensed waste carriers and disposal sites. This means that it is necessary to not only know what the waste materials are, but also to have the necessary documentation and licenses.

Handling and storage of waste
Ensure that waste materials are not poured down the drain or onto soils. They should be stored in such a way as to prevent the escape of material to land, water or air.

They must also be segregated into different types of waste e.g. oil, metals, batteries, used vehicle components. This will prevent any reaction between different materials and assist in disposal.

Disposal of waste

Disposal of waste materials must only be to waste carriers who are licensed to carry those particular waste materials and all the necessary documentation must be completed. The waste carrier is responsible for ensuring that the waste is taken to the correct disposal sites.

Dispose of waste in accordance with the following guidelines:

- **Fuel, hydraulic fluid, anti-freeze and oil –** keep separate and dispose of to specialist contractor.
- **Refrigerant –** collect using specialist equipment and containers, and reuse.
- **Detergents –** safe to pour down the foul drain if diluted.
- **Paint, thinners –** keep separate and dispose of to specialist contractor.
- **Components –** send back to supplier for refurbishment, or disassemble and reuse any suitable parts. Dispose of the remainder in ordinary waste.
- **Small parts –** reuse any suitable parts, dispose of the remainder in ordinary waste.
- **Metals –** can be sold if kept separate from general waste.
- **Tyres –** keep separate and dispose of to specialist contractor.
- **Packaging –** compact as much as possible and dispose of in ordinary waste.
- **Asbestos-containing –** keep separate and dispose of to specialist contractor.
- **Oily and fuel wastes (e.g. rags, used spill kit material) –** keep separate and dispose of to specialist contractor.
- **Air filters –** keep separate and dispose of to specialist contractor.
- **Rubber/plastics –** dispose of in ordinary waste.
- **Hoses –** dispose of in ordinary waste.
- **Batteries –** keep separate and dispose of to specialist contractor.
- **Airbags (explosives) –** keep separate and dispose of to specialist contractor.
- **Electrical components –** send back to supplier for refurbishment, or disassemble and reuse any suitable parts. Dispose of the remainder in ordinary waste.
- **Electronic components –** send back to supplier for refurbishment, or disassemble and reuse any suitable parts. Dispose of the remainder in ordinary waste.
- **Catalysts –** can be sold if kept separate from general waste.
- **Used spill-absorbing material –** keep separate and dispose of to specialist contractor.
- **Office waste –** recycle paper and toner/ink cartridges, dispose of the remainder in ordinary waste.

General fitting instructions

Precautions against damage
To avoid damage to the vehicle when carrying out repairs, always adhere to the following:

- Always fit wing and seat covers before commencing work. Avoid spilling brake fluid or battery acid on paintwork; immediately wash off with water if this occurs.
- Disconnect the battery earth lead before starting work, see **ELECTRICAL PRECAUTIONS.**
- Always use the recommended service tool or a satisfactory equivalent where specified.
- Protect exposed bearing surfaces, sealing surfaces and screw threads from damage.

Component removal
Whenever possible, clean components and surrounding area before removal.

- Blank off openings exposed by component removal.
- Immediately seal fuel, oil or hydraulic lines when apertures are exposed; use plastic caps or plugs to prevent loss of fluid and ingress of dirt.
- Close open ends of oilways exposed by component removal with tapered hardwood plugs or conspicuous plastic plugs.
- Immediately a component is removed, place it in a suitable container; use a separate container for each component and its associated parts.
- Clean bench and provide marking materials, labels, containers and locking wire before dismantling a component.

Dismantling
Observe scrupulous cleanliness when dismantling components, particularly when brake, fuel or hydraulic system parts are being worked on. A particle of dirt or a cloth fragment could cause a serious malfunction if trapped in these systems.

Use the following procedures:

- Blow out all tapped holes, crevices, oilways and fluid passages with an air line. Ensure that any O-rings used for sealing are correctly replaced or renewed if disturbed during the process.
- Use marking ink to identify mating parts and ensure correct reassembly. Do not use a centre punch or scriber to mark parts, they could initiate cracks or distortion in marked components.
- Wire together mating parts where necessary to prevent accidental interchange (e.g. roller bearing components).
- Wire labels on to all parts which are to be renewed, and to parts requiring further inspection before being passed for reassembly; place these parts in separate containers from those containing parts for rebuild.
- Do not discard a part due for renewal until after comparing it with a new part to ensure that its correct replacement has been obtained.

Cleaning components
Always use the recommended cleaning agent or equivalent. Ensure that adequate ventilation is provided when volatile degreasing agents are being used. Do not use degreasing equipment for components containing items which could be damaged by the use of this process.

When washing under bonnet, never direct water onto ECM, as water ingress may occur resulting in damage to electrical components inside.

General Inspection
All components should be inspected for wear or damage before being reassembled.

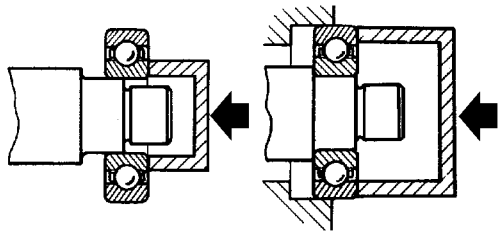
- Never inspect a component for wear or dimensional check unless it is absolutely clean; a slight smear of grease can conceal an incipient failure.
- When a component is to be checked dimensionally against recommended values, use the appropriate measuring equipment (surface plates, micrometers, dial gauges etc.). Ensure the measuring equipment is calibrated and in good serviceable condition.
- Reject a component if its dimensions are outside the specified tolerances, or if it appears to be damaged.
- A part may be refitted if its critical dimension is exactly to its tolerance limit and it appears to be in satisfactory condition.
- Use 'Plastigauge' 12 Type PG-1 for checking bearing surface clearances.

Ball and roller bearings

General

When removing and installing bearings, ensure that the following practices are observed to ensure component serviceability:

- Remove all traces of lubricant from the bearing under inspection by cleaning with a suitable degreasant; maintain absolute cleanliness throughout operations.
- Conduct a visual inspection for markings on rolling elements, raceways, outer surface of outer rings or inner surface of inner rings. Reject any bearings found to be marked, since marking in these areas indicates onset of wear.
- Hold inner race of bearing between finger and thumb of one hand and spin outer race to check that it revolves absolutely smoothly. Repeat, holding outer race and spinning inner race.
- Rotate outer ring gently with a reciprocating motion, while holding inner ring; feel for any check or obstruction to rotation. Reject bearing if action is not perfectly smooth.
- Lubricate bearing with generous amounts of lubricant appropriate to installation.
- Inspect shaft and bearing housing for discoloration or other markings which indicate movement between bearing and seatings.
- Ensure that shaft and housing are clean and free from burrs before fitting bearing.
- If one bearing of a pair shows an imperfection, it is advisable to replace both with new bearings; an exception could be if the faulty bearing had covered a low mileage, and it can be established that damage is confined to only one bearing.
- Never refit a ball or roller bearing without first ensuring that it is in a fully serviceable condition.
- When hub bearings are removed or displaced, NEW bearings must be fitted; do not attempt to refit the old hub bearings.



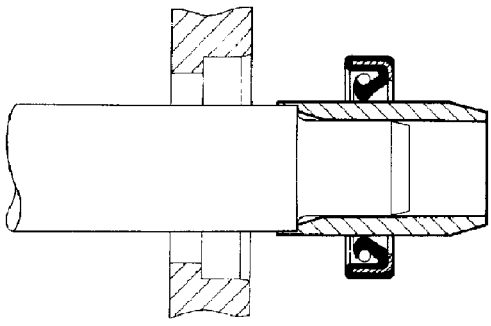
M01 0176

- When fitting a bearing to a shaft, only apply force to the inner ring of the bearing. When fitting a bearing into a housing, only apply force to the outer ring of the bearing.
- In the case of grease lubricated bearings (e.g. hub bearings) fill the space between bearing and outer seal with the recommended grade of grease before fitting seal.
- Always mark components of separable bearings (e.g. taper roller bearings) when dismantling, to ensure correct reassembly. Never fit new rollers in a used outer ring; always fit a complete new bearing assembly.

Oil seals

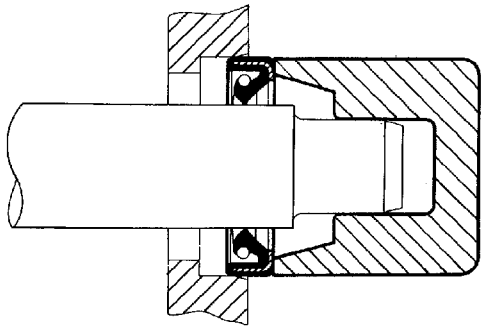
General
Always renew oil seals which have been removed from their working location (whether as an individual component or as part of an assembly). NEVER use a seal which has been improperly stored or handled, such as hung on a hook or nail.

- Carefully examine seal before fitting to ensure that it is clean and undamaged.
- Ensure the surface on which the new seal is to run is free of burrs or scratches. Renew the component if the original sealing surface cannot be completely restored.
- Protect the seal from any surface which it has to pass when being fitted. Use a protective sleeve or tape to cover the relevant surface.
- Certain oil seals are coated with a protective wax and must be fitted dry unless stated otherwise. Where an oil seal needs to be lubricated prior to fitment, lubricate the sealing lips with a recommended lubricant before use to prevent damage during initial use. On dual lipped seals, smear the area between the lips with grease.
- If a seal spring is provided, ensure that it is fitted correctly.
- Place lip of seal towards fluid to be sealed and slide into position on shaft. Use fitting sleeve where possible to protect sealing lip from damage by sharp corners, threads or splines. If a fitting sleeve is not available, use plastic tube or tape to prevent damage to the sealing lip.



M01 0177

- Grease outside diameter of seal, place square to housing recess and press into position using great care, and if possible a 'bell piece' to ensure that seal is not tilted. Never let weight of unsupported shaft rest in seal.



M01 0178

- Use the recommended service tool to fit an oil seal. If the correct service tool is not available, use a suitable tube approximately 0.4 mm (0.015 in.) smaller than the outside diameter of the seal. Use a hammer **VERY GENTLY** on drift if a suitable press is not available.
- Press or drift the seal in to the depth of its housing with the sealing lip facing the lubricant to be retained if the housing is shouldered, or flush with the face of the housing where no shoulder is provided. Ensure that the seal does not enter the housing in a tilted position.

Joints and joint faces

General
Fit joints dry unless specified otherwise.

- Always use the correct gaskets as specified.
- When joining compound is used, apply in a thin uniform film to metal surfaces; take care to prevent joining compound from entering oilways, pipes or blind tapped holes.
- If gaskets and/or joining compound is recommended for use; remove all traces of old joining material prior to reassembly. Do not use a tool which will damage the joint faces and smooth out any scratches or burrs using an oil stone. Do not allow dirt or joining material to enter any tapped holes or enclosed parts.
- Prior to reassembly, blow through any pipes, channels or crevices with compressed air.

Locking devices

General
Always replace locking devices with one of the same design.

Tab Washers
Always release locking tabs and fit new locking washers, do not re-use locking tabs. Ensure the new tab washer is the same design as that replaced.

Locking Nuts
Always use a backing spanner when loosening or tightening locking nuts, brake and fuel pipe unions.

Roll Pins
Always fit new roll pins of an interference fit in the hole.

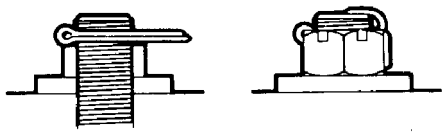
Circlips
Always fit new circlips of the correct size for the groove.

Locking wire
Always fit locking wire of the correct type. Arrange wire so that its tension tends to tighten the bolt heads or nuts to which it is fitted.

Keys and Keyways
Remove burrs from edges of keyways with a fine file and clean thoroughly before attempting to refit key.

Clean and inspect key closely; keys are suitable for refitting only if indistinguishable from new, as any indentation may indicate the onset of wear.

Split pins



M01 0179

Always fit new split-pins of the correct size for the hole in the bolt or stud.

Screw threads

General
Metric threads to ISO standards are used.

Damaged nuts, bolts and screws must always be discarded. Cleaning damaged threads with a die or tap impairs the strength and closeness of fit of the threads and is not recommended.

Always ensure that replacement bolts are at least equal in strength to those replaced.

Castellated nuts must not be slackened to accept a split-pin, except in recommended cases when this forms part of an adjustment.

Do not allow oil or grease to enter blind threaded holes. The hydraulic action on screwing in the bolt or stud could split the housing.

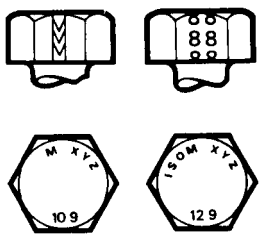
Always tighten a nut or bolt to the recommended torque figure. Damaged or corroded threads can affect the torque reading.

To check or re-tighten a bolt or screw to a specified torque figure, first loosen a quarter of a turn, then retighten to the correct torque figure.

Oil thread lightly before tightening to ensure a free running thread, except in the case of threads treated with sealant/lubricant, and self-locking nuts.

Bolt identification

Bolt identification

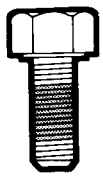


M01 0180

An ISO metric bolt or screw made of steel and larger than 6 mm in diameter can be identified by either the symbols ISO M or M embossed or indented on top of the bolt head.

In addition to marks identifying the manufacturer, the top of the bolt head is also marked with symbols indicating the strength grade, e.g. 8.8; 10.9; 12.9; 14.9. As an alternative, some bolts and screws have the M and strength grade symbol stamped on the flats of the hexagon.

Encapsulated bolts and screws



M01 0181

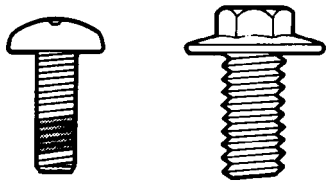
Encapsulated bolts and screws have a micro-encapsulated locking agent pre-applied to the thread. They are identified by a coloured section which extends 360° around the thread. The locking agent is released and activated by the assembly process and is then chemically cured to provide the locking action.

Unless a specific repair procedure states otherwise, encapsulated bolts may be re-used providing the threads are undamaged and the following procedure is adopted:

- Remove loose adhesive from the bolt and housing threads.
- Ensure threads are clean and free of oil and grease.
- Apply an approved locking agent.

An encapsulated bolt may be replaced with a bolt of equivalent specification provided it is treated with an approved locking agent.

Self-locking bolts and screws



M01 0182

Self-locking bolts and screws, i.e. nylon patched or trilobular thread can be re-used providing resistance can be felt when the locking portion enters the female thread.

Nylon patched bolts and screws have a locking agent pre-applied to the threads. They are identified by the presence of a coloured section of thread which extends for up to 180° around the thread.

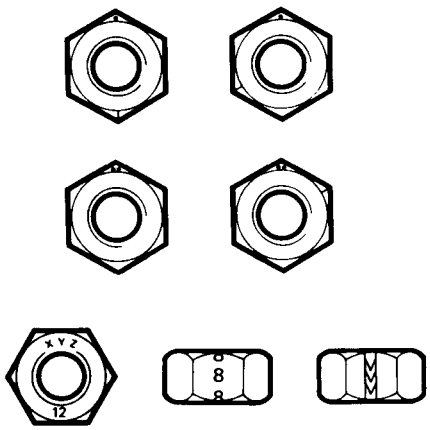
Trilobular bolts (i.e. Powerlok) have a special thread form which creates a slight interference in the tapped hole or threads of the nut into which it is screwed.

DO NOT re-use self-locking fasteners in critical locations (e.g. engine bearings, flywheel). Always use the correct replacement self-locking nut, bolt or screw.

DO NOT fit non self-locking fasteners in applications where a self-locking nut, bolt or screw is specified.

Nut identification

Nut identification



M01 0183

A nut with an ISO metric thread is marked on one face or on one of the flats of the hexagon with the strength grade symbol 8, 12, or 14. Some nuts with a strength grade 4, 5 or 6 are also marked and some have the metric symbol M on the flat opposite the strength grade marking.

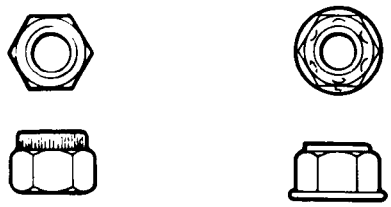
A clock face system is sometimes used as an alternative method of indicating the strength grade. The external chamfers or a face of the nut is marked in a position relative to the appropriate hour mark on a clock face to indicate the strength grade.

A dot is used to locate the 12 o'clock position and a dash to indicate the strength grade. If the grade is above 12, two dots identify the 12 o'clock position.

When tightening a slotted or castellated nut, never loosen it to insert a split pin except where recommended as part of an adjustment. If difficulty is experienced, alternative washers or nuts should be selected, or the washer thickness reduced.

Where bearing pre-load is involved, nuts should be tightened in accordance with special instructions.

Self-locking nuts



M01 0184

Self-locking nuts, i.e. nylon insert or deferred thread nuts can be re-used providing resistance can be felt when the locking portion of the nut passes over the thread of the bolt or stud.

DO NOT apply heat in an attempt to free deferred thread nuts or fittings; as well as causing damage to protective coatings, there is a risk of damage to electronic equipment and brake linings from stray heat.

Where self-locking nuts have been removed, it is advisable to replace them with new ones of the same type.

Where bearing pre-load is involved, nuts should be tightened in accordance with special instructions.

Flexible pipes and hoses

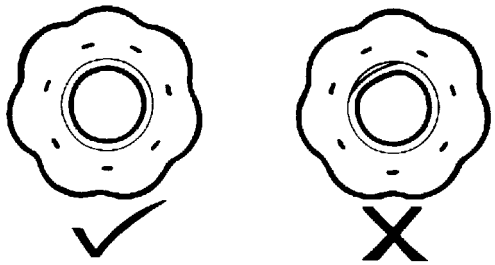
General

When removing and installing flexible hydraulic pipes and hoses, ensure that the following practices are observed to ensure component serviceability:

- Before removing any brake or power steering hose, clean end fittings and area surrounding them as thoroughly as possible.
- Obtain appropriate plugs or caps before detaching hose end fittings, so that the ports can be immediately covered to prevent the ingress of dirt.
- Clean hose externally and blow through with airline. Examine carefully for cracks, separation of plies, security of end fittings and external damage. Reject any faulty hoses.
- When refitting a hose, ensure that no unnecessary bends are introduced, and that hose is not twisted before or during tightening of union nuts.
- Fit a cap to seal a hydraulic union and a plug to its socket after removal to prevent ingress of dirt.
- Absolute cleanliness must be observed with hydraulic components at all times.
- After any work on hydraulic systems, carefully inspect for leaks underneath the vehicle while a second operator applies maximum brake pressure to the brakes (engine running) and operates the steering.

Do not disconnect any pipes in an air conditioning refrigeration system unless trained and instructed to do so. A refrigerant is used which can cause blindness if allowed to contact eyes.

Fuel System Hoses



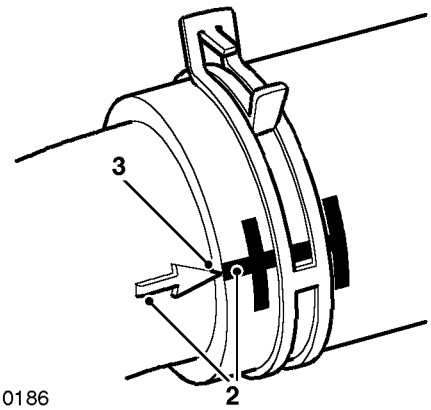
M01 0185

All fuel hoses are made up of two laminations, an armoured rubber outer sleeve and an inner viton core. If any of the fuel system hoses have been disconnected, it is imperative that the internal bore is inspected to ensure that the viton lining has not become separated from the armoured outer sleeve. A new hose must be fitted if separation is evident.

Cooling system hoses

The following precautions MUST be followed to ensure that integrity of cooling hoses and their connections to system components are maintained.

Hose orientation and connection



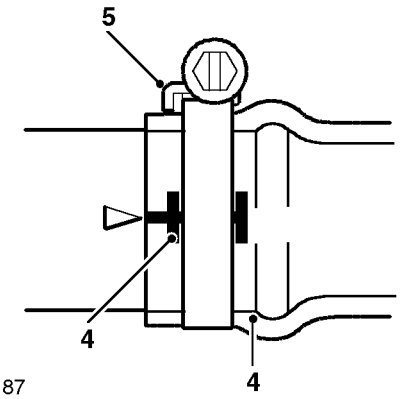
M01 0186

Correct orientation of cooling hoses is important in ensuring that the hose does not become fatigued or damaged through contact with adjacent components.

Where 'timing' marks (2) are provided on the hose and corresponding connection, these must be used to ensure correct orientation.

Hoses must be pushed fully onto their connection points. Usually, a moulded form (3) on the stub pipe provides a positive indicator.

Hose clips



M01 0187

Markings (4) are usually provided on the hose to indicate the correct clip position. If no markings are provided, position the clip directly behind the retaining lip at the end of the stub as shown.

Worm drive clips should be oriented with the crimped side of the drive housing (5) facing towards the end of the hose, or the hose may become pinched between the clip and the stub pipe retaining lip.

Worm drive clips should be tightened to 3 Nm (2 lbf.ft) unless otherwise stated.

Ensure that hose clips do not foul adjacent components.

Heat protection

Always ensure that heatshields and protective sheathing are in good condition. Replace if damage is evident.

Particular care must be taken when routing hoses close to hot engine components, such as the exhaust manifold and the Exhaust Gas Recirculation (EGR) pipe.

Hoses will relax and deflect slightly when hot; ensure this movement is taken into account when routing and securing hoses.

Service tools

General
Special service tools have been developed to facilitate removal, dismantling and assembly of mechanical components in a cost effective and time efficient manner. The use of such special tools also helps prevent the potential for damage to components.

Some operations described in this Manual cannot be carried out properly without the aid of the relevant service tools.

Special service tools can be obtained from the following suppliers:

Cartool (UK) Limited
Unit 3, Sterling Business Park
Salthouse Road
Brackmills
Northampton
NN4 7EX
England
☎ +44 (0) 1604 760099
📠 +44 (0) 1604 760017
e-mail: sales@cartooluk.co.uk

Cartool GmbH
Straussenlettenstrasse 15
85053 Ingolstadt

Germany
☎ +49 (0)841 9650080
📠 +49 (0)841 9650090
e-mail: i.amann@cartool.de

Rolling road testing

General
IMPORTANT: Use a four wheel rolling road for brake testing if possible.

The front and rear wheels cannot be driven independently due to the viscous coupling. This eliminates the need for differential lock by progressively applying more torque to the rear wheels if the front wheels start to slip.

DO NOT attempt to drive individual wheels with vehicle supported on floor jacks or stands.

Four wheel rolling road
Provided that front and rear rollers are rotating at identical speeds and that normal workshop safety standards are applied, there is no speed restriction during testing, except any that may apply to the tyres.

Before testing a vehicle with anti-lock brakes on a four wheel rolling road, disconnect the ABS modulator. The ABS function will not work, the ABS warning light will illuminate. Normal braking will be available.

Two wheel rolling road
ABS will not function on a two wheel rolling road. The ABS light will illuminate during testing. Normal braking will be available.

If brake testing on a two wheel rolling road is necessary, the following precautions should be taken:

- propeller shaft to the rear axle is removed/ disconnected;
- neutral selected in gearbox;
- hill descent control not selected.

When checking brakes, run engine at idle speed to maintain servo vacuum.

Fuel handling precautions

Fuel vapour is highly inflammable and in confined spaces is also explosive and toxic. The vapour is heavier than air and will always fall to the lowest level. The vapour can easily be distributed throughout a workshop by air currents; consequently, even a small spillage of fuel is potentially very dangerous.

The following information provides basic precautions which must be observed if petrol (gasoline) is to be handled safely. It also outlines other areas of risk which must not be ignored. This information is issued for basic guidance only, if in doubt consult your local Fire Officer.

General
Always have a fire extinguisher containing FOAM, CO_2, GAS or POWDER close at hand when handling or draining fuel or when dismantling fuel systems. Fire extinguishers should also be located in areas where fuel containers are stored.

Always disconnect the vehicle battery before carrying out dismantling or draining work on a fuel system.

Whenever fuel is being handled, drained or stored, or when fuel systems are being dismantled, all forms of ignition must be extinguished or removed; any leadlamps must be flameproof and kept clear of spillage.

WARNING: No one should be permitted to repair components associated with fuel without first having specialist training.

WARNING: Do not remove fuel system components while the vehicle is over a pit.

Fuel tank draining
Fuel tank draining should be carried out in accordance with the procedure outlined in the **FUEL DELIVERY** section of this manual and observing the following precautions:

WARNING: Fuel must not be extracted or drained from any vehicle while it is over a pit. Extraction or draining of fuel must be carried out in a well ventilated area.

The capacity of containers must be more than adequate for the amount of fuel to be extracted or drained. The container should be clearly marked with its contents and placed in a safe storage area which meets the requirements of local authority regulations.

WARNING: When fuel has been drained from a fuel tank the precautions governing naked lights and ignition sources should be maintained.

Fuel tank removal
When the fuel line is secured to the fuel tank outlet by a spring steel clip, the clip must be released before the fuel line is disconnected or the fuel tank is removed. This procedure will avoid the possibility of residual petrol fumes in the fuel tank being ignited when the clip is released.

As an added precaution, fuel tanks should have a 'FUEL VAPOUR' warning label attached to them as soon as they are removed from the vehicle.

Fuel tank repairs
No attempt should be made to repair a plastic fuel tank. If the structure of the tank is damaged, a new tank must be fitted.

Body repairs
Plastic fuel pipes are particularly susceptible to heat, even at relatively low temperature, and can be melted by heat conducted from some distance away.

When body repairs involve the use of heat, all fuel pipes which run in the vicinity of the repair area must be removed, and the tank outlet plugged.

Electrical precautions

General
The following guidelines are intended to ensure the safety of the operator and ensure the prevention of damage to the electrical and electronic components fitted to the vehicle. Where necessary, specific precautions are detailed in the individual procedures of this manual.

Equipment
Prior to commencing any test procedure on the vehicle, ensure that the relevant test equipment is working correctly and any harness or connectors are in good condition. It is particularly important to check the condition of the lead and plugs of mains operated equipment.

Polarity
Never reverse connect the vehicle battery and always ensure the correct polarity when connecting test equipment.

High Voltage Circuits
Whenever disconnecting live ht circuits, always use insulated pliers and never allow the open end of the ht lead to contact other components, particularly ECU's.

Exercise caution when measuring the voltage on the coil terminals while the engine is running, high voltage spikes can occur on these terminals.

Connectors and harnesses
The engine compartment of a vehicle is a particularly hostile environment for electrical components and connectors:

- Always ensure electrically related items are dry and oil free before disconnecting and connecting test equipment.
- Ensure disconnected multiplugs and sensors are protected from being contaminated with oil, coolant or other solutions. Contamination could impair performance or result in catastrophic failure.
- Never force connectors apart using tools to prise apart or by pulling on the wiring harness.
- Always ensure locking tabs are disengaged before disconnection, and match orientation to enable correct reconnection.
- Ensure that any protection (covers, insulation etc.) is replaced if disturbed.

Having confirmed a component to be faulty:

- Switch off the ignition and disconnect the battery.
- Remove the component and support the disconnected harness.
- When replacing the component, keep oily hands away from electrical connection areas and push connectors home until any locking tabs fully engage.

Battery disconnection
Before disconnecting the battery, disable the alarm system and switch off all electrical equipment. If the radio is to be serviced, ensure the security code has been deactivated.

CAUTION: To prevent damage to electrical components, always disconnect the battery when working on the vehicle's electrical system. The ground lead must be disconnected first and reconnected last.

CAUTION: Always ensure that battery leads are routed correctly and are not close to any potential chafing points.

Battery charging
Only recharge the battery with it removed from the vehicle. Always ensure any battery charging area is well ventilated and that every precaution is taken to avoid naked flames and sparks.

Ignition system safety precautions
The vehicle's ignition system produces high voltages and the following precautions should be observed before carrying out any work on the system:

WARNING: Before commencing work on an ignition system, ensure all high tension terminals, adapters and diagnostic equipment are adequately insulated and shielded to prevent accidental personal contacts and minimise the risk of shock. Wearers of surgically implanted pacemaker devices should not be in close proximity of ignition circuits or diagnostic equipment.

Disciplines
Switch off the ignition prior to making any connection or disconnection in the system, to prevent electrical surges caused by disconnecting 'live' connections damaging electronic components.

Ensure hands and work surfaces are clean and free of grease, swarf, etc. Grease collects dirt which can cause electrical tracking (short-circuits) or high-resistance contacts.

When handling printed circuit boards, treat with care and hold by the edges only; note that some electronic components are susceptible to body static.

Connectors should never be subjected to forced removal or refit, especially inter-board connectors. Damaged contacts can cause short-circuit and open-circuit fault conditions.

Prior to commencing test, and periodically during a test, touch a good vehicle body earth to discharge static charge. Some electronic components are vulnerable to the static electricity that may be generated by the operator.

Grease for electrical connectors
Some under bonnet and under body connectors may be protected against corrosion by the application of a special grease during vehicle production. Should connectors be disturbed in service, or repaired or replaced, additional grease should be re-applied: Part No. BAU 5811, available in 150 gm tubs.

NOTE: The use of greases other than BAU 5811 must be avoided as they can migrate into relays, switches etc. contaminating the contacts and leading to intermittent operation or failure.

Supplementary restraint system precautions

General
The Supplementary Restraint System (SRS) provides active protection for vehicle occupants in the event of a serious collision. The system components include airbags and pre-tensioner seatbelts which are automatically deployed when a severe frontal crash condition is detected.

The SRS pyrotechnic components could be potentially hazardous to the service engineer if not handled correctly. The following guidelines are intended to alert the service engineer to potential sources of danger and emphasise the importance of ensuring the integrity of SRS components fitted to the vehicle.

In order to assure system integrity, it is essential that the SRS system is regularly checked and maintained so that it is ready for operation in the event of an accident.

Where necessary, additional specific precautions are detailed in the relevant sections of this Manual which should be referred to prior to commencing repair operations.

WARNING: Always follow the 'SRS Precautions' and the correct procedures for working on SRS components. Persons working on SRS systems must be fully trained and have been issued with copies of the Safety guidelines.

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: The airbag module contains sodium azide which is poisonous and extremely flammable. Contact with water, acid or heavy metals may produce harmful or explosive compounds. Do not dismantle, incinerate or bring into contact with electricity, before the unit has been deployed.

WARNING: Always replace a seat belt assembly that has withstood the strain of a severe vehicle impact, or if the webbing shows signs of fraying.

WARNING: Always disconnect the vehicle battery before carrying out any electric welding on a vehicle fitted with an SRS system.

CAUTION: Do not expose an airbag module or seat belt pre-tensioner to heat exceeding 85° C (185° F).

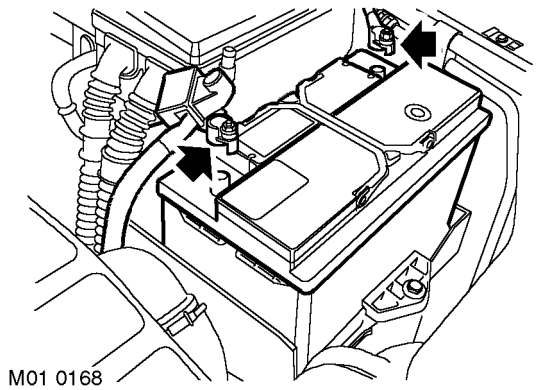
It should be noted that these precautions are not restricted to operations performed when servicing the SRS system, the same care should be exercised when working on ancillary systems and components located in the vicinity of SRS components; these include but are not limited to:

- **Steering system –** steering wheel airbag, rotary coupler.
- **Front fascia –** passenger front airbag (where fitted); SRS DCU behind centre console, on transmission tunnel under the HeVAC system.
- **Front seats –** seat belt pre-tensioners, integral with seat belt buckle assembly.
- **Electrical system –** SRS harnesses, link leads and connectors.

Making the SRS system safe

Before working on or in the vicinity of SRS components, ensure the system is rendered safe by performing the following procedures:

- Remove the ignition key from the ignition switch.



- Disconnect both battery leads, earth lead first.
- Wait 10 minutes for the SRS DCU back-up power circuit to discharge.

The SRS system uses energy reserve capacitors that keep the system active in the event of electrical supply failure under crash conditions. It is necessary to allow the capacitor sufficient time to discharge (10 minutes) in order to avoid the risk of accidental deployment.

WARNING: Always disconnect both battery leads before beginning work on the SRS system. Disconnect the negative battery lead first. Never reverse connect the battery.

Installation

In order to assure system integrity, it is essential that the SRS system is regularly checked and maintained so that it is ready for effective operation in the event of a collision. Carefully inspect SRS components before installation. Do not install a part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.

WARNING: The integrity of SRS system components is critical for safety reasons. Ensure the following precautions are always adhered to:

- ***Never install used SRS components from another vehicle or attempt to repair an SRS component.***
- ***When repairing an SRS system only use genuine new parts.***
- ***Never apply electrical power to an SRS component unless instructed to do so as part of an approved test procedure.***
- ***Special Torx bolts are necessary for installing the airbag module — do not use other bolts. Ensure bolts are tightened to the correct torque.***
- ***Always use new fixings when replacing an SRS component.***
- ***Ensure the SRS Diagnostic Control Unit (DCU) is always installed correctly. There must not be any gap between the DCU and the bracket to which it is mounted. An incorrectly mounted DCU could cause the system to malfunction.***

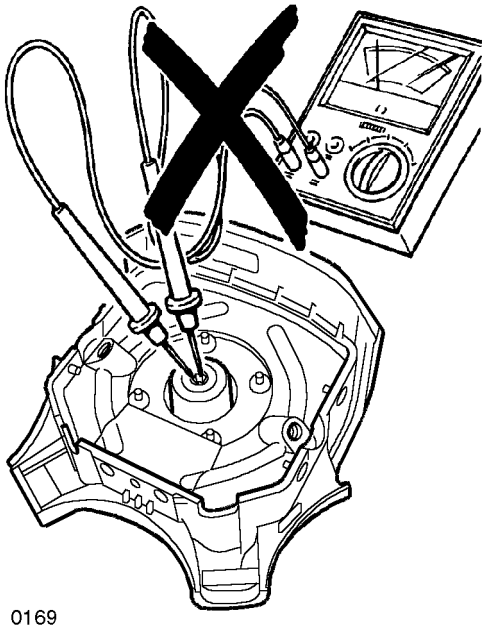
CAUTION: Ensure SRS components are not contaminated with oil, grease, detergent or water.

Ensure that SRS component fixings are correctly positioned and torqued during service and repair.

CAUTION: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

If you suspect an airbag assembly could be defective, install a new unit and dispose of the old unit. Manually deploy the old unit before disposal.

SRS component testing



M01 0169

The SRS components are triggered using relatively low operating currents, always adhere to the following precautions:

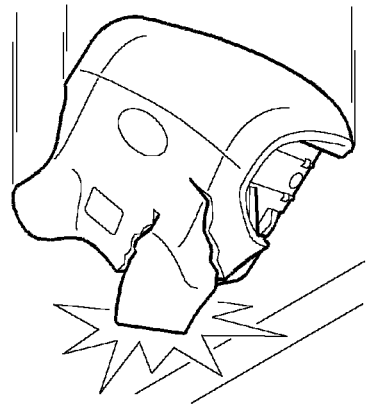
WARNING: Do not use a multimeter or other general purpose test equipment on SRS system components or accidental deployment may occur. Use only Testbook to diagnose system faults.

WARNING: Do not use electrical test equipment on the SRS harness while it is connected to any of the SRS system components. It may cause accidental deployment and personal injury.

Never apply electrical power to an SRS component unless instructed to do so as part of an approved test procedure.

The SRS Diagnostic Control Unit is a non-serviceable component and no attempt should be made to repair or modify the unit.

Component handling



M01 0170

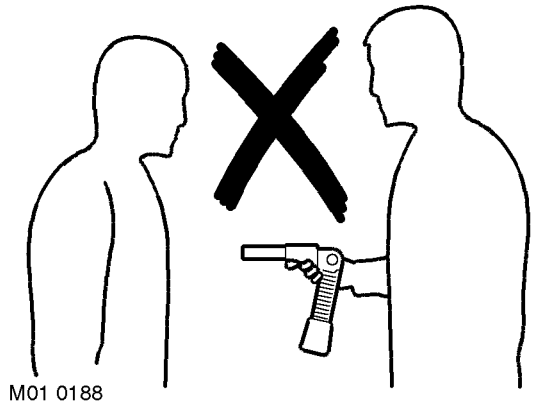
The SRS components are sensitive and potentially hazardous if not handled correctly; always comply with the following handling precautions:

WARNING: The SRS components are sensitive and potentially hazardous if not handled correctly; always comply with the following handling precautions:

- ***Never drop an SRS component. The airbag diagnostic control unit is a particularly shock sensitive device and must be handled with extreme care. Airbag modules and seat belt pre-tensioner units could deploy if subjected to a strong shock.***
- ***Never wrap your arms around an airbag module. If an airbag module has to be carried, hold it by the cover, with the cover uppermost and the base away from your body.***
- ***Never transport airbag modules or seat belt pre-tensioners in the cabin of a vehicle. Always use the luggage compartment of the vehicle for carrying airbag modules and seat belt pre-tensioner units.***

WARNING: Never attach anything to an airbag cover or any trim component covering an airbag module. Do not allow anything to rest on top of an airbag module.

WARNING: Always keep components cool, dry and free from contamination.

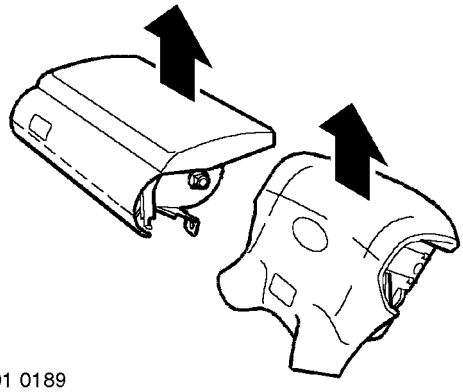


M01 0188

WARNING: For front seat buckle type pre-tensioners, hold by the piston tube, with the open end of the piston tube pointing towards the ground and the buckle facing away from your body. Do not cover the end of the piston tube. DO NOT hold buckle pre-tensioners by the bracket assembly or steel cable. NEVER point the piston tube towards your body or other people.

CAUTION: Do not apply grease or cleaning solvents to seatbelt pre-tensioner units, component failure could result.

Storage



M01 0189

There are regulations for the safe storage of SRS components which must be observed, consult your local authority for details.

WARNING: Airbag modules and seat belt pre-tensioners are classed as explosive devices. For overnight and longer term storage, they must be stored in a secure steel cabinet which has been approved as suitable for the purpose and has been registered by the local authority.

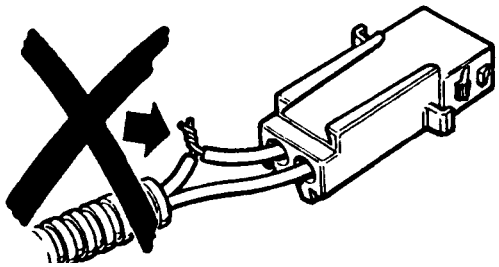
WARNING: Store the airbag module with the deployment side uppermost. If it is stored deployment side down, accidental deployment will propel the airbag module with enough force to cause serious injury.

CAUTION: Improper handling or storage can internally damage the airbag module, making it inoperative. If you suspect the airbag module has been damaged, install a new module and refer to the Deployment/Disposal Procedures for disposal of the damaged module.

Always observe the following precautions when temporarily storing an airbag module:

- Ensure the cover is facing upwards and the luggage compartment is secured.
- Always keep components cool, dry and free from contamination.
- Do not allow anything to rest on the airbag module.
- Store any removed airbag assembly on a secure flat surface away from electrical equipment and heat sources (exceeding 85° C (185° F).

SRS Harnesses and Connectors

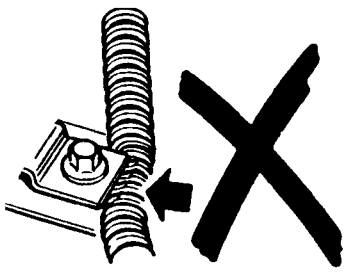


M01 0190

CAUTION: Always observe the following precautions with regards to SRS system electrical wiring:

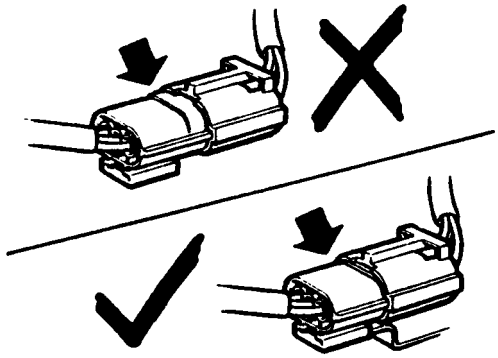
- **Never attempt to modify, splice or repair SRS wiring.**
- **Never install electronic equipment (such as a mobile telephone, two-way radio or in-car entertainment system) in such a way that it could generate electrical interference in the airbag harness. Seek specialist advice when installing such equipment.**

NOTE: SRS system wiring can be identified by a special yellow outer sleeve protecting the wires (black with yellow stripe protective coverings are sometimes used).



M01 0191

WARNING: Always ensure SRS wiring is routed correctly. Be careful to avoid trapping or pinching the SRS wiring. Do not leave the connectors hanging loose or allow SRS components to hang from their harnesses. Look for possible points of chafing.



M01 0192

CAUTION: Ensure all SRS harness connectors are mated correctly and securely fastened. Do not leave the connectors hanging loose.

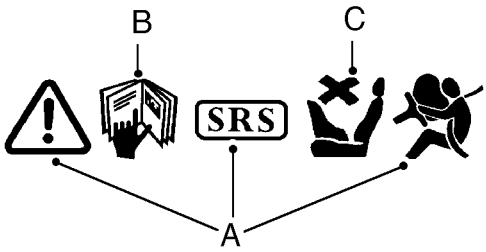
Rotary Coupler

CAUTION: Always follow the procedure for fitting and checking the rotary coupler as instructed in the SRS repairs section. Comply with all safety and installation procedures to ensure the system functions correctly. Observe the following precautions:

- **Do not install a rotary coupler if it is suspected to be defective.**
- **Do not attempt to service, modify or repair a rotary coupler.**
- **Do not cut, splice or modify the wires attached to the rotary coupler.**
- **Always ensure the rotary coupler connectors are mated correctly and securely fastened.**
- **Always ensure the battery is disconnected before working on the rotary coupler.**
- **Do not unlock and rotate the rotary coupler when it is removed from the vehicle.**
- **Do not turn the road wheels when the rotary coupler is removed from the vehicle.**
- **Always ensure the rotary coupler is removed and installed in its centred position and with the front road wheels in the straight ahead position - refer to the SRS repair section for the correct removal and installation procedure.**
- **If a new rotary coupler is being installed, ensure the locking tab holding the coupler's rotational position is not broken; units with a broken locking tab should not be used.**

Warning Labels

Warning symbols are displayed at various positions in the vehicle (either in a suitable prominent position such as driver and passenger side glass, or attached to the component itself) to indicate SRS items which must be treated with particular care. These include:



M01 0193

A - The need for caution when working in close proximity to SRS components.

B - Refer to the publication where the procedures, instructions and advice can be found (usually Workshop Manual or Owner's Handbook) for working on the SRS system.

C - Do not use rear facing child seats in the front passenger seat if the vehicle is fitted with a passenger airbag.

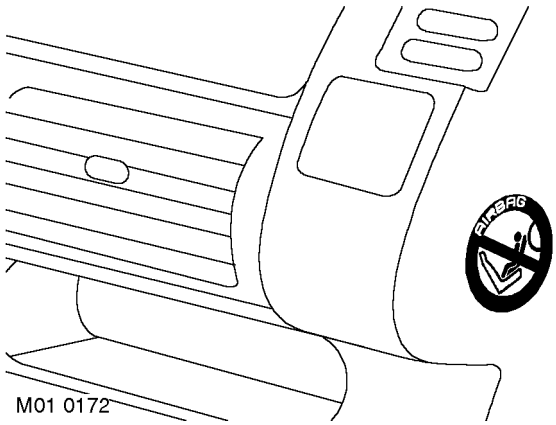
M01 0171

Driver and Passenger Side Windows

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

Caution labels are attached to SRS system components and may also be applied to vehicle trim close to SRS components and harnesses. The driver and front passenger airbag modules have an 'SRS AIRBAG' symbol moulded into the module's plastic trim to identify the presence of airbags. Other SRS warning labels include:

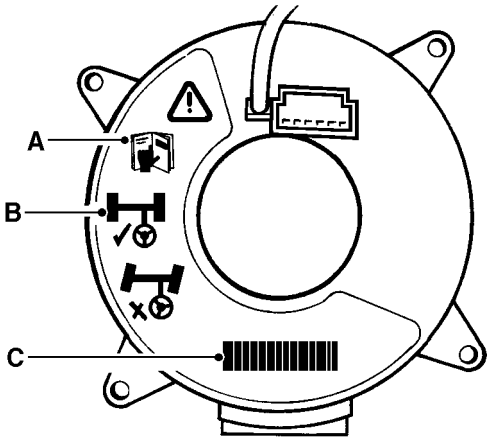
End of Fascia



M01 0172

Label located on end of fascia; warning not to use rear facing child seats in the front passenger seat in vehicles fitted with a front passenger airbag.

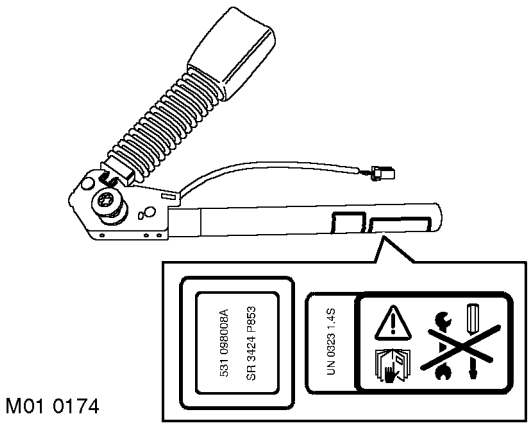
Rotary coupler



M01 0173

A - Refer to the Workshop Manual for detailed instructions.**B** - Ensure wheels are in the straight ahead position before removal and refitting.**C** - LAND ROVER Part Number/Bar code - The code must be recorded and quoted for ordering purposes.

Front seat belt pre-tensioners

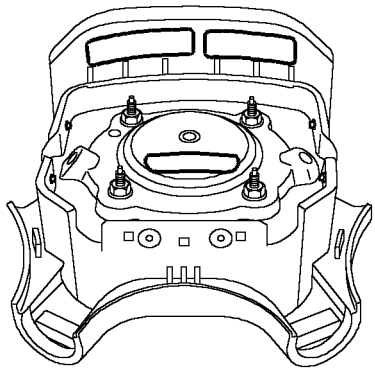


M01 0174

A warning label is fixed to the piston tube of the front seat belt pre-tensioners:

- Exercise caution.
- Refer to the publication where the procedures, instructions and advice can be found (usually Workshop Manual or Owner's Handbook) for working on SRS system components.
- Do not attempt to repair or disassemble.

Bar codes



M01 0175

Driver's airbag module

Bar codes are fitted to SRS system components and components which are critically related to SRS operation. The code number(s) must be recorded if the component is to be replaced. Components featuring bar codes include the following:

- Driver's front airbag module – label attached to rear of module housing.
- Passenger front airbag module – label attached to rear of module housing.
- Rotary coupler – label attached on face of rotary coupler.
- DCU – included on label on top of DCU.
- SRS wiring – label attached around harness wires.

VEHICLE RECOVERY

Observe the following procedures for vehicle towing after a collision has taken place:

Towing – SRS components not deployed

Normal towing procedures are unlikely to cause an SRS module to deploy. However, as a precaution, switch the ignition off and then disconnect both battery leads. Disconnect the negative '-' lead first.

Towing – SRS components deployed

Once the driver's airbag has been deployed, the vehicle must have a front suspended tow. However, as a precaution, switch the ignition off and then disconnect both battery leads. Disconnect the negative '-' lead first.

SRS component manual deployment

If a vehicle is to be scrapped and contains an undeployed airbag module, the module must be manually deployed. Always observe the following precautions:

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

WARNING: A deployed airbag or seatbelt pre-tensioner is very hot, DO NOT return to a deployed airbag module until at least 30 minutes have elapsed since deployment.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: If a vehicle is to be scrapped, undeployed airbag modules and pre-tensioner units must be deployed in accordance with the instructions in this manual.

WARNING: Contact with chemicals from deployed and damaged SRS components could present a health hazard, wear protective clothing when handling. DO NOT eat, drink or smoke when handling SRS components.

WARNING: Deployment of airbag modules and seatbelt pre-tensioners can cause injury to personnel in the close vicinity of the deploying unit. In case of injury seek urgent medical advice. Possible sources of injury include:

- ***impact - due to inflating airbag or pre-tensioner operation causing component 'kick'.***
- ***hearing - due to noise produced by deploying airbags and seatbelt pre-tensioner units.***
- ***burns - hot component parts and gases.***
- ***irritation to eyes and lungs - from deploying gases or combustion residue.***

WARNING: Ensure the SRS component to be deployed is securely fastened to its mounting.

WARNING: Deployment procedures detailed in this manual should be strictly adhered to. Compliance with the following precautions MUST be ensured:

- ***Only use deployment equipment approved for the intended purpose.***
- ***Before commencing deployment procedure, ensure the deployment tool functions properly by performing the self test procedure detailed in the SRS Repairs section of this manual.***
- ***Deployment of airbag/pre-tensioner modules should be performed in a well ventilated area which has been designated for the purpose.***
- ***Ensure airbag/pre-tensioner modules are not damaged or ruptured before attempting to deploy.***
- ***Notify the relevant authorities of intention to deploy airbag and pre-tensioner units.***
- ***When deploying airbag and seatbelt pre-tensioner units, ensure that all personnel are at least 15 metres away from the deployment zone.***
- ***Ensure deployment tool is connected correctly, in compliance with the instructions detailed in this manual. In particular, ensure deployment tool is NOT connected to battery supply before connecting to the airbag or seatbelt pre-tensioner module connector.***
- ***When deploying seatbelt pre-tensioners in the vehicle, ensure the pre-tensioner unit is fully secured to its fixing point.***
- ***When removing deployed airbag and seatbelt pre-tensioner modules, wear protective clothing. Use gloves and seal deployed units in a plastic bag.***
- ***Following deployment of any component of the SRS system within the vehicle, all SRS components must be replaced. DO NOT re-use or salvage any parts of the SRS system.***
- ***Do not lean over airbag modules or seatbelt pre-tensioner units when connecting deployment equipment.***

WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

SRS component replacement policy

The following information details the policy for replacement of SRS components; either as a result of a vehicle accident or as a result of vehicle age.

Impacts which do not deploy the airbags or seat belt pre-tensioners
Check for structural damage in the area of the impact, paying particular attention to bumper armatures, longitudinals, crash cans and bracketry.

Impacts which deploy the airbags and/or seat belt pre-tensioners
The inspection and replacement policy is dependent on the type and severity of the crash condition. The following guidelines are the minimum that should be exercised as a result of the deployment of specific SRS components.

Front airbag/ seat belt pre-tensioner deployment (driver and passenger)
If the front airbags and/or seat belt pre-tensioners are deployed as a result of a front, front angled or side impact, the following parts must be replaced:

- Driver airbag module
- Passenger airbag module (where fitted)
- SRS flyleads
- SRS DCU
- Rotary coupler
- Front seat belt pre-tensioners

In addition, the following should be inspected for damage and replaced as necessary:

- Front seat belt and buckle tongue (anchorage points, webbing etc.)
- Fascia moulding adjacent to passenger airbag module (where fitted)
- Steering wheel (if damage is evident)
- Front seat frames and head restraints (if there is evidence of damage to the seat frame or cushion pan)
- Steering column (if adjustment is lost or there are signs of collapse)
- Front seat belt height adjusters on 'BC' posts (5 door models only)
- Rear seat belts and seat belt buckles (webbing, buckle covers, body anchorage and tongue latching function)

Rear impacts
Rear impacts may cause the front seat belt pre-tensioners to deploy. If this occurs, the seat belt pre-tensioners must be replaced. In addition, the following components should be inspected for damage and replaced as necessary:

- Front seat frames
- Front seat belts and buckle (retractors, webbing, tongue latching, buckle covers, body anchorages and 'D' loops)
- Seat belt height adjusters (5 door models only)
- Rear seat belts and seat belt buckles (webbing, buckle covers, body anchorage and tongue latching function)

Periodic replacement of SRS components
The performance of the propellants within airbags and seat belt pre-tensioners will deteriorate over a period of time. As a result, it is essential that the airbags and seat belt pre-tensioners are periodically replaced to maintain occupant safety. Airbags, seat belt pre-tensioners and the rotary coupler should be replaced at the recommended intervals.

Air conditioning system precautions

General

The air conditioning system contains fluids and components which could be potentially hazardous to the service engineer or the environment if not serviced and handled correctly. The following guidelines are intended to alert the service engineer to potential sources of danger and emphasise the importance of ensuring the integrity of the Air Conditioning operating conditions and components fitted to the vehicle.

Where necessary, additional specific precautions are detailed in the relevant sections of this Manual which should be referred to prior to commencing repair operations.

The refrigerant used in the air conditioning system is HFC-134a (Hydrofluorocarbon) R134a. Always adhere to the following precautions:

WARNING: Servicing must only be carried out by personnel familiar with both the vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

WARNING: Do not allow a refrigerant container to be heated by direct flame or to be placed near any heating appliance. A refrigerant container must not be heated above 50 °C.

Do not leave a container of refrigerant without its cap fitted. Do not transport a container of refrigerant that is unrestrained, especially in the boot of a car.

WARNING: Do not smoke or weld in areas where R134a is in use. Inhalation of concentrations of vapour can cause dizziness, disorientation, incoordination, narcosis, nausea or vomiting.

R134a is odourless and colourless. Do not handle or discharge in an enclosed area, or any area where the vapour and liquid can come in contact with a naked flame or hot metal. R134a is not flammable but can cause a highly toxic gas.

WARNING: Do not allow fluids other than R134a or compressor lubricant to enter the air conditioning system. Spontaneous combustion may occur.

WARNING: R134a is a hazardous liquid and when handled incorrectly can cause serious injury. Suitable protective clothing, consisting of face protection, heat proof gloves, rubber boots and rubber apron or waterproof overalls, must be worn when carrying out operations on the air conditioning system.

WARNING: Due to its low evaporating temperature, R134a must be handled with care. R134a splashed on any part of the body will cause immediate freezing of that area. Also, refrigerant cylinders and replenishment trolleys when discharging will freeze skin to them if contact is made.

WARNING: Under no circumstances should refrigerant hoses be disconnected without first discharging the system.

Do not disconnect any pipes in an air conditioning refrigeration system unless trained and instructed to do so. A refrigerant is used which can cause blindness if allowed to contact eyes.

WARNING: Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerant is high enough for safe use in the air conditioning system.

Recycling should always be carried out with equipment which is design certified by Underwriter Laboratory Inc. for compliance with SAE J1991. Other equipment may not recycle refrigerant to the required level of purity.

A R134a Refrigerant Recovery Recycling Recharging Station must not be used with any other type of refrigerant.

Refrigerant R134a from domestic and commercial sources must not be used in motor vehicle air conditioning systems.

Remedial actions

If an accident involving R134a should occur, conduct the following remedial actions:

- If liquid R134a enters the eye, do not rub it. Gently run large quantities of eye wash over affected eye to raise the temperature. If an eye wash is not available, cool clean water may be used to flush the eye. After rinsing, cover the eye with a clean pad and seek immediate medical attention.
- If liquid R134a is splashed onto the skin, run large quantities of water over the affected area to raise the temperature. Implement the same action if the skin comes in contact with discharging cylinders. Wrap the contaminated body parts in blankets (or similar materials) and seek immediate medical attention.
- If the debilitating effects of inhalation of R134a vapour is suspected, seek fresh air. If the affected person is unconscious, move them away from the contaminated area to fresh air and apply artificial respiration and/or oxygen and seek immediate medical attention.

Service precautions

Observe the following precautions when handling components used in the air conditioning system:

- Air conditioning units must not be lifted by their hoses, pipes or capillary lines.
- Hoses and lines must not be subjected to any twist or stress - the efficiency of the system will be impaired by kinks or restrictions. Ensure that hoses are correctly positioned before tightening couplings, and ensure that all clips and supports are utilised.
- Flexible hoses should not be positioned close to the exhaust manifold (less than 100mm) unless protected by heat shielding.
- Completed assemblies must be checked for refrigeration lines touching metal panels. Any direct contact of components and panels may transmit noise and so must be eliminated.
- The appropriate torque wrench must be used when tightening refrigerant connections to the stipulated value. An additional spanner must be used to hold the union to prevent twisting of the pipe when tightening connections.
- Before connecting any hose or pipe, ensure that refrigerant oil is applied to the seat of the new 'O' ring seals, BUT NOT to the threads of the connection.
- All protective plugs must remain in place to seal the component until immediately prior to connection.
- Ensure components are at room temperature before uncapping, to prevent condensation of moisture from the air that enters it.
- Components must not remain uncapped for longer than 15 minutes. In the event of a delay, the caps must be fitted.
- When disconnecting, immediately cap all air conditioning pipes to prevent ingress of dirt and moisture into the system.
- The modulator (receiver/drier) contains desiccant which absorbs moisture. It must be positively sealed at all times. A modulator that has been left uncapped must not be used, fit a new unit.
- The modulator should be the last component connected to the system to ensure optimum dehydration and maximum moisture protection of the system.
- Whenever the refrigerant system is opened, the modulator must be renewed immediately before evacuating and recharging the system.
- Use alcohol and a clean lint-free cloth to clean dirty connections.
- Ensure that all new parts fitted are marked for use with R134a.

When a major repair has been completed, a leak test should be conducted; refer to the air conditioning section of this manual for the correct procedure.

Refrigerant oil
Use an approved refrigerant lubricating oil:

ND Oil 8

CAUTION: Do not use any other type of refrigerant oil.

CAUTION: Refrigerant oil easily absorbs water and must not be stored for long periods. Do not pour unused oil back into the container.

When renewing system components, add the quantities of refrigerant oil recommended in the Air Conditioning section of this manual.

Compressor
A new compressor is sealed and pressurised with Nitrogen gas. When fitting a new compressor, slowly release the sealing cap; gas pressure should be heard to vent as the seal is broken.

CAUTION: A new compressor should always be sealed and could be pressurised with nitrogen gas. To avoid possible oil loss, release the sealing cap(s) slowly. Do not remove the cap(s) until immediately prior to connecting the air conditioning pipes to the compressor.

Rapid refrigerant discharge
If the air conditioning system is involved in accident damage and the system is punctured, the refrigerant will discharge rapidly. The rapid discharge of refrigerant will also result in the loss of most of the oil from the system. The compressor must be removed and all the remaining oil in the compressor drained and refilled in accordance with the 'Air Conditioning Compressor Replacement Procedure'.

Air conditioning compressor replacement

A new compressor is supplied filled with a full charge of (X cm^3) of refrigerant oil.

A new compressor is supplied with an oil fill (X cm) of 120 cm^3.

A calculated quantity of oil must be drained from the new compressor before fitting. To calculate the quantity of oil to be drained:

1. Remove the drain plug from the old compressor.
2. Invert the compressor and gravity drain the oil into a calibrated measuring cylinder. Rotate the compressor clutch to ensure the compressor is completely drained.
3. Note the quantity of oil drained (Y cm^3).
4. Calculate the quantity of oil to be drained from the new compressor using the following formula:

   X cm^3 – (Y cm^3 + 20 cm^3) = Q cm^3
5. Remove the drain plug from the new compressor and drain Q cm^3 of oil.
6. Fit and tighten the compressor drain plug.

System components
When renewing system components, add the following quantities of refrigerant oil:

- Condenser = 40 cm^3
- Evaporator = 30 cm^3
- Receiver drier = 15 cm^3
- Pipe or hose = 5 cm^3

Engine – Td4 Diesel

General	
Type	2.0 litre in-line direct injection diesel, 16-valve, DOHC, turbocharged and intercooled
Cylinder arrangement	4 in-line, transverse, No.1 cylinder at front of engine
Bore	84.00 mm (3.307 in.)
Stroke	88.00 mm (3.465 in.)
Capacity	1951 cm^3 (119.05 in^3)
Firing order	1-3-4-2
Compression ratio	18:1 ± 0.5:1
Direction of rotation	Clockwise, viewed from the front of the engine
Maximum power	82 kW (112 bhp) @ 4000 rev/min.
Maximum torque	260 Nm (192 lbf.ft) @ 1750 rev/min.
Maximum governed speed	4800 rev/min.
Maximum overrun speed	5250 rev/min
Idle speed	780 ± 30 rev/min
Dimensions: ⇒ Length ⇒ Width ⇒ Height	 482 mm (19.0 in) 634 mm (25.0 in) 697 mm (27.4 in)
Glow plugs:	4 off, one per cylinder arranged centrally on inlet side between inlet valves
Turbocharger	Mitsubishi MR1 TD025L3 - 08T - 3.3
Fuel injection system:	Common rail, direct injection fed by Bosch high pressure delivery pump
Injection timing	Controlled by ECM
Emissions standard	ECD3
Valve timing	
Inlet valves: ⇒ Opens ⇒ Closes	 8° BTDC 28° ABDC
Exhaust valves: ⇒ Opens ⇒ Closes	 38° BBDC 4° ATDC
Lubrication	
Type	Wet aluminium die-cast sump, pressure fed
Oil filter	Disposable canister with full flow by-pass
Oil cooler	Integral with oil filter assembly, connected to vehicle cooling system
Oil pump: ⇒ Type ⇒ Oil flow rate ⇒ Outer rotor to body clearance ⇒ Peak pressure	 Crankshaft driven, eccentric rotor 30 litres / min. (6.625 gallons/min.) 0.080 - 0.158 mm (0.0031 - 0.062 in.) up to 20 bar (290 $lbf.in^2$)
Oil pressure at idle: ⇒ Cold - 1000 rev/min. ⇒ Operating temperature (minimum) ⇒ Regulated pressure ⇒ Pressure at 3500 rev/min (hot)	 1.5 bar (21.8 $lbf.in^2$) 0.5 bar (7.3 $lbf.in^2$) 4.2 ±0.5 bar (60.9 ± 7.3 $lbf.in^2$) 3.0 - 4.5 bar (43.5 - 65.3 $lbf.in^2$)
Relief valve opening pressure	4.2 bar (60.9 $lbf.in^2$)
Low oil pressure switch opening pressure	0.2 - 0.5 bar (2.9 - 7.3 $lbf.in^2$)

Cylinder block	
Type	Grey cast iron with hollow beam structure
Cylinder head warp - maximum	0.03 mm (0.001 in.)
Cylinder head bore:†	
⇒ Standard	84.000 - 84.018 mm (3.3071 - 3.3078 in)
⇒⇒ Wear limit	84.040 mm (3.3087 in)
⇒ Intermediate	84.080 - 84.098 mm (3.3102 - 3.3109 in)
⇒⇒ Wear limit	84.120 mm (3.3118)
⇒ 1st.Oversize (Grinding dimension)	84.250 - 84.268 mm (3.3169 - 3.3176 in)
⇒⇒ Wear limit	84.290 mm (3.3185 in)
Cylinder bore ovality (permitted roundness deviation) †	0.01 mm (0.0004 in)
⇒ Wear limit	0.04 mm (0.0016 in)
Cylinder bore taper (permitted conicity) †	0.01 mm (0.0004 in)
⇒ Wear limit	0.04 mm (0.0016 in)
†Measurements at top centre and bottom of bore	
Crankshaft	
Main journal diameter	60 mm (2.36 in.)
Crankpin journal diameter	44.975 - 45.009 mm (1.7707 - 1.7720 in)
End float	0.08 - 0.163 mm (0.0031 - 0.0064 in.)
Maximum out of round †	0.15 mm (0.006 in.)
Crankshaft seal	PTFE
†At centre main journal; crankshaft supported on outer bearing pins	
Main bearings	
Quantity	5 (4 main, 1 thrust)
Type	Grooved shells in crankshaft, plain shells in main bearing caps
Ground sizes of main bearing journals:	
Standard:	
⇒ Yellow	59.977 - 59.983 mm (2.3613 - 2.3615 in)
⇒ Green	59.970 - 59.976 mm (2.3610 - 2.3613 in)
⇒ White	59.964 - 59.970 mm (2.3608 - 2.3610 in)
1st Undersize (0.25):	
⇒ Yellow	59.727 - 59.733 mm (2.3515 - 2.3517 in)
⇒ Green	59.720 - 59.726 mm (2.3512 - 2.3514 in)
⇒ White	59.714 - 59.720 mm (2.3509 - 2.3512 in)
2nd Undersize (0.50):	
⇒ Yellow	59.477 - 59.483 mm (2.3416 - 2.3418 in)
⇒ Green	59.470 - 59.476 mm (2.3413 - 2.3416 in)
⇒ White	59.464 - 59.469 mm (2.3411 - 2.3413 in)
Crankshaft radial bearing play	0.027 - 0.063 mm (0.0011 - 0.0025 in)
Connecting Rods	
Type	Forged H-sections, horizontally split big-end, plain small-end
Distance between centres	135 mm (5.32 in.)
Parallel deviation	0.05 mm (0.002 in)
Parallel distortion	0.5 mm (0.02 in)
Big-end bearings	
Quantity	4
Material	Sputter bearing on rod end halves

Gudgeon pins	
Type	Fully floating, retained by circlips
Bush bore diameter	30.008 - 30.015 mm (1.1814 - 1.1817 in.)
Fit in connecting rod	Press fit
Length	65 mm (2.56 in.)
Pistons	
Type	Graphite compound skirt with recessed combustion chamber in crown and oil cooling channel
Piston running clearance	0.036 - 0.072 mm (0.0014 - 0.0028 in)
Maximum clearance in cylinder bore (engine run in)	0.15 mm (0.006 in)
Piston diameter †:	
⇒ Standard	83.950 ± 0.009 mm (3.3051 ± 0.0004 in)
⇒ Intermediate	84.030 ± 0.009 mm (3.3083 ± 0.0004 in)
⇒ 1st Oversize	84.200 ± 0.009 mm (3.3150 ± 0.0004 in)
†measured 12 mm (0.47 in) from bottom of skirt and 90° to gudgeon pin:	
Piston rings	
Type:	2 compression, 1 oil control
⇒ Top compression ring	Barrel edge, chrome plated
⇒ 2nd compression ring	Taper faced
⇒ Oil control ring	Bevelled ring with spring
New ring to groove clearance (axial play):	
⇒ Top compression ring	does not have to be measured
⇒ 2nd compression ring	0.05 - 0.09 mm (0.0020 - 0.0035 in.)
⇒ Oil control ring	0.03 - 0.07 mm (0.0012 - 0.0028 in.)
New ring fitted gap 30 mm (1.2 in) from top of bore:	
⇒ Top compression ring	0.20 - 0.35 mm (0.008 - 0.014 in.)
⇒ 2nd compression ring	0.30 - 0.45 mm (0.012 - 0.018 in.)
⇒ Oil control ring	0.20 - 0.40 mm (0.008 - 0.016 in.)
Cylinder head	
Type	Aluminium alloy gravity die casting
Port configuration	Cross flow
Intake ports	1 x helical, 1 x tangential
Cylinder head gasket:	
⇒ Type	Multi-layer steel
⇒ Selection:	
⇒⇒ 1 hole	Piston protrusion up to 0.91 mm (0.036 in)
⇒⇒ 2 hole	Piston protrusion 0.92 - 1.03 mm (0.036 - 0.041 in)
⇒⇒ 3 hole	Piston protrusion over 1.03 mm (0.041 in)
Camshaft	
Type	DOHC made from clear chill casting, hollow cast, negative cam radius; vacuum pump driven from exhaust camshaft
Bearings	5 per camshaft
Drive	Simplex chain
Radial runout	0.047 - 0.088 mm (0.0019 - 0.0035 in)
End float	0.15 - 0.33 mm (0.006 - 0.013 in.)
Bearing clearance	0.011 - 0.034 mm (0.0004 - 0.0013 in.)
Tappets	
Type	Hydraulic valve adjusters with roller finger levers

Valves	
Stem diameter:	
⇒ Inlet	5.97 ± 0.01 mm (0.235 ± 0.0004 in.)
⇒ Exhaust	5.97 ± 0.01 mm (0.235 ± 0.0004 in.)
Valve stem to guide clearance	0.025 - 0.054 mm (0.0010 - 0.0021 in.)
Valve head stand down:	
⇒ Inlet	0.73 ± 0.1 mm (0.029 ± 0.004 in.)
⇒ Exhaust	0.56 ± 0.1 mm (0.022 ± 0.004 in.)
Head diameter	25.9 ± 0.1 mm (1.02 ± 0.004 in.)
Valve seat angle:	45°
Valve seat width:	
⇒ Inlet	1.20 ± 0.15 mm (0.047 ± 0.006 in)
⇒ Exhaust	1.45 ± 0.15 mm (0.057 ± 0.006 in)
Valve springs	
Type	Parallel, single coil
Free length	47.5 mm (1.87 in.)
Fitted length	32 mm (1.26 in.)

Engine – K1.8 Petrol

General	
Type	1.8 litre petrol, 16-valve DOHC
Cylinder arrangement	4 in-line, transverse, No.1 cylinder at front of engine
Bore	80.00 mm (3.150 in.)
Stroke	89.30 mm (3.516 in.)
Capacity	1796 cm^3 (109.59 in^3)
Firing order	1-3-4-2
Compression ratio	10.5 :1 ± 0.5 :1
Direction of rotation	Clockwise viewed from the front of the engine
Maximum power	88 kW (118 bhp) @ 5500 rev/min.
Maximum torque	165 Nm (223.7 lbf.ft) @ 2750 rev/min.
Idle speed	775 ± 50 rev/min.
Maximum intermittent engine speed	6750 rev/min.
Weight (fully dressed, wet)	108 kg (238 lb)
Dimensions: ⇒ Length (nominal) ⇒ Width (nominal) ⇒ Height (nominal)	 654 mm (25.75 in.) 600 mm (23.62 in.) 615 mm (24.21 in.)
Spark plugs: ⇒ Make/Type ⇒ Gap	 GSP 66527 1.0 mm ± 0.05 mm (0.039 in. ± 0.002 in.)
Ignition coils: ⇒ Make ⇒ Type ⇒ Primary resistance (typical) ⇒ Secondary resistance (typical)	 Nippon Denso - NEC 100730 2 x twin output coils, plug top mounted; cylinders 1 & 4 and 2 & 3 0.7 Ω 10 Ω
Fuel injection system: Type	 Returnless fuel rail, multi-point fuel injection, electronically controlled from ECM
Controller	MEMS 3 breakerless, electronic, fully mapped engine management system
Injectors: ⇒ Operating pressure ⇒ Fuel flow rate	 3.5 bar (50.8 $lbf.in^2$) 117 g/min. @ 3.0 bar (4.13 fl.oz/min. @ 43.5 $lbf. in^2$)
Valve operation	Self-adjusting, lightweight hydraulic tappets operated directly by camshafts
Emissions standard	ECD3
Cylinder block:	
Material	Aluminium alloy
Cylinder liner type	Damp, bottom half stepped - sliding fit into lower part of cylinder block
Cylinder liner bore: ⇒ RED grade A ⇒ BLUE grade B	 80.000 - 80.015 mm (3.1496 - 3.1501 in.) 80.016 - 80.030 mm (3.1502 - 3.1508 in.)
Cylinder head	
Material	Aluminium alloy
Cylinder head warp - maximum	0.05 mm (0.002 in)
Cylinder head height: ⇒ New	 118.95 - 119.05 mm (4.683 - 4.687 in.)

General	
⇒ Reface limit	0.20 mm (0.008 in.)
Crankshaft	
Crankshaft end-float	0.10 - 0.25 mm (0.004 - 0.010 in.)
⇒ Service limit	0.34 mm (0.013 in.)
Main journal diameter:	47.986 - 48.007 mm (1.8892 - 1.8900 in.)
⇒ Maximum out of round	0.010 mm (0.0004 in.)
Main journal tolerance:	
⇒ Grade 1	48.000 - 48.007 mm (1.8898 - 1.8900 in.)
⇒ Grade 2	47.993 - 48.000 mm (1.8895 - 1.8898 in.)
⇒ Grade 3	47.986 - 47.993 mm (1.8892 - 1.8895 in.)
Big-end journal diameter	47.986 - 48.007 mm (1.8892 - 1.8900 in.)
⇒ Maximum out of round	0.010 mm (0.0004 in.)
Big-end journal tolerance:	
⇒ Grade A	48.000 - 48.007 mm (1.8898 - 1.8900 in.)
⇒ Grade B	47.993 - 48.000 mm (1.8895 - 1.8898 in.)
⇒ Grade C	47.986 - 47.993 mm (1.8892 - 1.8898 in.)
Main bearings:	
Quantity	5
Type	Steel backed, aluminium/tin lined, oil grooves in upper halves, plain in bearing caps
Clearance in bearings	0.02 - 0.05 mm (0.0008 - 0.0020 in.)
Thrust washers	Halves at No.3 main bearing
Thrust washer halves thickness	2.61 - 2.65 mm (0.1028 - 1.043 in.)
Big-end bearings:	
Clearance in bearings	0.021 - 0.049 mm (0.0008 - 0.0019 in.)
Big-end end-float	0.10 - 0.25 mm (0.004 - 0.010 in.)
Connecting rods:	
Type	Horizontally split big-end, plain small end
Distance between centres	133.05 - 133.15 mm (5.238 - 5.242 in.)
Gudgeon pins:	
Type	Semi-floating off-set towards thrust side
⇒ Fit in connecting rod	Interference
⇒ Diameter (RED)	17.997 - 18.000 mm (0.7085 - 0.7087 in.)
⇒ Diameter (GREEN)	17.994 - 17.997 mm (0.7084 - 0.7087 in.)
⇒ Length	52.3 - 52.6 mm (2.06 - 2.07 in.)
Pistons	
Type	Aluminium alloy, tin plated, thermal expansion with offset gudgeon pin
Piston diameter:	
⇒ Grade A	79.975 - 79.990 mm (3.1486 - 3.1492 in.)
⇒ Grade B	79.991 - 80.005 mm (3.1492 - 3.1498 in.)
Clearance in bore	0.01 - 0.04 mm (0.0004 - 0.0016 in.)
Maximum ovality	0.30 mm (0.012 in.)
Piston rings:	
Type:	2 compression, 1 oil control
⇒ Top compression ring	Barrel faced, granulite coated
⇒ 2nd compression ring	Tapered, phosphate coated

General	
⇒ Oil control ring	Nitrided ring with radii and spring
New ring to groove clearance:	
⇒ Top compression ring	0.040 - 0.072 mm (0.0016 - 0.0028 in.)
⇒ 2nd compression ring	0.030 - 0.062 mm (0.0012 - 0.0024 in.)
⇒ Oil control ring	0.010 - 0.180 mm (0.0004 - 0.0071 in.)
Ring fitted gap 20 mm (0.75 in) from top of bore:	
⇒ Top compression ring	0.20 - 0.35 mm (0.008 - 0.014 in.)
⇒ 2nd compression ring	0.28 - 0.48 mm (0.011 - 0.019 in.)
⇒ Oil control ring	0.15 - 0.40 mm (0.006 - 0.016 in.)
Piston ring width:	
⇒ Top compression ring	0.978 - 0.990 mm (0.0385 - 0.0390 in.)
⇒ 2nd compression ring	1.178 - 1.190 mm (0.0464 - 0.0469 in.)
⇒ Oil control ring	0.33 - 0.38 mm (0.0130 - 0.0150 in.)
Camshaft	
Type	DOHC acting directly on tappets, incorporates target/reluctor for camshaft sensor
Bearings	6 per camshaft, direct line bored
Drive	Toothed belt driven from crankshaft gear, automatically tensioned
Camshaft end-float	0.06 - 0.19 mm (0.002 - 0.007 in.)
⇒ Service limit	0.30 mm (0.012 in.)
Bearing clearance	0.060 - 0.094 mm (0.0024 - 0.0037 in.)
⇒ Service limit	0.15 mm (0.006 in.)
Tappets	
Type	Self-adjusting lightweight hydraulic tappets, operated directly from camshafts
Tappet outside diameter	32.959 - 32.975 mm (1.2976 - 1.2982 in.)
Valve timing:	
Inlet valves:	
⇒ Opens	12° BTDC
⇒ Closes	52° ABDC
⇒ Maximum lift	8.8 mm (0.35 in.)
Exhaust valves:	
⇒ Opens	52° BBDC
⇒ Closes	12° ATDC
⇒ Maximum lift	8.8 mm (0.35 in.)
Valves	
Stem diameter:	
⇒ Inlet valves	5.952 - 5.967 mm (0.2343 - 0.2349 in.)
⇒ Exhaust valves	5.947 - 5.962 mm (0.2341 - 0.2347 in.)
Stem to guide clearance:	
⇒ Inlet valves	0.033 - 0.063 mm (0.0013 - 0.0025 in.)
⇒⇒ Service limit	0.07 mm (0.0028 in.)
⇒ Exhaust valves	0.038 - 0.078 mm (0.0015 - 0.0031 in.)
⇒⇒ Service limit	0.11 mm (0.0043 in.)
Valve stem fitted height:	
⇒ New	38.93 - 39.84 mm (1.5327 - 1.5685 in.)
⇒ Service limit	40.10 mm (1.5787 in.)
Head diameter:	
⇒ Inlet valves	27.6 - 27.8 mm (1.087 - 1.094 in.)
⇒ Exhaust valves	24.0 - 24.2 mm (0.945 - 0.953 in.)

General	
Valve seat width:	
⇒ Inlet	1.0 - 1.4 mm (0.039 - 0.055 in)
⇒ Exhaust	1.4 - 1.8 mm (0.055 - 0.071 in)
Seat face angle - Inlet and Exhaust	45°
Valve face angle - Inlet and Exhaust	45°
Valve springs	
Free length	50.0 mm (1.97 in.)
Fitted length	37.0 mm (1.46 in.)
Load at fitted length	250 ± 12 N
Load at valve open length	450 ± 18 N
Lubrication	
Type	Cast aluminium wet sump
Pump type	Crankshaft driven, eccentric rotor
⇒ Outer rotor to housing clearance	0.28 - 0.36 mm (0.011 - 0.014 in.)
⇒ Inner rotor tip clearance	0.05 - 0.13 mm (0.002 - 0.005 in.)
⇒ Rotor end-float	0.02 - 0.06 mm (0.001 - 0.002 in.)
Relief valve spring free length	38.90 mm (1.531 in.)
Oil filter	Full flow disposable screw-on canister
Pressure at idle (min.) Pressure at 2500 rev/min (hot) Relief valve opening pressure Low oil pressure switch opening pressure	100 kPa (14.5 lbf/in²) 375 kPa (3.75 bar, 54.4 lbf/in²) 410 kPa (59.5 lbf/in²) 20 - 58 kPa (3.0 - 8.5 lbf/in²)
Sensors:	
Crankshaft sensor	Siemens NSC 100630, Hall effect acting on profiled target on flywheel
Camshaft sensor:	
⇒ Make / Type	ITT NSC 100610 +0, Hall effect acting on camshaft reluctor ring
⇒ Ring	TGN 100050
Oxygen sensor:	
⇒ Make / Type	NTK - MHK 100720
⇒ Heating element (nominal)	7 Watts
⇒ Sensor voltage - High	≈ 900 mV
⇒ Sensor voltage - Low	≈ 40 mV
Throttle potentiometer:	
⇒ Make / Type	CTS - MJC 100020
⇒ Total track resistance	4 kΩ ± 20%
⇒ Sensor supply voltage	5V ± 4%
TMAP sensor:	
⇒ Make / Type	Motorola - MHK 100820
⇒ Sensor supply voltage	5V ± 4%
Coolant temperature sensor:	
⇒ Make / Type	AB Electronik - MEK 100170; NTC thermistor bead
Oil temperature sensor	
⇒ Make / Type	AB Elektronik - MEK100170; NTC thermistor bead

Engine – KV6 Petrol

General	
Type	2.5 litre V6 direct injection petrol, 24 valve, air assisted fuel injection, water cooled, transverse mounted
Cylinder arrangement: ⇒ Left bank ⇒ Right bank	90° V6, numbered from the front of the engine Cylinders 1, 3 and 5 Cylinders 2, 4 and 6
Bore (nominal)	80 mm (3.15 in.)
Stroke	82.8 mm (3.26 in.)
Capacity	2497 cm^3 (152.37 in^3)
Firing order	1-6-5-4-3-2
Compression ratio	10.5 : 1 ± 0.5 : 1
Direction of rotation	Clockwise viewed from front of engine
Maximum power	130 kW (177 bhp) @ 6500 rev/min.
Maximum torque	240.0 Nm (177 lbf.ft) @ 4000 rev/min.
Maximum engine speed: ⇒ Continuous ⇒ Intermittent	 6500 rev/min. 6750 rev/min.
Idle speed	750 rev/min. ± 50 rev/min.
Weight (fully dressed, wet)	154 kg (340 lb)
Dimensions (dressed): ⇒ Length (nominal) ⇒ Width (nominal) ⇒ Height (nominal)	 770 mm (30.3 in.) 750 mm (29.5 in.) 750 mm (29.5 in.)
Valve operation	Self-adjusting lightweight hydraulic tappets operated directly by the camshafts
Fuel injection system: ⇒ Make ⇒ Type	 Siemens engine management system Multi-point, air assisted fuel injection controlled by ECM and electro-mechanical injectors with twin sprays targeted at back of inlet valves
Inlet manifold	Variable geometry
Spark plugs ⇒ Make / Type ⇒ Plug gap	 GSP 66527 1.0 mm ± 0.05 mm (0.039 in. ± 0.002 in.)
Coils: ⇒ Make ⇒ Type	 BREMR 6 x coils (3 x plug top, 3 x remote mounted)
Emissions standard	ECD3
Cylinder head	
Type	Aluminium alloy
Cylinder head gasket *	Multi-layer steel
Cylinder head warp: ⇒ Lateral ⇒ Longitudinal	 0.025 mm (0.001 in) 0.2 mm (0.08 in)
Cylinder head height Reface height - minimum	118.95 - 119.05 mm (4.683 - 4.687 in) 118.95 mm (4.683 in)
Cylinder block	
Type	Cosworth cast aluminium alloy with bearing ladder bolted to bottom of block
Cylinder liner type	Damp, bottom half stepped - sliding fit into lower part of cylinder block

General	
Cylinder liner bore:	
⇒ RED grade A	80.000 - 80.015 mm (3.1496 - 3.1502 in.)
⇒ BLUE grade B	80.015 - 80.030 mm (3.1502 - 3.1508 in.)
Crankshaft	
Material / Type	Cast spheroidal graphite iron with cold rolled fillets on all journals except outer mains
Crankshaft end-float	0.10 - 0.30 mm (0.004 - 0.012 in.)
⇒ Service limit	0.40 mm (0.016 in.)
Main journal diameter:	
⇒ Grade 1	67.743 - 67.749 mm (2.6670 - 2.6673 in.)
⇒⇒ Grade A (Green)†	
⇒⇒ Grade B (Yellow)†	
⇒⇒ Grade C (Black)†	
⇒ Grade 2	67.737 - 67.743 mm (2.6668 - 2.6670 in.)
⇒⇒ Grade A (Blue)†	
⇒⇒ Grade B (Green)†	
⇒⇒ Grade C (Yellow)†	
⇒ Grade 3	67.731 - 67.737 mm (2.6666 - 2.6668 in.)
⇒⇒ Grade A (Red)†	
⇒⇒ Grade B (Blue)†	
⇒⇒ Grade C (Green)†	
Maximum out of round	0.010 mm (0.0004 in.)
Main housing diameter:	
⇒ Grade A	71.600 - 71.593 mm (2.8189 - 2.8186 in.)
⇒ Grade B	71.593 - 71.586 mm (2.8186 - 2.8183 in.)
⇒ Grade C	71.586 - 71.579 mm (2.8183 - 2.8181 in.)
Big-end journal diameter:	
⇒ Grade A	54.049 - 54.055 mm (2.1279 - 2.1281 in.)
⇒ Grade B	54.043 - 54.049 mm (2.1277 - 2.1279 in.)
⇒ Grade C	54.037 - 54.043 mm (2.1274 - 2.1277 in.)
⇒ Maximum out of round	0.010 mm (0.0004 in.)
Big-end housing diameter:	
⇒ Grade 7	57.677 - 57.671 mm (2.2707 - 2.2705 in.)
⇒⇒ Grade A (Green)*	
⇒⇒ Grade B (Blue)*	
⇒⇒ Grade C (Red)*	
⇒ Grade 8	57.671 - 57.665 mm (2.2705 - 2.2703 in.)
⇒⇒ Grade A (Yellow)*	
⇒⇒ Grade B (Green)*	
⇒⇒ Grade C (Blue)*	
⇒ Grade 9	57.665 - 57.659 mm (2.2703 - 2.2700 in.)
⇒⇒ Grade A (Black)*	
⇒⇒ Grade B (Yellow)*	
⇒⇒ Grade C (Green)*	
†Cylinder block / bearing ladder bore diameter grades * Crankshaft big-end journal grades	
Main bearings	
Quantity	4
Material / type	Glacier AS15 - oil grooves in upper half shells, plain lower half shells
Clearance in bearings	0.021 - 0.039 mm (0.0008 - 0.0015 in.)
Thrust washers:	

General	
⇒ Type / position	Glacier AS15 - thrust washer halves at top and bottom of rear main bearing, oil grooves in top and bottom halves
⇒ Thrust washer halves thickness	2.61 - 2.65 mm (0.103 - 0.104 in.)
Main bearing thickness:	
⇒ Red	1.930 - 1.927 mm (0.0760 - 0.0759 in.)
⇒ Blue	1.927 - 1.924 mm (0.0759 - 0.0757 in.)
⇒ Green	1.924 - 1.921 mm (0.0757 - 0.0756 in.)
⇒ Yellow	1.921 - 1.918 mm (0.0756 - 0.0755 in.)
⇒ Black	1.918 - 1.915 mm (0.0755 - 0.0754 in.)
Big-end bearings	
Material / Type	Glacier AS15 - plain upper and lower half shells with locating tags
Clearance in bearings	0.022 - 0.040 mm (0.0009 - 0.0016 in.)
Big-end bearing thicknesses:	
⇒ Red	1.803 - 1.800 mm (0.0710 - 0.0709 in.)
⇒ Blue	1.800 - 1.797 mm (0.0709 - 0.0707 in.)
⇒ Green	1.797 - 1.794 mm (0.0707 - 0.0706 in.)
⇒ Yellow	1.794 - 1.791 mm (0.0706 - 0.0705 in.)
⇒ Black	1.791 - 1.788 mm (0.0705 - 0.0704 in.)
Big-end end-float	0.19 - 0.29 mm (0.007 - 0.011 in.)
Connecting rods	
Type	Forged steel H-sections with horizontally split big-ends
Distance between centres	151.31 - 151.41 mm (5.957 - 5.961 in.)
Gudgeon pins	
Type	Semi-floating offset towards thrust side
Fit in connecting rods	Interference
⇒ Diameter - Red coded	17.997 - 18.000 mm (0.7085 - 0.7087 in.)
⇒ Diameter - Green coded	17.994 - 17.997 mm (0.7084 - 0.7085 in.)
⇒ Length	52.3 - 52.6 mm (2.059 - 2.071 in.)
⇒ Clearance in piston	0.011 mm (0.0004 in.)
Pistons	
Type	Aluminium alloy, tin plated, thermal expansion with offset gudgeon pin
Piston diameter (at right angle to gudgeon pin and 10 mm (0.4 in. from bottom of skirt):	
⇒ Grade A	79.965 - 79.980 mm (3.1482 - 3.1488 in.)
⇒ Grade B	79.981 - 79.995 mm (3.1489 - 3.1494 in.)
Clearance in bore 20 mm (0.75 in.) from bottom of cylinder bore	0.034 - 0.035 mm (0.0013 - 0.0014 in.)
Maximum ovality	0.3 mm (0.012 in.)
Piston rings	
Type:	
⇒ Top compression ring	Chrome plated steel
⇒ 2nd compression ring	Chrome plated cast iron
⇒ Oil control ring	Stainless steel top and bottom rails with expander ring
New ring to groove clearance:	
⇒ Top compression ring	0.05 - 0.08 mm (0.0020 - 0.0031 in.)
⇒ 2nd compression ring	0.04 - 0.07 mm (0.0012 - 0.0024 in.)
⇒ Oil control ring	0.010 - 0.180 mm (0.0004 - 0.0071 in.)
Ring fitted gap 20 mm (0.75 in) from top of bore:	

General	
⇒ Top compression ring	0.20 - 0.35 mm (0.008 - 0.014 in.)
⇒ 2nd compression ring	0.28 - 0.45 mm (0.011 - 0.018 in.)
⇒ Oil control ring	0.25 - 1.00 mm (0.010 - 0.039 in.)
Piston ring width:	
⇒ Top compression ring	3.1 ± 0.15 mm (0.122 ± 0.006 in.)
⇒ 2nd compression ring	3.15 - 3.45 mm (0.124 - 0.136 in.)
⇒ Oil control ring	2.286 - 2.438 mm (0.090 - 0.096 in.)
Camshaft	
Type	Twin camshafts on each cylinder bank retained by camshaft carrier, line bored with cylinder head. Reluctor for camshaft sensor mounted on left hand inlet camshaft
Camshaft identification:	
⇒ Inlet	Orange paint mark
⇒ Exhaust	Blue paint mark
Bearings	5 per camshaft
Drive	Toothed belt driven from crankshaft to front of inlet camshafts, 2 x short toothed belts from rear of inlet camshafts to exhaust camshafts
Camshaft end-float	0.06 - 0.19 mm (0.002 - 0.007 in.)
⇒ Service limit	0.3 mm (0.012 in.)
Bearing clearance	0.025 - 0.059 mm (0.0010 - 0.0023 in.)
⇒ Service limit	0.1 mm (0.004 in.)
Tappets	
Type	Hydraulic self-adjusting, directly operated from camshafts
Tappet outside diameter	32.959 - 32.975 mm (1.2976 - 1.2982 in.)
Valve timing	
Inlet valves:	
⇒ Opens	2° BTDC
⇒ Closes	54° ABDC
Exhaust valves:	
⇒ Opens	50° BBDC
⇒ Closes	14° ATDC
Valve maximum lift:	
Inlet valves	8.2 mm (0.32 in.)
Exhaust valves	8.8 mm (0.35 in.)
Valves	
Stem diameter:	
⇒ Inlet valves	5.952 - 5.967 mm (0.2343 - 0.2349 in.)
⇒ Exhaust valves	5.947 - 5.962 mm (0.2341 - 0.2347 in.)
Stem to guide clearance:	
Inlet valves	0.033 - 0.063 mm (0.0013 - 0.0025 in.)
⇒ Service limit	0.07 mm (0.0028 in.)
Exhaust valves	0.038 - 0.078 mm (0.0015 - 0.0013 in.)
⇒ Service limit	0.11 mm (0.0043 in.)
Valve stem fitted height:	
⇒ New	38.93 - 39.84 mm (1.533 - 1.569 in.)
⇒ Service limit	40.10 mm (1.579 in.)
Valve guide fitted height	6.0 mm (0.24 in.)
Valve guide inside diameter	6.000 - 6.025 mm (0.2362 - 0.2372 in.)

General	
Head diameter:	
⇒ Inlet valves	31.4 - 31.6 mm (1.236 - 1.244 in.)
⇒ Exhaust valves	27.3 - 27.5 mm (1.075 - 1.083 in.)
Valve seat width:	
⇒ Inlet valves	1.2 mm (0.05 in.)
⇒ Exhaust valves	1.6 mm (0.06 in)
Seat face angle:	
⇒ Inlet valves	45°
⇒ Exhaust valves	45°
Valve face angle:	
⇒ Inlet valves	45°
⇒ Exhaust valves	45°
Valve springs	
Free length	47.6 mm (1.874 in.)
Fitted length	37.0 mm (1.457 in.)
Load at fitted length	210 ± 13 N
Load at top of lift	440 ± 22 N
Lubrication	
Type	Cast aluminium, wet sump with full flow filtration
Oil pump:	Crankshaft driven, high pressure die cast body
⇒ Outer rotor end-float	0.04 - 0.09 mm (0.0016 - 0.0035 in.)
⇒ Inner rotor end-float	0.04 - 0.09 mm (0.0016 - 0.0035 in.)
⇒ Inner rotor tip	0.05 - 0.13 mm (0.002 - 0.005 in)
⇒ Outer rotor to body diameterical clearance	0.13 - 0.23 mm (0.0051 - 0.0091 in.)
⇒ Rotor body to drive gear clearance (pump not fitted)	0.15 - 0.25 mm (0.0059 - 0.0098 in.)
Relief valve spring free length	38.90 mm (1.531 in)
Oil filter	Full-flow disposable cartridge
Oil cooler	Partial flow type
Pressure at idle (min.)	1.0 bar (14.5 lbf.in^2)
Pressure at 3000 rev/min.	3.0 bar (43.5 lbf.in^2)
Relief valve opening pressure	4.1 bar (59.5 lbf.in^2)
Low oil pressure switch opening pressure	0.3 - 0.5 bar (4.4 - 7.3 lbf.in^2)

* New metal dowels supplied with gasket must be fitted

Fuel system — Td4 Diesel

System	Common rail, direct injection
Fuel specification	EN590 diesel*
Fuel tank pump	Electric - submersible in fuel tank
⇒ Pump output	250 kPa (2.5 bar, 36.3 lbf.in^2)
Auxiliary delivery pump	Electrical - in line
Maximum delivery volume	240 litres per hour (52.75 imp. gallons) @ 12V
Fuel high pressure pump	Bosch Cp1 mechanical high pressure, 3 radial piston
⇒ Drive	Chain driven from crankshaft at 0.75 x engine speed
⇒ Pressure control	Mounted on CP1, controlled by DDE 4.0
Pressure regulator	Fitted between fuel filter and injection pump
⇒ Pressure (nominal)	2.5 bar (36.3 lbf.in^2)
Injectors:	
⇒ Make	Bosch CRI 0445 110 030
⇒ Nozzle type	DSLA 145P 868
⇒ Position	Central
⇒ Impedance	14.5 Ω ± 5% @ 20%
⇒ Injector operating pressure	250 - 1350 bar (3625 - 19575 lbf.in^2)
Injection begins:	
⇒ Pre-injection (maximum)	60° BTDC
⇒ Main injection (maximum)	25° BTDC
⇒ Post injection	100 - 200° crank ATDC
Injection timing	Controlled by Bosch DDE 4.0 engine management system for common rail injection
Injection quantity	1 - 80 mm^3
Pre-delivery fuel pressure sensor	Bosch / DS-K-400/50
⇒ Pressure	400 kPa (58.0 lbf/in^2)
Fuel rail pressure sensor:	
⇒ Measuring range	0 - 1500 bar (0-21750 lbf/in
⇒ Overpressure (max.)	1800 bar (26100 lbf/in^2)
⇒ Burst pressure	3000 bar (43500 lbf/in^2)
⇒ Temperature range	-40°C to +120°C (-40°F to +248°F)
Fuel filter	In-line between auxiliary fuel pump and high-pressure fuel injection pump
Turbocharger:	
⇒ Type	Mitsubishi - MR1 TD025L3/08T/3.3, with intercooler
⇒ Max. shaft radial clearance (housing/bearing)	0.02 mm (0.001 in.)
⇒ Max. shaft radial clearance (bearing/shaft)	0.0218 mm (0.0009 in.)
⇒ Min. shaft axial clearance	0.067 mm (0.0026 in.)
⇒ Max. shaft axial clearance	0.073 mm (0.0029 in.)
Waste gate valve opening pressure:	
⇒ Valve open 1.0 mm (0.04 in.)	1.465 ± 0.03 bar (21.24 ± 0.4 lbf.in^2)
⇒ Valve open 5.0 mm (0.20 in.)	1.765 ± 0.03 bar (25.59 ± 0.4 lbf.in^2)

* EN590 covers 'low sulphur' diesel fuel

Fuel system – K1.8 Petrol

System	Returnless multi-point fuel injection electronically controlled by Motorola MEMS 3, ECM, with electro-mechanical fuel injectors
Fuel specification	EN228, 95 unleaded*
Fuel rail	Single nylon moulding with integral pressure damper
Injectors	4 x Bosch EV6E - MYJ 100550; air assisted, split stream targeted onto back of inlet valves
Injector flow rate	117 g/min. @ 300 kPa (3.0 bar, 43.5 lbf.in^2)
Fuel pump	Continuous flow, electrically driven roller vane pump submerged in fuel tank
Fuel pressures	3.5 bar, 50.7 lbf.in^2)
Fuel pressure regulation	Controlled by in-tank pressure regulator
Fuel pump delivery	39 litres @ 300 kPa (43.5 lbf.in^2)
Fuel filter	In-tank, lifetime fit, Mesh area 584 cm^2; Mesh size 8 to 10 microns
Air cleaner	Mann & Hummel paper element type

Different octane ratings (98 RON) may be defined nationally; 90 — 98 RON if re-tuned via Testbook programme. Leaded specifications will be available in certain markets. Alternative fuel specification (23% ethanol) is available in certain markets.

Fuel system – KV6 Petrol

System	Multi-port injection from pressure regulated, returnless supply controlled by Siemens ECM and electro-mechanical injectors
Fuel specification	EN228 95 RON unleaded*
Fuel rail	2 x nylon mouldings joined by steel crossover tube, pressure regulator on RH rail
Injectors	6 x air assisted, split stream targeted onto back of inlet valves
Injector flow rate	152 g/min. @ 350 kPa (3.5 bar, 54.7 lbf.in^2)
Injector air flow rate	1.0 kg/hour
Fuel pump	Electric submersible
Fuel pressures	350 kPa (3.5 bar, 54.7 lbf.in^2)
Air filter	Paper element type

Different octane ratings (98 RON) may be defined nationally; 90 — 98 RON if re-tuned via Testbook programme. Leaded specifications will be available in certain markets. Alternative fuel specification (23% ethanol) is available in certain markets.

Cooling system – Td4 Diesel

Type	Pressurised, spill return, thermostatically controlled water / anti-freeze mixture
Cooling fans	Twin 11-blade axial flow electric, variable speed controlled via cooling fan control unit by PWM signal from ECM.
Coolant pump	Radial flow impeller - mechanical
Coolant pump drive ratio	1.563:1
Coolant pump output @ 2000 rev/min.	3.8 m^3 (134.2 $ft.^3$)
Thermostat	Wax element
Thermostat operating temperature: ⇒ Initial opening	88 °C ± 2 °C (190 °F ± 36 °F)
Expansion tank cap relief valve - system operating pressure	140 kPa (1.43 bar, 20.3 $lbf.in^2$)

Cooling system – K1.8 Petrol

Type	Pressurised, spill return, thermostatically controlled water/anti-freeze
Cooling fans	Twin 11-blade axial flow electric, variable speed controlled via cooling fan control unit by PWM signal from ECM.
Coolant pump	Radial flow impeller - mechanical
Coolant pump drive ratio	1:1
Thermostat	Wax element
Thermostat operating temperature: ⇒ Initial opening ⇒ Fully open - 9 mm (0.35 in.)	 85 °C - 91 °C (185 °F - 196 °F) 100 °C (212 °F)
Expansion tank cap relief valve - system operating pressure	100 kPa (1.0 bar, 14.5 lbf.in^2)

Cooling system – KV6 Petrol

Type	Pressurised, spill return, thermostatically controlled water/ant-freeze
Cooling fans	Twin 11-blade axial flow electric, variable speed controlled via cooling fan control unit by PWM signal from ECM.
Coolant pump	Radial flow - mechanical
Coolant pump drive ratio	0.93:1
Coolant pump output @ 1000 rev/min.	0.5 litres/sec. (0.875 imp. pts / sec.)
Thermostat	Wax element
Thermostat operating temperature: ⇒ Initial opening ⇒ Fully open - 9 mm (0.35 in.)	 82 °C ± 2 °C (180 °F ± 36 °F) 102 °C (216 °F)
Expansion tank cap relief valve - system operating pressure	100 kPa (1.0 bar, 14.5 lbf.in^2)

Clutch

Type	Maintenance free hydraulic system
Pressure plate diameter (all variants)	228 mm (8.976 in.)
Drive plate diameter (all variants)	228 mm (8.976 in.)
Clutch plate friction material	Valeo F808
Diaphragm finger height when clamped on a thick gauge plate	28.58 - 31.54 mm (1.125 - 1.242 in.)
Diaphragm finger clearance (service limit)	1.0 mm (0.039 in)
Clutch plate thickness under 6600 N (1484 lb) axial load:	
⇒ New	6.9 - 7.5 mm (0.272 - 0.295 in.)
⇒ Service limit (K1.8/PG1)	5.60 mm (0.220 in.)
⇒ Service limit (Td4/Getrag)	5.60 mm (0.220 in.)
Rivet depth:	
⇒ New	1.2 mm (0.047 in.) above rivet head
⇒ Service limit	0.20 mm (0.008 in.) above rivet head
Clutch plate run-out:	
⇒ New	0.4 mm (0.016 in.)
⇒ Service limit	0.4 mm (0.016 in.)
Pressure plate warpage (Service limit):	
⇒ K1.8 engine with PG1 gearbox	0.18 mm (0.0071 in.)
⇒ Td4 engine with Getrag gearbox	0.18 mm (0.0071 in.)

Manual Gearbox – Getrag

Type	Getrag 282
Gears	5 forward, 1 reverse, all synchromesh
Gear ratios: ⇒ First ⇒ Second ⇒ Third ⇒ Fourth ⇒ Fifth ⇒ Reverse	 3.577 : 1 1.887 : 1 1.192 : 1 0.848 : 1 0.686 : 1 3.308 : 1
Final drive ratio:	3.182 : 1

Manual Gearbox – PG1

Gear ratios:	
⇒ First	3.250 : 1 (19.902 : 1 overall)
⇒ Second	1.894 : 1 (11.598 : 1 overall)
⇒ Third	1.222 : 1 (7.483 : 1 overall)
⇒ Fourth	0.848 : 1 (5.019 : 1 overall)
⇒ Fifth	0.649 : 1 (3.974 : 1 overall)
⇒ Reverse	3.000 : 1
Reverse idler gear to selector fork clearance	0.5 to 1.1 mm (0.020 - 0.043 in)
Selector fork prong width	13.0 to 13.3 mm (0.512 - 0.524 in)
Selector fork groove to pin clearance:	
⇒ Standard	0.05 to 0.35 mm (0.002 - 0.014 in)
⇒ Service limit	0.50 mm (0.020 in)
Selector fork groove width	7.05 to 7.25 mm (0.278 - 0.285 in)
Gearshift arm to guide clearance:	
⇒ Standard	0.20 to 0.30 mm (0.008 - 0.012 in)
⇒ Service limit	0.55 mm (0.022 in)
Interlock shift guide groove width	8.10 to 8.20 mm (0.319 - 0.323 in)
Synchro ring to gear clearance:	
⇒ Standard	0.85 to 1.10 mm (0.033 - 0.043 in)
⇒ Service limit (minimum clearance)	0.40 mm (0.016 in)
Selector shaft forks in synchro sleeve grooves clearance:	
⇒ Standard	0.45 to 0.65 mm (0.018 - 0.026 in)
⇒ Service limit	1.00 mm (0.039 in)
Gearshift arm guide to selector fork clearance:	
⇒ Standard	0.20 to 0.50 mm (0.008 - 0.020 in)
⇒ Service limit	0.80 mm (0.031 in)
Gearshift arm guide tongue width	11.90 to 12.00 mm (0.469 - 0.472 in)
Gearshift arm guide to interlock assembly clearance:	
⇒ Standard	0.05 to 0.35 mm (0.002 - 0.014 in)
⇒ Service limit	0.60 mm (0.024 in)
Gearshift arm guide groove width	13.05 to 13.25 mm (0.514 - 0.522 in)
Interlock ball to gearshift arm guide clearance:	
⇒ Standard	0.05 to 0.25 mm (0.002 - 0.010 in)
⇒ Service limit	0.50 mm (0.020 in)
Interlock ball outside diameter	12.05 to 12.15 mm (0.474 - 0.478 in)
2nd to 3rd gear clearance:	
⇒ Standard	0.06 to 0.21 mm (0.002 - 0.008 in)
⇒ Service limit	0.30 mm (0.012 in)
3rd gear thickness:	
⇒ Standard	35.42 to 35.47 mm (1.394 - 1.396 in)
⇒ Service limit	35.30 mm (1.390 in)
4th to 5th gear clearance:	
⇒ Standard	0.06 to 0.21 mm (0.002 - 0.008 in)
⇒ Service limit	0.30 mm (0.012 in)
Spacer collar length:	
⇒ Standard	26.03 to 26.08 mm (1.025 - 1.027 in)
⇒ Service limit	26.01 mm (1.024 in)

4th gear thickness:	
⇒ Standard	30.92 to 30.97 mm (1.217 - 1.219 in)
⇒ Service limit	30.80 mm (1.213 in)
5th gear thickness:	
⇒ Standard	30.42 to 30.47 mm (1.198 - 1.200 in)
⇒ Service limit	30.30 mm (1.193 in)
1st. gear to thrust washer clearance:	
⇒ Standard	0.03 to 0.08 mm (0.0012 - 0.0031 in)
⇒ Service limit	0.18 mm (0.007 in)
2nd to 3rd gear clearance	0.03 to 0.10 mm (0.0012 - 0.0039 in)
Input shaft end thrust	0.14 to 0.21 mm (0.006 - 0.008 in)

Intermediate Reduction Drive (IRD)

Ratios:	
⇒IRD input shaft to IRD countershaft	0.828 : 1
⇒ IRD countershaft to Front driveshaft	1.762 : 1
⇒ IRD countershaft to Propeller shaft	0.553 : 1
IRD ratio:	
⇒ Td4 engines	1.467 : 1
⇒ K1.8 engines	1.467 : 1
⇒ KV6 engines	1.359 : 1
Oil cooler	Connected to vehicle cooling system

Automatic Gearbox – Jatco

Gear Ratios - Td4 engine:	
⇒ First	3.801:1
⇒ Second	2.131:1
⇒ Third	1.364:1
⇒ Fourth	0.935:1
⇒ Fifth	0.685:1
⇒ Reverse	2.970:1
Gear ratios - KV6 engine	
⇒ First	3.474 : 1
⇒ Second	1.948 : 1
⇒ Third	1.247 : 1
⇒ Fourth	0.854 : 1
⇒ Fifth	0.685 : 1
⇒ Reverse	2.714 : 1
Final drive ratio:	
⇒ Td4 engine	2.91 : 1
⇒ KV6 engine	3.66 : 1
Torque converter lock-up	Engaged in fourth and fifth gears.
Td4	50% throttle - 80 Kph (50 mph) in normal drive mode
KV6	50% throttle - 110 Kph (69 mph) in normal drive mode

Rear Axle and Final Drive

Rear Axle	
Type	Hypoid gear, centreline of drive pinion below centre of ring gear
Differential carrier material	Aluminium
Ring gear to Pinion gear backlash tolerance	0.13 to 0.20 mm (0.005 - 0.008 in)
Propeller shaft to rear driveshaft ratio	3.214 : 1
Final Drive	
Ratios:	
⇒ Td4 engine with manual gearbox	3.182 : 1
⇒ Td4 engine with automatic gearbox	2.91 : 1
⇒ K1.8 engine	4.200 : 1
⇒ KV6 engine	3.66 : 1
Hill Descent Control (HDC) speeds:	
Minimum forward	9.6 km/h (6.0 mph)
Minimum reverse	6.5 km/h (4.0 mph)
Viscous coupling	
Rating:	
⇒ Max	440 Nm (325 lbf.ft) @ 75 rpm
⇒ Min	360 Nm (265 lbf.ft) @ 75 rpm

Steering

Type	Power assisted rack and pinion
Steering column	Height adjustable by 3.5° or 30 mm vertical movement of steering wheel
Turns - lock to lock	3.20
Turning circle:	11.38 m (37 ft 1.2 in) - with a 215/65 tyre
Overall ratio	19.5: 1
Wheel alignment*	
Front	
⇒ Camber angle (negative):	-0° 15' ± 0° 45' (-0.25° ± 0.75°)
⇒ Cross camber angle	1° (1°) Maximum
⇒ Castor angle:	3° 30' ± 1° (3.92° ± 1.0°)
⇒ Cross castor angle	1° (1°) Maximum
⇒ King pin inclination	12° 18' (12.3°)
⇒ Front wheel alignment - total toe-out:	- 0° 14' ± 0° 14' (- 0.23° ± 0.23°)
Rear	
⇒ Camber angle (negative):	-0° 30' ± 0° 45' (0.5° ± 0.75°)
⇒ Cross camber angle	1° (1°) Maximum
⇒ Thrust angle:	0° 0' ± 0° 6' (0° ± 0.10°)
⇒ Rear wheel alignment - total toe-in:	0° 20' ± 0° 15' (0.3° ± 0.25°)
Power assisted steering	
Maximum Operating Pressure (limited by pressure relief valve in pump):	
⇒ K1.8	120 - 127 bar (1740 - 1841.5 lbf/in²)
⇒ KV6 & Td4	120 - 127 bar (1740 - 1841.5 lbf/in²)
Pressure at idle	5 - 7 bar (72.5 - 101.5 lbf/in²)
Maximum flow	5.5 ± 0.5 litres/min. (1.45 ± 0.13 US gal/min), limited by flow control valve in pump

* The steering geometry settings are given in degrees and minutes, decimal parts of a degree and millimetres. Steering and suspension geometry settings are for a vehicle at unladen weight.

Front Suspension

Type	Independent, MacPherson struts with coil springs, lower "L" shaped arms and anti-roll bar
Nominal height to wheel arch from hub centre*	453 mm (17.83 in)
Road spring identification (colour code):	
Td4 with manual gearbox	
⇒ Colour code	YELLOW / BLUE
⇒ Total coils	6
⇒ Active coils	5
⇒ Wire diameter	14.87 mm (0.585 in)
⇒ Free length	367 mm (14.45 in)
Td4 with automatic gearbox, non air conditioning	
⇒ Colour code	YELLOW / WHITE
⇒ Total coils	6
⇒ Active coils	5
⇒ Wire diameter	14.87 mm (0.585 in)
⇒ Free length	367 mm (14.445 in)
Td4 with automatic gearbox and air conditioning	
⇒ Colour code	YELLOW / BROWN
⇒ Total coils	6
⇒ Active coils	5
⇒ Wire diameter	14.866 mm (0.5853 in)
⇒ Free length	375 mm (14.76 in)
K1.8 without air conditioning	
⇒ Colour code	YELLOW / PINK
⇒ Total coils	5.5
⇒ Active coils	4.5
⇒ Wire diameter	14.03 mm (0.552 in)
⇒ Free length	359 mm (14.13 in)
K1.8 with air conditioning	
⇒ Colour code	YELLOW / GREY
⇒ Total coils	5.5
⇒ Active coils	4.5
⇒ Wire diameter	14.03 mm (0.552 in)
⇒ Free length	359 mm (14.13 in)
KV6 with air conditioning	
⇒ Colour code	YELLOW / BLUE
⇒ Total coils	6
⇒ Active coils	5
⇒ Wire diameter	14.87 mm (0.585 in)
⇒ Free length	367 mm (14.45 in)
KV6 with air conditioning	'
⇒ Colour code	YELLOW / WHITE
⇒ Total coils	6
⇒ Active coils	5
⇒ Wire diameter	14.87 mm (0.585 in)
⇒ Free length	371 mm (14.61 in)
Anti-roll bar diameter	20.5 mm (0.81 in)

* At unladen weight

Rear Suspension

Type	Independent, MacPherson struts with coil springs and lower "trapezoidal links"
Nominal height to wheel arch from hub centre*	463 mm (18.228 in) ± 10 mm (0.39)
Road spring identification	White / Green
Total coils	6.42
Active coils	4.7
Wire diameter	13.825 mm (0.5443 in)
Free length	349.86 (13.774 in)

* At unladen weight

Brakes

Front disc brakes	
Type	Pin-slider caliper with ventilated disc, self-adjusting
Disc diameter	262 mm (10.31 in)
Disc thickness: ⇒ New ⇒ Service limit	 20.8 - 21.00 mm (0.818 - 0.826 in) 18.00 mm (0.708 in)
Disc run-out (maximum)	0.040 mm (0.0016 in), with wheel on
Pad minimum thickness	3.00 mm (0.118 in)
Rear drum brakes	
Drum inside diameter	254 mm (10.00 in)
Drum wear limit	255.49 mm (10.059 in), discard drum
Lining minimum thickness	2.00 mm (0.079 in)
Drum ovality limit	0.012 mm (0.0005 in)
Master cylinder	
Bore diameter	23.80 mm (0.937 in)
Brake servo	
Servo boost ratio	4.5 : 1
Parking brake	
Type	Mechanically operated via twin cables on rear drum brakes
Anti-lock braking system	
Circuit type	Diagonal split, dual circuit, 4-sensor ABS
ABS type	TEVES MK20 with ABS, Hill Descent Control (HDC), Electronic Traction Control (ETC) and Electronic Brakeforce Distribution (EBD)

Wheels and tyres

Wheel type and size:	
⇒ Standard	$5^1/_2$ J x 15" steel
⇒ Option	$5^1/_2$ J x 15" alloy
⇒ Option	6.0 J x 16" alloy
⇒ Option	6.0 J x 17" alloy
Tyre sizes	
$5^1/_2$ J x 15" Wheels	195/80 R15 'Multi terrain' tyre
6 J x 16" Wheels	225/55 R16 'Multi terrain' tyre
7 J x 17" Wheels	225/55 R17 'Multi terrain' tyre

Tyre pressures

Front and rear – all engine variations	
⇒ Normal driving conditions (up to 4 passengers and luggage)	2.1 bar (30 lbf/in²)
⇒ Maximum Gross Vehicle Weight	2.1 bar (30 lbf/in²)
⇒ Towing	2.1 bar (30 lbf/in²)

Air Conditioning

System	CFC free, sealed, closed-loop system
Refrigerant	HFC - R134a
Refrigerant charge quantity All models except LHD KV6 LHD KV6 models	 540 ± 25 grammes 430 ± 25 grammes
Compressor:	
⇒ Type	Denso - variable displacement, 7-cylinder swash plate unit
⇒ Pressure (High side)	35.3 bar (3.53 MPa, 512 lbf/in²)
⇒ Pressure (Low side)	16.7 bar (1.67 MPa, 242 lbf/in²)
⇒ Displacement (Min.)	5%
⇒ Displacement (Max.)	95%
Lubricating oil	Nippon Denso ND-8
Evaporator thermostat: ⇒ Opens ⇒ Closes	 +2 °C (+36 °F) -4 °C (+25 °F)
Condenser fan control	PWM signal from ECM to cooling fan control unit
Refrigerant Pressure Sensor	
Low pressure limit:	
⇒ A/C on (pressure rising)	2.25 ± 0.2 bar (32.6 ± 2.9 lbf/in²)
⇒ A/C off (pressure falling)	1.96 ± 0.2 bar (28.4 ± 2.9 lbf/in²)
High pressure limit:	
⇒ A/C off (pressure rising)	31.4 ± 2.0 bar (455.3 ± 29 lbf/in²)
⇒ A/C on (pressure falling)	25.5 ± 2.0 bar (369.8 ± 29 lbf/in²)

Electrical – Td4 engine

System	12 volt, negative earth
Battery: ⇒ Type ⇒ Capacity	 H6, sealed for life 75 amp /hour
⇒ Type ⇒ Capacity	H7, sealed for life (cold climates) 80 amp /hour
Alternator: ⇒ Type ⇒ Maximum output ⇒ Maximum output (models with PTC heater)	 Nippon Denso K-frame 105 amp 150 amp

Electrical – K1.8 engine

System	12 volt, negative earth
Battery: ⇒ Type ⇒ Capacity	 H5, sealed for life 55 amp/hour
Alternator ⇒ Type ⇒ Maximum output	 Nippon Denso K-frame 105 amp

Electrical – KV6 engine

System	12 volt, negative earth
Battery: ⇒ Type ⇒ Capacity	 H6, sealed for life 75 amp/hour
Alternator: ⇒ Type ⇒ Maximum output	 Nippon Denso L-frame 120 amp

Dimensions

Overall length (inc. 195/80 spare wheel/tyre):	
⇒ K1.8	4368 mm (14ft 4 in)
⇒ KV6	4433 mm (14 ft 7 in)
⇒ Td4	4368 mm (14ft 4 in)
Overall length (inc. 195/80 spare wheel/tyre):	
⇒ K1.8	4368 mm (14ft 4 in)
⇒ KV6	4433 mm (14 ft 7 in)
⇒ Td4	4368 mm (14ft 4 in)
Overall width (including mirrors)	2.068 m (6 ft 9.4 in)
Overall height (including roof bars and cross rails)*	1.708 m (5 ft 7.2 in)
Overall height (including roof bars and cross rails)*	
⇒ 3 door	1.808 m (5 ft 11.2 in)
⇒ 5 door	1.828 m (5 ft 11.9 in)
Ground clearance (minimum)*:	186 mm (7.3 in)
Wading depth (maximum)	400 mm (15.7 in)
Wheelbase	2.557 m (8ft 4.7 in)
Maximum approach angle *	30.5°
Maximum departure angle (with towbar)*	24°
Maximum departure angle (without towbar)*	33.9°
Maximum breakover angle	24°
Track:	
⇒ Front	1534 mm (60.4 in)
⇒ Rear	1545 mm (60.8 in)

* At EEC kerb weight

Weights

Unladen weight (full fuel tank, excluding options):	
⇒ Petrol models	1410 - 1620 kg (3109 -3572 lb)
⇒ Diesel models	1540 - 1635 kg (3395 - 3605 lb)
Maximum gross vehicle weight:	
⇒ Td4 engine	2080 kg (4586 lb)
⇒ K1.8 engine	2040 kg (4497 lb)
⇒ KV6 engine	2060 kg (4542 lb)
Maximum front axle load:	
⇒ Td4 engine	1100 kg (2425 lb)
⇒ K1.8 engine	1050 kg (2315 lb)
⇒ KV6 engine	1080 kg (2381 lb)
Maximum rear axle load (must NOT be exceeded)	1120 kg (2470 lb)
Maximum trailer weight *	2000 kg (4410 lb)
Maximum Gross Towing Weight (GTW)**:	
⇒ Td4 engine	3880 kg (8554 lb)
⇒ K1.8 engine	3840 kg (8466 lb)
⇒ KV6 engine	3860 kg (8510 lb)
Towing hitch downward load (maximum nose weight) †	140 kg (309 lb)
Maximum roof rack load (includes weight of rack)	75 kg (165 lb)

†To increase stability, it is recommended that the nose weight is adjusted to the maximum limit, when loading to the maximum trailer weight.

*If the vehicle trailer weight exceeds 1800 kg the vehicle payload must be restricted to less than the Gross Vehicle Weight to ensure the loaded combination is within the Gross Train Weight limit.

**The Gross Towing Weight must be reduced by 300 kg (662 lb) when the following conditions exist:

climbing steep hills and mountains with air temperatures above 30 °C/ 86°F.

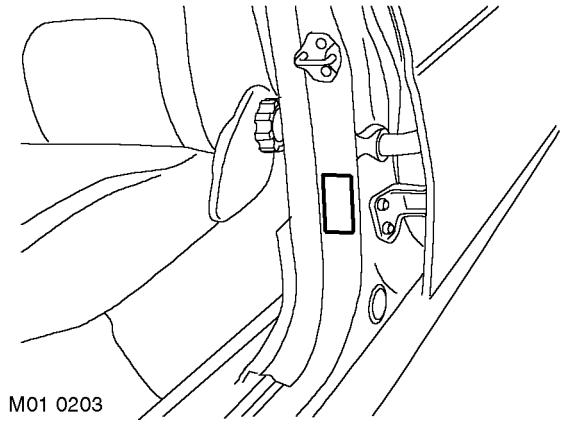
altitudes of 1000 metres (3280 feet) and above.

Vehicle Identification Number

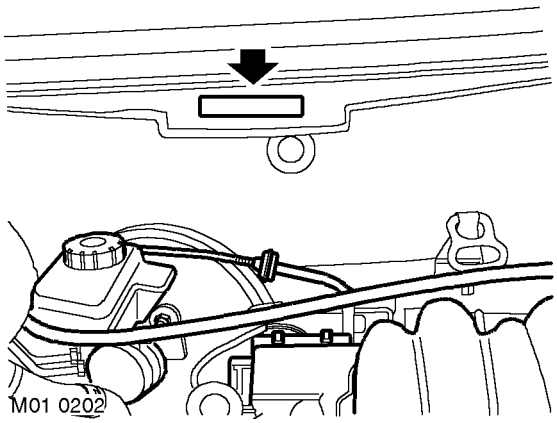
Location

The Vehicle Identification Number (VIN) plate is stamped on a plate attached to the LH 'B' post. The VIN is also stamped in the following locations:

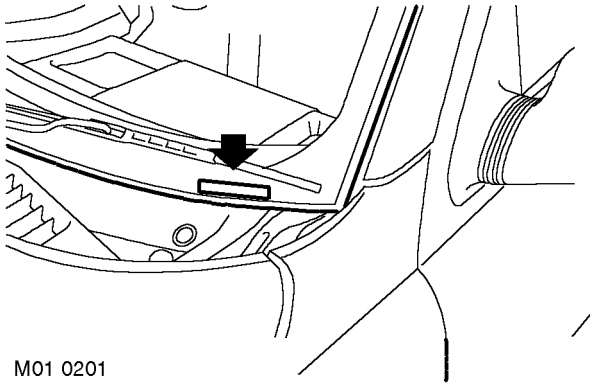
- On a plate attached to the LH 'B' post.
- On a plate behind the LH lower corner of the windscreen.
- On the engine compartment bulkhead.



VIN plate on LH 'B' post

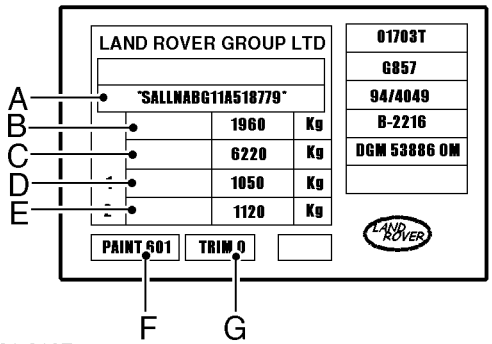


Engine compartment bulkhead



Windscreen VIN

The VIN plate contains the following information:



a Vehicle Identification Number (VIN)
b Gross vehicle weight
c Gross train weight
d Maximum front axle load
e Maximum rear axle load
f Paint code
g Trim code

Vehicle identification number -
Example: **SALLNABG11A518779**

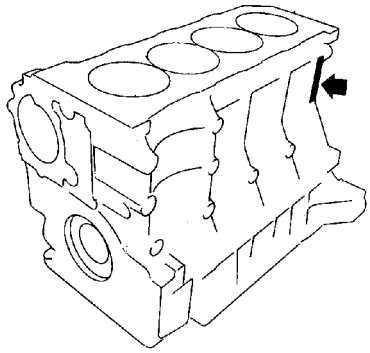
SAL	Manufacturer's identifier (Land Rover UK)
LN	Marque/Model LN = Freelander
A	Trim level A = Trim level 1
B	Body Style B = 5 door models
G	Engine G = KV6 petrol engine models
1	Transmission and Steering 1 = RHD automatic gearbox
1	Model Year 1 = 2001 Model year 2 = 2002 Model year 3 = 2003 Model year
A	Assembly plant A = Solihull
6 figures= Serial number	

Paint and trim colour codes
Paint code (F): a 3 digit code identifying the original paint colour is stamped on the VIN plate.

Trim code (G):a code identifying the original trim type and colour is stamped on the VIN plate.

Identification Number Locations

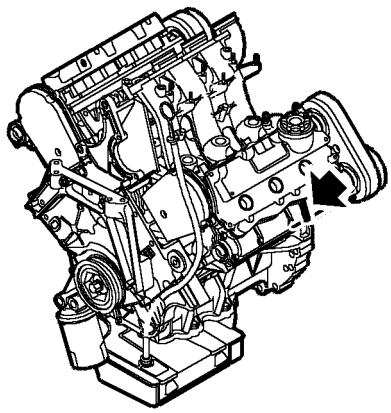
Engine number
K1.8 engine serial number is stamped on the front face of the cylinder block adjacent to the gearbox.



M01 0204

K1.8 engines

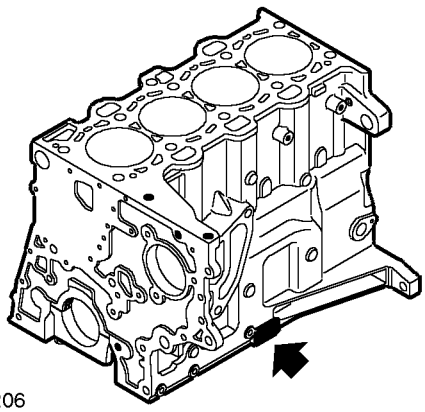
KV6 engine serial number is stamped on the rear LH side of the LH cylinder block.



M01 0205

KV6 engines

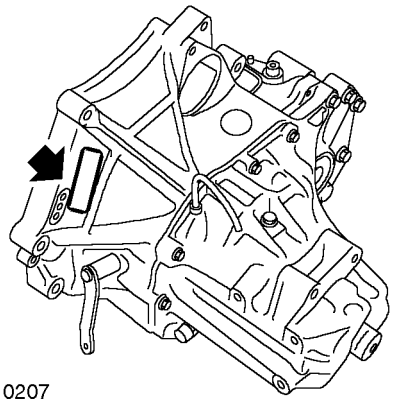
Td4 engine serial number is stamped on the bottom LH side of the cylinder block.



M01 0206

Td4 engines

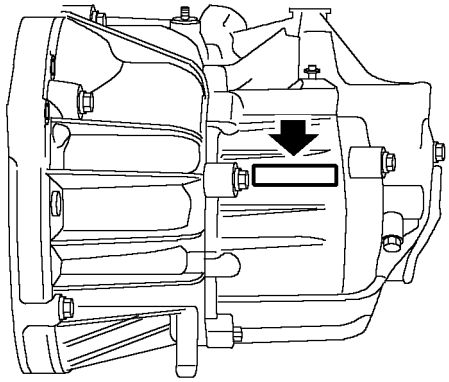
Manual gearbox number
PG1 gearbox serial number is provided on a barcode label attached to the front face of the clutch housing.



M01 0207

PG1 gearbox

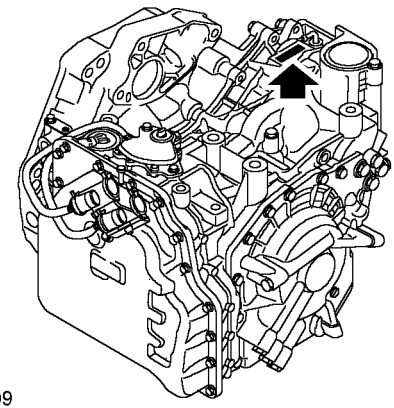
Getrag gearbox serial number is provided on an adhesive barcode label attached to the gearbox casting.



M01 0208

Getrag gearbox

Automatic gearbox number
The JATCO automatic gearbox serial number is stamped on the upper RH side of the gearbox casing.

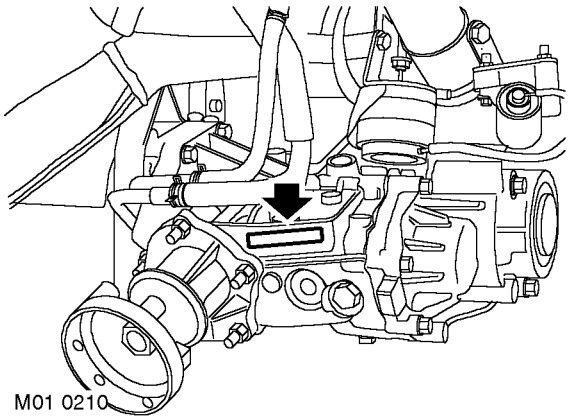


M01 0209

JATCO automatic gearbox

IRD unit

The IRD unit serial number is provided as a barcode on an adhesive label applied to the IRD casing.



IRD unit

Maintenance

TORQUE DESCRIPTION	METRIC	IMPERIAL
K1.8 engine oil drain plug	25 Nm	18 lbf.ft
KV6 engine oil drain plug	25 Nm	18 lbf.ft
Td4 engine oil drain plug	28 Nm	21 lbf.ft
Td4 engine oil filter cap	25 Nm	18 lbf.ft
Automatic gearbox oil drain plug	45 Nm	33 lbf.ft
Automatic gearbox oil filler/level plug	14 Nm	10 lbf.ft
Manual gearbox oil drain plug	35 Nm	26 lbf.ft
Manual gearbox oil filler/level plug	35 Nm	26 lbf.ft
Road wheel bolts - Alloy and steel wheels	115 Nm	85 lbf.ft

Engine – Td4

TORQUE DESCRIPTION	METRIC	IMPERIAL
Acoustic cover to engine	8 Nm	6 lbf.ft
Ancillary drive belt jockey pulley Allen bolt*	24 Nm	18 lbf.ft
Ancillary drive belt tensioner arm nut	10 Nm	7.5 lbf.ft
Big end bearing cap bolts:		
⇒ Stage 1	5 Nm	3.5 lbf.ft
⇒ Stage 2	25 Nm	18 lbf.ft
⇒ Stage 3	+70°	+70°
Camshaft bearing cap bolts †	10 Nm	7.5 lbf.ft
Camshaft cover bolts †	10 Nm	7.5 lbf.ft
Camshaft sprocket retaining screw:		
⇒ Stage 1	20 Nm	15 lbf.ft
⇒ Stage 2	+35°	+35°
Chain lubrication jet bolt	10 Nm	7.5 lbf.ft
Coolant rail to exhaust manifold bolts	20 Nm	15 lbf.ft
Coolant rail to exhaust manifold bolts	8 Nm	6 lbf.ft
Crankshaft pulley:		
⇒ Stage 1	100 Nm	74 lbf.ft
⇒ Stage 2	+60 °	+60 °
⇒ Stage 3	+60 °	+60 °
⇒ Stage 4	+30 °	+30 °
Crankshaft rear oil seal housing:		
⇒ M6 bolts	10 Nm	7.5 lbf.ft
⇒ M8 bolts	22 Nm	16 lbf.ft
Cylinder block reinforcing plate	22 Nm	16 lbf.ft
Cylinder head bolts:		
⇒ Stage 1†	80 Nm	59 lbf.ft
⇒ Stage 2 †	-1/2 turn	-1/2 turn
⇒ Stage 3†	50 Nm	37 lbf.ft
⇒ Stage 4†	+90°	+90°
⇒ Stage 5†	+90°	+90°
⇒ Stage 6 – tighten 41 mm bolt in position 12	110 Nm	81 lbf.ft
Cylinder head to timing cover Allen screws	15 Nm	11 lbf.ft
Dipstick tube to oil filter housing bolt	10 Nm	7.5 lbf.ft
Drive plate to crankshaft bolts †	115 Nm	85 lbf.ft
EGR cooler to cylinder head and lifting bracket bolts	25 Nm	18 lbf.ft
Engine breather pipe to air cleaner housing bolt	10 Nm	7.5 lbf.ft
Engine lifting eye bolts	20 Nm	15 lbf.ft
Engine mounting bracket assembly to engine bolts	100 Nm	74 lbf.ft
Engine mounting bracket to hydramount nut	85 Nm	63 lbf.ft
Engine lower steady bracket bolts:		
⇒ M10	45 Nm	33 lbf.ft
⇒ M12	50 Nm	37 lbf.ft
Engine steady mounting bolt	100 Nm	74 lbf.ft
Exhaust manifold to cylinder head nuts	24 Nm	18 lbf.ft
Flywheel to crankshaft bolts †	115 Nm	85 lbf.ft
Fuel pipe bracket to oil filter housing bolt	10 Nm	7.5 lbf.ft
Fuel pipe union nuts	30 Nm	22 lbf.ft
Fuel pump drive chain lower guide Allen bolt	24 Nm	18 lbf.ft

Fuel pump sprocket retaining nut	65 Nm	48 lbf.ft
Fuel rail Allen screws	24 Nm	18 lbf.ft
Fuel rail to coolant rail bolts	10 Nm	7.5 lbf.ft
Fuel rail to support bracket bolts	10 Nm	7.5 lbf.ft
Glow plugs	18 Nm	13 lbf.ft
Heatshield to coolant rail Allen screws	8 Nm	6 lbf.ft
Hose adaptor to cylinder head bolts	8 Nm	6 lbf.ft
LH engine mounting to gearbox bracket through bolt	100 Nm	74 lbf.ft
LH engine mounting to body	45 Nm	33 lbf.ft
Lower coolant rail support bracket bolts	15 Nm	11 lbf.ft
Main bearing cap bolts:		
⇒ 1st. Stage †	20 Nm	15 lbf.ft
⇒ 2nd Stage †	+70°	+70°
Oil cooler to oil filter housing bolts	22 Nm	16 lbf.ft
Oil feed guide rail bolts	10 Nm	7.5 lbf.ft
Oil filter cap	25 Nm	18 lbf.ft
Oil filter housing bolts	25 Nm	18 lbf.ft
Oil pick-up strainer to oil pump bolts	10 Nm	7.5 lbf.ft
Oil pressure switch	38 Nm	28 lbf.ft
Oil pump drive gear to oil pump drive shaft Torx bolt	25 Nm	18 lbf.ft
Oil pump to cylinder block	25 Nm	18 lbf.ft
PAS pipe clip to engine lifting eye bolt	10 Nm	7.5 lbf.ft
Sump: †		
⇒ M6 bolts	10 Nm	7.5 lbf.ft
⇒ M8 bolts	28 Nm	21 lbf.ft
Sump drain plug	28 Nm	21 lbf.ft
Sump plate bolts	10 Nm	7.5 lbf.ft
Timing chain support guides	20 Nm	15 lbf.ft
Timing chain tensioner access plug	30 Nm	22 lbf.ft
Timing chain tensioner bolt	10 Nm	7.5 lbf.ft
Timing cover bolts †	15 Nm	11 lbf.ft
Turbocharger to exhaust manifold bolts	45 Nm	33 lbf.ft
Turbocharger outlet pipe fixing bolts:		
⇒ 6mm	10 Nm	7.5 lbf.ft
⇒ 8mm	25 Nm	18 lbf.ft
Vacuum pump bolts	22 Nm	16 lbf.ft

† Tighten in sequence

* Fit new bolt

Engine – K1.8

TORQUE DESCRIPTION	METRIC	IMPERIAL
Big end bearing cap dowel bolts:		
⇒ Stage 1	20 Nm	15 lbf.ft
⇒ Stage 2	+45°	+45°
Bearing ladder to cylinder block bolts:		
⇒ Stage 1 †	5 Nm	3.5 lbf.ft
⇒ Stage 2 †	30 Nm	22 lbf.ft
Camshaft carrier to cylinder head bolts†	10 Nm	7.5 lbf.ft
Camshaft cover to carrier bolts †	8 Nm	6 lbf.ft
Camshaft gear bolt	65 Nm	48 lbf.ft
Camshaft rear oil seal cover plate bolts:		
⇒ Exhaust	25 Nm	18 lbf.ft
⇒ Inlet	6 Nm	4.5 lbf.ft
Camshaft sensor bolt	8 Nm	6 lbf.ft
Camshaft timing belt lower front cover bolts	9 Nm	7 lbf.ft
Camshaft drive belt upper front cover bolts	5 Nm	3.5 lbf.ft
Camshaft timing belt rear cover bolts	9 Nm	7 lbf.ft
Camshaft timing belt tensioner bolt *	25 Nm	18 lbf.ft
Camshaft upper cover to rear cover bolts	5 Nm	3.5 lbf.ft
Coolant outlet elbow to cylinder head bolts	9 Nm	7 lbf.ft
Crankshaft pulley bolt	205 Nm	151 lbf.ft
Cylinder head bolts		
⇒ Stage 1 †	20 Nm	15 lbf.ft
⇒ Stage 2 †	+180 °	+180 °
⇒ Stage 3 †	+180 °	+180 °
Dipstick tube to cylinder block	10 Nm	7.5 lbf.ft
Dipstick tube bracket and thermostat housing to cylinder block bolt	10 Nm	7.5 lbf.ft
Engine earth lead to body nut	9 Nm	7 lbf.ft
Engine harness to oil pump housing bolts	10 Nm	7.5 lbf.ft
Engine LH gearbox mounting bracket through bolt	80 Nm	59 lbf.ft
Engine LH mounting bracket to body bolts	45 Nm	33 lbf.ft
Engine lower steady to sump mounting bracket bolt	80 Nm	59 lbf.ft
Engine lower steady bracket to sump bolts	100 Nm	74 lbf.ft
Engine lower steady to subframe bolt	80 Nm	59 lbf.ft
Engine steady to LH mounting bolt	25 Nm	18 lbf.ft
Engine steady (lower) to rear beam bolt	80 Nm	59 lbf.ft
Engine steady (lower) to sump mounting bracket bolt	80 Nm	59 lbf.ft
Engine steady (upper RH) to body bolt	80 Nm	59 lbf.ft
Engine steady (upper RH) to top arm bolt	80 Nm	59 lbf.ft
Engine to gearbox top and front cover plate bolts and nuts	80 Nm	59 lbf.ft
Flywheel to crankshaft bolts†*	80 Nm	59 lbf.ft
Front cover plate to gearbox M6 bolt	9 Nm	7 lbf.ft
Ignition coils to camshaft cover bolts	8 Nm	6 lbf.ft
Oil pick-up strainer bolt	12 Nm	9 lbf.ft
Oil pick-up strainer support bracket to oil rail bolt	12 Nm	9 lbf.ft
Oil pressure switch	17 Nm	12.5 lbf.ft
Oil pressure relief valve plug	25 Nm	18 lbf.ft
Oil pump to cylinder block bolts†*	10 Nm	7.5 lbf.ft
Oil rail to bearing ladder nuts	9 Nm	7 lbf.ft

TORQUE DESCRIPTION	METRIC	IMPERIAL
Oil temperature sensor	17 Nm	12.5 lbf.ft
Pressure plate to flywheel bolts	25 Nm	18 lbf.ft
Spark plugs	25 Nm	18 lbf.ft
Spark plug cover screws	10 Nm	7.5 lbf.ft
Sump to engine bearing ladder bolts:		
⇒ M8 x 25 bolts †	25 Nm	18 lbf.ft
⇒ M8 x 60 bolts †	30 Nm	22 lbf.ft
Sump to gearbox bolts†	45 Nm	33 lbf.ft
Sump drain plug	28 Nm	21 lbf.ft
Timing belt tensioner bolt *	22 Nm	16 lbf.ft
Top arm to RH hydramount and engine:		
⇒ Bolts	170 Nm	125 lbf.ft
⇒ Nut	85 Nm	63 lbf.ft

† Tighten in sequence

* New bolt(s) must be fitted

Engine – KV6

TORQUE DESCRIPTION	METRIC	IMPERIAL
Bearing ladder to cylinder block bolts†		
⇒ Stage 1	20 Nm	15 lbf.ft
⇒ Stage 2	+90 °	+90 °
Camshaft carrier to cylinder head bolts †	10 Nm	7.5 lbf.ft
Camshaft cover to carrier bolts†	9 Nm	7 lbf.ft
Camshaft timing belt cover bolts	4 Nm	3 lbf.ft
Camshaft timing belt front cover backplate to cylinder head bolts	9 Nm	7 lbf.ft
Camshaft timing belt rear cover backplate to cylinder head bolts	9 Nm	7 lbf.ft
Camshaft timing belt tensioner bolts	25 Nm	18 lbf.ft
Camshaft timing gear bolts *		
⇒ Stage 1	27 Nm	20 lbf.ft
⇒ Stage 2	+90 °	+90 °
Camshaft position sensor bracket to camshaft cover bolt	9 Nm	7 lbf.ft
Connecting rod big-end bolts		
⇒ Stage 1	20 Nm	15 lbf.ft
⇒ Stage 2	+45 °	+45 °
Crankcase (lower) to cylinder block bolts		
⇒ M6 bolts	9 Nm	7 lbf.ft
⇒ M8 bolts	25 Nm	18 lbf.ft
Crankshaft pulley bolt	160 Nm	118 lbf.ft
Crankshaft rear oil seal to cylinder block bolts* †	8 Nm	6 lbf.ft
Cylinder head bolts †*		
⇒ Stage 1	25 Nm	18 lbf.ft
⇒ Stage 2	25 Nm	18 lbf.ft
⇒ Stage 3	25 Nm	18 lbf.ft
⇒ Stage 4	+180 °	+180 °
Drain plug to sump	25 Nm	18 lbf.ft
Drive plate to crankshaft bolts †*		
⇒ Stage 1	25 Nm	18 lbf.ft
⇒ Stage 2	100 Nm	74 lbf.ft
Earth lead to RH camshaft cover bolt	9 Nm	7 lbf.ft
Engine front mounting plate to cylinder block and IRD bracket		
⇒ M10 bolt - No. 1 on tightening sequence	25 Nm	18 lbf.ft
⇒ M10 bolt - No. 5 on tightening sequence	45 Nm	33 lbf.ft
⇒ M12 bolts	85 Nm	63 lbf.ft
Engine lifting bracket and front mounting plate to cylinder block and RH cylinder head bolts		
M10 bolts	25 Nm	18 lbf.ft
M12 bolts	45 Nm	33 lbf.ft
Engine mounting bracket to engine front plate bolts	45 Nm	33 lbf.ft
Engine mounting (LH) to body bolts	45 Nm	33 lbf.ft
Engine mounting bracket (LH) to gearbox bracket through bolt	85 Nm	63 lbf.ft
Engine mounting bracket (LH) to gearbox bracket through bolt	100 Nm	74 lbf.ft
Engine steady (lower) to sump bracket and subframe bolts	100 Nm	74 lbf.ft
Engine steady (upper RH) to body bolts	100 Nm	74 lbf.ft
Engine steady (upper RH) to top arm bolt	100 Nm	74 lbf.ft

Fuel rail to inlet manifold bolts	9 Nm	7 lbf.ft
Heat shield (RH rear timing belt) to cylinder head bolts		
⇒ M6	9 Nm	7 lbf.ft
⇒ M8	25 Nm	18 lbf.ft
Hydramount (RH)	85 Nm	63 lbf.ft
Idler pulley to engine front mounting plate Allen bolt	45 Nm	33 lbf.ft
Ignition coils to LH inlet manifold nut and bolts	9 Nm	7 lbf.ft
Ignition plug top coils to spark plug bolts	9 Nm	7 lbf.ft
Inlet manifold to cylinder head nuts and bolts	25 Nm	18 lbf.ft
IRD support bracket to front mounting plate bolts	45 Nm	33 lbf.ft
IRD support bracket to sump bolts	45 Nm	33 lbf.ft
LH mounting to body bolts	48 Nm	35 lbf.ft
LH mounting bracket to gearbox bolts	85 Nm	63 lbf.ft
LH mounting to gearbox bracket through bolt	100 Nm	74 lbf.ft
Oil cooler to sump mounting bracket nuts	25 Nm	18 lbf.ft
Oil cooler pipes to oil filter and oil cooler unions	26 Nm	19 lbf.ft
Oil dipstick tube bracket to cylinder block bolt	9 Nm	7 lbf.ft
Oil pick-up strainer to bearing ladder bolts	8 Nm	6 lbf.ft
Oil pressure relief valve plug nut	25 Nm	18 lbf.ft
Oil pressure switch	14 Nm	10 lbf.ft
Oil pump to cylinder block bolts †*		
⇒ Stage 1	5 Nm	4 lbf.ft
⇒ Stage 2	9 Nm	7 lbf.ft
PAS pipe to engine front mounting plate bolt	25 Nm	18 lbf.ft
PAS pipe support bracket to RH hydramount nut	85 Nm	63 lbf.ft
Sump to lower crank case bolts †	35 Nm	26 lbf.ft
Timing belt cover (front LH and RH) bolts	4 Nm	3 lbf.ft
Timing belt cover (lower) to cylinder block bolts	9 Nm	7 lbf.ft
Timing belt cover (rear LH and RH) bolts	4 Nm	3 lbf.ft
Rear timing belt cover backplate bolts	9 Nm	7.5 lbf.ft
Top arm to RH hydramount nut	85 Nm	63 lbf.ft
Top arm bracket to engine front plate and RH mounting bolts	100 Nm	74 lbf.ft

† Tighten in sequence

*New bolts must be fitted

Emission Control

TORQUE DESCRIPTION	METRIC	IMPERIAL
Depression limiter valve and filter assembly Allen screws	8 Nm	6 lbf.ft
EGR cooler to mounting bolts	25 Nm	18 lbf.ft
EGR valve Allen screws	10 Nm	7.5 lbf.ft
EGR solenoid valve bolts	10 Nm	7.5 lbf.ft
EGR pipe to lifting bracket and cylinder head bolts	25 Nm	18 lbf.ft
Fuel rails to support bracket bolt	10 Nm	7.5 lbf.ft
Turbocharger outlet pipe to support bracket bolt	10 Nm	7.5 lbf.ft
Turbocharger pipe to coolant rail bolts	25 Nm	18 lbf.ft

Engine Management System – EDC

TORQUE DESCRIPTION	METRIC	IMPERIAL
Camshaft position (CMP) sensor Torx screw	8 Nm	6 lbf.ft
Crankshaft position (CKP) sensor Allen screw	8 Nm	6 lbf.ft
'E' box cover Allen screws	2 Nm	1.5 lbf.ft
Engine coolant temperature sensor (ECT)	15 Nm	11 lbf.ft
Engine breather pipe to air cleaner housing bolt	6 Nm	4.4 lbf.ft
Mass air flow / inlet air temperature MAF/IAT sensor to air cleaner housing	6 Nm	4.4 lbf.ft
Throttle pedal to stud nuts	25 Nm	18 lbf.ft
Throttle Position (TP) sensor nuts and bolts	10 Nm	7 lbf.ft
TP sensor release lever nut	10 Nm	7 lbf.ft

Engine Management System – MEMS

TORQUE DESCRIPTION	METRIC	IMPERIAL
Camshaft position (CMP) sensor bolt	8 Nm	6 lbf.ft
Crankshaft position sensor (CKP) to housing bolt	8 Nm	6 lbf.ft
'E' box retaining clip nut	9 Nm	7 lbf.ft
Engine coolant temperature (ECT) sensor to housing bolt	15 Nm	11 lbf.ft
Fuel cut-off (inertia) switch nuts	2 Nm	1.5 lbf.ft
Idle air control (IAC) valve to manifold Torx screws	1.5 Nm	1.1 lbf.ft
Ignition coil and ht lead cover bolts	10 Nm	7.5 lbf.ft
Ignition coil mounting bolts	8 Nm	6 lbf.ft
Spark plugs to cylinder head	27 Nm	20 lbf.ft
Throttle body to inlet manifold chamber Torx screws (KV6)	7 Nm	5 lbf.ft
Throttle actuator support bracket to throttle body Torx screws (vehicles with cruise control only)	9 Nm	7 lbf.ft
Throttle position sensor to housing Torx screws	1.5 Nm	1.1 lbf.ft

Engine Management System – Siemens

TORQUE DESCRIPTION	METRIC	IMPERIAL
Camshaft position (CMP) sensor	8 Nm	6 lbf.ft
CMP sensor mounting bracket bolt	8 Nm	6 lbf.ft
Crankshaft position (CKP) sensor bolt	9 Nm	6.5 lbf.ft
Engine Coolant temperature (ECT) sensor	17 Nm	12.5 lbf.ft
'E' box cover Allen screws	2 Nm	1.5 lbf.ft
'E' box mounting nut	9 Nm	7 lbf.ft
Plug top coils to LH inlet manifold nut and bolt	9 Nm	6.5 lbf.ft
Plug top coils to RH camshaft cover bolts	9 Nm	6.5 lbf.ft
Spark plugs	25 Nm	18 lbf.ft
Throttle body to inlet manifold chamber Torx screws (KV6)	7 Nm	5 lbf.ft
Throttle pedal assembly to bulkhead nuts	25 Nm	18 lbf.ft
Throttle position (TP) sensor screws	1.5 Nm	1.1 lbf.ft

Fuel Delivery System – Diesel

TORQUE DESCRIPTION	METRIC	IMPERIAL
Air cleaner cover Allen screws	8 Nm	6 lbf.ft
Condenser to radiator bolts	3 Nm	2.2 lbf.ft
Filler neck to body nuts and bolt	9 Nm	6.5 lbf.ft
Fuel cooler to mounting bracket bolts	10 Nm	7 lbf.ft
Fuel cooler matrix to bonnet locking platform nuts	10 Nm	7 lbf.ft
Fuel cut-off (inertia) switch to bracket nuts	2 Nm	1.5 lbf.ft
Fuel injector clamp nuts	10 Nm	7 lbf.ft
Fuel injector pipe union nuts	20 Nm	15 lbf.ft
Fuel injection pump nuts	24 Nm	18 lbf.ft
Fuel injection pump sprocket nut	65 Nm	48 lbf.ft
Fuel injector studs	10 Nm	7 lbf.ft
Fuel pressure regulator Torx screws	9 Nm	6.5 lbf.ft
Fuel pressure sensor	38 Nm	28 lbf.ft
Fuel pump/sender unit to tank locking ring	35 Nm	26 lbf.ft
Fuel rails to support bracket bolt	10 Nm	7.5 lbf.ft
Fuel rail Allen screws	24 Nm	18 lbf.ft
Fuel tank to body bolts	45 Nm	33 lbf.ft
Glow plugs	20 Nm	15 lbf.ft
High pressure fuel pipe union nuts	20 Nm	15 lbf.ft
Intercooler to radiator bolts	3 Nm	2.2 lbf.ft
Low pressure fuel rail bolts	10 Nm	7 lbf.ft
Timing case access plug	30 Nm	22 lbf.ft
Turbocharger boost control solenoid valve mounting bracket to turbocharger bolts	10 Nm	7 lbf.ft
Turbocharger boost control solenoid valve to mounting rubber nuts	5 Nm	3.7 lbf.ft
Turbocharger boost pressure sensor to inlet manifold bolt	8 Nm	6 lbf.ft
Turbocharger oil drain pipe bracket bolts	20 Nm	15 lbf.ft
Turbocharger oil drain pipe flange bolts	8 Nm	6 lbf.ft
Turbocharger oil feed pipe banjo bolts	22 Nm	16 lbf.ft
Turbocharger outlet pipe to bracket bolts: ⇒ 6 mm ⇒ 8 mm	 10 Nm 20 Nm	 7 lbf.ft 15 lbf.ft
Turbocharger to exhaust manifold bolts	50 Nm	37 lbf.ft

Fuel delivery system – Petrol

TORQUE DESCRIPTION	METRIC	IMPERIAL
Air cleaner to battery tray bolts	9 Nm	7 lbf.ft
Fuel filler neck to body nuts and bolt	9 Nm	7 lbf.ft
Fuel pump/sender unit to tank locking ring	35 Nm	26 lbf.ft
Fuel rail to inlet manifold bolt	8 Nm	6 lbf.ft
Fuel tank to body bolts	40 Nm	29 lbf.ft
Heated Oxygen (HO_2S) Sensor	40 Nm	29 lbf.ft
Ignition coils to LH inlet manifold nuts and bolts	9 Nm	7 lbf.ft
Inertia (fuel cut-off) switch	2 Nm	1.5 lbf.ft
Intake Air Control Valve (IACV) to throttle body Allen screws	6 Nm	4.5 lbf.ft
Subframe to body bolts	190 Nm	140 lbf.ft
Throttle housing to inlet manifold bolts [1] (K1.8) ⇒1st. stage ⇒2nd. stage	 4 Nm 9 Nm	 3 lbf.ft 7 lbf.ft
Throttle body to inlet manifold chamber Torx screws (KV6)	8 Nm	6 lbf.ft
Throttle actuator support bracket to throttle body Torx screws (vehicles with cruise control only)	9 Nm	7 lbf.ft
Throttle position sensor to housing Torx screws	1.5 Nm	1.1 lbf.ft
VIS motor to inlet manifold chamber screws (KV6 only)	8 Nm	6 lbf.ft

[1] Tighten in sequence using the procedure defined in 'Repairs' section.

☞ **ENGINE MANAGEMENT SYSTEM - SIEMENS, REPAIRS, Sensor - combined - manifold absolute pressure/Intake air temperature (MAP/IAT).**

Cooling System – Td4

TORQUE DESCRIPTION	METRIC	IMPERIAL
Coolant hose adaptor to cylinder head bolts	8 Nm	6 lbf.ft
Coolant rail (lower) to sump bolts	10 Nm	7.5 lbf.ft
Coolant rail to cylinder head bolt	20 Nm	15 lbf.ft
Coolant rail to exhaust manifold bolt	20 Nm	15 lbf.ft
Coolant pump to cylinder block bolts	10 Nm	7.5 lbf.ft
Fan and motor assembly to fan cowl bolts	5 Nm	4 lbf.ft
Fan cowl to radiator bolts	5 Nm	4 lbf.ft
Fuel cooler to mounting nuts	10 Nm	7.5 lbf.ft
Fuel rail to coolant rail bolt	10 Nm	7.5 lbf.ft
Heatshield to coolant rail Allen screws	8 Nm	6 lbf.ft
Thermostat housing to coolant pump bolts	8 Nm	6 lbf.ft
Upper coolant rail to thermostat housing bolt	8 Nm	6 lbf.ft

Cooling System – K1.8

TORQUE DESCRIPTION	METRIC	IMPERIAL
Condenser to radiator bolts	3 Nm	2.2 lbf.ft
Cooling fan control unit mounting bolt	5 Nm	4 lbf.ft
Cooling fan cowl to radiator	5 Nm	4 lbf.ft
Cooling fan and motor assembly to cowl bolts	5 Nm	4 lbf.ft

Cooling System – KV6

TORQUE DESCRIPTION	METRIC	IMPERIAL
Coolant pump to cylinder block bolts †	9 Nm	6.5 lbf.ft
Cooling fan and motor assembly to fan cowl bolts	5 Nm	3.7 lbf.ft
Cooling fan cowl to radiator bolts	5 Nm	3.7 lbf.ft
Cylinder block drain plug	20 Nm	15 lbf.ft
Injector protection cover to RH fuel rail and inlet manifold bolts	9 Nm	6.5 lbf.ft
Radiator baffle bolts	5 Nm	3.7 lbf.ft
Thermostat housing flange / coolant elbow bolt	18 Nm	13 lbf.ft

†Tighten in sequence.

Manifolds and Exhaust System – Td4

TORQUE DESCRIPTION	METRIC	IMPERIAL
Coolant rail to cylinder head bolt	20 Nm	15 lbf.ft
Coolant rail to exhaust manifold bolt	20 Nm	15 lbf.ft
Coolant rail to thermostat housing bolt	8 Nm	6 lbf.ft
EGR cooler to cylinder head and lifting bracket bolts	25 Nm	18 lbf.ft
EGR pipe clamp screw	10 Nm	7.5 lbf.ft
EGR pipe to cylinder head bolt	20 Nm	15 lbf.ft
EGR pipe to manifold Torx screws	22 Nm	16 lbf.ft
Exhaust manifold to cylinder head nuts	24 Nm	18 lbf.ft
Front pipe clamping plate nuts	50 Nm	37 lbf.ft
Front pipe to intermediate pipe flange nuts	60 Nm	44 lbf.ft
Fuel rail to coolant rail bolt	10 Nm	7.5 lbf.ft
Fuel rail to support bracket bolt	10 Nm	7.5 lbf.ft
Heat shield to coolant rail Allen screws	8 Nm	6 lbf.ft
Inlet manifold: ⇒ M6 bolts ⇒ M7 bolts and nuts	 10 Nm 15 Nm	 7.5 lbf.ft 11 lbf.ft
Intermediate pipe to tail pipe flange nuts	60 Nm	44 lbf.ft
Tail pipe clamp nut	55 Nm	41 lbf.ft
Turbocharger to exhaust manifold bolts	50 Nm	37 lbf.ft
Turbocharger outlet pipe bolts: ⇒6 mm ⇒8 mm	 10 Nm 25 Nm	 7.5 lbf.ft 18 lbf.ft

Manifolds and Exhaust Systems – K1.8

TORQUE DESCRIPTION	METRIC	IMPERIAL
Alternator bolts	45 Nm	33 lbf.ft
Alternator mounting bracket bolts	25 Nm	18 lbf.ft
Coil cover bolts	10 Nm	7.5 lbf.ft
Exhaust heatshield to manifold bolts	10 Nm	7.5 lbf.ft
Exhaust heatshield to manifold nut	25 Nm	18 lbf.ft
Exhaust front pipe to intermediate pipe nuts	60 Nm	44 lbf.ft
Exhaust front pipe to manifold nuts	60 Nm	44 lbf.ft
Exhaust manifold to cylinder head nuts †	45 Nm	33 lbf.ft
Exhaust manifold heatshield to front pipe bolts	9 Nm	7 lbf.ft
Heated Oxygen (HO_2S) Sensor	55 Nm	41 lbf.ft
Heatshield to alternator bracket:		
⇒ Nut	25 Nm	18 lbf.ft
⇒ Bolts	10 Nm	7.5 lbf.ft
Inlet manifold to cylinder head nuts †	17 Nm	12.5 lbf.ft
Intermediate pipe to tail pipe flange nuts	60 Nm	44 lbf.ft
RH coil bolts	10 Nm	7.5 lbf.ft
Tail pipe clamp nut	55 Nm	41 lbf.ft

†Tighten in sequence.

Manifolds and Exhaust Systems – KV6

TORQUE DESCRIPTION	METRIC	IMPERIAL
Coolant/breather hose bracket to inlet manifold bolt	9 Nm	6.5 lbf.ft
Exhaust heatshield to exhaust mounting bracket bolts	45 Nm	33 lbf.ft
Exhaust heatshield to IRD housing nut	45 Nm	33 lbf.ft
Exhaust heatshield to lower engine steady mounting bracket bolts	9 Nm	6.5 lbf.ft
Exhaust heatshield to pinion housing nuts	25 Nm	18 lbf.ft
Exhaust flange (LH) to front pipe nuts	50 Nm	37 lbf.ft
Exhaust flange (LH) to front pipe nuts	50 Nm	37 lbf.ft
Exhaust manifold to cylinder head nuts	45 Nm	33 lbf.ft
Exhaust front pipe to manifold flange nuts	50 Nm	37 lbf.ft
Heated Oxygen (HO_2S) sensor	55 Nm	41 lbf.ft
Inlet manifold chamber to inlet manifold bolts	18 Nm	13 lbf.ft
Inlet manifold chamber support brackets to RH camshaft cover bolts	10 Nm	7.5 lbf.ft
Inlet manifold to cylinder head nuts and bolts	25 Nm	18 lbf.ft
Intermediate pipe to front pipe nuts	50 Nm	37 lbf.ft
Intermediate pipe to front pipe nuts	50 Nm	44 lbf.ft
Lower engine steady to subframe bolt	100 Nm	74 lbf.ft
Lower engine steady to sump mounting bolt	100 Nm	74 lbf.ft
RH upper engine steady to body bolt	100 Nm	74 lbf.ft
RH upper engine steady to top arm bolt	100 Nm	74 lbf.ft
Tail pipe clamp nuts	55 Nm	41 lbf.ft

Clutch

TORQUE DESCRIPTION	METRIC	IMPERIAL
Clutch assembly to flywheel Allen screws †	25 Nm	18 lbf.ft
Clutch slave cylinder mounting bracket to gearbox bolts	25 Nm	18 lbf.ft
Inertia switch bolt	8 Nm	6 lbf.ft
Pressure plate to flywheel Torx bolts†	25 Nm	18 lbf.ft

† Tighten in diagonal sequence

Manual Gearbox – PG1

TORQUE DESCRIPTION	METRIC	IMPERIAL
Clutch slave cylinder mounting bracket to gearbox bolts	25 Nm	18 lbf.ft
Drain plug	35 Nm	26 lbf.ft
Filler / level plug	35 Nm	26 lbf.ft
1st. gear switch	24 Nm	18 lbf.ft
Front cover plate to gearbox bolt and nut	9 Nm	7 lbf.ft
Gearbox to engine bolts	80 Nm	59 lbf.ft
Gearbox to sump bolts	45 Nm	33 lbf.ft
Gear change steady rod to mounting bracket bolt	25 Nm	18 lbf.ft
Lifting bracket to gearbox bolt	45 Nm	33 lbf.ft
LH engine mounting to gearbox bolts	65 Nm	48 lbf.ft
LH engine mounting to gearbox bolts	80 Nm	59 lbf.ft
Reverse light switch	24 Nm	18 lbf.ft

Manual Gearbox – Getrag

TORQUE DESCRIPTION	METRIC	IMPERIAL
Earth lead to gearbox bolt	25 Nm	18 lbf.ft
Engine LH mounting to body bolts (KV6)	48 Nm	35 lbf.ft
1st gear switch to gearbox	24 Nm	18 lbf.ft
Gearbox drain plug	35 Nm	26 lbf.ft
Gearbox casing end cover Torx bolts	25 Nm	18 lbf.ft
Gearbox filler / level plug	35 Nm	26 lbf.ft
Gearbox closing plate bolts	10 Nm	7 lbf.ft
Gearbox to engine bolts	85 Nm	63 lbf.ft
Gearbox to LH engine mounting bolts (KV6)	85 Nm	63 lbf.ft
Gear change cover bolts	25 Nm	18 lbf.ft
Gearbox mounting bracket to gearbox bolts	85 Nm	63 lbf.ft
Gearbox mounting bracket to gearbox bolts	100 Nm	74 lbf.ft
Gearbox mounting bracket to LH engine mounting through bolt	100 Nm	74 lbf.ft
Gearbox to engine bolts	85 Nm	63 lbf.ft
Gearbox rear cover Torx bolts	25 Nm	18 lbf.ft
Gear change cover to selector shaft Torx bolts	25 Nm	18 lbf.ft
LH engine mounting to gearbox bracket bolts	100 Nm	74 lbf.ft
Release bearing sleeve bolts	12 Nm	9 lbf.ft
Reverse lamp switch to gearbox	24 Nm	18 lbf.ft

Intermediate Reduction Drive

TORQUE DESCRIPTION	METRIC	IMPERIAL
Drain plug	35 Nm	26 lbf.ft
Exhaust heatshield to exhaust mounting bracket	45 Nm	33 lbf.ft
Exhaust heatshield to IRD screws (Td4)	30 Nm	22 lbf.ft
Exhaust heatshield to IRD nut (K1.8 and KV6)	45 Nm	33 lbf.ft
Filler / level plug	35 Nm	26 lbf.ft
IRD unit to gearbox bolts	90 Nm	66 lbf.ft
IRD end cover bolts	30 Nm	22 lbf.ft
IRD support bracket to cylinder block bolt (Td4)	45 Nm	33 lbf.ft
IRD support bracket to cylinder block bolt (Td4)	45 Nm	33 lbf.ft
IRD support bracket to cylinder block bolt (Td4)	50 Nm	37 lbf.ft
IRD support bracket to IRD bolts (Td4) ⇒ M8 ⇒ M10	 30 Nm 50 Nm	 22 lbf.ft 37 lbf.ft
IRD support bracket to IRD bolts (K1.8 and KV6)	50 Nm	37 lbf.ft
IRD support bracket to sump (K1.8 and KV6)	45 Nm	33 lbf.ft
Lower engine steady to IRD support bracket bolts	100 Nm	74 lbf.ft
Manifold heatshield to IRD support bracket bolts (K1.8 and KV6)	9 Nm	6.5 lbf.ft
Manifold heatshield to IRD support bracket bolts (K1.8 and KV6)	25 Nm	18 lbf.ft
Manifold heatshield to pinion housing nut (KV6)	45 Nm	33 lbf.ft
Manifold heatshield to IRD (Td4)	30 Nm	22 lbf.ft
Breather pipe bracket screw	9 Nm	7 lbf.ft
Mass damper to pinion housing nuts (K1.8)	25 Nm	18 lbf.ft
Pinion nut	150 Nm	111 lbf.ft
Pinion housing nuts	25 Nm	18 lbf.ft
Propeller shaft to IRD flange bolts	40 Nm	30 lbf.ft

Automatic Gearbox – Jatco

TORQUE DESCRIPTION	METRIC	IMPERIAL
Air blast cooler assembly to chassis bolts:		
⇒ Lower	10 Nm	7.5 lbf.ft
⇒ Upper	5 Nm	3.5 lbf.ft
Air blast cooler fan cowl to matrix bolts	5 Nm	3.5 lbf.ft
Air blast cooler fan motor to cowl bolts	5 Nm	3.5 lbf.ft
Air blast cooler multiplug mounting bracket nut	10 Nm	7.5 lbf.ft
Air blast cooler pipe union nuts	25 Nm	18 lbf.ft
Crankshaft Position (CKP) Sensor	9 Nm	7 lbf.ft
Closing panel to gearbox panel bolt	10 Nm	7.5 lbf.ft
Drive plate to converter bolts	45 Nm	33 lbf.ft
Earth lead to gearbox housing bolt	25 Nm	18 lbf.ft
Fluid cooler to mounting bracket bolts (KV6)	25 Nm	18 lbf.ft
Fluid cooler mounting bracket bolts (KV6):		
⇒ M8	25 Nm	18 lbf.ft
⇒ M12	85 Nm	63 lbf.ft
Fluid cooler mounting bolts (Td4):		
⇒ 2 off	45 Nm	33 lbf.ft
⇒ 1 off	25 Nm	18 lbf.ft
Fluid cooler hoses to gearbox	18 Nm	13 lbf.ft
Fluid cooler hose unions	18 Nm	13 lbf.ft
Fluid pan bolts †	7 Nm	5 lbf.ft
Gearbox closing plate bolt (Td4)	10 Nm	7.5 lbf.ft
Gearbox drain plug	45 Nm	33 lbf.ft
Gearbox level plug	14 Nm	10 lbf.ft
Gearbox housing to sump	85 Nm	63 lbf.ft
Gearbox to engine bolts	85 Nm	63 lbf.ft
Gearbox mounting bracket bolts	85 Nm	63 lbf.ft
Gearbox mounting through bolt	100 Nm	74 lbf.ft
Inhibitor switch bolts	3 Nm	2.2 lbf.ft
IRD cooling hose retainer bolt (KV6)	25 Nm	18 lbf.ft
IRD support bracket mounting bolts † (KV6)	50 Nm	37 lbf.ft
IRD support bracket to engine front mounting bracket bolts † (KV6)	50 Nm	37 lbf.ft
IRD support bracket to sump bolts † (KV6)	45 Nm	33 lbf.ft
IRD to gearbox bolts (KV6)	80 Nm	59 lbf.ft
Manifold heatshield to IRD support bracket (KV6):		
⇒ Bolts	9 Nm	7 lbf.ft
⇒ Nut	45 Nm	33 lbf.ft
Manifold heatshield to IRD pinion housing nut (KV6)	25 Nm	18 lbf.ft
Selector housing nuts	10 Nm	7.5 lbf.ft
Selector cable trunnion nut	6 Nm	4.5 lbf.ft
Selector lever to gearbox selector shaft nut	25 Nm	18 lbf.ft
Starter motor to gearbox bolts	45 Nm	33 lbf.ft
Torque converter access plate bolts	9 Nm	7 lbf.ft

†Tighten in sequence.

Driveshafts

TORQUE DESCRIPTION	METRIC	IMPERIAL
Adjustable transverse link to subframe nut and bolt [1]	120 Nm	89 lbf.ft
Adjustable transverse link to subframe nut and bolt [1]	120 Nm	89 lbf.ft
Fixed transverse link to subframe nut and bolt	120 Nm	89 lbf.ft
Front propeller shaft to IRD flange bolts and nuts	40 Nm	30 lbf.ft
Front propeller shaft to viscous coupling bolt	65 Nm	48 lbf.ft
Handbrake cable clip to subframe bolt	22 Nm	16 lbf.ft
Propeller shaft to IRD flange nuts and bolts	40 Nm	30 lbf.ft
Propeller shaft to rear axle nuts and bolt	65 Nm	48 lbf.ft
Propeller shaft to viscous coupling nuts and bolts	65 Nm	48 lbf.ft
Rear differential pinion nut: ⇒ Initial tightening ⇒ Maximum	 190 Nm 373 Nm	 140 lbf.ft 275 lbf.ft
Rear cover to differential casing bolts	25 Nm	18 lbf.ft
Rear differential to front mounting bolts	65 Nm	48 lbf.ft
Rear differential front mounting bush to subframe bolt	120 Nm	89 lbf.ft
Rear differential to rear mounting bolts	65 Nm	48 lbf.ft
Rear differential oil plug	27 Nm	20 lbf.ft
Trailing link to rear hub nut and bolt	120 Nm	89 lbf.ft
Viscous coupling support bearing bolts	28 Nm	21 lbf.ft

[1] Tighten with weight of vehicle on suspension

Steering

TORQUE DESCRIPTION	METRIC	IMPERIAL
Ball joint to steering arm nuts	55 Nm	41 lbf.ft
Coolant rail to cylinder block bolts (KV6)	9 Nm	7 lbf.ft
Gear change linkage to bulkhead bolts (Td4 manual)	25 Nm	18 lbf.ft
Heatshield nuts (KV6)	25 Nm	18 lbf.ft
Interlock cable to column lock union (JATCO)	4 Nm	3 lbf.ft
IRD hose clip bolt (Td4)	25 Nm	18 lbf.ft
Key cable clamp bolt (JATCO)	6 Nm	4.5 lbf.ft
PAS pipe clip to engine lifting eye bolt	10 Nm	7.5 lbf.ft
PAS high pressure pipe clip bolt	8 Nm	6 lbf.ft
PAS fluid pipe bracket bolts	10 Nm	7.5 lbf. ft
PAS outlet hose to pump banjo bolt (KV6 & K1.8)	20 Nm	15 lbf.ft
PAS outlet hose to pump banjo bolt (Td4)	25 Nm	18 lbf.ft
PAS outlet pipe clip bolt	22 Nm	16 lbf.ft
PAS pipe to clamp bolt	22 Nm	16 lbf. ft
PAS pipe to engine front mounting plate bolt (KV6)	25 Nm	18 lbf.ft
PAS pipe support bracket to RH hydramount nut (KV6)	85 Nm	63 lbf.ft
PAS pipe to RH turret clip bolt	10 Nm	7.5 lbf.ft
PAS pump high pressure pipe union	25 Nm	18 lbf.ft
PAS pump pulley bolts	10 Nm	7.5 lbf.ft
PAS pump to mounting bracket bolts (KV6 & K1.8)	25 Nm	18 lbf.ft
PAS pump to mounting bracket bolts (Td4):		
⇒ M6	10 Nm	7.5 lbf.ft
⇒ M8	25 Nm	18 lbf.ft
PAS pump mounting to cylinder block bolts	45 Nm	33 lbf.ft
PAS rack fluid feed pipe union nut	18 Nm	13 lbf. ft
PAS rack fluid return pipe union nut	22 Nm	16 lbf. ft
PAS rack mounting and clamp to bulkhead bolts	45 Nm	33 lbf. ft
Ram feed pipe union nuts:		
⇒ Small (6mm) diameter	18 Nm	13 lbf.ft
⇒ Large (10 mm) diameter	24 Nm	18 lbf.ft
Steering column height adjuster clamp bolt and nut	10 Nm	7.5 lbf.ft
Steering column height adjuster clamp bolt and nut	12 Nm	9 lbf.ft
Steering column bracket side support bolt	10 Nm	7.5 lbf.ft
Steering column lock bolt	SHEAR	
Steering column to fascia support rail (Nyloc) nuts and bolts	14 Nm	10 lbf.ft
Steering column to PAS rack pinion clamp pinch bolt [1]	32 Nm	24 lbf. ft
Steering wheel nut	45 Nm	33 lbf.ft
Track-rod ends to steering arm nuts	55 Nm	41 lbf.ft
Track-rod end pinch bolt *	28 Nm	21 lbf.ft
Track-rod to rack bolts	100 Nm	74 lbf.ft
Turnbuckle lock nuts	90 Nm	66 lbf.ft

* Tighten with weight of vehicle on suspension

Front Suspension and Subframe

TORQUE DESCRIPTION	METRIC	IMPERIAL
Anti-roll bar saddle clamp to subframe bolts	23 Nm	17 lbf.ft
Anti-roll bar link to damper nut	45 Nm	33 lbf.ft
Anti-roll bar to link nut	55 Nm	41 lbf.ft
Damper assembly to body top mounting nuts[2]	45 Nm	33 lbf.ft
Damper to hub nuts and bolts[2]	205 Nm	151 lbf.ft
Damper shaft locking nut	57 Nm	42 lbf.ft
Engine lower steady to support beam bolt	100 Nm	74 lbf.ft
Engine tie-bar to sump bolts	100 Nm	74 lbf.ft
Front subframe to body front bolts	190 Nm	140 lbf.ft
Hub drive shaft nut[1]	400 Nm	295 lbf.ft
Hub assembly to lower swivel joint nut	65 Nm	48 lbf.ft
Lower arm front bush to subframe bolt[2]	190 Nm	140 lbf.ft
Lower arm rear bush housing bolts to body[2]	105 Nm	77 lbf.ft
Lower arm to rear bush housing nut[2]	140 Nm	103 lbf.ft
Road wheel nuts[3]	115 Nm	85 lbf.ft
Support beam to body bolts	190 Nm	140 lbf.ft

[1] Use NEW nuts

[2] Tighten with weight of vehicle on suspension

[3] Tighten in diagonal sequence

Rear Suspension and Subframe

TORQUE DESCRIPTION	METRIC	IMPERIAL
Backplate to hub bolts	45 Nm	33 lbf.ft
Brake pipe to wheel cylinder union	14 Nm	10 lbf.ft
Damper shaft self locking nut	57 Nm	42 lbf.ft
Damper top mounting nuts	45 Nm	33 lbf.ft
Differential mountings to casing bolts	65 Nm	48 lbf.ft
Differential mountings to subframe	120 Nm	89 lbf.ft
Hub to damper nuts and bolts[2]	205 Nm	151 lbf.ft
Hub drive shaft nut[1]	400 Nm	295 lbf.ft
Propeller shaft to rear axle bolts	65 Nm	48 lbf.ft
Road wheel nuts	115 Nm	85 lbf.ft
Subframe to body bolts	190 Nm	140 lbf.ft
Trailing link to rear hub nut and bolt[1]	120 Nm	89 lbf.ft
Transverse links to hub nut and bolt[1]	120 Nm	89 lbf.ft
Transverse link to subframe nuts and bolts[1]	105 Nm	77 lbf.ft

[1] Tighten with weight of vehicle on suspension

Brakes

TORQUE DESCRIPTION	METRIC	IMPERIAL
ABS ECU pipe unions	17 Nm	12 lbf.ft
ABS modulator to mounting bracket bolts	9 Nm	7 lbf.ft
ABS modulator mounting bracket to inner wing: ⇒ Nuts ⇒ Bolts	 13 Nm 8 Nm	 10 lbf.ft 6 lbf.ft
Bleed screw - front calipers	10 Nm	7.5 lbf.ft
Brake servo to bulkhead nuts	22 Nm	16 lbf.ft
EGR cooler to mounting bolts	25 Nm	18 lbf.ft
EGR pipe support bracket to engine lifting bracket bolts	25 Nm	18 lbf.ft
Front caliper brake hose banjo bolt	28 Nm	21 lbf.ft
Front caliper guide pin bolts	27 Nm	20 lbf.ft
Front caliper mounting bolts	100 Nm	74 lbf.ft
Front disc shield to hub screw	8.5 Nm	6.3 lbf.ft
Front disc to drive flange screws	5 Nm	3.7 lbf.ft
Fuel rail to support bracket bolt	10 Nm	7.5 lbf.ft
Handbrake cable to body and subframe bolts	22 Nm	16 lbf.ft
Handbrake cable retaining plate bolts	22 Nm	16 lbf.ft
Handbrake lever assembly to body bolts	22 Nm	16 lbf.ft
Hill Descent Control (HDC) switch bolt	5 Nm	3.5 lbf.ft
Master cylinder to servo nuts	25 Nm	18 lbf.ft
PAS oil cooler pipe bolts	10 Nm	7.5 lbf.ft
Primary and secondary brake pipe union nuts	17 Nm	12 lbf.ft
Rear wheel cylinder pipe union nut	17 Nm	12 lbf.ft
Rear wheel cylinder to backplate bolts	8 Nm	6 lbf.ft
Reservoir to master cylinder (LHD) Torx bolt	8 Nm	6 lbf.ft
Reservoir to master cylinder (LHD) Torx bolt	6 Nm	4.5 lbf.ft
Road wheel nuts	115 Nm	85 lbf.ft
Turbocharger intercooler pipe to support bracket bolt	10 Nm	7.5 lbf.ft
Turbocharger pipe to coolant rail bolt	25 Nm	18 lbf.ft
Vacuum pump bolts[1]	22 Nm	16 lbf.ft
Vacuum reservoir to mounting bracket nut	10 Nm	7.5 lbf.ft

[1] Use NEW bolts

Supplementary Restraint Systems

TORQUE DESCRIPTION	METRIC	IMPERIAL
SRS Diagnostic Control Unit (DCU) fixing bolts	9 Nm	6.5 lbf.ft
Driver's airbag module to steering wheel Torx screws	9 Nm	6.5 lbf.ft
Front seat belt pre-tensioner to seat Torx bolt	32 Nm	24 lbf.ft
Passenger's airbag module to fascia Torx screws	9 Nm	6.5 lbf.ft

Body

TORQUE DESCRIPTION	METRIC	IMPERIAL
Doors		
Door lock striker to body screws	10 Nm	7 lbf.ft
Door stiffener Torx screws	9 Nm	7 lbf.ft
Front door control unit to glass clamp bolts	9 Nm	7 lbf.ft
Front door hinge bolts	30 Nm	22 lbf.ft
Rear door glass clamp bolts	8 Nm	6 lbf.ft
Tail door exterior handle nuts	5 Nm	3.7 lbf.ft
Tail door glass clamp bolts	8 Nm	6 lbf.ft
Tail door glass regulator lock nuts	14 Nm	10 lbf.ft
Tail door hinge bolts	30 Nm	22 lbf.ft
Exterior Fittings		
Bonnet hinge, bolts	9 Nm	6.5 lbf.ft
Bonnet release lever to 'A' post bolt	9 Nm	6.5 lbf.ft
Exterior mirror to door Torx screws	6 Nm	4.4 lbf.ft
Front wing bolts	5 Nm	3.7 lbf.ft
Spare wheel mounting bracket: ⇒ Bolts ⇒ Nuts	 13 Nm 25 Nm	 10 lbf.ft 18 lbf.ft
Spare wheel to bracket retention nuts	45 Nm	33 lbf.ft
Splash shield bolts	10 Nm	7 lbf.ft
Underbelly panel to body bolts	45 Nm	33 lbf.ft
Underbelly panel to body rear screws	8 Nm	6 lbf.ft
3 door vehicles		
Hard back catch Torx screws	10 Nm	7.5 lbf.ft
Hard back retainer Torx screws	10 Nm	7.5 lbf.ft
Soft back support bracket bolts	25 Nm	18 lbf.ft
5 door vehicles		
Roof rack side rail bolts	22 Nm	16 lbf.ft
Interior Trim Components		
Engine compartment fusebox bolts	8 Nm	6 lbf.ft
Passenger compartment fusebox mounting plate to body and steering column bracket bolts	8 Nm	6 lbf.ft
Passenger compartment fusebox to mounting plate bolts	8 Nm	6 lbf.ft
Seats		
Front seat runner to body bolts	45 Nm	33 lbf.ft
Front seat squab frame to cushion frame Torx bolts	45 Nm	33 lbf.ft
Rear bench seat to body bolts	25 Nm	18 lbf.ft
Rear seat cushion to squab Torx bolts	28 Nm	21 lbf.ft
Rear seat catch assembly Torx bolts	32 Nm	24 lbf.ft
Rear seat squab lock Torx screws	20 Nm	15 lbf.ft
Rear seat squab to cushion Torx bolts	28 Nm	21 lbf.ft
Rear seat hinge Torx bolts	25 Nm	18 lbf.ft

TORQUE DESCRIPTION	METRIC	IMPERIAL
Seat belts (3-door models)		
Front seat belt loop to 'B' post bolt	31 Nm	23 lbf.ft
Front seat belt pre-tensioner and buckle to seat frame Torx bolt	32 Nm	24 lbf.ft
Front seat belt reel bolt	31 Nm	23 lbf.ft
Front seat belt slider bar bolts	40 Nm	30 lbf.ft
Front seat belt lower mounting Torx bolts	40 Nm	30 lbf.ft
Front seat belt upper mounting Torx bolt	31 Nm	23 lbf.ft
Rear seat belt and buckle to frame Torx bolts	32 Nm	24 lbf.ft
Rear seat belt lower fixing to body bolt	50 Nm	37 lbf.ft
Rear seat belt reel to squab nut	32 Nm	24 lbf.ft
Rear seat belt upper mounting bolt	32 Nm	24 lbf.ft
Rear seat squab lock Torx screws	20 Nm	15 lbf.ft
Seat belt pre-tensioner to seat bolt	32 Nm	24 lbf.ft
Seat belts (5-door models)		
Front seat belt adjuster to 'B' post Torx bolts	26 Nm	19 lbf.ft
Front seat belt upper anchorage to adjuster mounting nut	31 Nm	23 lbf.ft
Front seat belt lower fixing to 'B' post bolt	40 Nm	30 lbf.ft
Front seat belt pre-tensioner and buckle to seat frame Torx bolt	32 Nm	24 lbf.ft
Front seat belt reel bolt	31 Nm	23 lbf.ft
Rear centre seat belt reel to seat squab nut	32 Nm	24 lbf.ft
Rear seat belt and buckle bolts	32 Nm	24 lbf.ft
Rear side seat belt lower fixing bolt	40 Nm	30 lbf.ft
Rear side seat belt reel bolt	50 Nm	37 lbf.ft
Rear side seat belt buckle to catch assembly bolt	32 Nm	24 lbf.ft
Rear side seat belt upper mounting bolt	32 Nm	24 lbf.ft
Seat belt height adjuster bolts	26 Nm	19 lbf.ft
Screens		
Sun roof side rail Torx bolts	22 Nm	16 lbf.ft

Heating and Ventilation

TORQUE DESCRIPTION	METRIC	IMPERIAL
Air intake hose and bracket assembly to fuel burning heater bolts (Td4)	10 Nm	7.5 lbf.ft
Exhaust pipe clamp bolts (Td4)	5 Nm	3.5 lbf.ft
Fuel burning heater to body bolts (Td4)	8 Nm	6 lbf.ft
Fuel burning heater to mounting bracket bolts (Td4)	8 Nm	6 lbf.ft
Heater to fascia nuts	8 Nm	6 lbf.ft
Heater to bulkhead bolt	8 Nm	6 lbf.ft
Evaporator to bulkhead bolts	8 Nm	6 lbf.ft

Air Conditioning

TORQUE DESCRIPTION	METRIC	IMPERIAL
A/C compressor to mounting bracket bolts (Td4 & K1.8)	25 Nm	18 lbf.ft
A/C compressor mounting bracket to cylinder block bolts (Td4 & K1.8)	45 Nm	33 lbf.ft
A/C compressor mounting bracket to cylinder block bolts (KV6)	45 Nm	33 lbf.ft
A/C compressor support bracket to sump bolt (Td4)	10 Nm	7.5 lbf.ft
A/C compressor drive belt tensioner clamp bolt (Td4)	24 Nm	18 lbf.ft
A/C compressor drive belt tensioner pivot bolt (Td4)	24 Nm	18 lbf.ft
A/C compressor upper and lower securing bolts (KV6)	25 Nm	18 lbf.ft
A/C pipe rail to condenser bolt (KV6)	8 Nm	6 lbf.ft
A/C pipe rail to condenser bolt (KV6)	8 Nm	6 lbf.ft
Condenser bracket to radiator bolts	8 Nm	6 lbf.ft
Receiver drier to condenser bolts	12 Nm	9 lbf.ft
Refrigerant pressure sensor	10 Nm	7.5 lbf.ft
TXV to bulkhead Allen screws	25 Nm	18 lbf.ft

Wipers and Washers

TORQUE DESCRIPTION	METRIC	IMPERIAL
Rear wiper arm nut	13 Nm	10 lbf.ft
Rear wiper motor bolts	5 Nm	3.7 lbf.ft
Rear wiper motor spindle nut	5 Nm	3.7 lbf.ft
Windscreen wiper arm nut	18 Nm	13 lbf.ft
Windscreen wiper motor and linkage to body bolts	5 Nm	3.7 lbf.ft

Electrical

TORQUE DESCRIPTION	METRIC	IMPERIAL
Alternator drive belt tensioner bolt	25 Nm	18 lbf.ft
Alternator mounting bracket bolts (K1.8)	25 Nm	18 lbf.ft
Alternator pivot and adjustment bracket bolts (K1.8)	25 Nm	18 lbf.ft
Alternator to front mounting plate nut and bolts (KV6)	45 Nm	33 lbf.ft
Alternator support bracket bolts (K1.8)	25 Nm	18 lbf.ft
Alternator pivot and adjustment bracket bolts (K1.8)	25 Nm	18 lbf.ft
Alternator to mounting bracket bolts (Td4):		
⇒ M8	25 Nm	18 lbf.ft
⇒ M10	45 Nm	9.5 lbf.ft
Alternator upper and lower bolts (K1.8 with A/C)	45 Nm	33 lbf.ft
Ancillary drive belt idler pulley to mounting Allen bolt (Td4)	25 Nm	18 lbf.ft
Battery cable to alternator terminal nut (Td4 & KV6)	10 Nm	7.5 lbf.ft
Battery cable to starter motor solenoid nut (K1.8)	8 Nm	6 lbf.ft
Battery cable to starter motor solenoid nut (K1.8)	13 Nm	9.5 lbf.ft
Battery clamp bolt	12 Nm	9 lbf.ft
Battery and starter motor lead to underbonnet fusebox bolts	8 Nm	6 lbf.ft
'E' box mounting nut	9 Nm	7 lbf.ft
Passenger compartment fusebox mounting plate to body bolts	8 Nm	6 lbf.ft
Passenger compartment fusebox to mounting plate bolts	8 Nm	6 lbf.ft
Starter motor mounting bolts (Td4)	45 Nm	33 lbf.ft
Starter motor to engine upper and lower nuts and bolts (K1.8)	45 Nm	33 lbf.ft
Starter motor to engine upper and lower nuts and bolts (K1.8)	80 Nm	59 lbf.ft

Jacking

The following instructions must be carried out before raising the vehicle off the ground:

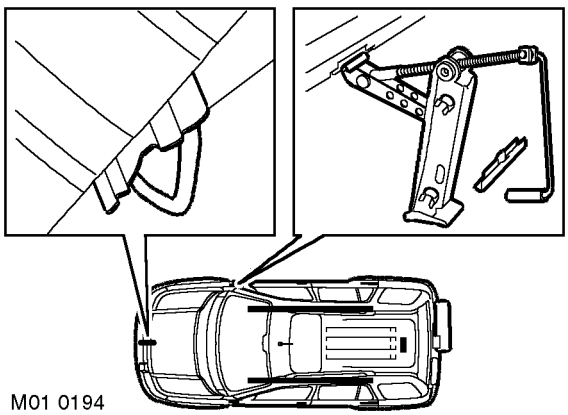
- Use a solid level surface.
- Apply parking brake.
- Select 1st. gear in main gearbox and ensure HDC is not selected.

CAUTION: To avoid damage to under body components of the vehicle, adhere to the following jacking procedures:

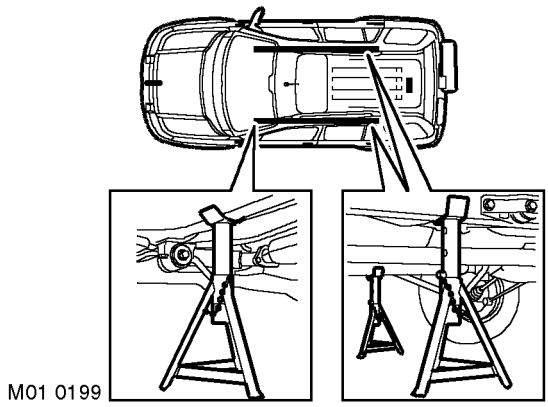
DO NOT POSITION JACKS OR AXLE STANDS UNDER THE FOLLOWING COMPONENTS:

- **Bumpers**
- **Brake or Fuel lines**
- **Exhaust pipe**
- **Suspension components**
- **Steering rack and linkages**
- **Fuel tank**
- **Engine sump**
- **Gearbox**
- **IRD unit**

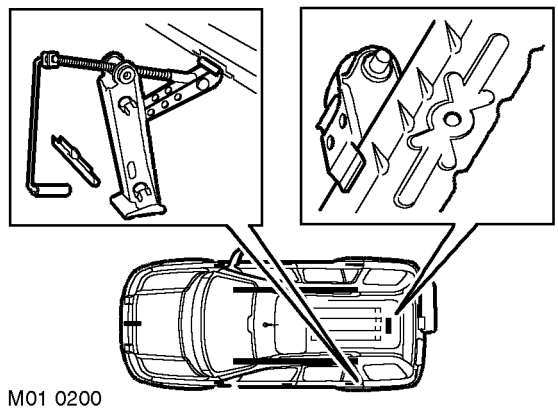
Jack or support vehicle only on approved jacking points as detailed in the following illustration:



Front (hydraulic jack) and side (vehicle jack) jacking points



Safety stand positions under longitudinal members



Rear (hydraulic jack) and side (vehicle jack) jacking points

Vehicle jack

The jack provided with the vehicle is only intended to be used in an emergency, for changing a tyre. Do **NOT** use the jack for any other purpose. Refer to the Owner's Handbook for vehicle jack location points and procedure. Never work under a vehicle only supported by the vehicle jack.

Hydraulic jack

A hydraulic jack with a minimum 1500 kg (3,300 lbs) load capacity must be used.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raising the front of a vehicle
Position the cup of the hydraulic arm under the centre of the front body crossmember assembly.

Use jack to raise front road wheels to enable safety stands to be installed under the front end of each longitudinal member.

Carefully lower jack until vehicle sits securely on safety stands.

Before working on the underside of a vehicle re-check the stability of the vehicle on the stands.

Use the reverse procedure when removing a vehicle from stands.

NOTE: For some repair operations it may be necessary to use a jack to support the engine under the sump. In this case, a block of wood should be used on the jack to protect the sump.

Raising the rear of a vehicle
Position cup of hydraulic arm under the centre of the rear subframe crossmember at the position identified by the embossed arrows.

Use jack to raise rear road wheels to enable safety stands to be installed under the rear ends of the body longitudinal members.

Carefully lower jack until vehicle sits securely on safety stands.

Before working on the underside of a vehicle, re-check the stability of the vehicle on the stands.

Use the reverse procedure when removing a vehicle from stands.

Wheel-free lift
Locate the lifting pads under the ends of the body longitudinal members. Raise the ramp to support the weight of the vehicle, ensure the vehicle is secure on the lifting pads, then raise the ramp to the required height.

Towing

General
The vehicle has permanent four wheel drive. The following instructions must be adhered to:

Towing the vehicle on all four wheels with driver operating steering and brakes

- Turn ignition key to position '1' to release steering lock and then to position 'II' to enable the brake lights, wipers and direction indicators to be operated, if necessary.
- Select neutral in gearbox and ensure HDC (hill descent control) is deselected.
- Secure tow rope, chain or cable to towing eye.
- Release the parking brake.

CAUTION: The brake servo and power assisted steering system will not be functional without the engine running. Greater pedal pressure will be required to apply the brakes and the steering system will require greater effort to turn the front road wheels. The vehicle tow connection should only be used under normal road conditions, 'snatch' recovery should be avoided.

Suspended tow by breakdown vehicle
Mark propeller shaft drive flanges and mating flanges with identification lines to enable the propeller shaft to be refitted in its original position.

Remove the propeller shaft fixings then remove the shaft from the vehicle.

CAUTION: To prevent vehicle damage, rear propeller shaft MUST BE removed.

If the front of the vehicle is to be trailed, turn ignition key to position 'I' to release steering lock.

WARNING: Do not turn the starter switch to position '0' or remove the ignition key while the vehicle is being towed.

CAUTION: If it is considered unsafe to turn the starter switch to position '1' due to accident damage or an electrical fault; disconnect the battery before turning the ignition switch.

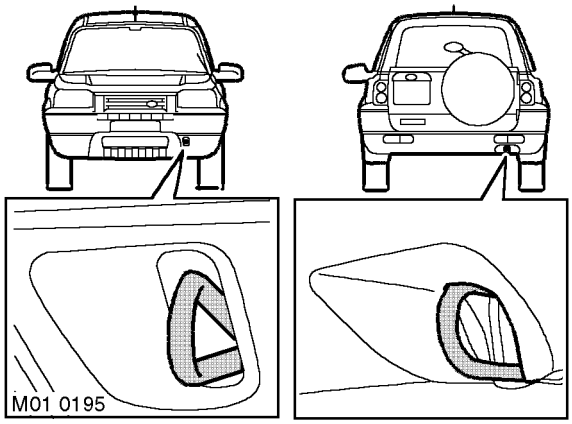
CAUTION: The steering wheel and/or linkage must be secured in a straight ahead position. DO NOT use the steering lock mechanism for this purpose.

CAUTION: Under no circumstances should the vehicle be towed or recovered by means of lashing to the rear subframe. Serious damage to the subframe and body could result.

CAUTION: Only use the rear towing eye for towing another vehicle.

Towing eyes

The towing eyes at the front and rear of the vehicle are designed for vehicle recovery purposes only and must not be used to tow a trailer or caravan.



Front and rear towing eyes

A single towing eye is provided in the front spoiler. Only use when the vehicle is to be towed with all four wheels on the ground.

A single towing eye is provided in the rear RH spoiler. Only use when towing another vehicle.

Transporting the vehicle by trailer

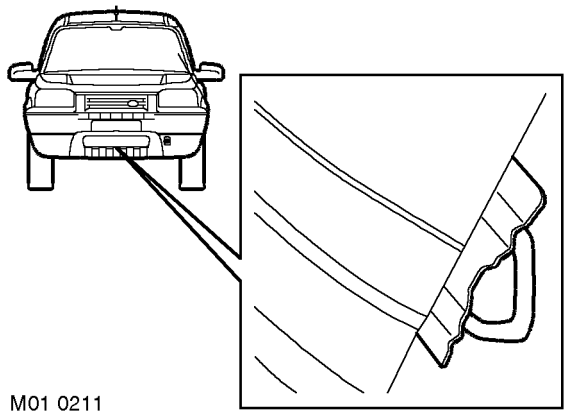
Lashing rings are provided at the front and rear of the body to facilitate the securing of the vehicle to a trailer or other means of transportation.

CAUTION: Underbody components must not be used as lashing points. The lashing rings must not be used for towing.

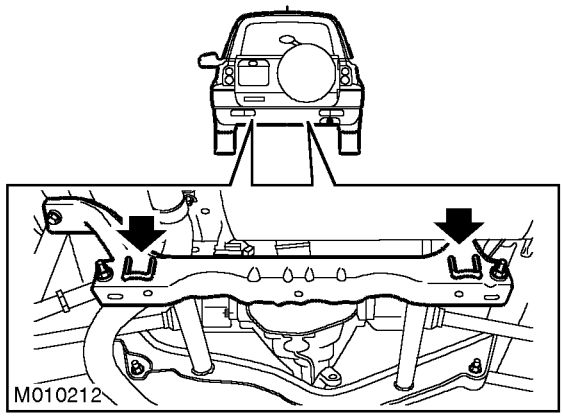
Install the vehicle on trailer and apply the parking brake. Select neutral.

Lashing eyes

Lashing rings are provided at the front and rear of the vehicle for use when transporting by trailer. DO NOT use lashing eyes for towing purposes.



Front lashing eye



Rear lashing eyes

Emergency starting

WARNING: Battery fluid (electrolyte) contains sulphuric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.

If electrolyte gets on your skin or clothes, immediately rinse it off with water.

If electrolyte gets in your eyes, immediately flush eyes with water for at least 15 minutes and seek medical help.

To Jump Start - Negative Ground Battery
Position vehicles so that jump leads will reach, ensuring that vehicles **DO NOT TOUCH,** alternatively a fully charged slave battery may be positioned on the floor adjacent to the vehicle.

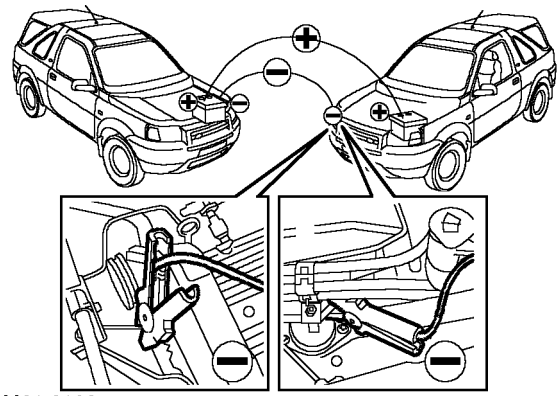
Ensure that:
- the ignition and all electrical accessories are switched off
- the parking brake is applied and neutral is selected on gearbox

Connect the jump leads as follows:

WARNING: Making final cable connection could cause an electrical arc, which if made near battery could cause an explosion.

a Connect one end of first jumper cable to positive (+) terminal of booster battery.
b Connect other end of first jumper cable to positive (+) terminal of discharged battery.
c Connect one end of second jumper cable to negative terminal of booster battery.
d Connect other end of second jumper cable to a good earth point on the engine, **NOT TO NEGATIVE TERMINAL OF DISCHARGED BATTERY.**

CAUTION: Keep jumper leads away from moving parts, pulleys, drive belts and fan blade assembly.


M01 0198

If the booster battery is installed in another vehicle, start engine and allow to idle.

Start engine of vehicle with discharged battery, following starting procedure in Owners' Handbook.

CAUTION: If vehicle fails to start within a maximum time of 12 seconds, switch ignition off and investigate cause. Failure to follow this instruction could result in irreparable damage to catalyst.

To disconnect:
- Remove negative (-) jumper cable from the engine and then terminal of booster battery.
- Remove positive (+) jumper cable from positive terminals of booster battery and discharged battery.

Capacities

The following capacities are only an approximation of the amount of fluid required to fill the respective system.

Capacities – UK/ROW

Component / system	Capacity
Fuel tank:	
⇒ Td4 Model	59 litres (13 gallons)
⇒ K1.8 & KV6 Model	65 litres (14.3 gallons
Engine - Td4 (including oil cooler and oil filter):	
⇒ Refill	6.8 litres (12 imp. pts)
⇒ Fill from dry	7.3 litres (12.9 imp. pts)
Engine - K1.8 (including filter):	
⇒ Refill	4.5 litres (7.9 imp. pts)
⇒ Fill from dry	4.8 litres (8.4 imp. pts)
Engine - KV6 (including oil cooler and filter):	
⇒ Refill	5.2 litres (9.125 imp. pts)
⇒ Fill from dry	6.0 litres (10.625 imp. pts)
Manual gearbox - PG1:	
⇒ Refill	2.0 litres (3.5 imp. pts)
⇒ From dry	2.2 litres (3.9 imp. pts)
Manual gearbox - Getrag:	
⇒ Refill	1.6 litres (2.875 imp. pts)
⇒ From dry	1.67 litres (3 imp. pts)
Automatic gearbox - JATCO:	
⇒ Refill	4.0 litres (7 imp. pts)
⇒ From dry†	8.5 litres (15 imp. pts)
Intermediate Reduction Drive	1.1 litres (2 imp. pts)
Rear differential:	
⇒ Maximum	830 ml (29.2 imp. fl. oz.)
⇒ Minimum	750 ml (26.4 imp. fl. oz.)
Power steering reservoir	335 cm^3
Cooling system - Td4 Engine – Fill from dry (with reservoir)*:	
⇒ Automatic	7.25 litres (12.8 imp. pts)
⇒ Manual	7.25 litres (12.8 imp. pts)
Cooling system - K1.8 Engine:	
⇒ Fill from dry (with reservoir)*	5.8 litres (10.25 imp. pts)
Cooling system - KV6 Engine:	
⇒ Fill from dry (with reservoir)*	7.8 litres (13.75 imp. pts)
Reservoir tank:	
⇒ Maximum fill	0.44 litres (0.75 imp. pts)
⇒ Expansion tank volume	1.2 litres (2.125 imp. pts)
⇒ Gross expansion capacity	0.72 litres (1.27 imp. pts)
Windscreen washer reservoir	4.0 litres (7 imp. pints)

† An extra 420 cc (0.73 imp pt) is required for vehicles with an air blast fluid cooler fitted.

* Refill capacity is approx. 0.7 litre (1.125 imp. pt) less than the from dry figures.

Capacities – NAS

Component / system	Capacity
Fuel tank: Td4 Model KV6 Model	 15.6 US gallons 17.2 US gallons
Engine - KV6 (including oil cooler and filter):	
⇒ Engine oil and filter change ⇒ Fill from dry	11 US pts 12.7 US pts
Automatic gearbox - JATCO:	
⇒ Refill ⇒ From dry	8.5 US pts 18.2 US pts
Intermediate Reduction Drive	2.3 US pts
Rear differential:	
⇒ Maximum ⇒ Minimum	28.1 US fl. oz. 25.4 US fl. oz.
Power steering reservoir	335 cm^3
Cooling system - KV6 Engine:	
⇒ Fill from dry (with reservoir)	17.82 US pts
Reservoir tank:	
⇒ Maximum fill ⇒ Expansion tank volume ⇒ Gross expansion capacity	0.93 US pts 2.54 US pts 1.52 US pts
Windscreen washer reservoir	8.5 US pts

Fluids

Fuel
Always use the following recommended fuels:

Petrol engines
Use unleaded petrol with a minimum octane rating of 95 RON to ENN 228 specification.

In an emergency (and only if the correct fuel is unavailable), lower octane rated fuel can be used for very limited periods of moderate, low speed motoring, provided engine 'knocking' does not occur.

Fuels of 90 RON is used in certain markets; 90 RON fuel can be used regularly ONLY if the engine has been tuned specifically to suit low octane fuel.

Certain markets use fuel containing a 23% Ethanol additive.

K1.8 and KV6 engines are also available for use with a low octane leaded fuel specification in some markets.

Diesel engines
Use a good quality diesel fuel or automotive gas oil (AGO) conforming to EN 590 specification.

It is important that the sulphur content of diesel fuel does not exceed 0.3%.

Ensure the fuel filter element is changed at the recommended intervals.
☞ **MAINTENANCE, MAINTENANCE, Fuel Filter - Diesel.**

Brake Fluid
Use only Shell Donax YB DOT 4 brake fluid or, if this is unavailable, use a brake fluid of the same specification. DO NOT use brake fluid of a different specification.

PAS fluid
Use fluid to Dexron III specification.

Anti-freeze solutions
The overall anti-freeze concentration should not fall, by volume, below 50% to ensure that the anti-corrosion properties of the coolant are maintained. Anti-freeze concentrations greater than 60% are not recommended as cooling efficiency will be impaired.

Use **Havoline Extended Life Coolant (XLC)**, or any ethylene glycol based anti-freeze (containing no methanol) with only Organic Acid Technology (OAT) corrosion inhibitors, to protect the cooling system.

CAUTION: No other anti-freeze should be used with Havoline Extended Life Coolant.

The cooling system should be drained, flushed and refilled with the correct amount of anti-freeze solution at the intervals given on the Service Maintenance Check Sheet.

After filling with anti-freeze solution, attach a warning label to a prominent position on the vehicle stating the type of anti-freeze contained in the cooling system to ensure that the correct type is used for topping-up.

The following recommended quantities of anti-freeze will provide frost protection to -36 °C (-33 °F):

Engine – Td4

Concentration	50%
Amount of anti-freeze	3.75 litres (6.625 imp. pts)

Engine – K1.8

Concentration	50%
Amount of anti-freeze	2.9 litres (5.125 imp. pts)

Engine – KV6

Concentration	50%
Amount of anti-freeze	3.9 litres (6.875 imp. pts, 8.25 US pts)

Lubrication

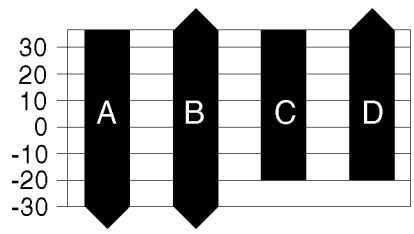
The engine and other lubricating systems are filled with high- performance lubricants giving prolonged life.

CAUTION: Always use a high quality oil of the correct viscosity range in the engine. The use of oil of the incorrect specification can lead to high oil and fuel consumption and ultimately to damaged components.

Oil to the correct specification contains additives which disperse the corrosive acids formed by combustion and prevent the formation of sludge which can block the oil ways. Additional oil additives should not be used.

Always adhere to the recommended servicing intervals.

Engine oil
Engine oil viscosity / temperature ranges are indicated in the following table:



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a 0W-30; 5W30 – K1.8 & Td4 only
b 0W-40, 50, 60; 5W-40, 50, 60 – all engine types
c 10W-30 – K1.8 & Td4 only
d 10W-40, 50, 60 – all engine types

Engine oil – Td4 engine
Use a 10W/40 or 15W/40 oil meeting both ACEA A3 and ACEA B3 specifications, and having a viscosity band recommended for the temperature range of your locality. Where oils to these Land Rover and European specifications are not available, well known brands of oils meeting API SH quality should be used.

Engine oil – K1.8 engine
Use a 10W/40 oil meeting specification ACEA A2 and having a viscosity band recommended for the temperature range of your locality. Alternatively, a 10W/40 engine oil meeting specification ACEA A1 can be used.

Engine oil – KV6 engine
Use a 10W/40 oil meeting specification ACEA A2 and having a viscosity band recommended for the temperature range of your locality.

Engine oil – KV6 engine - NAS models
Use a 5W/40 or 5W/50 oil meeting specification ACEA A1 and having a viscosity band recommended for the temperature range of your locality.

Gearbox oil
Use of gearbox oils other than those specified may result in serious damage to the gearbox.

Manual Gearbox – PG1 and Getrag
Use Texaco MTF 94 oil or Burmah Oil MTF 1067 plus OPEL B 0400063 for refill or topping-up.

Automatic Gearbox – JATCO
Use Texaco N402 fluid or equivalent for refill or topping-up.

Intermediate Reduction Drive
Texaco S5 75W90; Specification: API GL5

Rear Differential
Texaco Multigear 80W-90 ETL 7441; Specification: API GL5

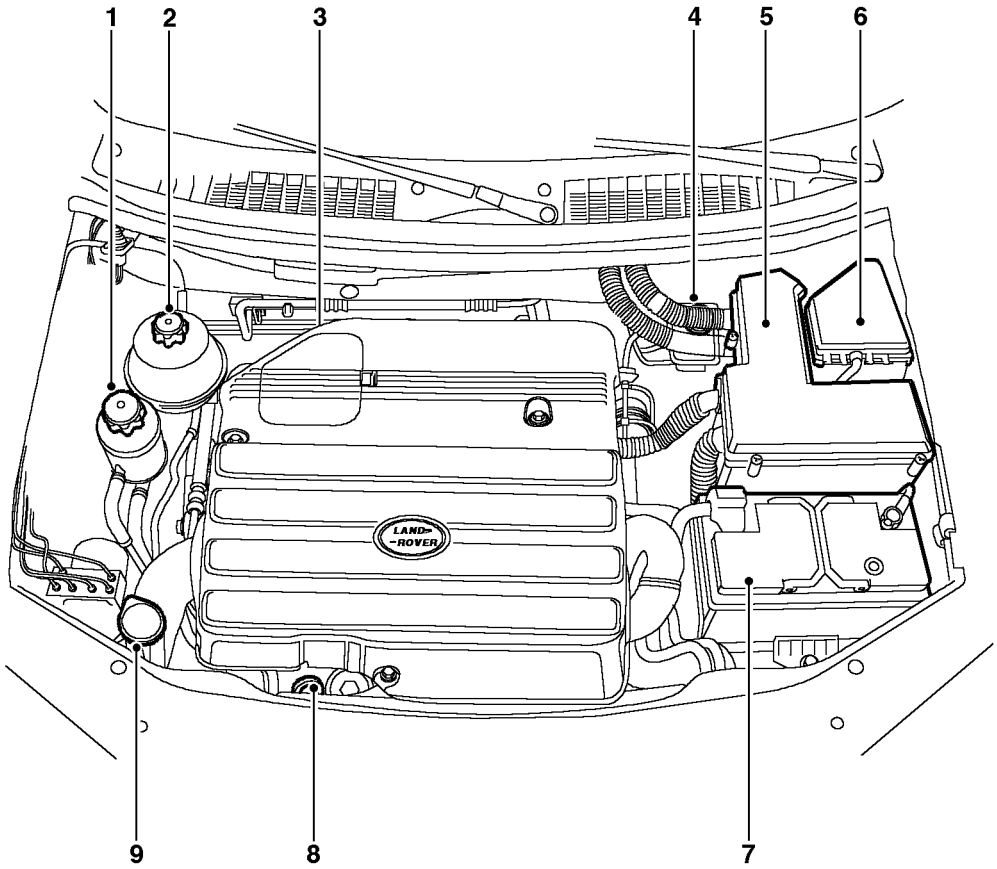
Gear linkage - Manual
Use grease Part No. AFU 1500 containing 3% Molybdenum Disulphide.

General Greasing
Use Multipurpose Lithium Base Grease NLGI consistency No. 2.

Bonnet latch
Lubricate cable and latch with oil.

Locks, Latches and Hinges
Use Door Lock and Latch Lubricant, Part No. CYL 100020.

Td4 - Diesel Engine - Under Bonnet View

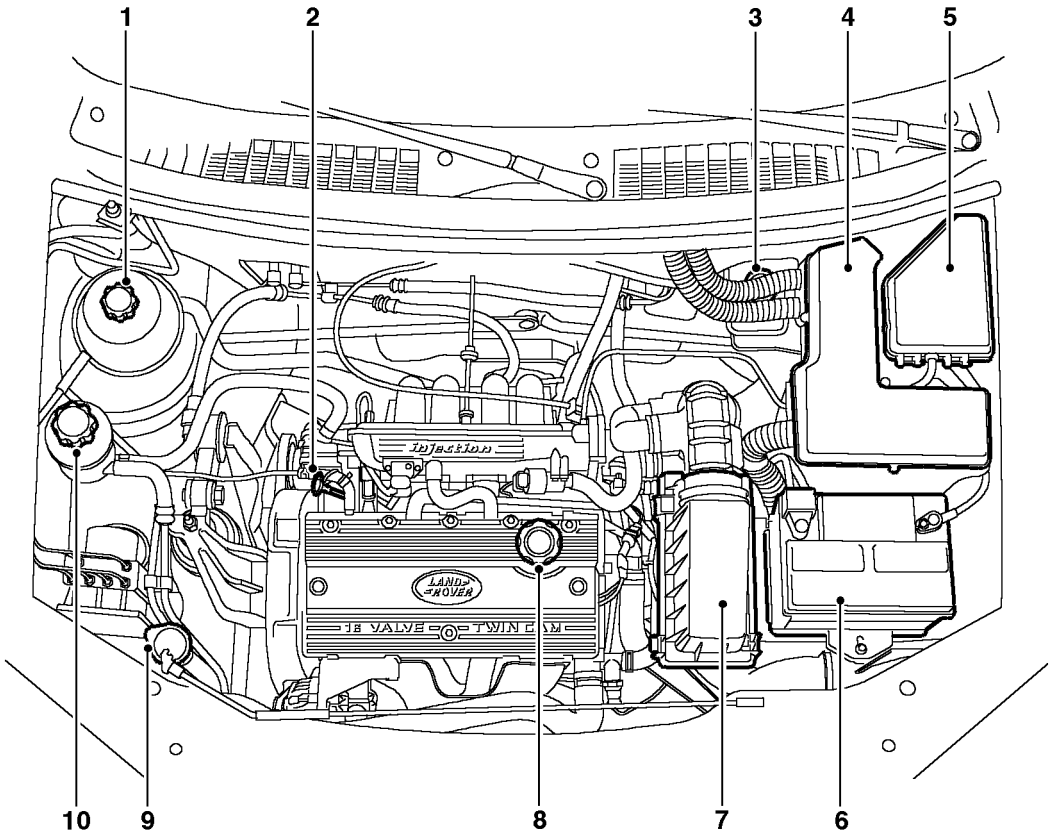


M10 0748

LHD shown, RHD similar

1 Power steering reservoir
2 Cooling system expansion tank filler cap
3 Engine oil filler cap
4 Brake/Clutch fluid reservoir cap
5 Engine Control Module box
6 Engine compartment fusebox
7 Battery
8 Engine oil dipstick
9 Windscreen washer reservoir filler cap

K1.8 – Petrol Engine – Under Bonnet View

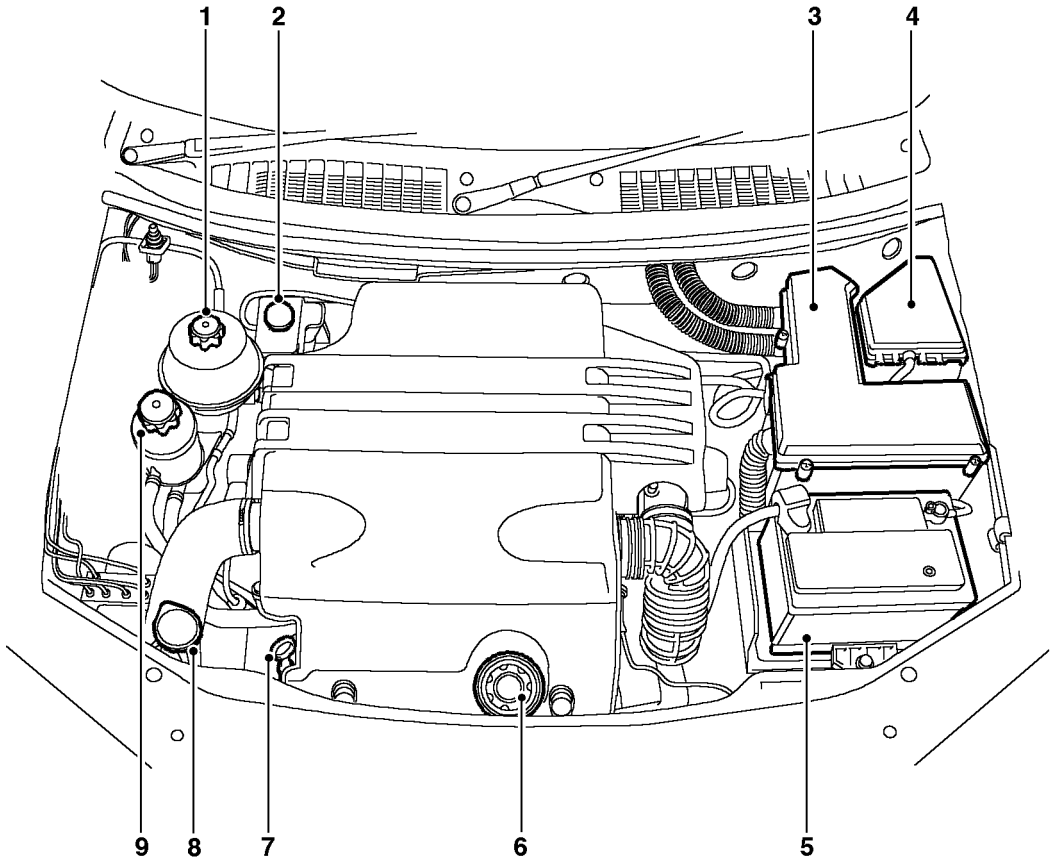


M10 0749

LHD shown, RHD similar

1 Cooling system expansion tank filler cap
2 Engine oil dipstick
3 Brake/Clutch fluid reservoir cap
4 Engine Control Module box
5 Engine compartment fusebox
6 Battery
7 Air cleaner
8 Engine oil filler cap
9 Windscreen washer reservoir filler cap
10 Power steering reservoir

KV6 – Petrol Engine – Under Bonnet View



M10 0750

RHD shown, LHD similar

1 Cooling system expansion tank filler cap
2 Brake/Clutch fluid reservoir cap
3 Engine Control Module box
4 Engine compartment fusebox
5 Battery
6 Engine oil filler cap
7 Engine oil dipstick
8 Windscreen washer reservoir filler cap
9 Power steering reservoir

Seats and Seat Belts

Check

1. Check seat frames are secured to floor and show no signs of movement.
2. Check operation of seat slide and tilt mechanisms, ensuring there is no excessive play between seat cushion and seat back.
3. Check tightness of accessible seat fixings.
4. Fully extract seat belt and allow it to return under its own recoil mechanism.
5. Check entire length of seat belt webbing for signs of fraying or damage. Repeat for all belts.
6. Check security of seat belt upper mountings.
7. Check for correct operation of seat belt height adjusters.
8. Check security of seat belt buckle mountings.
9. Connect each belt to the correct buckle, check seat belt buckle and tongue are secure. Release seat belt buckle and check for correct operation.
10. Check tightness of accessible seat belt mountings.

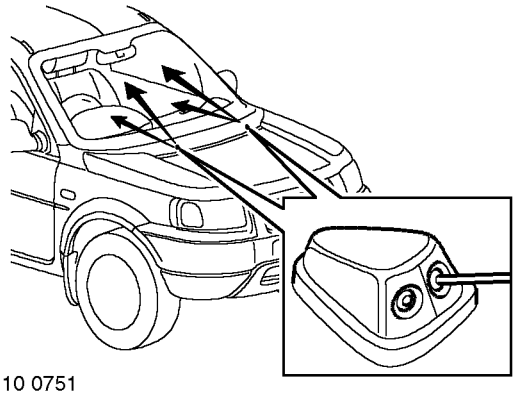
Lamps, Horns and Warning Indicators

Check

1. Switch on side, head and tail lights and check operation.
2. Check headlamp dim/dip operation.
3. Check headlamp levelling operation.
4. Check turn signals and hazard warning lights operation.
5. Press brake pedal and check operation of brake lights.
6. Check all exterior lamp lenses for clarity and condition. Pay particular attention to head lamp lenses for signs of stone chips or damage.
7. Check horn for loud clear sound.
8. Check operation of all instrument pack warning and indicator lights.
9. Check for correct operation of interior courtesy lights.
10. Switch on headlamps (with ignition switch at 'O' position) and check light reminder warning operates when door is opened.

Wipers and Washers

Check



M10 0751

1. Operate screen washer and switch on wipers. Check washer jets are correctly aimed and check for smooth smearless operation across screen of wiper blades at all speeds, including intermittent.
2. Repeat operation for rear screen wipers/ washers.
3. Check all wiper blades for condition and signs of splits or damage.
4. Check security of wiper arms.

Handbrake

Check

1. With the vehicle stationary and on a level surface, apply and release handbrake and check for correct operation. If required, adjust handbrake.

   ☞ **BRAKES, ADJUSTMENTS, Cable - handbrake - check and adjust.**

   NOTE: Any adjustment required as a result of the checking process will be subject to additional labour and/or material cost and should not be carried out without the authorisation of the customer.

Adjust Handbrake (First 12,000 miles/12 months only)

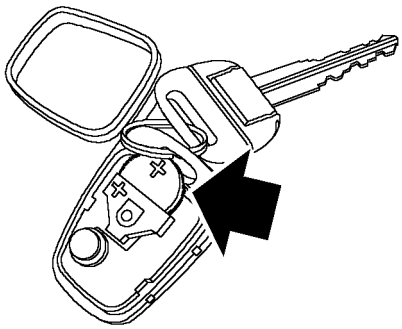
1. Adjust handbrake cable.

   ☞ **BRAKES, ADJUSTMENTS, Cable - handbrake - check and adjust.**

   NOTE: Additional time is built into the first 12,000/12 months service time to allow for handbrake cable adjustment.

Alarm Handset Battery

Replace



M10 0775

1. Insert the blade of a small, flat bladed screwdriver into the slot at the keyring end of the handset and carefully prise the two halves of the handset apart.
2. Slide the battery out of the clip taking care not to touch the circuit board or the battery contacts.
3. Press and hold each button in turn for at least 5 seconds to drain any residual power from the handset.
4. Fit the replacement battery (Land Rover STC4080 or Panasonic CR2032) ensuring the correct polarity is maintained (+) side facing upwards. Avoid touching the flat surfaces of the battery.
5. Press the 2 halves of the handset together, making sure the two halves click into place correctly.
6. Check the operation of the handset.

Road Wheels

Remove

1. Loosen wheel nuts. Raise vehicle for wheel free condition and remove the wheel nuts.
2. Mark the wheel to stud relationship to ensure that the wheels are refitted in the same orientation.

Refit

1. Apply a thin coat of anti-seize compound to wheel hub centre.
2. Refit wheels to original hub position.

   NOTE: When refitting road wheel nuts, do not overtighten using powered tools. Ensure the wheel nuts are correctly torqued in the correct sequence.

3. Tighten wheel nuts to 115 Nm (85 lbf.ft).

Tyres

Check

1. Check for any apparent damage to tyres, paying particular attention to side walls.
2. Look at tyre treads and check for any unusual wear patterns which may indicate out of specification adjustment of steering or suspension.

   NOTE: Any adjustments to steering or suspension will be subject to additional labour and/or material cost and should not be carried out without the authorisation of the customer.

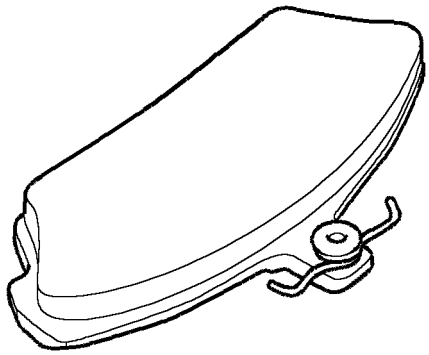
3. Measure the tread depth across the width of the tyre and around the circumference. Annotate the maintenance check sheet with the lowest figure obtained from each tyre.

   NOTE: Any requirement to replace tyres should be advised to the customer before any remedial work is carried out. This will be subject to additional labour and/or material cost and should not be carried out without the authorisation of the customer.

   CAUTION: If new tyres are to be fitted, ensure that they are fitted to the rear axle only or to both front and rear axles. DO NOT fit new tyres to front axle only.

Brake Pads and Calipers

Brake Pads



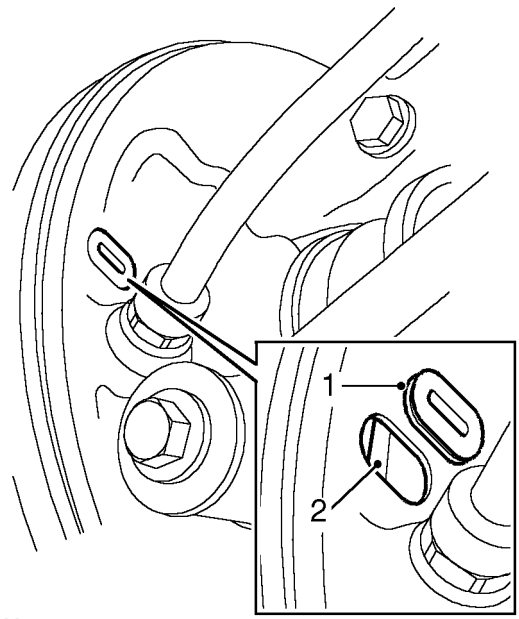
M10 0752

1. With front road wheels removed, check brake pad thickness and ensure that both pads are wearing evenly.
2. Check brake discs for signs of cracking, excessive scoring or oil contamination.

   NOTE: Any requirement to replace brake pads or brake discs should be advised to the customer as this will be subject to additional labour and/or material cost and should not be carried out without the authorisation of the customer.

3. Check for any signs of brake fluid leakage from caliper seals, hoses or unions.
4. Using brake cleaner, remove excessive deposits of brake dust from pads, calipers and disc shields.

Brake Shoes



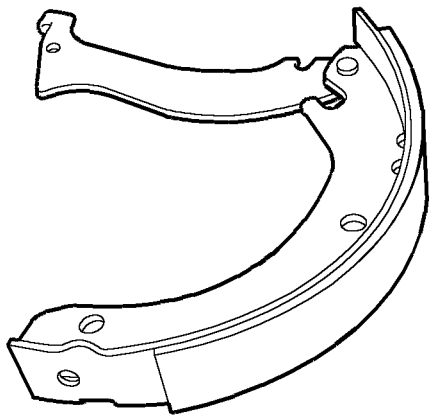
M10 0753

1. With the vehicle at a convenient working height, remove the rubber plugs from the rear of the back plate.
2. Using a lamp, inspect thickness of rear brake shoes.

   NOTE: Any requirement to replace brake shoes should be advised to the customer as this will be subject to additional labour and/or material cost and should not be carried out without the authorisation of the customer.

3. Check for any signs of brake fluid contamination on brake shoes, or evidence of brake fluid leakage from drum/backplate.
4. Ensure that rubber plug is correctly fitted into back plate upon completion of check.

Brake Drums



M10 0754

1. With vehicle at a convenient working height and the wheels removed, remove the rear brake drums.

   ☞ **BRAKES, REPAIRS, Drum - rear.**
2. Check brake shoe thickness, and condition of brake shoes for any evidence of contamination from brake fluid.
3. Check brake drum for signs of cracking, excessive scoring or oil contamination.

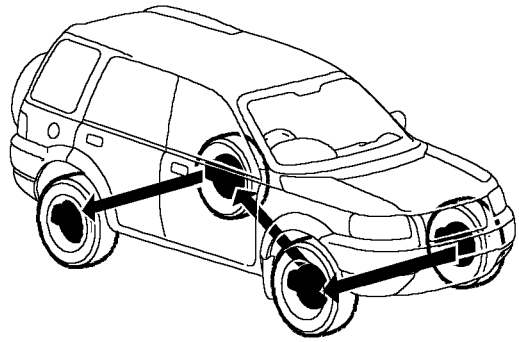
   NOTE: Any requirements to replace brake shoes, wheel cylinders or brake drums should be advised to the customer as this will be subject to additional labour and/or material cost and should not be carried out without the authorisation of the customer.

4. Using brake cleaner, remove excessive deposits of brake dust from drums, shoes and back plate.
5. Refit drums.

   ☞ **BRAKES, REPAIRS, Drum - rear.**

Brake Fluid

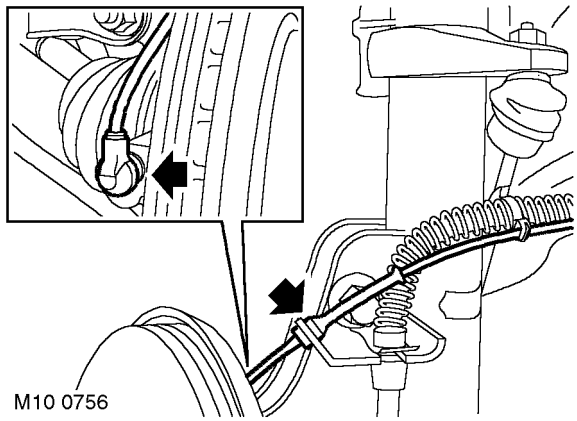
Replace


M10 0755

1. Replace brake fluid.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**

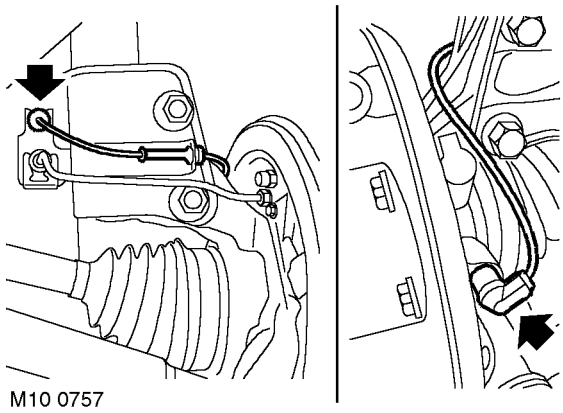
Road Wheel Speed Sensors

Inspect


M10 0756

Front wheel

1. Check harness is correctly routed and secured. Ensure harness shows no sign of damage or chafing.
2. Check speed sensor is fully inserted to the correct position. Check reluctor ring condition and ensure it is free from debris.


M10 0757

Rear wheel

3. Check harness is correctly routed and secured. Ensure harness shows no sign of damage or chafing.
4. Check speed sensor is fully inserted to the correct position. Check reluctor ring condition and ensure it is free from debris.

Fuel Filter - Petrol

Replace

1. Renew fuel filter.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filter - main.**

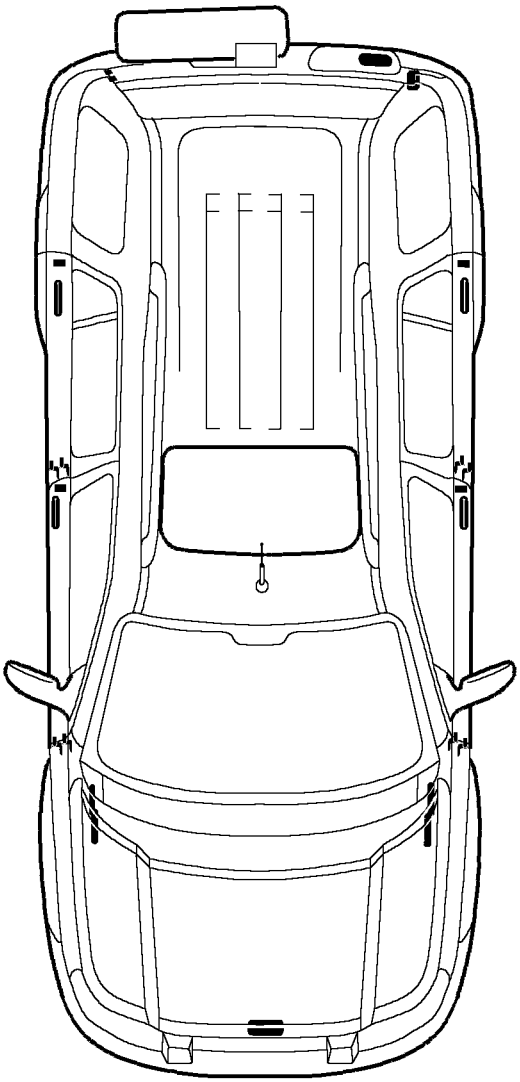
Fuel Filter - Diesel

Replace

1. Replace fuel filter element.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Filter - main.**

Door Locks, Hinges, Check Straps and Bonnet Catch

Check



M10 0758

1. Check operation of each door, door lock, bonnet catch and fuel filler flap.

Lubricate Front and Rear Doors

1. Open each door in turn and lubricate door hinges and check strap using recommended lubricant.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
2. Lubricate door lock, striker and private lock using PTFE lubricant. Remove excessive lubricant, particularly from door striker area, to avoid customer complaint.
3. Check tightness of accessible door lock and striker fixings.
4. Open and close door to check for smooth, noise-free operation. Ensure door closes securely.
5. Check for smooth operation of private lock.

Lubricate Tail Door

1. Open tail door and lubricate hinges using recommended lubricant.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
2. Grease tail door check slide.
3. Lubricate rear door lock and striker using PTFE lubricant. Remove excessive lubricant to avoid customer complaint, particularly from door striker area.
4. Check tightness of accessible tail door lock and striker fixings.

Lubricate Bonnet

1. With bonnet open, lubricate hinges, striker, lock and safety catch using a suitable lubricant.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**

Sunroof Guide Rails, Slides and Seal

1. With sunroof open, lubricate accessible guide rails, slides and seals. Remove any excess lubricant to avoid contaminating roof lining and trim.
2. Ensure sunroof closes correctly.

Sunroof Drain Tubes and Channels

1. Remove any debris from sunroof tray.
2. Ensure that all accessible sunroof drain tubes are clear using a low pressure air line.

Anti-freeze

Replace

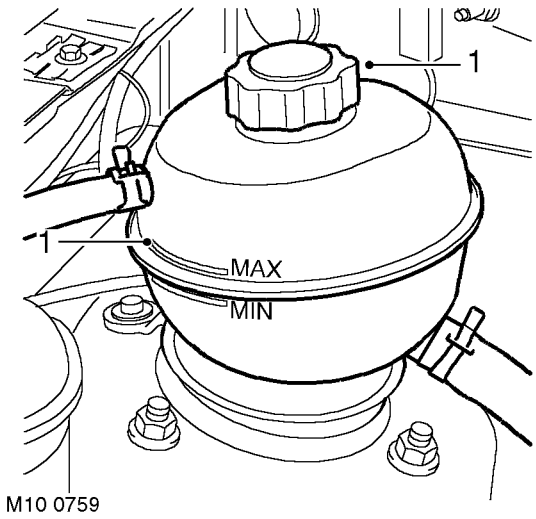
1. Replace anti-freeze.
   ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
   ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
   ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**

Cooling System and Intercooler

Check

1. Check for any obstructions in the radiator matrix and remove debris as necessary.
2. Check condition of all coolant hoses. Check for any signs of leakage or chafing.
3. Check tightness of accessible hose clips.
4. Check for any obstructions in the intercooler matrix and remove debris as necessary (**diesel only**).
5. Check intercooler hoses for security and condition.
6. Check security of radiator and intercooler mountings.

Coolant Level



1. Check coolant level and top up if necessary.

Spark Plugs – K1.8

Check & Renew

1. Check spark plugs condition and gap. Renew if necessary.
   ☞ **ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Spark plugs.**

Spark Plugs – KV6

Check & Renew

1. Check spark plugs condition and gap. Renew if necessary.
   ☞ **ENGINE MANAGEMENT SYSTEM - SIEMENS, REPAIRS, Spark plugs.**

Air Cleaner – Petrol Models

Replace

1. Replace air cleaner element.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Element - air cleaner - KV6.**

Clean

1. Clean the drain hole in filter casing.

Ancillary Drive Belt – Td4

Check

1. Check ancillary drive belts for tension, signs of fraying, damage and for any oil contamination.

Replace

1. Replace ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**

Ancillary Drive Belt – K1.8

Check

1. Check ancillary drive belts for tension, signs of fraying, damage and for any oil contamination.

Replace

1. Replace ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - K1.8 without A/C.**
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - K1.8 with A/C.**

Ancillary Drive Belt – KV6

Check

1. Check ancillary drive belts for tension, signs of fraying, damage and for any oil contamination.

Replace

1. Replace ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.**

Camshaft Timing Belt – K1.8

Check

1. Check camshaft drive belt and renew if necessary.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**

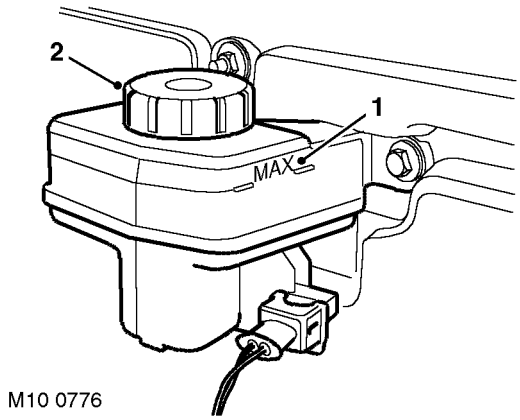
Camshaft Timing Belt – KV6

Check

1. Check camshaft drive belt and renew if necessary.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**

Brake/Clutch Reservoir

Check/Top-up



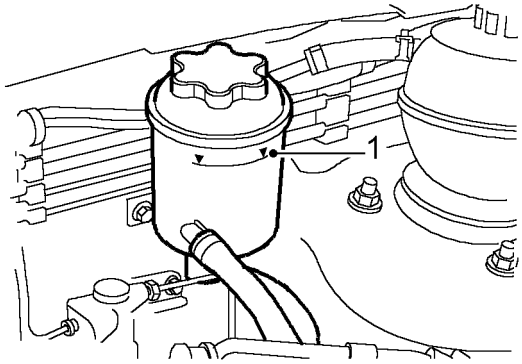
M10 0776

RHD shown, LHD similar

1. Check fluid level in brake/clutch fluid reservoir.
2. Clean area around filter cap, remove cap.
3. Top-up if necessary to correct level on reservoir using recommended fluid.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Fluids.**
4. Fit filler cap.

PAS Fluid Level

Check/Top-up

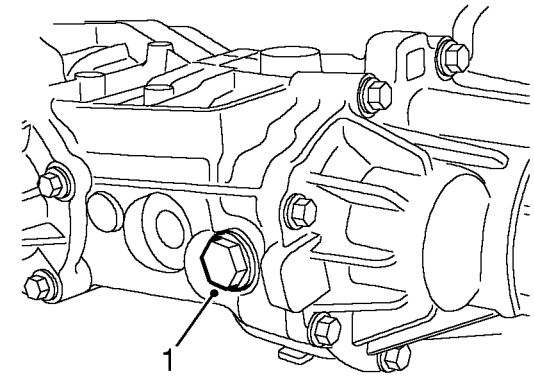


M10 0760

1. Check Power Assisted Steering (PAS) fluid level. Before topping up PAS fluid level, ensure there are no leaks from the pump, hoses, unions or steering rack.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Fluids.**

Intermediate Reduction Drive - Non NAS models

Check and Top-up Fluid

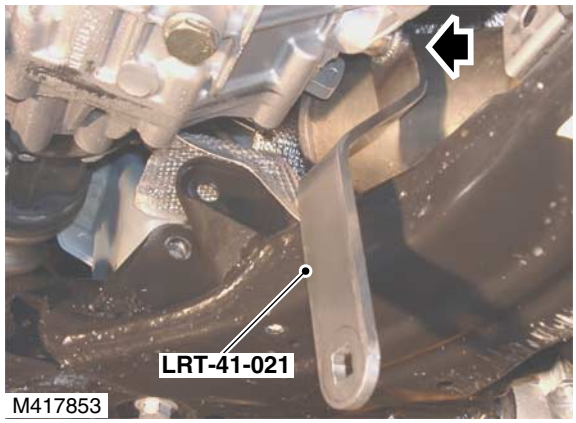


M10 0761

1. With vehicle on a ramp at a convenient working height, carefully remove IRD level plug and collect sealing washer.
2. Check oil level. Before topping up oil level, check for visible signs of leakage. Pay particular attention to drive shaft and prop shaft oil seals.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
3. Refit level plug to IRD unit using a new sealing washer.

Intermediate Reduction Drive - NAS models

Check and Top-up Fluid



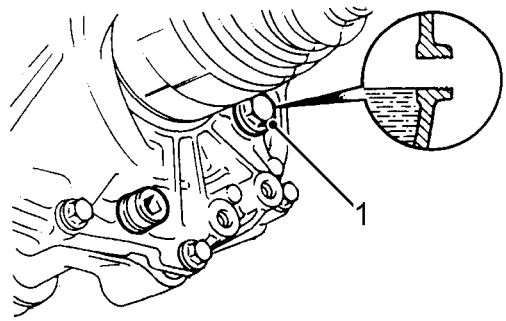
M417853

1. With vehicle on a ramp at a convenient working height, using **LRT-41-021,** carefully remove IRD level plug and collect sealing washer.
2. Top-up, if required, until fluid just runs from hole. Allow sufficient time for oil to flow until it reaches a common level in unit.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Fluids.**
3. Refit level plug to IRD unit using a new sealing washer.

Manual Gearbox – PG1

Check and Top-up Fluid

WARNING: Avoid excessive skin contact with mineral oil. Mineral oils remove the natural fats from the skin, leading to dryness, irritation and dermatitis.



M10 0762

1. With vehicle on a ramp at a convenient working height, carefully remove gearbox level plug and collect sealing washer.
2. Check oil level. Before topping up oil level, check for visible signs of leakage. Pay particular attention to drive shaft oil seal.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
3. Refit level plug to gearbox using a new sealing washer.

Manual Gearbox – GETRAG

Replace Fluid

WARNING: Avoid excessive skin contact with mineral oil. Mineral oils remove the natural fats from the skin, leading to dryness, irritation and dermatitis.

1. Replace gearbox fluid.
   ☞ **MANUAL GEARBOX - GETRAG, ADJUSTMENTS, Gearbox oil - drain and refill.**

Automatic Gearbox – JATCO

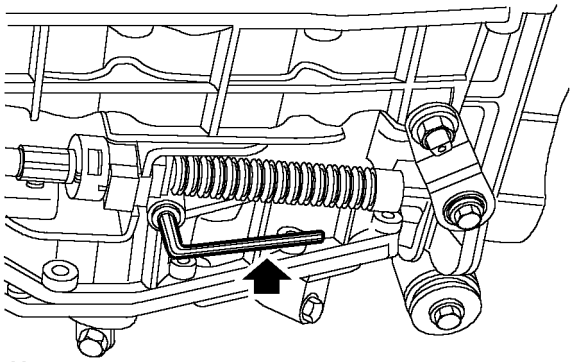
Check and top-up fluid

WARNING: Avoid excessive skin contact with mineral oil. Mineral oils remove the natural fats from the skin, leading to dryness, irritation and dermatitis.

1. Position vehicle on ramp.
2. Apply handbrake and position chocks under front and rear wheels.
3. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
4. Connect TestBook to monitor gearbox fluid temperature.

   CAUTION: The gearbox fluid level must only be checked when the temperature of the fluid is between 35° and 45°. The reading obtained will be incorrect if the fluid is outside this temperature range.

5. Start engine, move selector lever from 'P' through all gear positions, pausing in each gear position for 2-3 seconds and return to 'P' position.
6. Clean area around level plug.



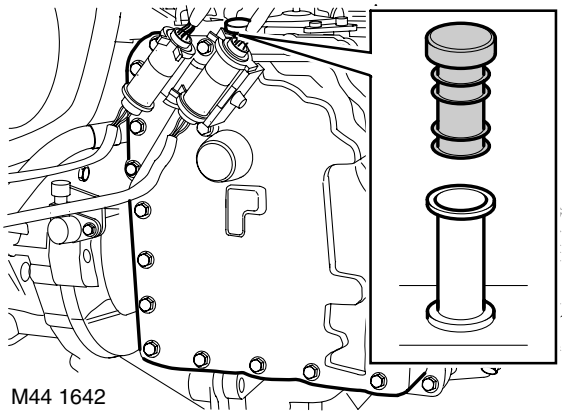
M44 1644

7. With the engine still running, remove level plug using a 5 mm Allen socket and allow any excess fluid to drain off.

   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.

   CAUTION: There are a number of similar fixings/plugs on the underside of the gearbox. It is imperative that the correct plug is removed prior to checking the level. Removing the wrong fixing/plug could result in internal damage to the gearbox.

8. If no fluid loss is apparent when level plug is removed:



M44 1642

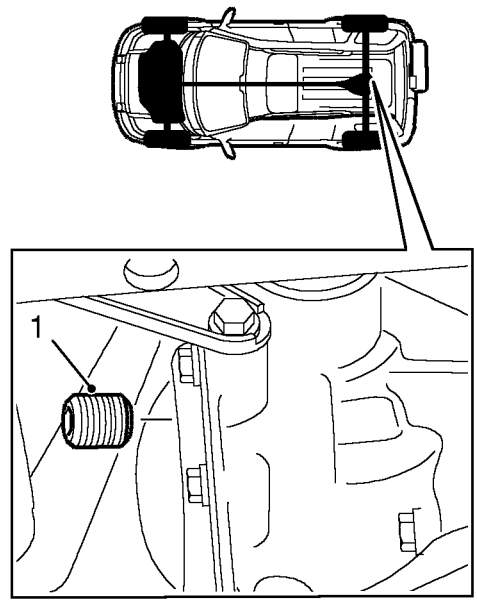
9. Remove filler plug and add fluid until it just runs from level plug aperture.

   When topping up after a new air blast cooler (Td4 hot climates) has been fitted, an extra 420 cc of fluid is required. The fluid must also reach a temperature of 80° C (176° F) to allow the switch on the cooler to open.

10. Move selector lever from 'P' through each gear position and return to 'P' , allowing any excess fluid to drain off.
11. Fit new level plug and tighten to 14 Nm (10 lbf.ft).
12. Clean and fit filler plug.
13. Disconnect TestBook.
14. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Rear Axle

Replace Fluid



M10 0763

1. With vehicle on a ramp at a convenient working height, carefully remove rear differential level plug.
2. Check oil level. Before topping up oil level, check for visible signs of leakage. Pay particular attention to drive shaft oil seals, differential pinion oil seal and backplate gasket.
3. Refit level plug to rear differential.

Clutch Pipes and Unions

Check

1. Check route of clutch pipe from master cylinder to slave cylinder. Ensure that pipe is correctly retained and shows no signs of fluid leakage or chafing.
2. Check unions for signs of fluid leakage.

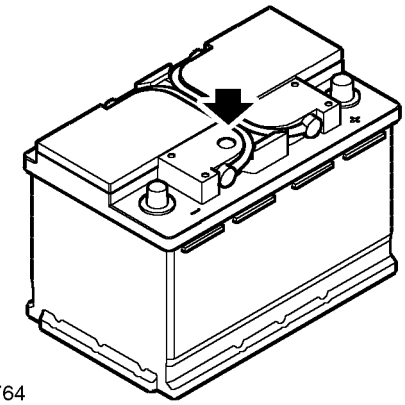
Windscreen and Rear Washer Reservoir

Check and Top-up

1. Release cap from washer reservoir and fill with the correct concentration of screen washer fluid.
2. Refit cap ensuring it is securely fastened.

Battery

Check



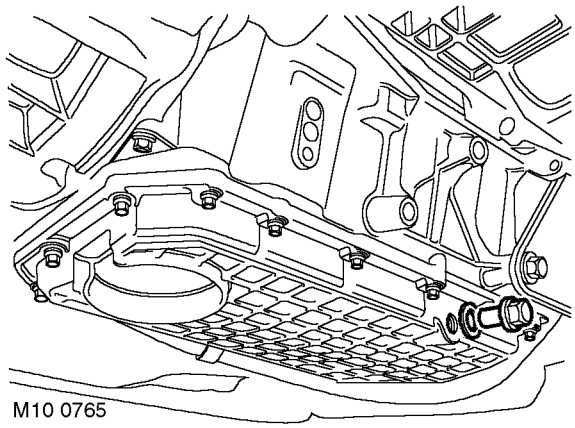
M10 0764

1. Check battery condition indicator. Green = OK. Black = Battery requires charging. Clear/white = New battery required.
2. Clean and check security of battery terminals. Smear with petroleum jelly.

Engine Oil and Filter – Td4

Drain

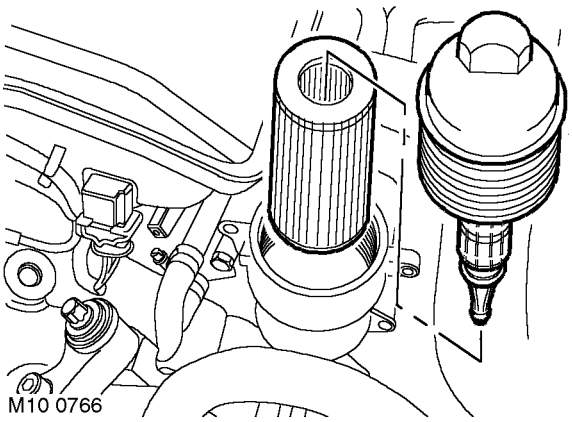
1. Raise vehicle on ramp.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M10 0765

3. Place a suitable container under engine sump drain plug, remove drain plug and discard sealing washer. Allow oil to drain.
   WARNING: Observe due care when draining engine oil as the oil can be very hot.

   WARNING: Avoid excessive skin contact with used engine oil. Used engine oil contains potentially harmful contaminants which may cause skin cancer or other serious skin disorders.

4. Lower vehicle


M10 0766

5. Remove oil filter cap and discard 3 seals.
   CAUTION: Care must be taken to ensure that oil or fluid does not enter or contaminate the alternator.

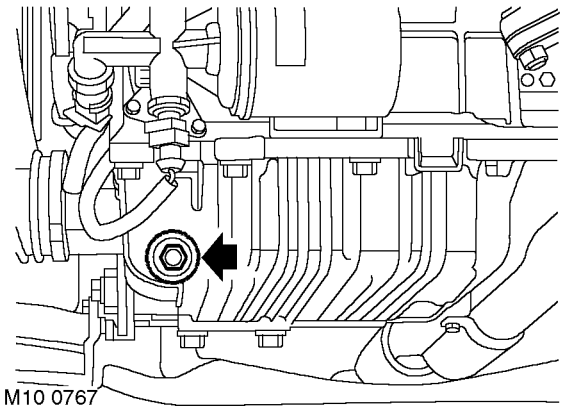
Refill

1. Replace engine oil filter.
   ☞ **ENGINE - Td4, REPAIRS, Filter - engine oil.**
2. Fit new seals and lubricate with clean engine oil.
3. Fit oil filter cap and tighten to 25 Nm (18 lbf.ft).
4. Raise vehicle.
5. Clean sump drain plug, fit new sealing washer and tighten sump drain plug to 28 Nm (21 lbf.ft).
6. Fit oil filler cap.
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
8. Lower vehicle.
9. Remove engine oil filler cap and fill engine with oil to correct level.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
10. Start engine. Run at idle until oil pressure warning light extinguishes.
11. Stop engine. Recheck engine oil level.
12. Check for signs of leakage.

Engine Oil and Filter – K1.8

Drain

1. Raise vehicle on ramp.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M10 0767

3. Place a suitable container under engine sump drain plug, remove plug and discard sealing washer. Allow oil to drain.
   WARNING: Observe due care when draining engine oil as the oil can be very hot.

   WARNING: Avoid excessive skin contact with used engine oil. Used engine oil contains potentially harmful contaminants which may cause skin cancer or other serious skin disorders.

4. Remove and discard engine oil filter.

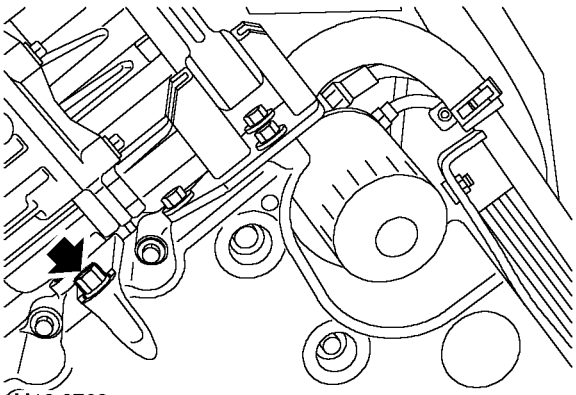
Refill

1. Lubricate sealing ring of new filter with clean engine oil.
2. Fit new filter and tighten by hand until it seats, then tighten a further half a turn.
3. Clean sump drain plug and fit new sealing washer.
4. Fit sump drain plug and tighten to 25 Nm (18 lbf.ft).
5. Remove engine oil filler cap and fill engine with oil to correct level.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
6. Fit oil filler cap.
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
8. Lower vehicle.
9. Start engine. Run at idle until oil pressure warning light extinguishes.
10. Stop engine. Recheck engine oil level.
11. Check for signs of leakage.

Engine Oil and Filter – KV6

Drain

1. Raise vehicle on ramp.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M10 0768

3. Place a suitable container under engine sump drain plug, remove plug and discard sealing washer. Allow oil to drain.
   WARNING: Observe due care when draining engine oil as the oil can be very hot.

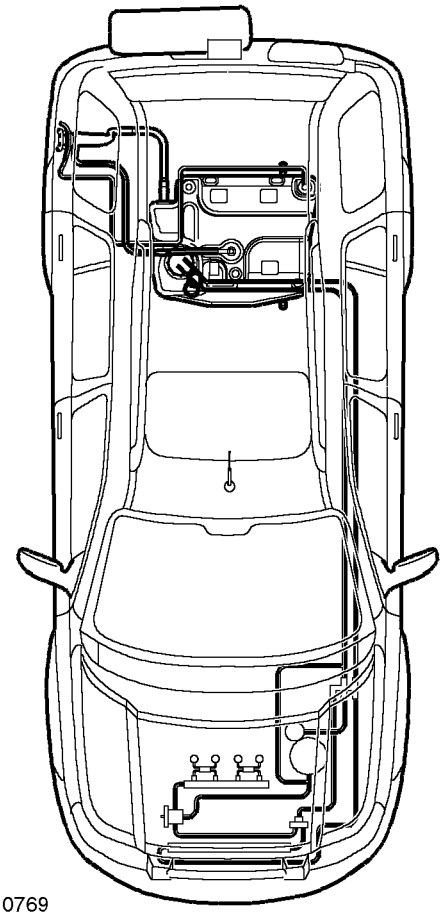
   WARNING: Avoid excessive skin contact with used engine oil. Used engine oil contains potentially harmful contaminants which may cause skin cancer or other serious skin disorders.

4. Remove and discard engine oil filter.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Filter - engine oil.**

Refill

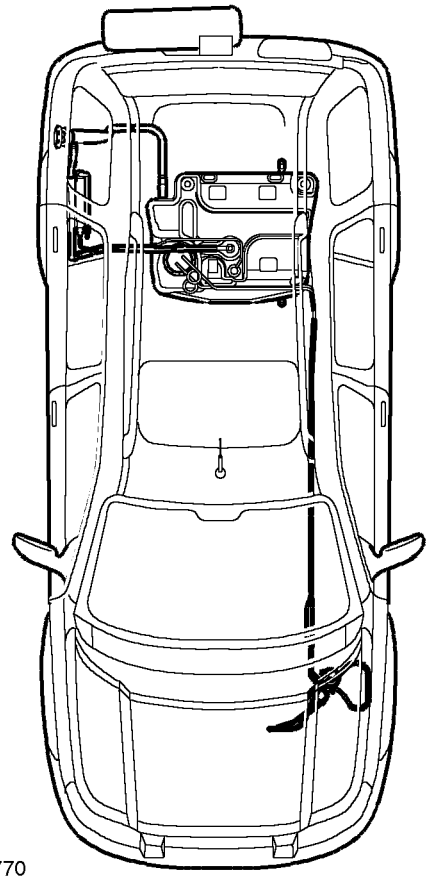
1. Fill canister of replacement oil filter with clean engine oil.
2. Lubricate sealing ring of new filter with clean engine oil.
3. Fit new filter and tighten by hand until it seats, then tighten a further half turn.
4. Clean sump drain plug and fit new sealing washer.
5. Fit sump drain plug and tighten to 25 Nm (18 lbf.ft).
6. Remove engine oil filler cap and fill engine with oil to correct level.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
7. Fit oil filler cap.
8. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
9. Lower vehicle.
10. Start engine. Run at 2500 rev/min until oil pressure warning light extinguishes.
11. Stop engine. Recheck engine oil level.
12. Check for signs of leakage.

Fuel Hoses and Pipes



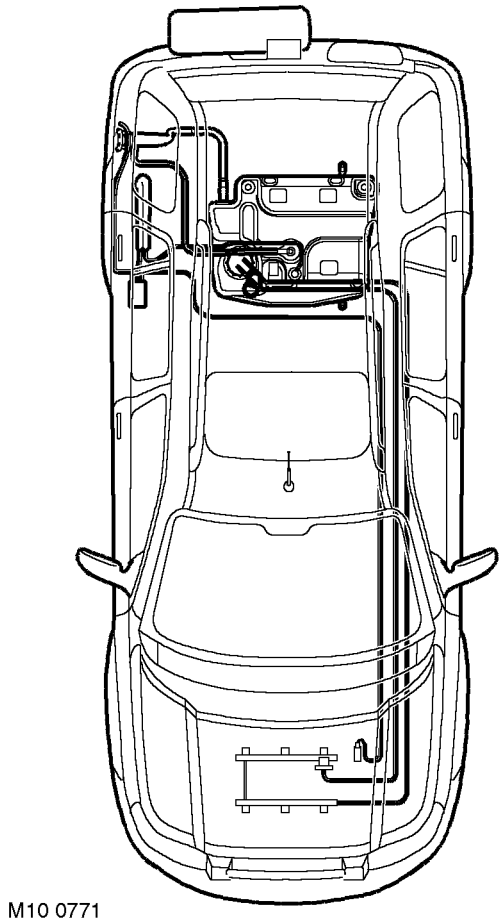
M10 0769

Td4 – Diesel engines



M10 0770

K1.8 – Petrol engines



KV6 – Petrol engines

Check

1. Check security of all fuel hoses, paying particular attention to those running under the vehicle. Check all hoses and pipes are correctly routed and secured. Check for signs of leakage or damage.

Brake Hoses and Pipes

Check

1. Visually check condition of all brake hoses. Look for any sign of damage or chafing. Check for any signs of fluid leakage.
2. Check brake pipes for signs of leakage or corrosion. Pay particular attention to pipe unions and joints. Ensure all pipes and hoses are correctly routed and secured.

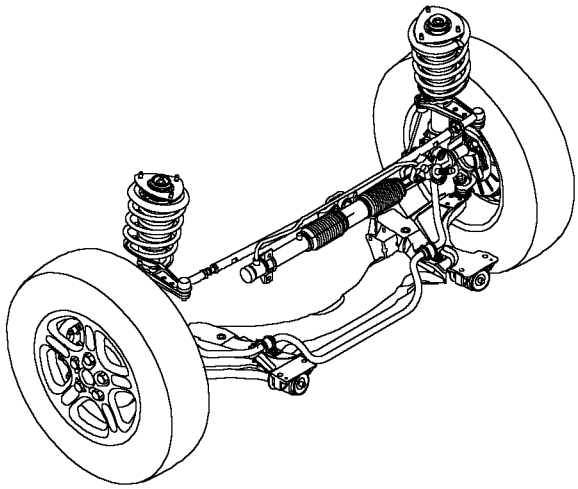
Check Exhaust System

Check

1. Visually check condition of exhaust system for signs of damage. Extra care should be taken to ensure the catalyst is in good condition and shows no signs of damage. Check condition of exhaust heat shields.
2. Check exhaust system is firmly secured and check condition of exhaust mounting rubbers, clamps and brackets.

Suspension

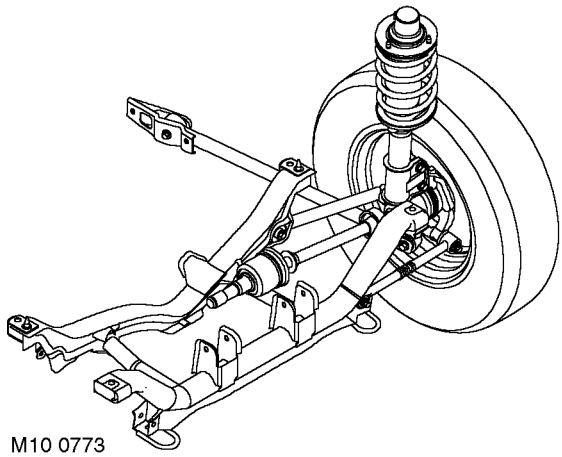
Check Front Suspension



M10 0772

1. Check condition of all ball joint dust covers, including anti-roll bar links.
2. Check tightness of all accessible suspension fixings including tie rods.
3. Check wheel bearings and suspension struts for signs of excessive play or wear.
4. Check for signs of leakage from suspension dampers.

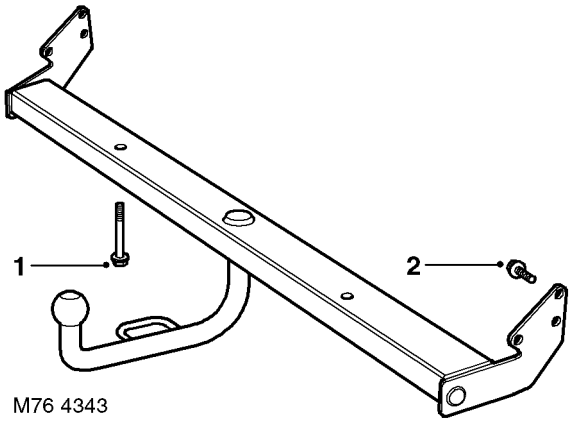
Check Rear Suspension



M10 0773

1. Check tightness of all accessible suspension fixings including transverse links.
2. Check wheel bearings and suspension struts for signs of excessive play or wear.
3. Check for signs of leakage from suspension dampers.

Check Tow Bar Fixings



1. Check that the two vertical fixings are tightened to a torque of 110 Nm (82 lbf.ft).
2. Check that the six transverse fixings are tightened to a torque of 60 Nm (45 lbf.ft).

Steering

Check

1. Check for excessive play from steering joints.
2. Check condition of steering ball joints paying particular attention to dust covers.
3. Check steering rack bellows for any signs of leakage.

Road Test

There are two purposes for conducting a road test. Firstly, to ensure the work completed within the dealership meets the standards required as laid down by dealership processes. Secondly, for a skilled technician to assess the general condition of the vehicle and report any conditions that the customer should be made aware of.

CAUTION: Two wheel dynamometer tests must not be carried out. Four wheel dynamometer tests must be restricted to 3 mph (5 kph).

Engine Start

1. Check for correct operation of starter switch. Ensure the engine starts in a correct manner. Leave the engine running.

Starter Inhibitor Switch – (Automatic only)

1. Select 'D' gear lever position.
2. Check that engine will not start.
3. Select 'R' gear lever position and repeat start check.
4. Check that engine will start in 'P' and 'N' positions.

Selector Cable – (Automatic only)

1. Check for correct setting of gear selector cable.

Engine Performance and Throttle Operation

1. Start engine and check that it starts easily.
2. Check that 'oil pressure' and 'no charge' warning lamps extinguish.
3. Check that throttle pedal movement is free and unrestricted.
4. Check that engine is responsive to throttle movement.

Clutch and Gear Selection – (Manual only, normal driving conditions)

1. Check that clutch engages smoothly without judder, slipping or noise.
2. Check for abnormal transmission noise.
3. Check for smooth quiet gear changes and that gear selected engages easily.

Gear Change and Parking Pawl Engagement – (Automatic only, normal driving conditions)

1. Select 'R' and check for smooth take up.
2. Select 'D' and check for smooth up-changes of ratio from rest.
3. Slow down vehicle and check for smooth down-changes of ratio.
4. Stop vehicle on a slope.
5. Select 'P' and release handbrake.
6. Check that vehicle does not move and that selector does not slip out of 'P'.
7. Carry out a similar check with vehicle facing in the opposite direction.

Steering

1. With vehicle stationary, turn steering from lock to lock. Check for smooth operation and ensure there is no undue noise from the power steering pump or drive belt.

Suspension

1. Check for noise, irregularity in ride (e.g. dampers) and wheel imbalance.

Foot brake

1. Check for pedal effort, travel, braking efficiency, pulling and binding.

Handbrake

1. Apply handbrake firmly, check travel and ratchet hold and release.

Instruments

1. Check for correct operation of all instruments and warning devices where practical.

Body

1. Check for abnormal body noise.

Seat Belts

1. Check for operation of inertia reels.

Road Test

1. Drive vehicle on a short road test. Check all vehicle systems for correct operation. Pay particular attention to:
   - Engine noise
   - Gearbox noise
   - Suspension noise
   - Body noise
   - Braking system operation
   - Gear selection
   - Engine performance
2. Where possible, check for correct operation of Hill Descent Control (HDC) system. This should not be carried out if excessive journey time is required.
3. After road test, carry out a final inspection of the vehicle on vehicle ramps.
4. Check all underbonnet fluid levels and top-up if necessary.

Endorse Service Record

Check

1. Insert date and mileage of next service.
2. Insert current mileage.
3. Tick one of the boxes on the brake fluid replacement indicator.
4. Tick one of the boxes on the camshaft drive belt indicator.
5. Endorse service record with dealer stamp.
6. Sign and date the service record.
7. Sign and date the maintenance check sheet.

Report any Unusual Features

Check

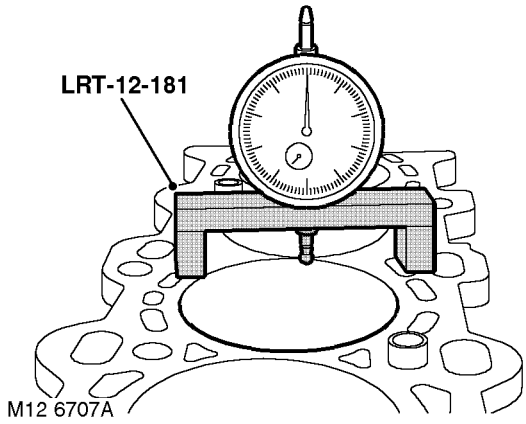
1. Produce a written report detailing additional work necessary, or items which may require attention prior to the next service.

Piston protrusion - check - head removed

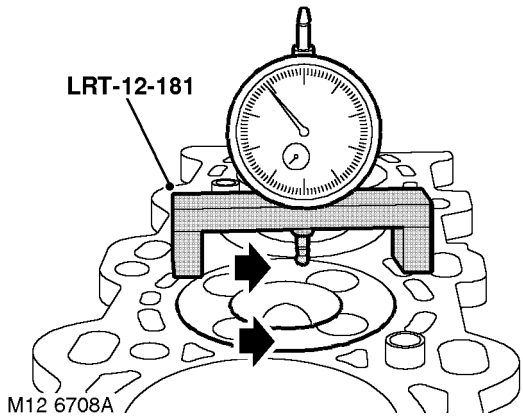
12.17.35.01

Check

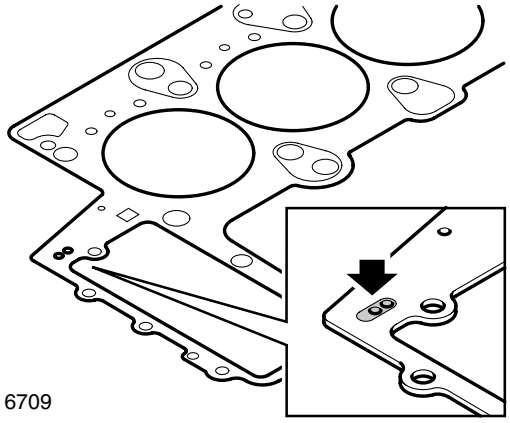
1. Cylinder block face and piston crowns must be clean.



2. Position a dial gauge with **LRT-12-181** to cylinder block.
3. Preload and zero gauge on cylinder block.



4. Move gauge onto piston crown and measure protrusion in 2 places as shown. Determine piston TDC position by rocking crankshaft, until highest reading is achieved. Note and record piston protrusion measurements and repeat for all pistons.



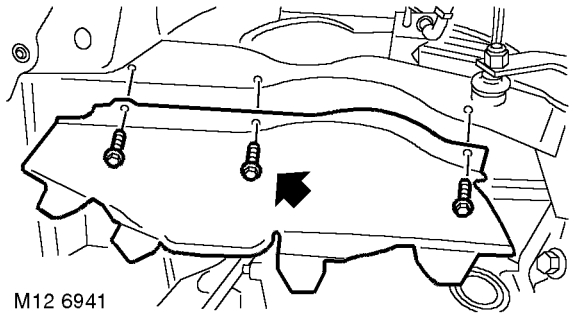
5. The highest piston protrusion figure recorded, determines thickness of required cylinder head gasket.
6. Piston protrusion up to 0.91 mm, install 1 hole cylinder head gasket.
7. Piston protrusion 0.92 mm to 1.03 mm, install 2 hole cylinder head gasket.
8. Piston protrusion over 1.03 mm, install 3 hole cylinder head gasket.

Valve timing - check & adjust

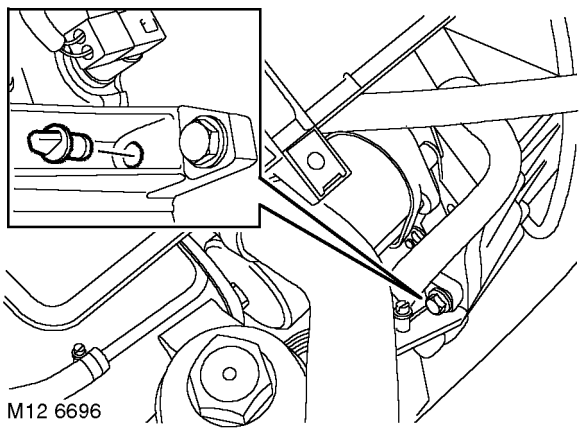
12.65.07

Check

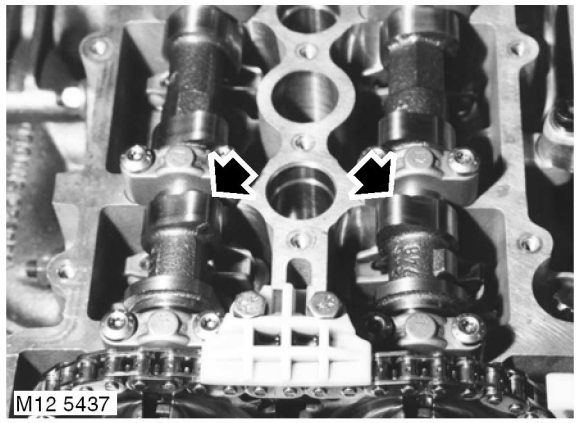
1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove RH front road wheel.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.


M12 6941

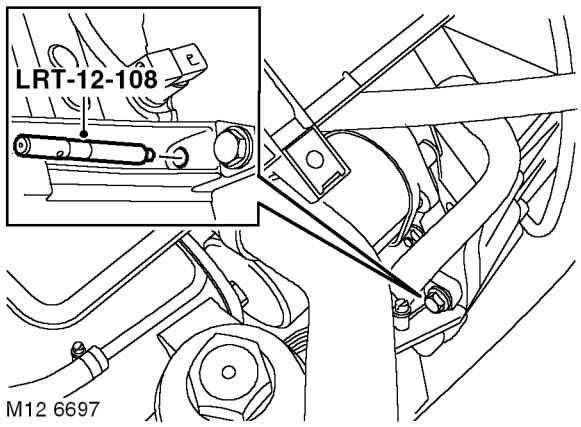
4. Remove 3 bolts and remove splash shield.
5. Remove camshaft cover gasket.
   ENGINE - Td4, REPAIRS, Gasket - camshaft cover.


M12 6696

6. Remove blanking plug from crankshaft timing pin hole.

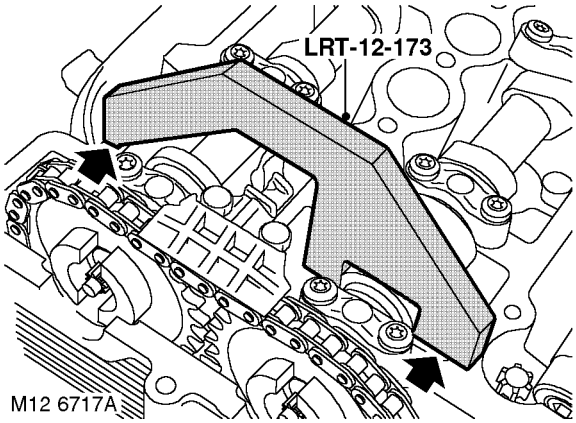

M12 5437

7. With a socket and bar fitted to pulley bolt, rotate crankshaft in direction of rotation until No 1 cylinder is at TDC position.

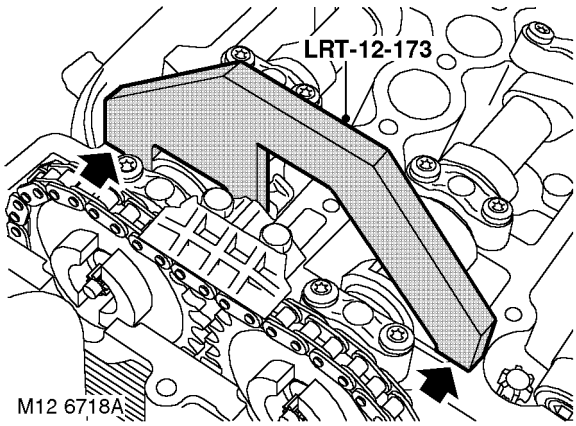


M12 6697

8. Fit **LRT-12-108** to lock crankshaft.
   CAUTION: Do not turn the engine against its direction of rotation.



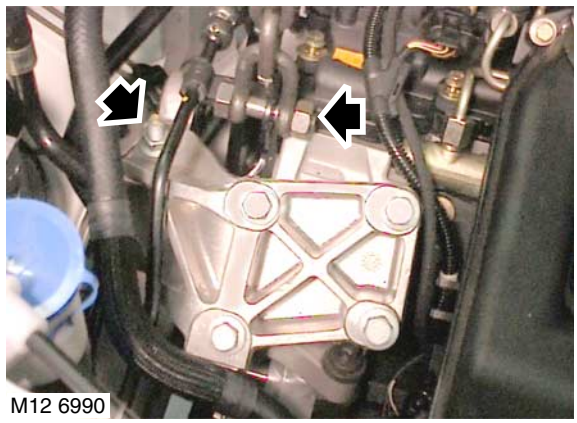
9. Fit **LRT-12-173** to inlet camshaft.
10. If inlet camshaft is timed correctly, **LRT-12-173** will contact both sides of camshaft cover gasket face on cylinder head.



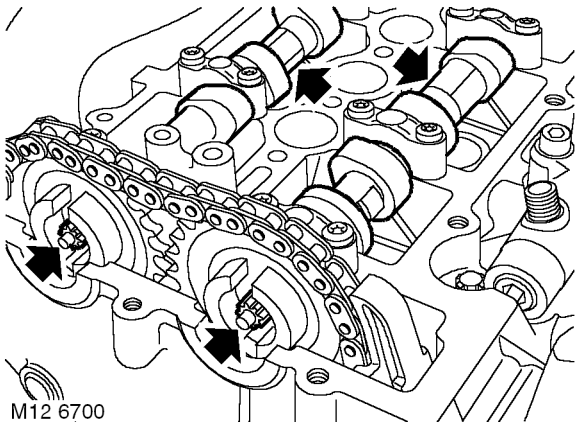
11. Remove **LRT-12-173** from inlet camshaft and fit to exhaust camshaft.
12. If exhaust camshaft is timed correctly, **LRT-12-173** will contact both sides of camshaft cover gasket face on cylinder head.

Adjust

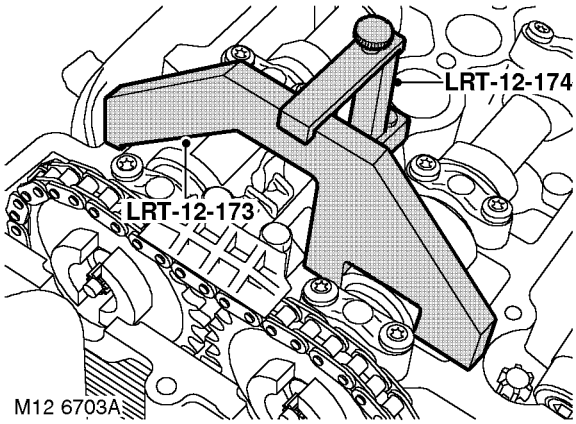
1. Tie bonnet back in upright position.
2. Remove engine upper steady.
   ☞ **ENGINE - Td4, REPAIRS, Engine steady - upper - RH.**



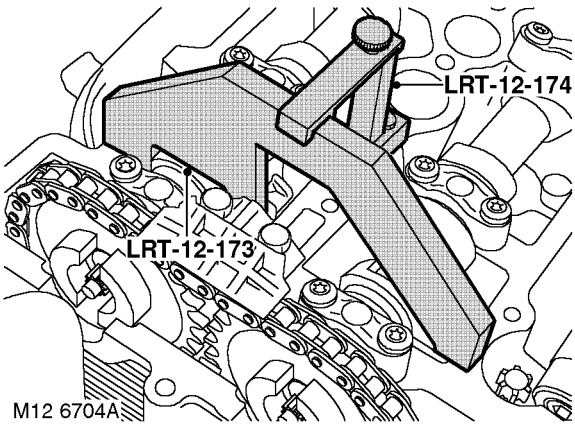
3. Remove nut securing engine RH mounting bracket to hydramount.
4. Fit lifting chains to lifting eye and raise engine for access.



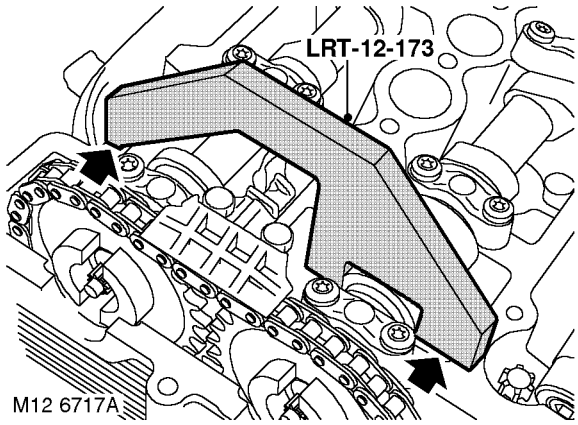
5. With **LRT-12-108** fitted to lock crankshaft, use a spanner on hexagon to hold camshafts; remove and discard screws securing chain sprockets.
6. Fit new screws to sprockets, tighten screws sufficiently to allow sprockets to rotate with all side play eliminated.



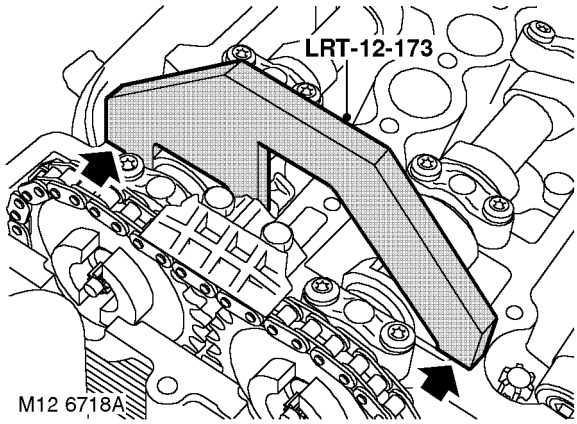
7. Fit **LRT-12-174** to cylinder head.
8. Align inlet camshaft, fit **LRT-12-173** to camshaft and tighten locking screw of **LRT-12-174**.
9. With spanner on hexagon to hold inlet camshaft, use a suitable angle torque gauge and tighten inlet camshaft sprocket retaining screw to 20 Nm (15 lbf.ft) and then a further 35°.
10. Loosen locking screw on **LRT-12-174**, and remove **LRT-12-173** from inlet camshaft.



11. Align exhaust camshaft, fit **LRT-12-173** to camshaft and tighten locking screw of **LRT-12-174**.
12. With a spanner on hexagon to hold exhaust camshaft, use a suitable angle torque gauge and tighten screw securing exhaust camshaft sprocket to 20 Nm (15 lbf.ft) and then a further 35 °.
13. Remove **LRT-12-174** and **LRT-12-173**.
14. Withdraw **LRT-12-108** to unlock crankshaft.
15. With a socket and bar fitted to pulley bolt, rotate crankshaft 2 revolutions in direction of rotation until No 1 cylinder is at TDC position.
16. Fit **LRT-12-108** to lock crankshaft.
    CAUTION: Do not turn the engine against its direction of rotation.



17. Fit **LRT-12-173** to inlet camshaft.
18. If inlet camshaft is timed correctly, **LRT-12-173** will contact both sides of camshaft cover gasket face on cylinder head.



19. Remove **LRT-12-173** from inlet camshaft and fit to exhaust camshaft.
20. If exhaust camshaft is timed correctly, **LRT-12-173** will contact both sides of camshaft cover gasket face on cylinder head.
21. If necessary, repeat adjustment procedure.
22. Remove tools **LRT-12-173** and **LRT-12-108**.
23. Fit blanking plug to crankshaft timing pin hole.
24. Lower engine onto hydramount.
25. Fit nut securing mounting bracket to hydramount and tighten to 85 Nm (63 lbf.ft).
26. Remove engine lifting chains.
27. Fit engine steady.
    ☞ **ENGINE - Td4, REPAIRS, Engine steady - upper - RH.**

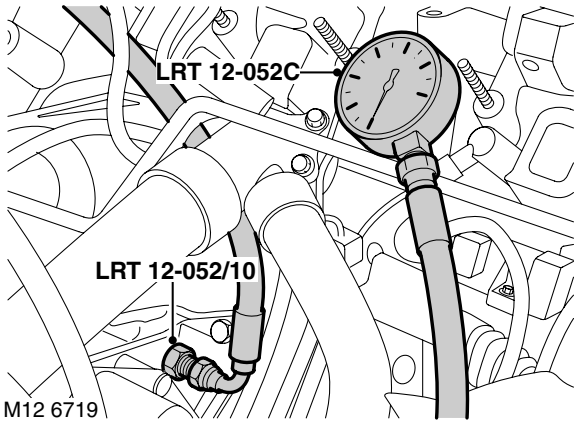
28. Fit camshaft cover gasket.
☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
29. Fit splash shield and tighten bolts to 10 Nm (7 lbf.ft).
30. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
31. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
32. Connect battery earth lead.
33. Untie and close bonnet.

Engine oil pressure - check

12.90.09.01

Check

1. Disconnect battery earth lead.
2. Remove oil pressure switch.
☞ **ENGINE - Td4, REPAIRS, Switch - oil pressure.**



3. Fit pressure switch sealing washer to **LRT-12-052/10** gauge adaptor.
4. Fit and tighten adaptor **LRT-052/10** to oil filter housing.
5. Fit **LRT-12-052C** gauge and tighten union.
6. Check engine oil level, top-up if necessary.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.**
7. Fit starter motor.
☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
8. Connect battery earth lead.
9. Start and run engine until normal operating temperature is reached.
10. Note oil pressure readings with the engine running at idle and at 3500 rev/min.
☞ **GENERAL DATA, Engine – Td4 Diesel.**
11. Switch off engine.
12. Disconnect battery earth lead.
13. Remove starter motor.
☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
14. Remove pressure gauge.
15. Remove adaptor.

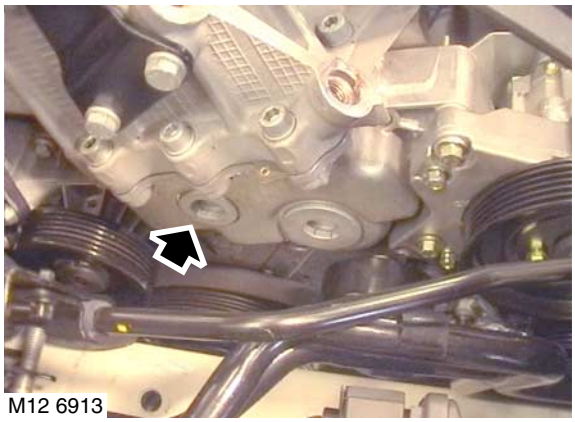
16. Clean oil spillage.
17. Fit oil pressure switch.
    ☞ **ENGINE - Td4, REPAIRS, Switch - oil pressure.**
18. Check engine oil level, top-up if necessary.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.**
19. Connect battery earth lead.

Camshaft - inlet or exhaust

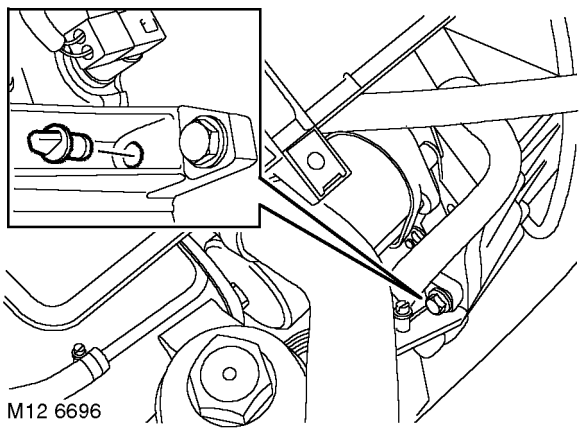
12.13.02

Remove

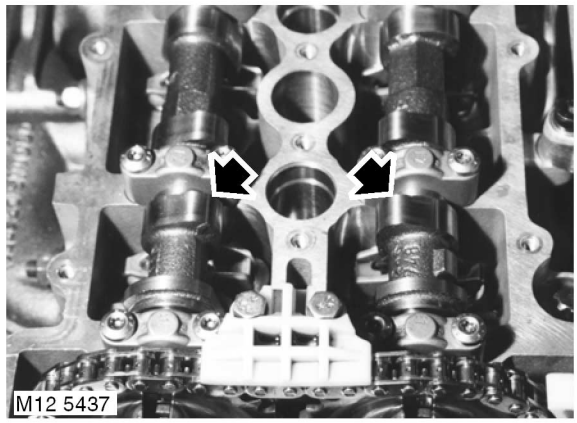
1. Disconnect battery earth lead.
2. Remove ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
3. Remove RH front road wheel.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
4. Remove camshaft cover gasket.
   ☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
5. Remove hydramount.
   ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**


M12 6913

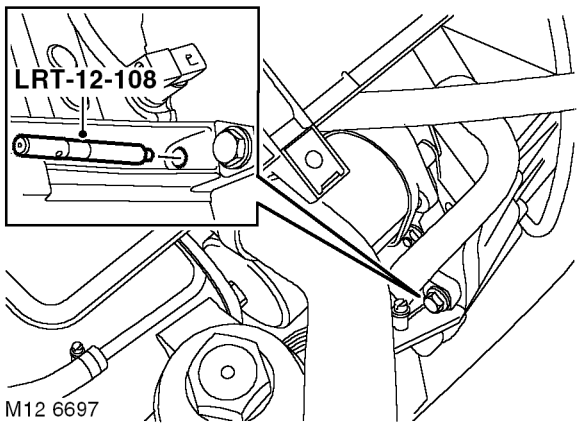
6. Remove chain tensioner access plug from timing cover.


M12 6696

7. Remove blanking plug from crankshaft timing pin hole.

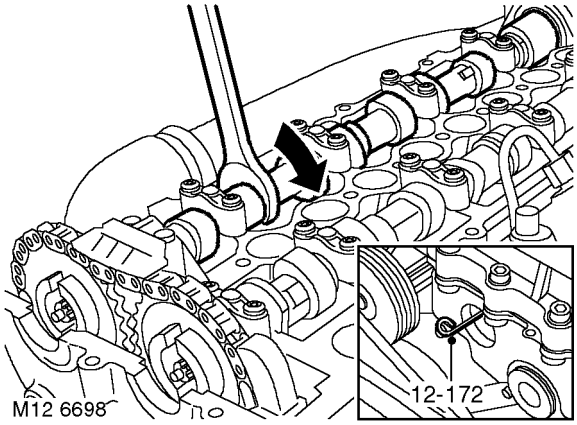

M12 5437

8. With a socket and bar fitted to pulley bolt, rotate crankshaft in direction of rotation until No 1 cylinder is at TDC position.

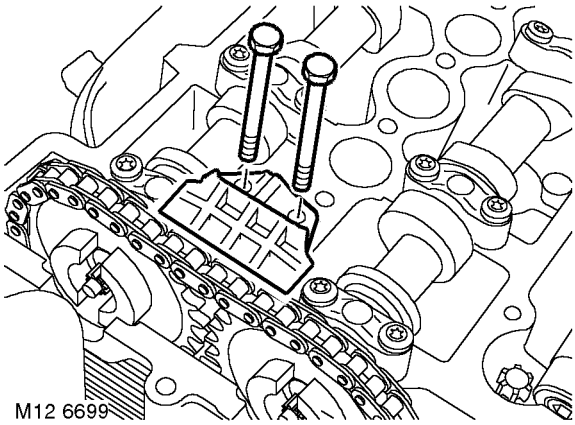


M12 6697

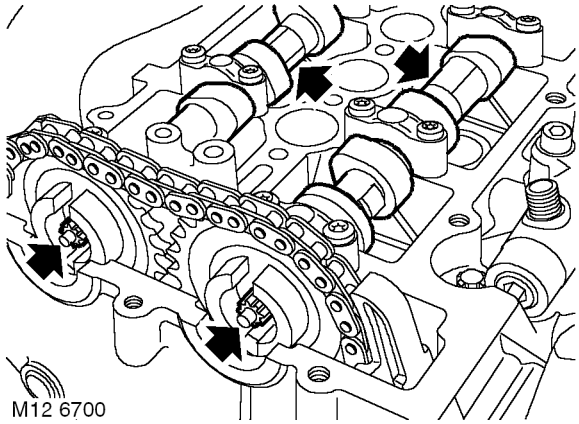
9. Fit **LRT-12-108** to lock crankshaft.
   CAUTION: Do not turn the engine against its direction of rotation.



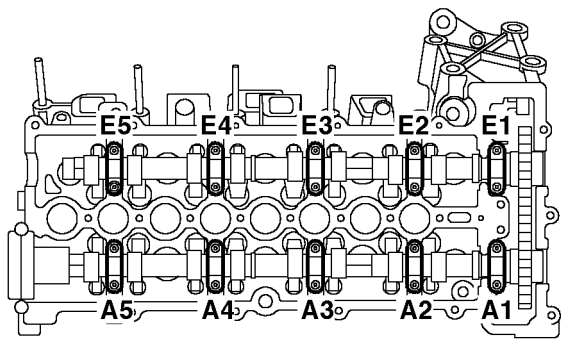
10. With a spanner on hexagon, slowly rotate exhaust camshaft clockwise to fully compress chain tensioner.
11. Fit **LRT-12-172** to lock tensioner.



12. Remove 2 bolts and remove oil feed guide rail. Discard seal.

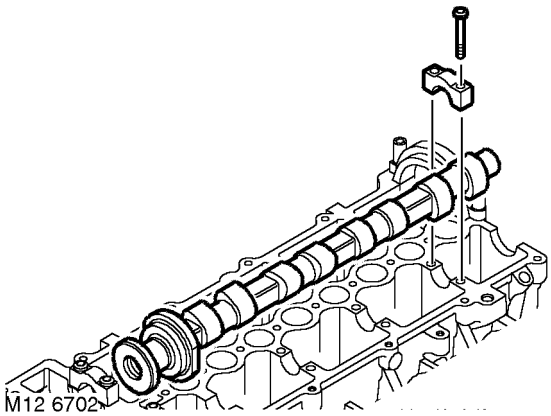


13. Hold camshafts with spanner on hexagon and loosen both camshaft sprocket retaining screws.
14. Withdraw **LRT-12-108** and rotate crankshaft approximately 45° against direction of rotation to prevent damage to valves when rotating camshafts.
15. Remove and discard retaining screws and release sprockets from camshafts.



M12 6701

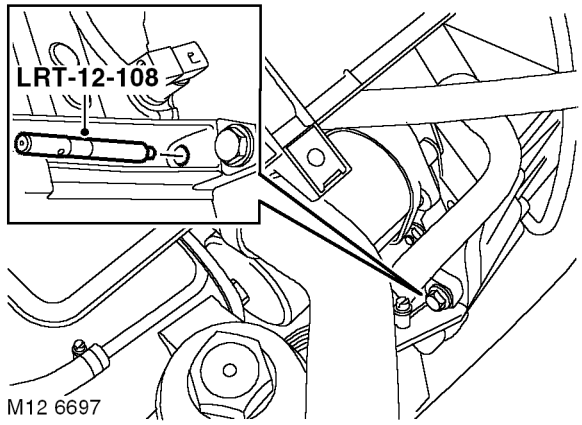
16. Identify camshaft bearing caps for refitting. Inlet camshaft is marked 'E' with caps marked 'E1' to 'E5' from sprocket when viewed from exhaust side of engine. Exhaust camshaft is marked 'A' with caps marked 'A1' to 'A5' from sprocket when viewed from exhaust side of engine.



17. Evenly and progressively loosen and remove 10 screws securing camshaft bearing caps.
18. Remove camshaft bearing caps.
19. Remove camshaft.
20. **Exhaust camshaft:** Release from vacuum pump coupling.

Refit

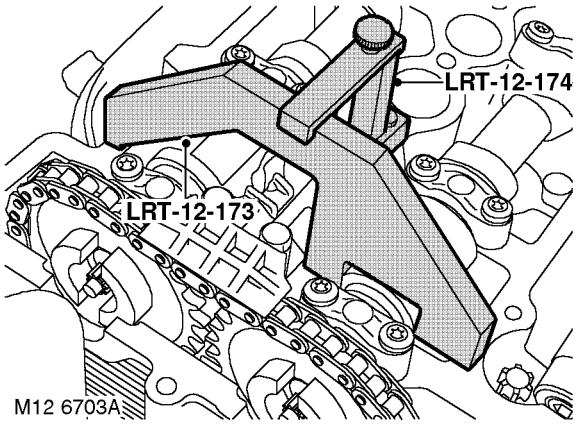
1. Clean camshaft, camshaft bearings and bearing caps.
2. Lubricate camshaft and camshaft bearings.
3. Fit camshaft to cylinder head, timed approximately No 1 cylinder at TDC firing position.
4. **Exhaust camshaft:** Engage with vacuum pump coupling.
5. Fit camshaft bearing caps in correct order, fit screws and tighten evenly and progressively to 10 Nm (7.5 lbf.ft).
6. Fit sprockets to camshafts and tighten new screws sufficiently to enable rotation of sprockets but eliminate side play.
7. Clean oil feed guide rail and mating face.
8. Fit new seal to oil feed guide rail.
9. Fit oil feed guide rail and tighten bolts to 10 Nm (7.5 lbf.ft).



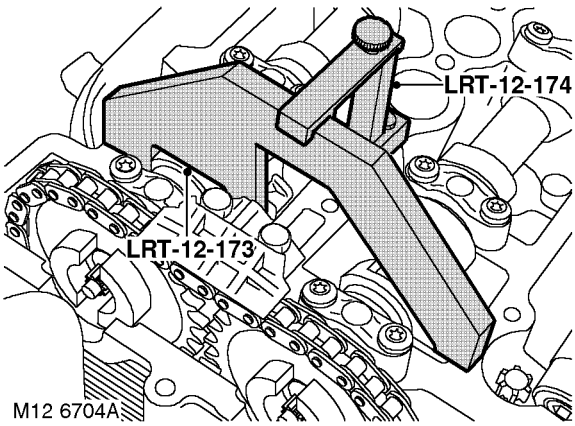
10. With spanner on crankshaft pulley bolt, rotate crankshaft in direction of rotation until **LRT-12-108** can be fitted to lock crankshaft at TDC firing position.

    CAUTION: Do not turn the engine against its direction of rotation.

11. With spanner on hexagon, tighten exhaust sprocket securing screw, and rotate exhaust camshaft in direction of rotation until chain tensioner is compressed.
12. Remove **LRT-12-172** from tensioner.
13. Loosen exhaust camshaft sprocket screw sufficiently to allow rotation of sprocket without side play.
14. Clean timing chain tensioner access plug and mating face.
15. Fit timing chain tensioner access plug and tighten to 30 Nm (22 lbf.ft).

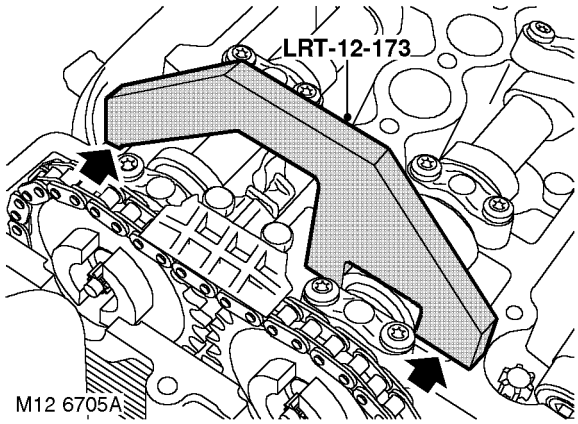


16. Fit **LRT-12-174** to cylinder head.
17. Align inlet camshaft, fit **LRT-12-173** to camshaft and tighten locking screw of **LRT-12-174**.
18. With spanner on hexagon to hold inlet camshaft, use a suitable angle torque gauge and tighten inlet camshaft sprocket retaining screw to 20 Nm (15 lbf.ft), and then a further 35°.
19. Loosen locking screw on **LRT-12-174**, and remove **LRT-12-173** from inlet camshaft.

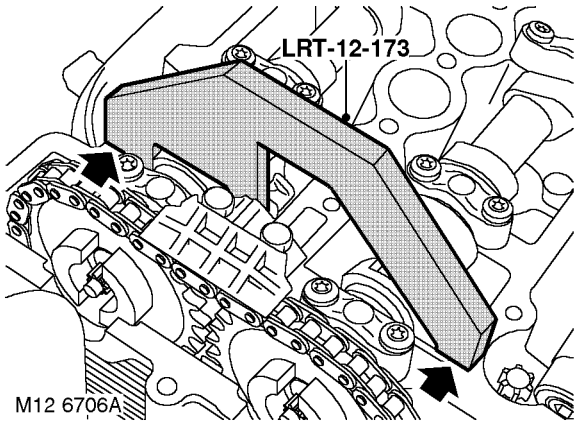


20. Align exhaust camshaft, fit **LRT-12-173** to camshaft and tighten locking screw of **LRT-12-174**.
21. With spanner on hexagon to hold exhaust camshaft, use a suitable angle torque gauge and tighten screw securing exhaust camshaft sprocket to 20 Nm (15 lbf.ft). and then a further 35°.
22. Remove **LRT-12-174** and **LRT-12-173**.
23. Withdraw **LRT-12-108** to unlock crankshaft.
24. With socket and bar on pulley bolt, rotate crankshaft 2 revolutions in direction of rotation until No 1 cylinder is at TDC firing position.
25. Fit **LRT-12-108** to lock crankshaft.

    CAUTION: Do not turn the engine against its direction of rotation.



26. Fit **LRT-12-173** to inlet camshaft.
27. If inlet camshaft is timed correctly, **LRT-12-173** will contact both sides of camshaft cover gasket face on cylinder head.



28. Remove **LRT-12-173** from inlet camshaft and fit to exhaust camshaft.
29. If exhaust camshaft is timed correctly, **LRT-12-173** will contact both sides of camshaft cover gasket face on cylinder head.
30. If necessary, repeat adjustment procedure.
31. Remove tools **LRT-12-173** and **LRT-12-108**.
32. Fit blanking plug to crankshaft timing pin hole.
33. Fit hydramount.

    ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**

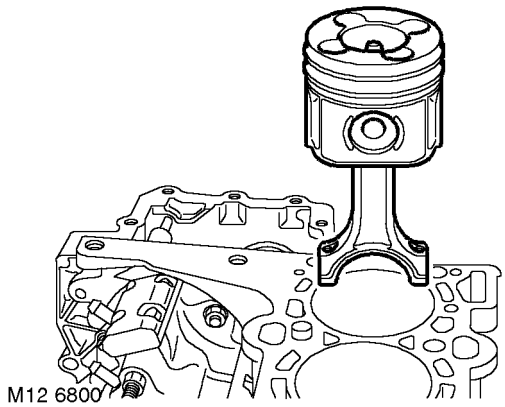
34. Fit camshaft cover gasket.
☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
35. Fit ancillary drive belt
☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
36. Fit road wheel.
37. Connect battery earth lead.

Piston assemblies - engine set

12.17.03

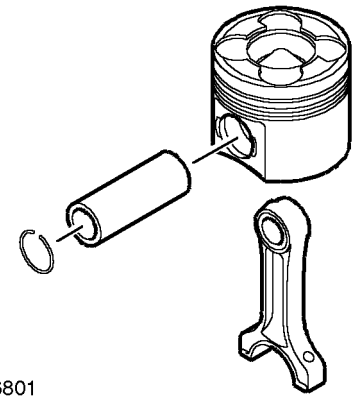
Remove

1. Disconnect battery earth lead.
2. Remove cylinder head gasket.
☞ **ENGINE - Td4, REPAIRS, Gasket - cylinder head - manual models.**
3. Remove connecting rod bearings.
☞ **ENGINE - Td4, REPAIRS, Connecting rod bearings - engine set.**
4. Remove ridge of carbon from top of cylinder bore.



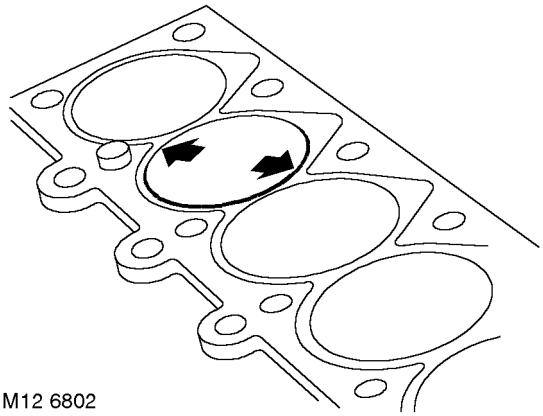
5. Carefully push piston assembly from cylinder bore.
CAUTION: Ensure that connecting rods do not contact cylinder bores or oil squirt jets.

6. Assistance may be required when pistons are removed to prevent timing chain lock up when crankshaft is rotated.
7. Repeat above operations for remaining 3 pistons.
8. Hold connecting rods in a soft jawed vice.



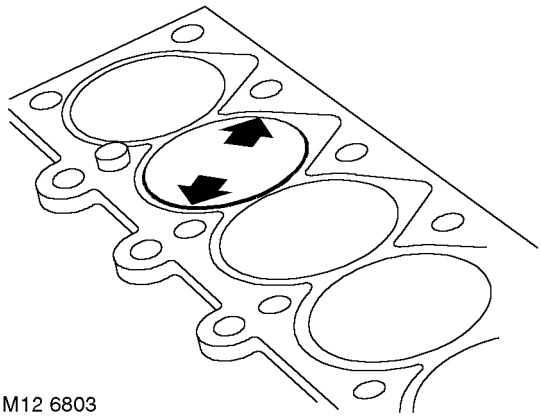
M12 6801

9. Using a pair of suitable thin screwdrivers, carefully remove and discard 2 retaining rings securing the gudgeon pin in the piston.
10. Push gudgeon pin out of piston and connecting rod, remove piston.



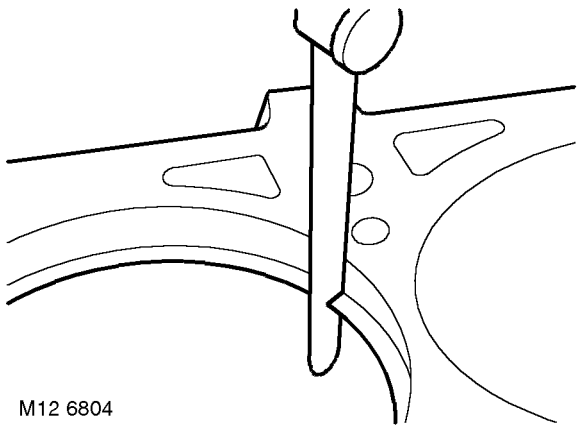
M12 6802

11. **Pistons and cylinder bores:** Check and record cylinder bore diameters at bottom, centre and top of bore ensuring that measurements are taken at the angle shown.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**



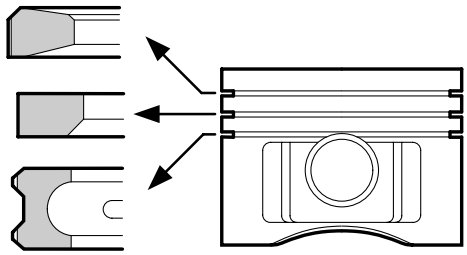
M12 6803

12. Repeat procedure at angle shown and from the 2 sets of measurements obtained, calculate cylinder bore ovality and taper.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**
13. Starting with No 1 piston,measure and record piston diameter at right angles to gudgeon pin holes, and 12 mm from bottom of piston skirt.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**
14. Compare piston diameter with cylinder bore size and determine piston to bore clearance.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**
15. Remove compression rings, oil control rails and expander from new piston.



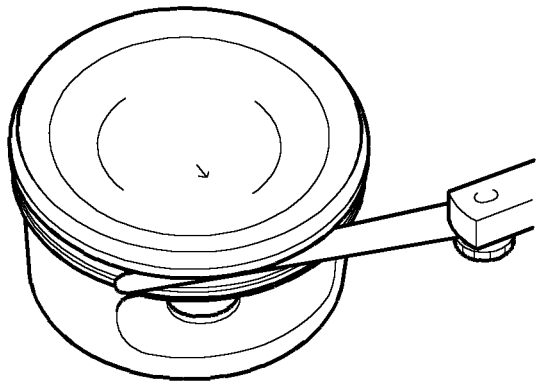
M12 6804

16. Check new ring fitted gap, 30 mm from top of bore. Ensure rings are fitted square to bore when checking gap.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**



M12 6805

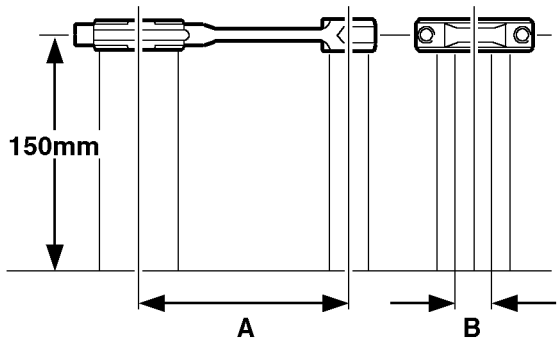
17. Fit oil control ring rails and expander, ensuring ends butt and do not overlap.
18. Fit 2nd compression ring with 'TOP' marking upwards.
19. Fit 1st compression ring with 'TOP' marking upwards.



M12 6806

20. Check piston ring to groove clearance.
☞ **GENERAL DATA, Engine – Td4 Diesel.**
21. Check fit of gudgeon pin in piston, pin must be a tight, sliding fit with no perceptible side play.
22. Check small-end bushes for wear, check that gudgeon pin is a sliding fit in the bush with no perceptible side play.
☞ **GENERAL DATA, Engine – Td4 Diesel.**
NOTE: Small end bushes cannot be replaced, a new connecting rod must be fitted.

23. Check connecting rod for distortion, fit a new BLUE colour coded 'sputter' big-end bearing shell to the connecting rod and a new RED colour coded bearing shell to the big-end bearing cap.
24. Fit bearing caps to connecting rods, fit original bolts and tighten to 5 Nm (3.5 lbf.ft).



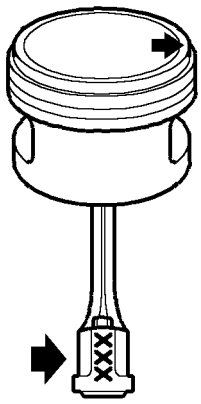
M12 6807

25. Check parallelism of connecting rods on both sides of connecting rod, taking the measurement approximately 150 mm (6.0 in) from the centre line of the connecting rod.
☞ **GENERAL DATA, Engine – Td4 Diesel.**
CAUTION: Do not attempt to straighten a distorted connecting rod.

26. Check for distortion on both sides of connecting rod.
☞ **GENERAL DATA, Engine – Td4 Diesel.**

Refit

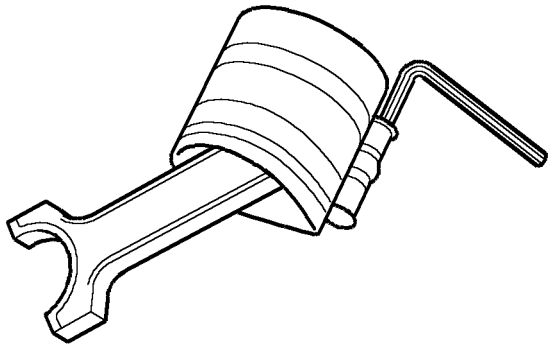
1. Clean cylinder bores, pistons, piston rings and connecting rods.



M12 6808

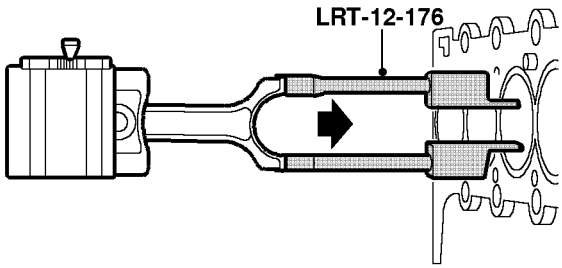
2. Assemble each piston to its connecting rod ensuring that the grade number on the connecting rod is positioned relative to the arrow on the piston crown as shown.
3. Lubricate gudgeon pins and bushes with engine oil, fit gudgeon pins and secure with new retaining rings ensuring that they are fully seated in their grooves.

4. Lubricate pistons, piston rings and cylinder bores with clean engine oil.
5. Check that rings are free to rotate, position ring gaps at 120° to each other and away from the thrust side - LH side of piston - viewed from front of piston.



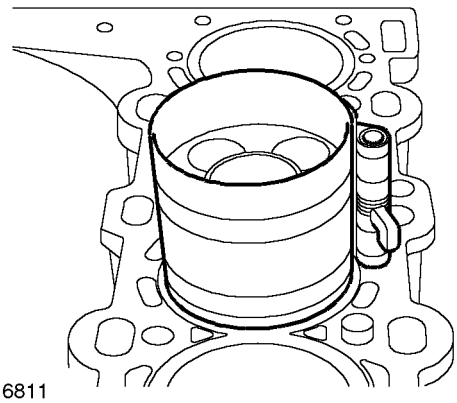
M12 6809

6. Using **LRT-12–204**, compress piston rings.



M12 6810A

7. Position **LRT-12-176** guides to connecting rod to protect cylinder bore and bearing journal.



M12 6811

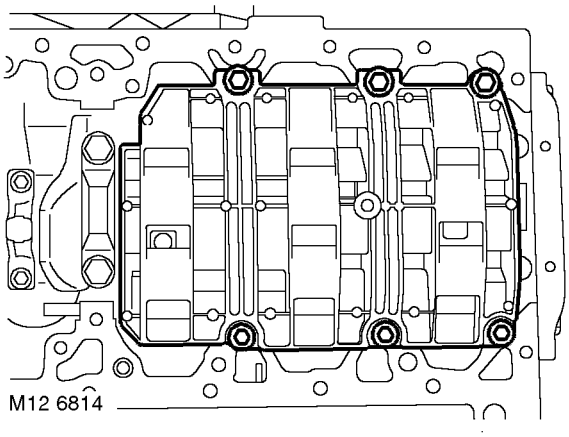
8. Insert connecting rod and piston into cylinder bore, ensuring that the arrow on piston crown is facing towards the front of the cylinder block.
9. Remove **LRT-12-176** guides from connecting rod.
10. Fit connecting rod bearings.
    ☞ **ENGINE - Td4, REPAIRS, Connecting rod bearings - engine set.**
11. Check piston protrusion.
    ☞ **ENGINE - Td4, ADJUSTMENTS, Piston protrusion - check - head removed.**
12. Fit cylinder head gasket.
    ☞ **ENGINE - Td4, REPAIRS, Gasket - cylinder head - manual models.**
13. Connect battery earth lead.

Connecting rod bearings - engine set

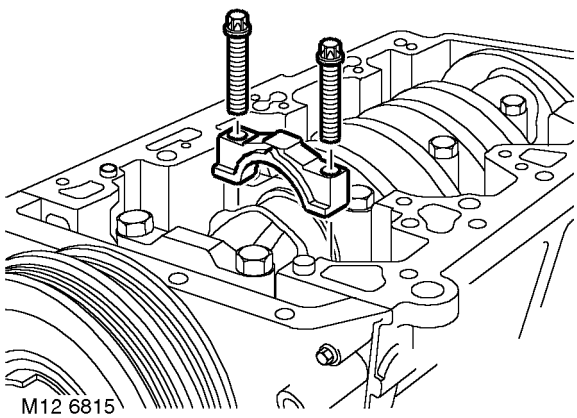
12.17.16

Remove

1. Disconnect battery earth lead.
2. Remove oil pump.
   ENGINE - Td4, REPAIRS, Pump - oil.



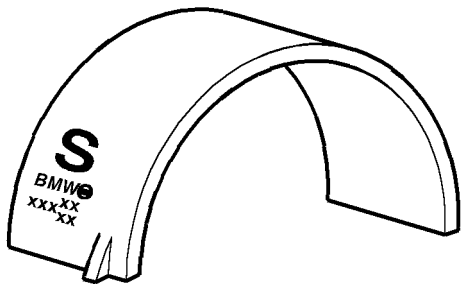
3. Remove 6 bolts securing reinforcing plate to cylinder block and remove plate.
4. Rotate crankshaft to gain access to connecting rod bearing bolts.
5. Mark connecting rod and bearing cap in relation to cylinder number.



6. Loosen and remove big-end bearing cap bolts, do not discard bolts at this stage.

   CAUTION: The big-end bearing caps are dowel located, do not tap the bearing caps sideways.

7. Remove big-end bearing cap, remove and discard bearing shell.
8. Rotate crankshaft sufficiently to move connecting rod clear of crankshaft journal.



M12 6816

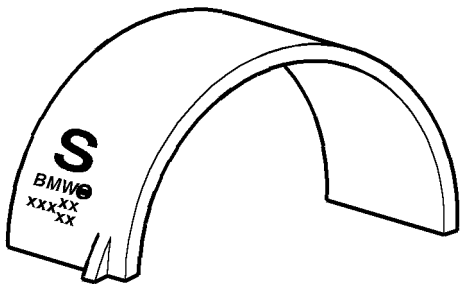
9. Remove and discard bearing shell from connecting rod noting the letter 'S' marked on the outside of the bearing shell.

   CAUTION: The big-end bearing shell fitted in the connecting rod is of the 'sputter' type, and is identified by the letter 'S' or a series of xxx on the outside of the shell.

10. Repeat above procedure for remaining connecting rod bearings. Keep big-end bearing caps in fitted order.

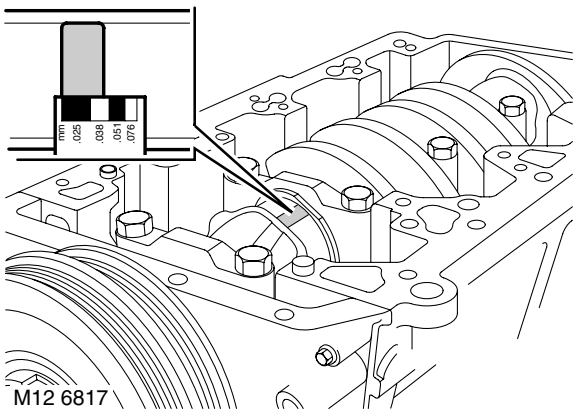
Refit

1. Wipe big-end journals, new bearing shells, connecting rods and bearing caps.
2. Measure and record each crankshaft big-end journal diameter, taking 4 measurements at 90° intervals on each journal.
   GENERAL DATA, Engine – Td4 Diesel.
3. Clean connecting rod bolts and lubricate bolts with engine oil.
4. Position crankshaft with big-end journals 1 and 4 at BDC.



M12 6816

5. Fit the new BLUE colour coded big-end bearing shell, marked with the letter 'S', to numbers 1 and 4 connecting rods.
6. Fit a new RED colour coded big-end bearing shell to numbers 1 and 4 big-end bearing caps.
7. Pull both connecting rods onto big-end journals.
8. Place a strip of Plastigauge across 1 and 4 big-end journals.
9. Fit big-end bearing caps ensuring that the reference marks on connecting rod and bearing cap are aligned.
10. Fit original big-end bearing cap bolts and tighten to: Stage 1 - 5 Nm (3.5 lbf.ft). Stage 2 - 25 Nm (18 lbf.ft). Stage 3 - Using an angle torque gauge, tighten a further 70°.
11. Remove bolts securing bearing caps to connecting rods and remove bearing caps.



M12 6817

12. Using the scale provided, measure width of Plastigauge on each journal and compare with bearing clearance.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**
13. If correct bearing clearance cannot be obtained with the available bearing shells, the crankshaft journals must be ground to the next undersize and appropriate oversize big-end bearing shells fitted.
14. Retain selected bearing shells with 1 and 4 connecting rods and bearing caps.
15. Remove all traces of Plastigauge from big end journals using an oily cloth.
16. Repeat above procedure for number 2 and 3 big-end bearings.
17. After completion of big-end bearing clearance checks, discard original bearing cap bolts.
18. Lubricate crankshaft journals and selected bearing shells with clean engine oil.
19. Fit selected big-end bearing shells to connecting rods and big-end bearing caps ensuring that the 'sputter' bearing, marked with the letter 'S', is fitted to the connecting rod.
20. Pull connecting rods down to crankshaft journals making sure that bearing shells are correctly located in connecting rods.
21. Fit big-end bearing caps ensuring that the reference marks on connecting rod and bearing cap are aligned.
22. Lubricate new big-end bearing cap bolts with clean engine oil.
23. Fit new big end bearing cap bolts and tighten to: Stage 1 - 5 Nm (3.5 lbf.ft). Stage 2 - 25 Nm (18 lbf.ft). Stage 3 - Using an angle torque gauge, tighten a further 70°.
24. Clean reinforcing plate and mating face.
25. Position reinforcing plate, fit bolts and tighten evenly to 22 Nm (16 lbf.ft).
26. Fit oil pump.
    ☞ **ENGINE - Td4, REPAIRS, Pump - oil.**
27. Connect battery earth lead.

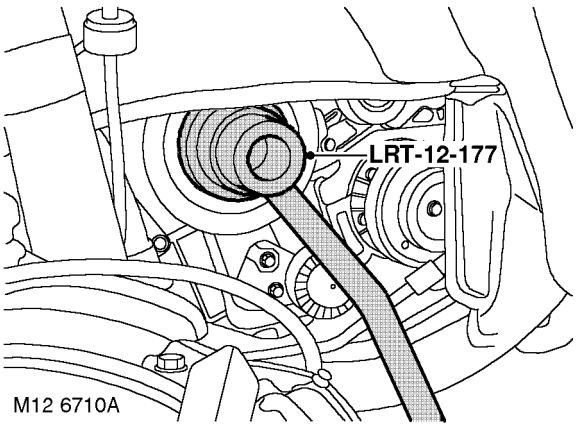
Pulley - crankshaft

12.21.01

Remove

1. Disconnect battery earth lead.
2. Remove ancillary drive belt.
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.
3. **Models with A/C:**Remove compressor drive belt.
   AIR CONDITIONING, REPAIRS, Drive belt - compressor - Td4.
4. Remove RH front road wheel.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



5. Fit **LRT-12-177** locking wrench with extension to crankshaft pulley.
6. Remove bolt securing pulley to crankshaft and collect washer.
7. Remove crankshaft pulley.

Refit

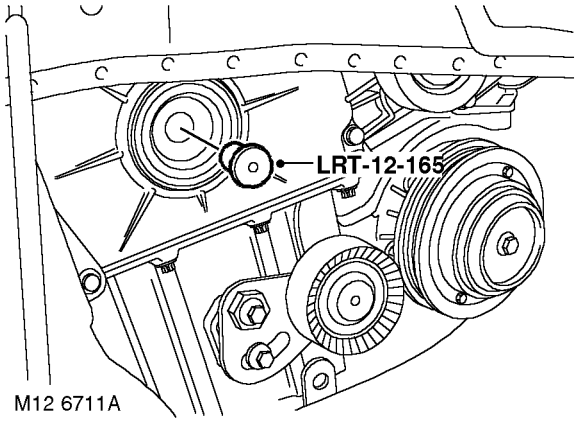
1. Clean crankshaft pulley and mating face.
2. Fit crankshaft pulley.
3. Fit washer and tighten new bolt securing crankshaft pulley initially to 100 Nm (74 lbf.ft), followed by 60°, then a further 60° and finally by 30°
4. **Models with A/C:** Fit compressor drive belt.
   AIR CONDITIONING, REPAIRS, Drive belt - compressor - Td4.
5. Fit ancillary drive belt.
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.
6. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
7. Remove stand(s) and lower vehicle.
8. Connect battery earth lead.

Crankshaft front oil seal

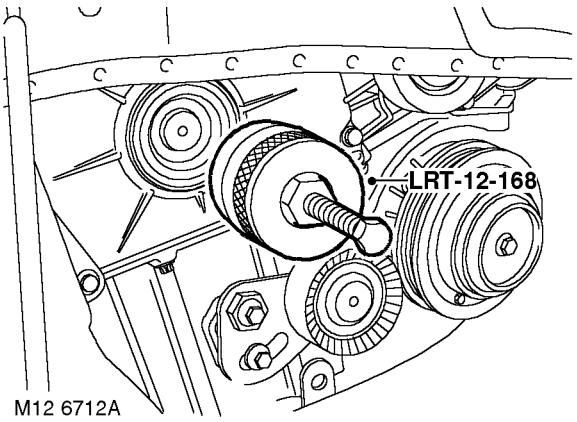
12.21.14

Remove

1. Disconnect battery earth lead.
2. Remove crankshaft pulley.
   ENGINE - Td4, REPAIRS, Pulley - crankshaft.



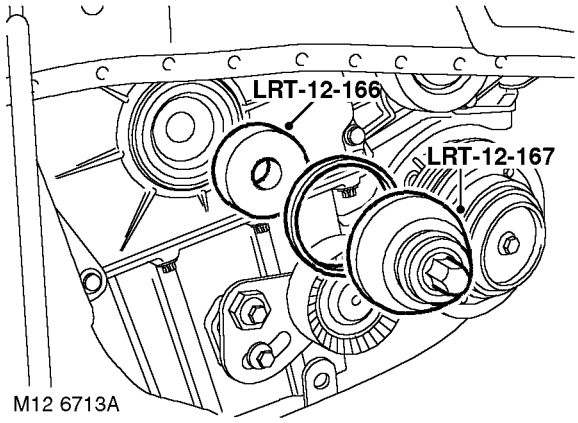
3. Fit thrust button **LRT-12-165** to end of crankshaft.
4. Ensure bore of **LRT-12-168** is free from burrs.



5. Fit **LRT-12-168** to crankshaft front oil seal and tighten bolt to remove seal.
6. Remove thrust button **LRT-12-165.**

Refit

1. Clean oil seal recess in timing cover and running surface on crankshaft.



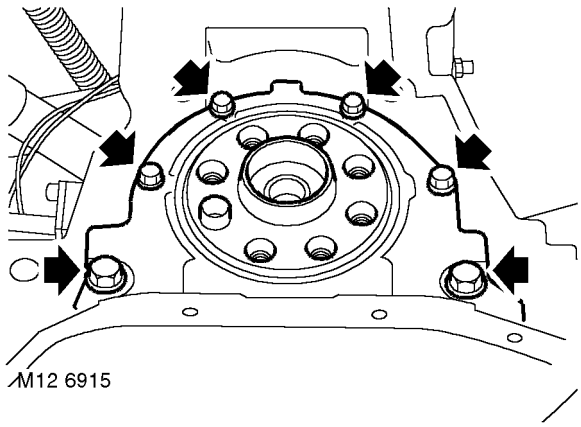
2. Fit oil seal guide **LRT-12-166** to crankshaft.
3. Use **LRT-12-167** with crankshaft pulley bolt to fit seal.
4. Remove bolt, **LRT-12-167** and **LRT-12-166**.
5. Fit crankshaft pulley.
   ENGINE - Td4, REPAIRS, Pulley - crankshaft.
6. Connect battery earth lead.

Crankshaft rear oil seal

12.21.20

Remove

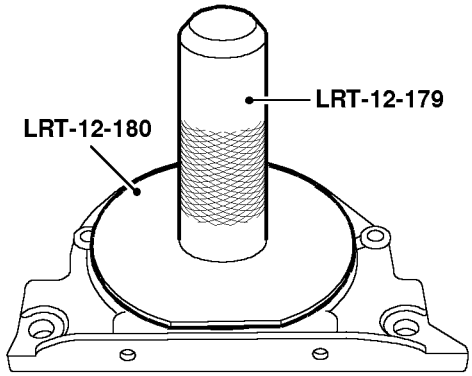
1. Disconnect battery earth lead.
2. Remove flywheel.
   ENGINE - Td4, REPAIRS, Flywheel.
3. **Models with automatic transmission:** Remove torque converter drive plate.
   ENGINE - Td4, REPAIRS, Torque converter drive plate.
4. Remove sump gasket.
   ENGINE - Td4, REPAIRS, Gasket - sump.


M12 6915

5. Remove 6 bolts and oil seal housing. Discard gasket
6. Remove and discard oil seal from housing.

Refit

1. Clean oil seal housing and mating faces.



M12 6916A

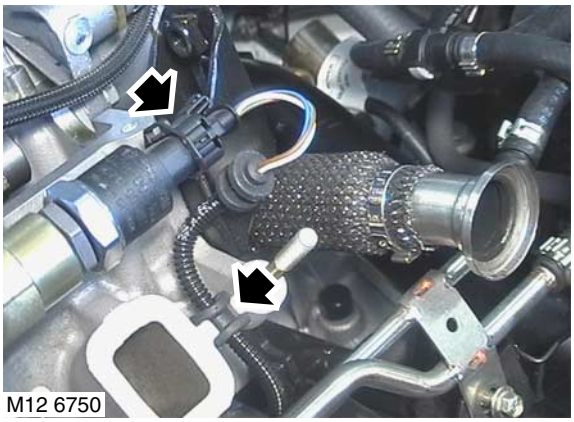
2. Remove seal protector from oil seal, position oil seal to housing, drift in oil seal using **LRT-12-179** and **LRT-12-180** as illustrated. Refit seal protector to oil seal.
3. Fit new housing gasket to cylinder block and locate on dowels.
4. Position oil seal housing, locate on dowels, fit bolts and tighten M6 bolts to 10 Nm (6.lbf.ft) and M8 bolts to 22 Nm 16 lbf.ft), remove oil seal protector.
5. Fit sump gasket.
   ENGINE - Td4, REPAIRS, Gasket - sump.
6. Fit flywheel.
   ENGINE - Td4, REPAIRS, Flywheel.
7. **Models with automatic transmission:** Fit torque converter drive plate.
   ENGINE - Td4, REPAIRS, Torque converter drive plate.
8. Connect battery earth lead.

Gasket - cylinder head - manual models

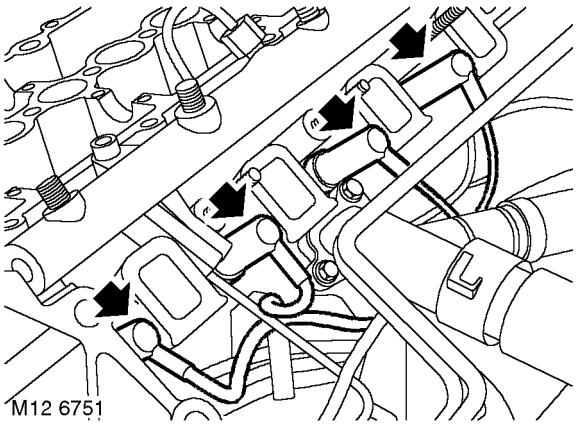
12.29.02

Remove

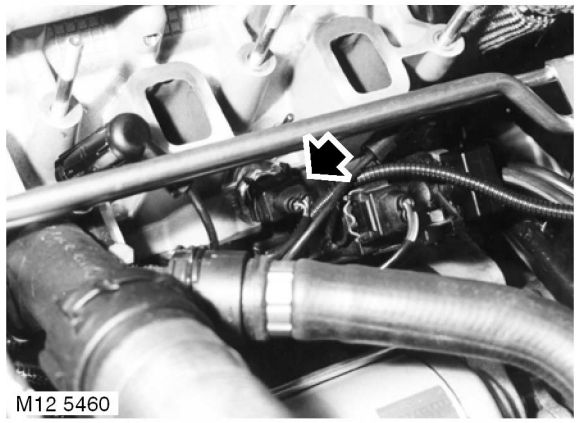
1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
3. Remove tappets.
   ENGINE - Td4, REPAIRS, Tappets - head set.
4. Fit wooden block to jack, position jack under engine sump to support engine.


M12 6750

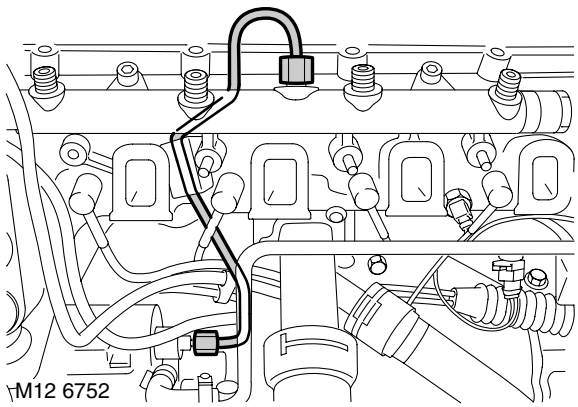
5. Disconnect multiplug from fuel pressure sensor.
6. Release fuel pressure harness grommet from cylinder head.


M12 6751

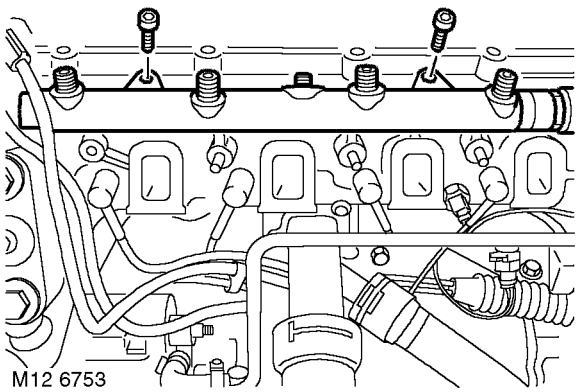
7. Disconnect glow plugs.


M12 5460

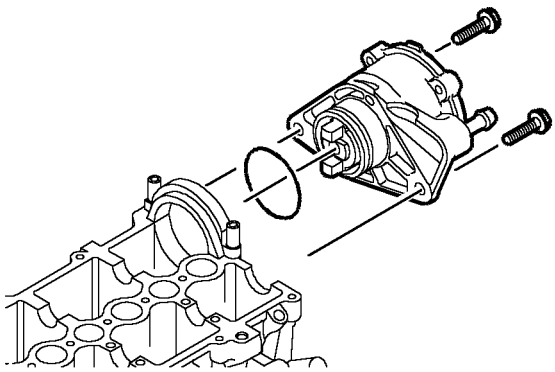
8. Disconnect multiplug from ECT sensor.


M12 6752

9. Loosen union nuts and remove fuel pipe from fuel rail and pump. Collect fuel pipe support bush.
   CAUTION: Always fit plugs to open connections to prevent contamination.

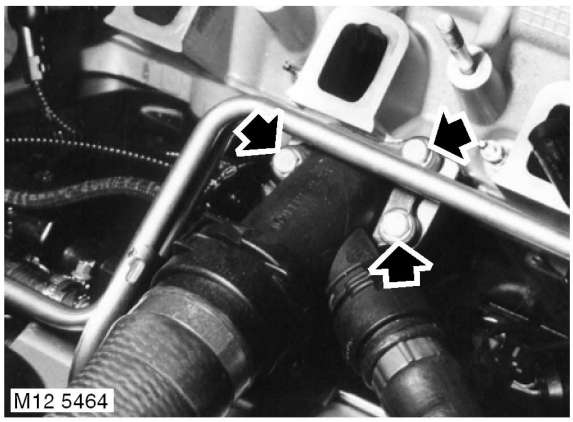

M12 6753

10. Remove 2 Allen screws and remove fuel rail.



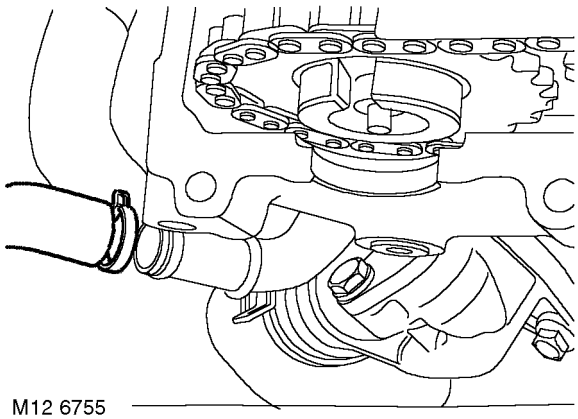
M12 6754

11. Remove and discard 2 bolts securing vacuum pump.
12. Release vacuum pump and lay aside. Discard seal.



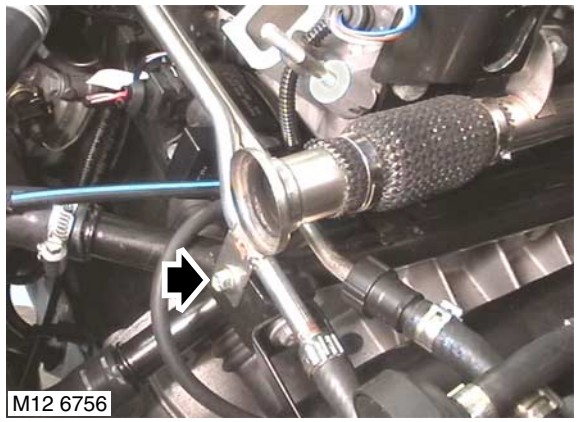
M12 5464

13. Remove 3 bolts and move coolant hose adaptor from cylinder head. Discard seal.



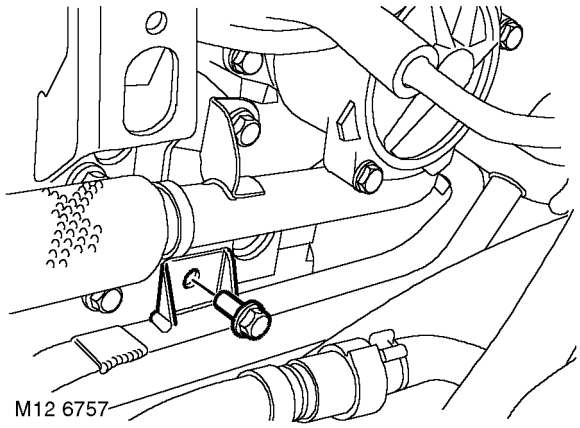
M12 6755

14. Release clip and disconnect expansion tank hose from coolant rail.



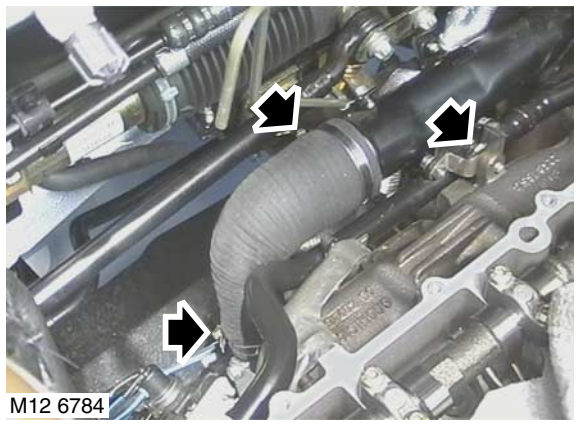
M12 6756

15. Remove bolt securing fuel rail to coolant rail.



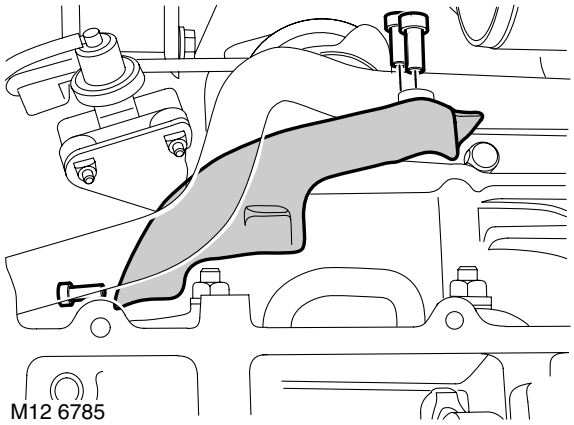
M12 6757

16. Remove bolt securing coolant rail to cylinder head.

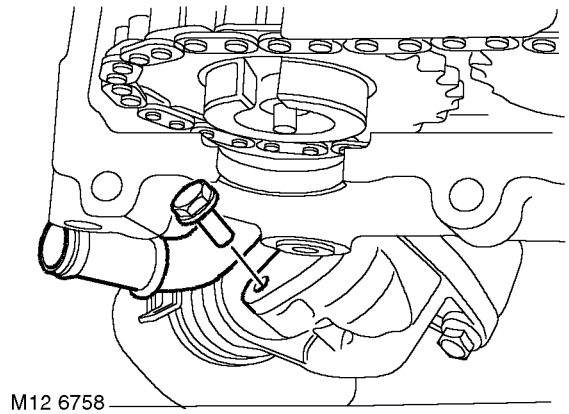


M12 6784

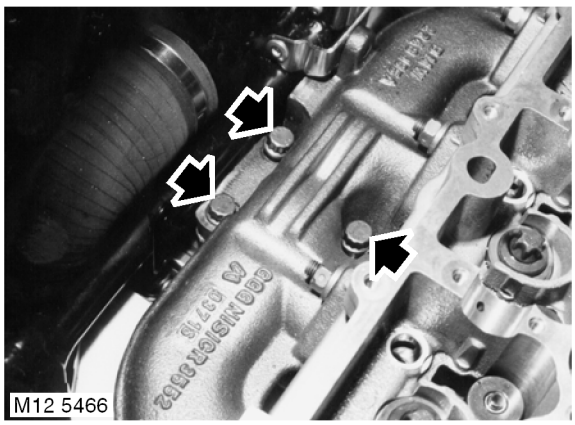
17. Remove bolt securing coolant rail to exhaust manifold.
18. Loosen clips and remove turbocharger outlet hose.


M12 6785

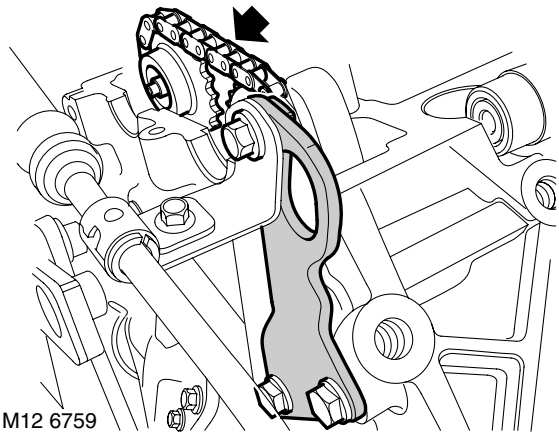
19. Remove 3 Allen screws securing heat shield to coolant rail.


M12 6758

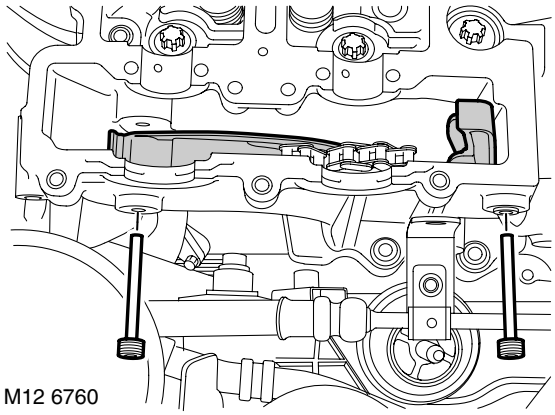
20. Remove bolt securing release coolant rail from thermostat housing and discard seal.
21. Remove heat shield.


M12 5466

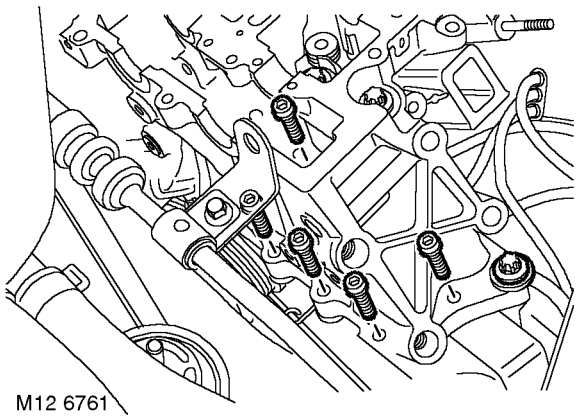
22. Remove 3 bolts securing turbocharger to exhaust manifold. Discard gasket.


M12 6759

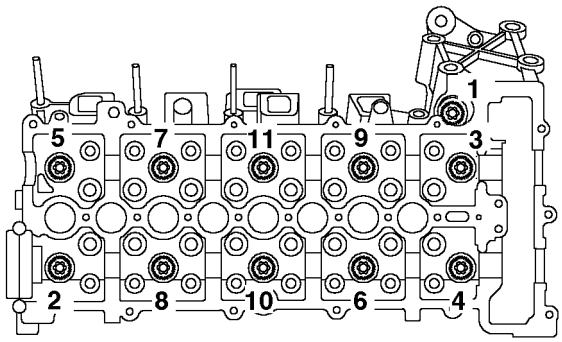
23. Remove bolt securing PAS pipe clip to engine lifting eye.
24. Remove 2 bolts and remove engine lifting eye.
25. Remove camshaft sprockets from timing chain.


M12 6760

26. Remove and discard timing chain guide support pins.
27. Remove chain guides. Accessibility to remove guide from inlet side will improve when cylinder head is removed.


M12 6761

28. Remove 5 Allen screws and 1 cylinder head bolt securing cylinder head to timing cover.

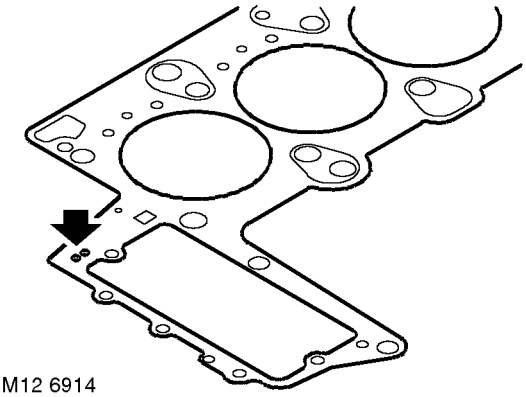


M12 6762

29. Remove in sequence and discard 11 cylinder head bolts.

30. With assistance, remove cylinder head.

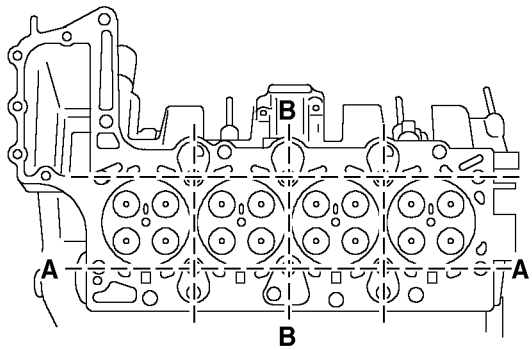
Care must be taken to avoid damage to protruding glow plugs.


M12 6914

31. Identify thickness of cylinder head gasket by number of holes. Remove and discard gasket.

Refit

1. Clean mating faces of cylinder head and cylinder block, dowels and dowel holes. If necessary remove all traces of sealing compound with hard wood scraper. Ensure remnants do not remain in oil ways, cooling ducts or bolt holes.



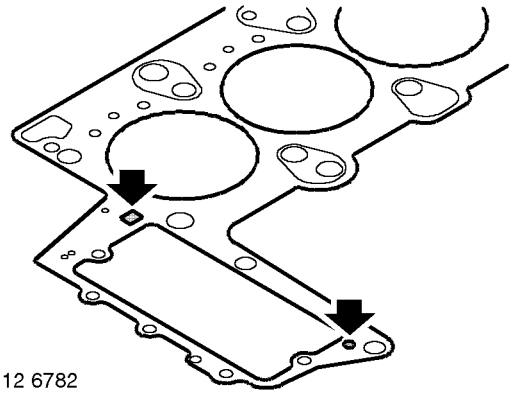
M12 6927

2. Using a straight edge and feeler gauges, check cylinder head for distortion along lines shown in illustration.

☞ **GENERAL DATA, Engine – Td4 Diesel.**

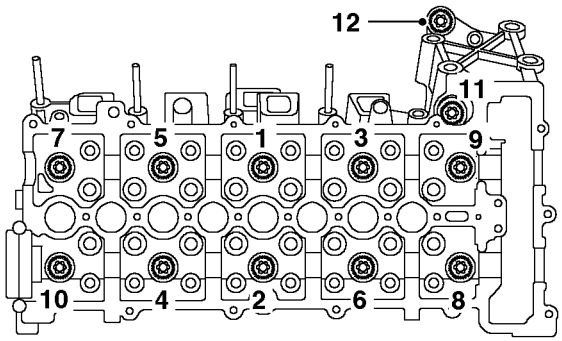
3. Replace cylinder head if figures obtained exceed those given. Cylinder head must not be refaced.

4. Select replacement gasket which must have the same thickness/number of holes as the original unless new piston and connecting rod assemblies have been fitted. If new piston and connecting rod assemblies have been fitted, check piston protrusion to determine gasket thickness/number of holes required.
   ☞ **ENGINE - Td4, ADJUSTMENTS, Piston protrusion - check - head removed.**



M12 6782

5. Ensure sealing strips are intact on new cylinder head gasket and fit gasket to cylinder block.
6. Lightly oil 12 new cylinder head bolts.



M12 6783

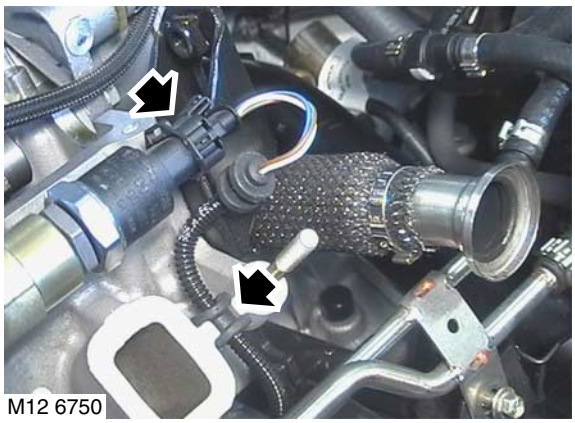
7. With assistance, fit cylinder head and tighten 11 cylinder head bolts in sequence to 80 Nm (59 lbf.ft). Ensure long bolt is fitted in position 11 as shown. Loosen all bolts one half turn, then tighten all bolts to 50 Nm (37 lbf.ft). Use a suitable angle torque gauge and tighten all bolts in sequence by 90° and then a final 90°.
8. Tighten remaining 41 mm long cylinder head bolt in position 12 to 110 Nm (81 lbf.ft).
9. Tighten Allen screws securing cylinder head to timing cover to 15 Nm (11 lbf.ft).
10. Clean timing chain guides.
11. Fit timing chain guides, Ensure guide on inlet side is located on its lower support pin and tighten both new upper support pins to 20 Nm (15 lbf.ft).
12. Clean camshaft sprockets.
13. Fit camshaft sprockets to timing chain.
14. Fit engine lifting eye and tighten bolts to 20 Nm (15 lbf.ft).
15. Tighten bolt, PAS pipe clip to engine lifting eye to 10 Nm (7.5 lbf.ft).
16. Fit new gasket and tighten bolts securing turbocharger to exhaust manifold to 45 Nm (33 lbf.ft).
17. Clean coolant rail and thermostat housing mating face.
18. Fit heat shield.
19. Fit new seal to coolant rail, fit rail to thermostat housing and tighten bolt to 8 Nm (6 lbf.ft).
20. Tighten Allen screws securing heat shield to 8 Nm (6 lbf.ft).
21. Tighten bolts securing coolant rail to 20 Nm (15 lbf.ft).
22. Tighten bolt fuel rail to coolant rail to 10 Nm (7.5 lbf.ft).
23. Fit turbocharger outlet hose and tighten clips.
24. Connect expansion tank hose and secure with clip.
25. Clean coolant hose adaptor and mating face.
26. Fit new seal to hose adaptor, fit adaptor to cylinder head and tighten bolts to 8 Nm (6 lbf.ft).
27. Clean vacuum pump and mating face.
28. Fit new seal to vacuum pump, fit vacuum pump and tighten new bolts to 22 Nm (16 lbf.ft).
29. Fit fuel rail and tighten Allen screws to 24 Nm (18 lbf.ft).
30. Fit fuel pipe and support bush and tighten union nuts to 30 Nm (22 lbf.ft).
31. Connect multiplug to ECT sensor.
32. Connect glow plugs.
33. Connect multiplug to fuel pressure sensor.
34. Fit fuel pressure sensor harness grommet to cylinder head.
35. Fit tappets.
    ☞ **ENGINE - Td4, REPAIRS, Tappets - head set.**
36. Connect battery earth lead.
37. Refill cooling system.
    ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

Gasket - cylinder head - automatic models

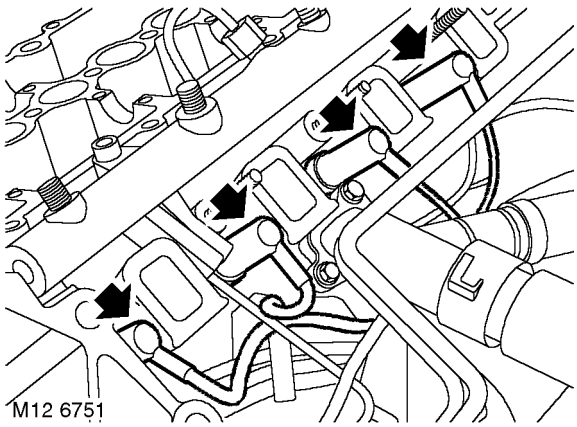
12.29.02

Remove

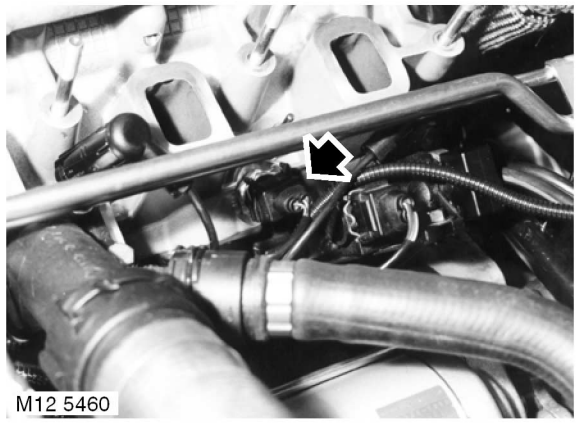
1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
3. Remove tappets.
   ENGINE - Td4, REPAIRS, Tappets - head set.
4. Fit wooden block to jack, position jack under engine sump to support engine.


M12 6750

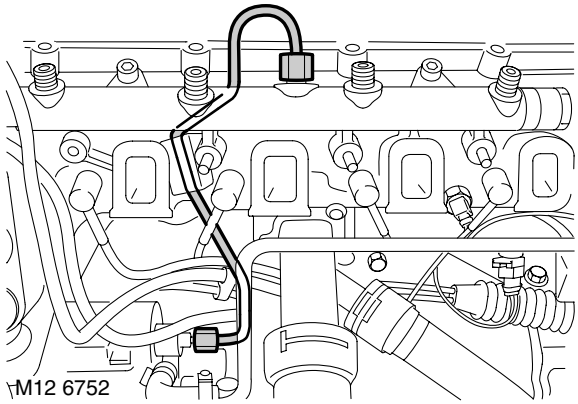
5. Disconnect multiplug from fuel pressure sensor.
6. Release fuel pressure harness grommet from cylinder head.


M12 6751

7. Disconnect connections from glow plugs.

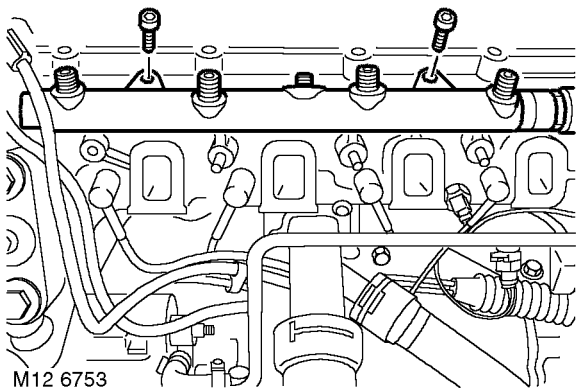

M12 5460

8. Disconnect multiplug from ECT sensor.

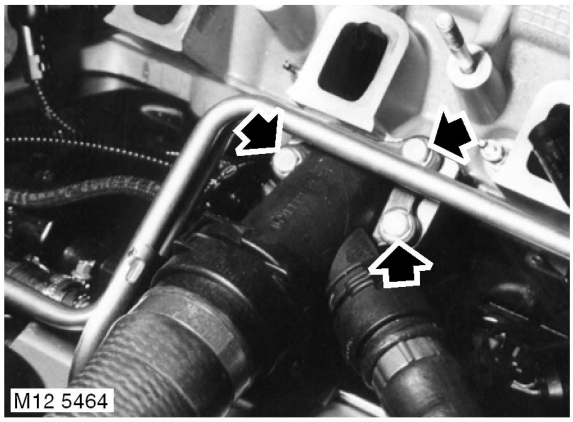

M12 6752

9. Loosen union nuts and remove fuel pipe from fuel rail and pump. Collect fuel pipe support bush.

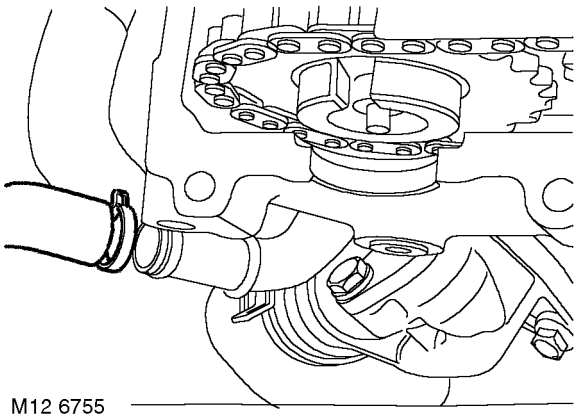
   CAUTION: Always fit plugs to open connections to prevent contamination.


M12 6753

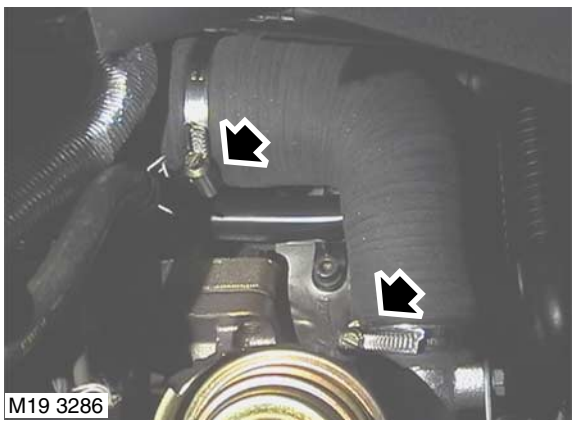
10. Remove 2 Allen screws and remove fuel rail.



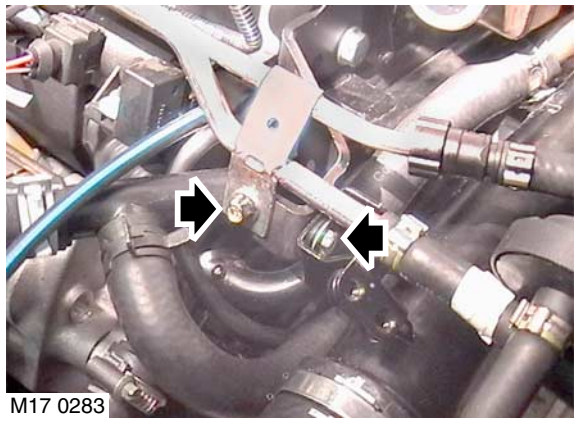
11. Remove 3 bolts and move coolant hose adaptor from cylinder head. Discard seal.



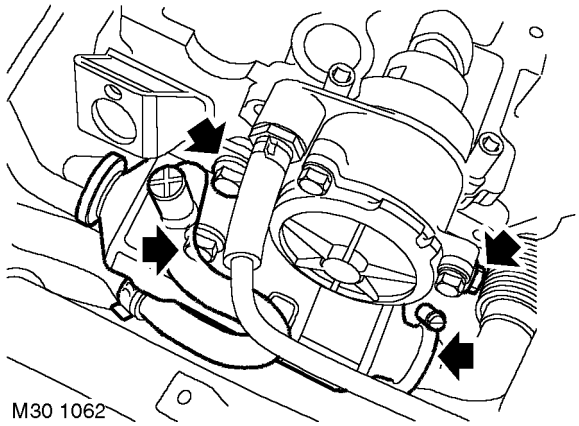
12. Release clip and disconnect expansion tank hose from coolant rail.



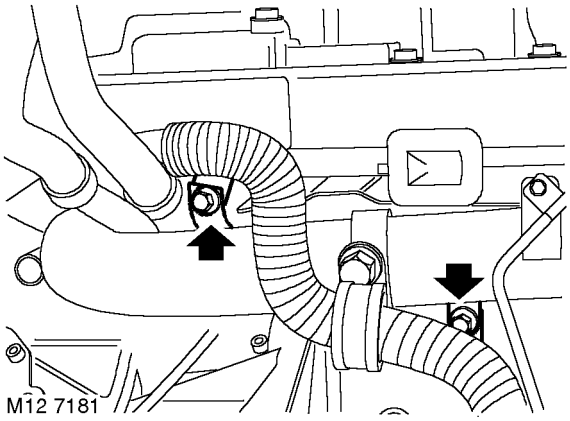
13. Loosen clips and remove turbocharger outlet hose.



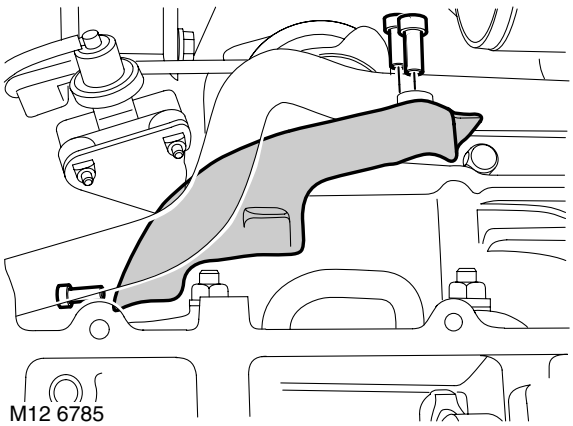
14. Remove bolt securing fuel rails to support bracket.
15. Remove bolt securing turbocharger outlet pipe to support bracket.



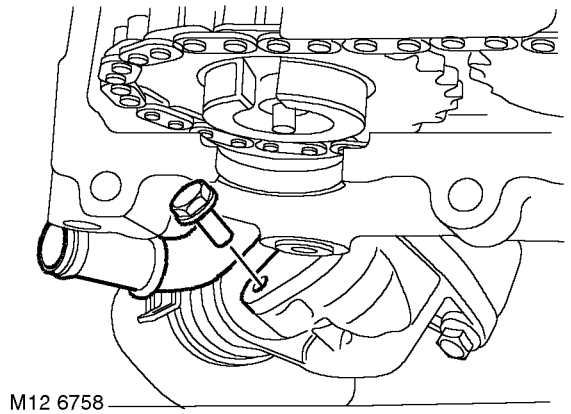
16. Loosen clamp screw securing EGR pipe to cooler and release clamp from cooler.
17. Remove 3 bolts securing EGR cooler to cylinder head and lifting bracket.



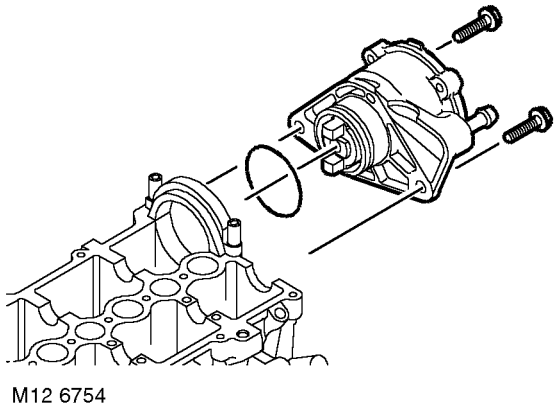
18. Remove bolt securing turbocharger outlet pipe to coolant rail.
19. Remove bolt securing turbocharger outlet pipe to bracket on exhaust manifold.



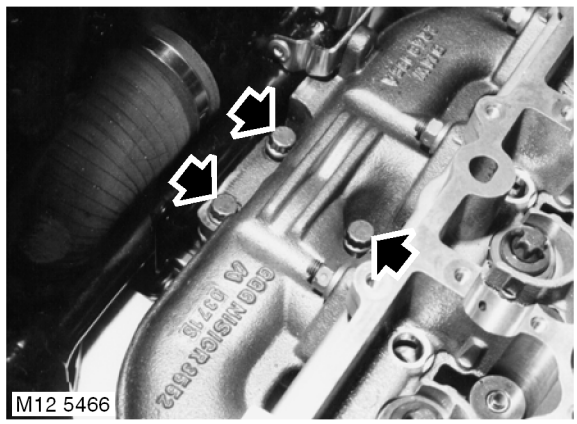
20. Remove 3 Allen screws heat shield to coolant rail.



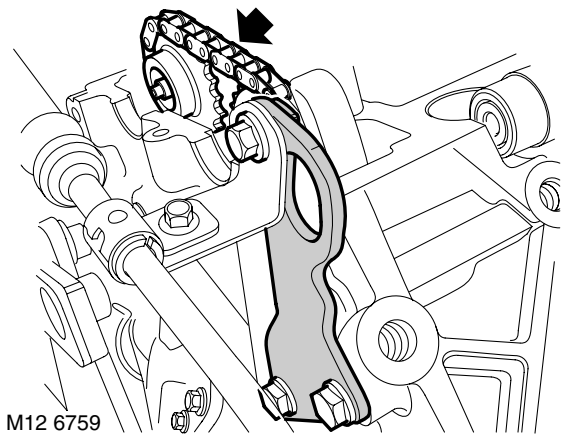
21. Remove bolt, release coolant rail from thermostat housing and discard seal.
22. Remove heat shield.



23. Remove and discard 2 bolts securing vacuum pump.
24. Release vacuum pump and lay aside. Discard seal.

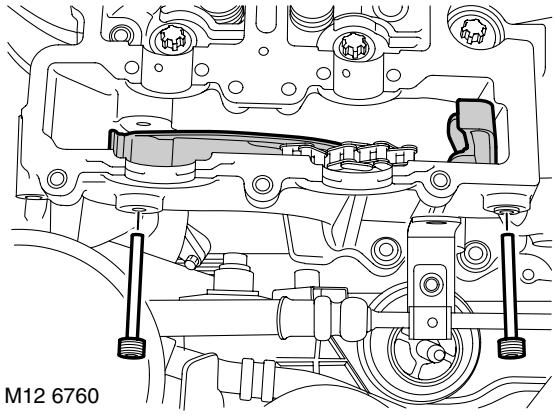


25. Remove 3 bolts securing turbocharger to exhaust manifold. Discard gasket.

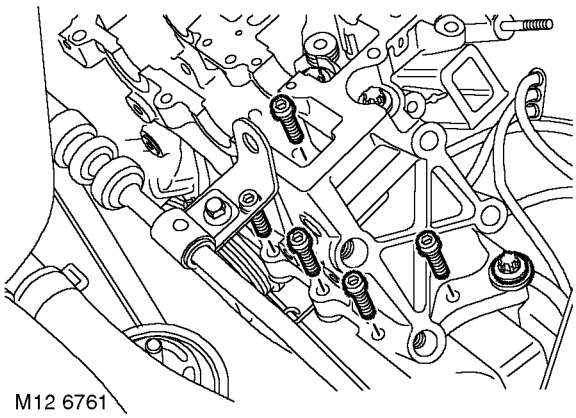


26. Remove bolt securing PAS pipe clip to engine lifting eye.

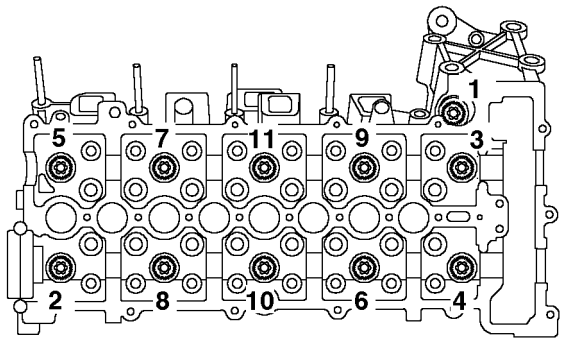
27. Remove 2 bolts and remove engine lifting eye.
28. Remove camshaft sprockets from timing chain.


M12 6760

29. Remove and discard timing chain guide support pins.
30. Remove chain guides.
Access to remove guide from inlet side will improve when cylinder head is removed.

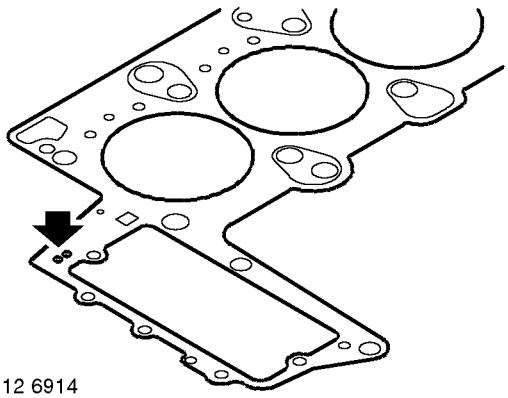

M12 6761

31. Remove 5 Allen screws and 1 cylinder head bolt securing cylinder head to timing cover.



M12 6762

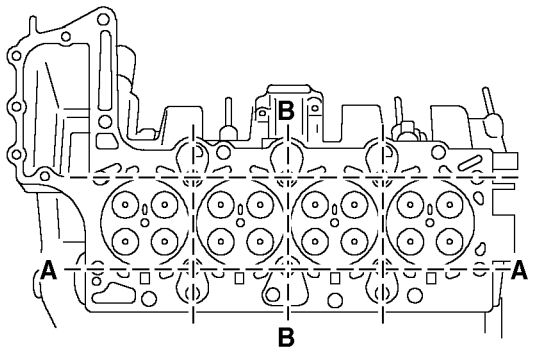
32. Remove in sequence and discard 11 cylinder head bolts.
33. With assistance, remove cylinder head.
Care must be taken to avoid damage to protruding glow plugs.


M12 6914

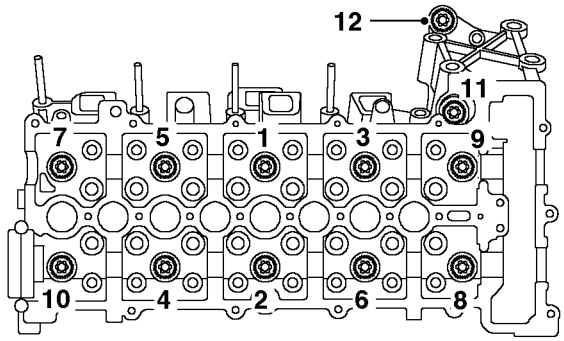
34. Identify thickness of cylinder head gasket by number of holes. Remove and discard gasket.

Refit

1. Clean mating faces of cylinder head and cylinder block, dowels and dowel holes. If necessary remove all traces of sealing compound with hard wood scraper. Ensure remnants do not remain in oil ways cooling ducts or bolt holes.

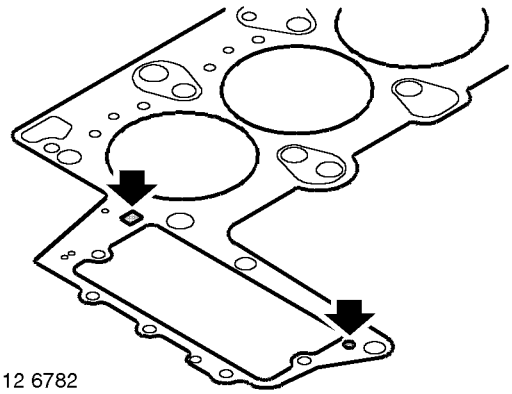


M12 6927



M12 6783

2. Using a straight edge and feeler gauges, check cylinder head for distortion along lines shown in illustration.
   ☞ **GENERAL DATA, Engine – Td4 Diesel.**
3. Replace cylinder head if figures obtained exceed those given. Cylinder head must not be refaced.
4. Select replacement gasket which must have the same thickness/number of holes as the original unless new piston and connecting rod assemblies have been fitted. If new piston and connecting rod assemblies have been fitted, check piston protrusion to determine gasket thickness/number of holes required.
   ☞ **ENGINE - Td4, ADJUSTMENTS, Piston protrusion - check - head removed.**



M12 6782

5. Ensure sealing strips are intact on new cylinder head gasket and fit gasket to cylinder block.
6. Lightly oil 12 new cylinder head bolts.
7. With assistance, fit cylinder head and tighten 11 cylinder head bolts in sequence to 80 Nm (59 lbf.ft). Ensure long bolt is fitted in position 11 as shown. Loosen all bolts one half turn, then tighten all bolts to 50 Nm (37 lbf.ft). Use a suitable angle torque gauge and tighten all bolts in sequence by 90° and then a final 90°.
8. Tighten remaining 41 mm long cylinder head bolt in position 12 to 110 Nm (81 lbf.ft).
9. Tighten Allen screws securing cylinder head to timing cover to 15 Nm (11 lbf.ft).
10. Clean timing chain guides.
11. Fit timing chain guides, Ensure guide on inlet side is located on its lower support pin and tighten both new upper support pins to 20 Nm (15 lbf.ft).
12. Clean camshaft sprockets.
13. Fit camshaft sprockets to timing chain.
14. Fit engine lifting eye and tighten bolts to 20 Nm (15 lbf.ft).
15. Tighten bolt securing PAS pipe clip to engine lifting eye to 10 Nm (7.5 lbf.ft).
16. Fit new gasket and tighten bolts securing turbocharger to exhaust manifold to 45 Nm (33 lbf.ft).
17. Clean vacuum pump and mating face.
18. Fit new seal to vacuum pump, fit vacuum pump and tighten new bolts to 22 Nm (16 lbf.ft).
19. Clean coolant rail and thermostat housing mating face.
20. Fit heat shield.
21. Fit new seal to coolant rail, fit rail to thermostat housing and tighten bolt to 8 Nm (6 lbf.ft).
22. Tighten Allen screws securing heat shield to 8 Nm.
23. Align EGR cooler and coolant rail, tighten bolts to 25 Nm (18 lbf.ft).
24. Fit EGR pipe clamp and tighten screw.
25. Align turbocharger outlet pipe and tighten 8 mm bolts to 25 Nm (18 lbf.ft)and 6 mm bolt to 10 Nm 7.5 lbf.ft).

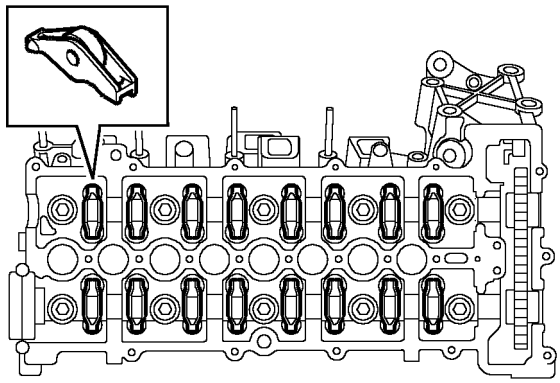
26. Fit bolt securing fuel rails to support bracket and tighten to 10 Nm (7.5 lbf.ft).
27. Fit turbocharger outlet hose and tighten clips.
28. Connect expansion tank hose and secure with clip.
29. Clean coolant hose adaptor and mating face.
30. Fit new seal to hose adaptor, fit adaptor to cylinder head and tighten bolts to 8 Nm (6 lbf.ft).
31. Fit fuel rail and tighten Allen screws to 24 Nm (18 lbf.ft).
32. Fit fuel pipe and support bush and tighten union nuts to 30 Nm (22 lbf.ft).
33. Connect multiplug to ECT sensor.
34. Connect glow plugs.
35. Connect multiplug to fuel pressure sensor.
36. Fit fuel pressure sensor harness grommet to cylinder head.
37. Fit tappets.
☞ **ENGINE - Td4, REPAIRS, Tappets - head set.**
38. Connect battery earth lead.
39. Refill cooling system.
☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

Tappets - head set

🔧 ***12.29.37***

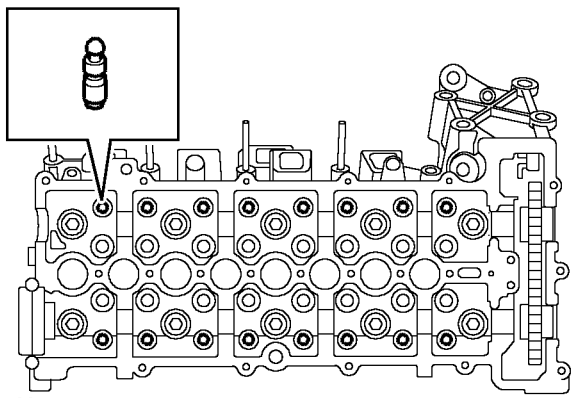
Remove

1. Disconnect battery earth lead.
2. Remove camshafts.
☞ **ENGINE - Td4, REPAIRS, Camshaft - inlet or exhaust.**



M12 6714

3. Remove rockers and retain in fitted order.



M12 6715

4. Remove tappets. Retain in fitted order if to be refitted.
CAUTION: Store hydraulic tappets in their fitted order and store inverted to prevent oil loss. Maintain absolute cleanliness when handling hydraulic tappets. Failure to observe these precautions can result in engine failure.

Refit

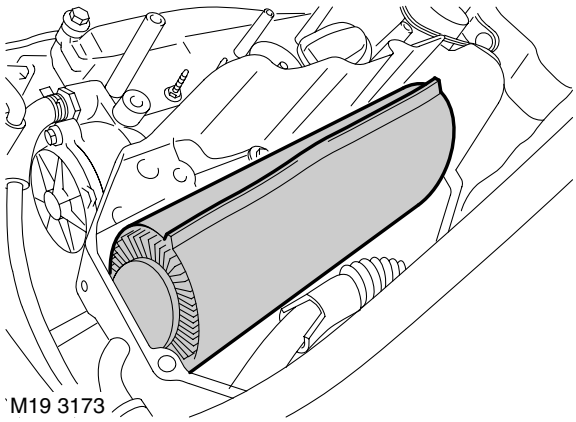
1. Clean tappets and bores in cylinder head.
2. Lubricate tappets and bores with clean engine oil.
3. Fit tappets, in original order if not renewed.
4. Clean rockers.
5. Lubricate rockers with clean engine oil.
6. Fit rockers in original order.
7. Fit camshafts.
   ☞ **ENGINE - Td4, REPAIRS, Camshaft - inlet or exhaust.**
8. Connect battery earth lead.

Gasket - camshaft cover

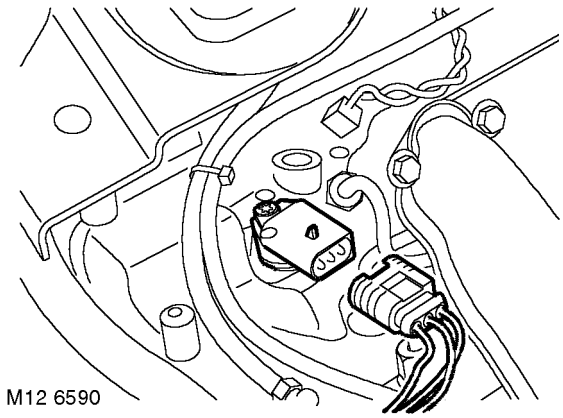
🔧 ***12.29.40***

Remove

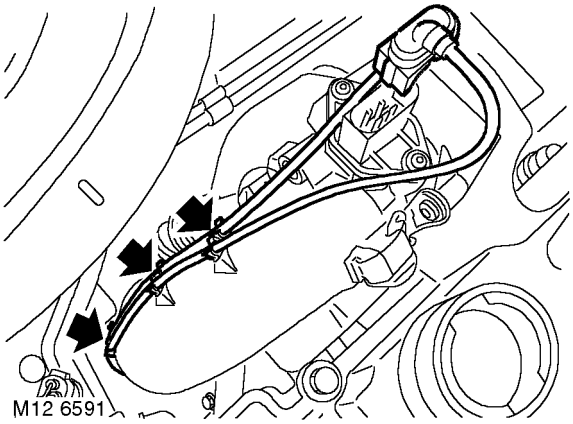
1. Disconnect battery earth lead.
2. Remove injectors.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Injector.**



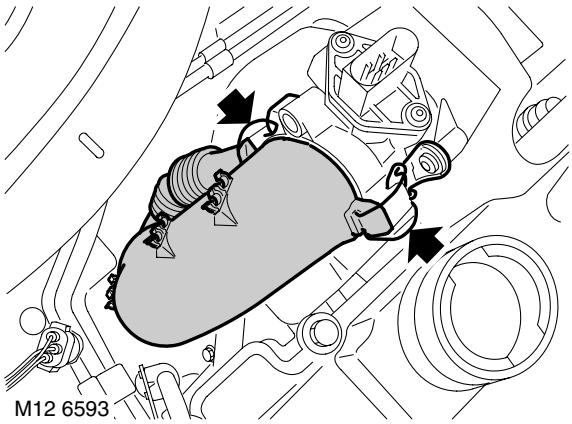
3. Remove air cleaner element.



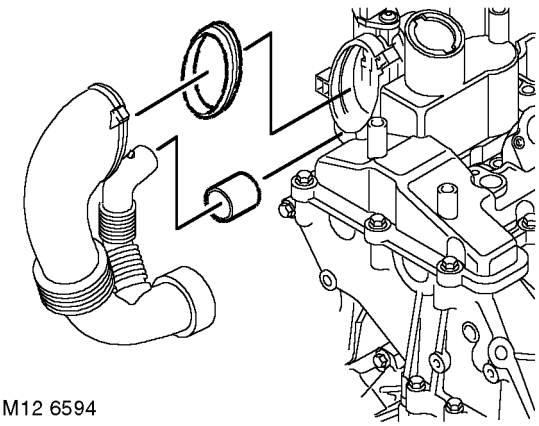
4. Disconnect multiplug from CMP sensor.


M12 6591

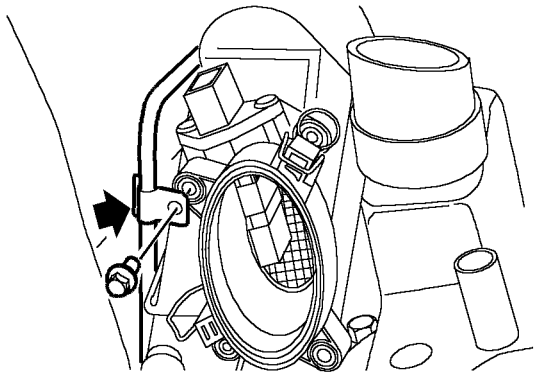
5. Disconnect multiplug from MAF/IAT sensor.
6. Release vacuum hose and harness from turbocharger duct.


M12 6593

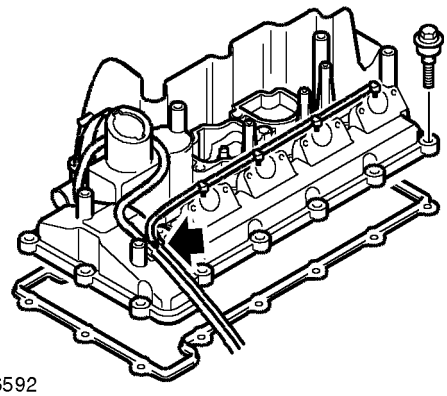
7. Release 2 clips securing turbocharger duct to MAF/IAT sensor and remove duct.


M12 6594

8. Remove seal, duct to MAF/IAT sensor.
9. Remove connector, engine breather pipe to air cleaner housing.


M12 6595

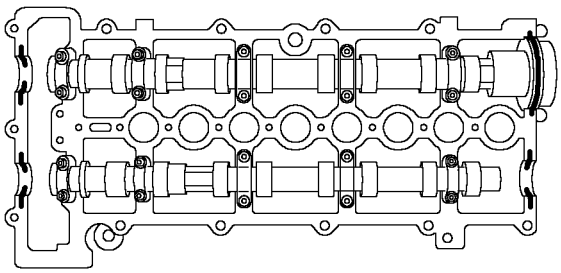
10. Remove bolt and move breather pipe aside.


M12 6592

11. Release harness from clip on camshaft cover.
12. Progressively loosen and remove 14 bolts securing camshaft cover.
13. Remove camshaft cover and discard gasket.

Refit

1. Clean camshaft cover and mating face of cylinder head.
2. Fit engine breather pipe connector to air cleaner housing.
3. Fit new gasket to camshaft cover and fit retaining bolts to cover and gasket.



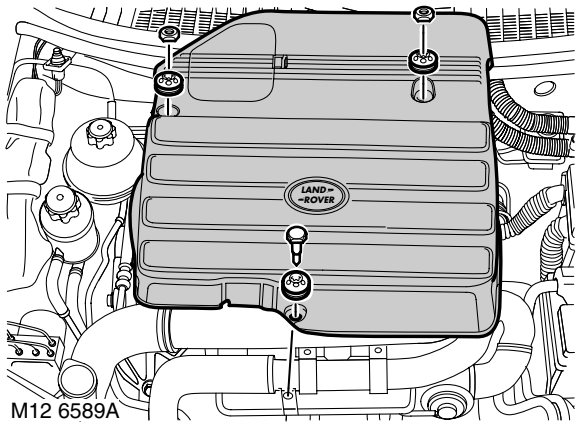
M12 6596

4. Apply a bead of suitable sealant 2 mm high and 2 mm wide to gasket mating face on cylinder head as shown.
5. Fit camshaft cover and tighten bolts evenly to 10 Nm (7.5 lbf.ft).
6. Fit upper seal to turbocharger duct and ensure lower seal to turbocharger is in good condition.
7. Fit duct to turbocharger, connect to engine breather and MAF/IAT sensor.
8. Secure duct with clips.
9. Fit breather pipe and tighten bolt to 6 Nm (4 lbf.ft).
10. Fit air cleaner element.
11. Connect multiplug to MAF/IAT sensor.
12. Connect multiplug to CMP sensor.
13. Fit vacuum hose and harness to clips.
14. Fit injectors.
    FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Injector.
15. Connect battery earth lead.

Cover - engine acoustic

12.30.50

Remove



M12 6589A

1. Remove 2 nuts and 1 bolt securing engine acoustic cover.
2. Remove acoustic cover.
3. Remove 3 grommets from acoustic cover.

Refit

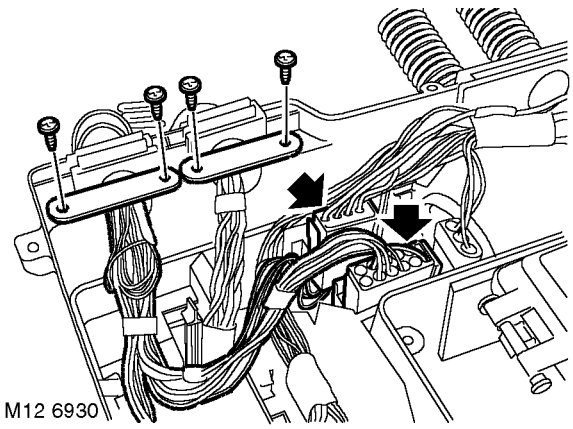
1. Fit 3 grommets to acoustic cover.
2. Fit acoustic cover and tighten bolt to 8 Nm (6 lbf.ft) and nuts to 4 Nm (3 lbf.ft).

Engine & manual gearbox

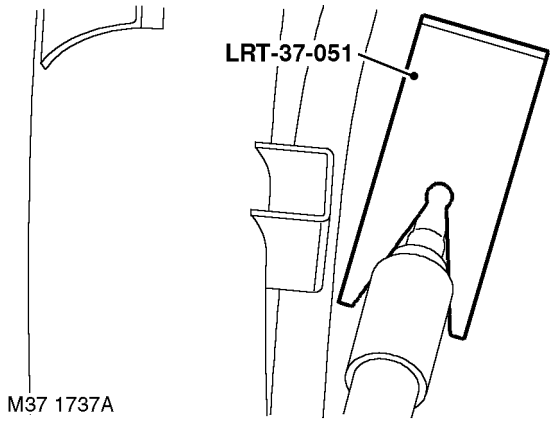
12.37.01.99

Remove

1. Position vehicle on a 2 post ramp.
2. Disconnect battery earth lead.
3. Tie bonnet back in upright position.
4. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
5. Remove intake ducting assembly.
6. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
7. Remove ECM.
   ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).

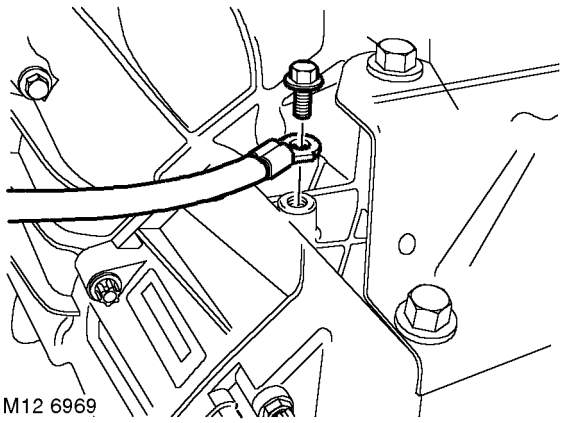

M12 6930

8. Disconnect multiplug from glowplug ECU.
9. Disconnect engine harness multiplug from 'E' box.
10. Remove 'E' box engine harness clamps.
11. Release engine harness from 'E' box and lay over engine.

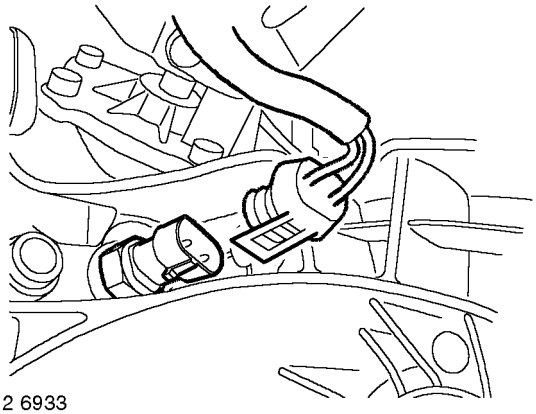


M37 1737A

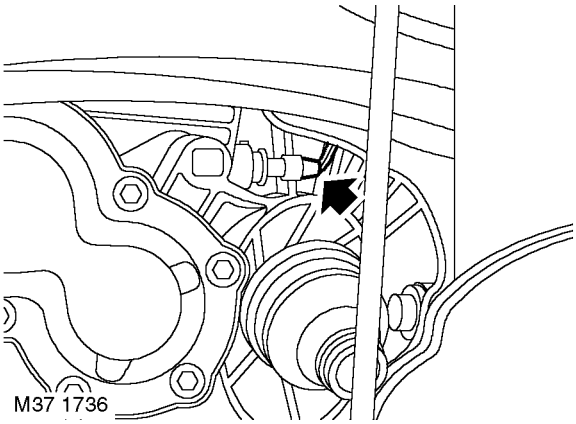
12. Use **LRT-37-051** to release, and disconnect clutch pipe connection.


M12 6969

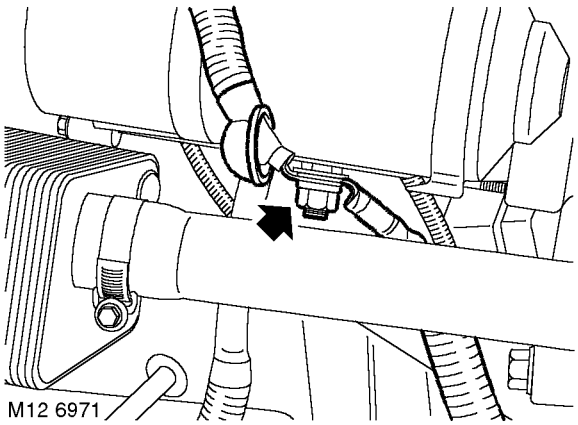
13. Remove bolt and release earth lead from gearbox.


M12 6933

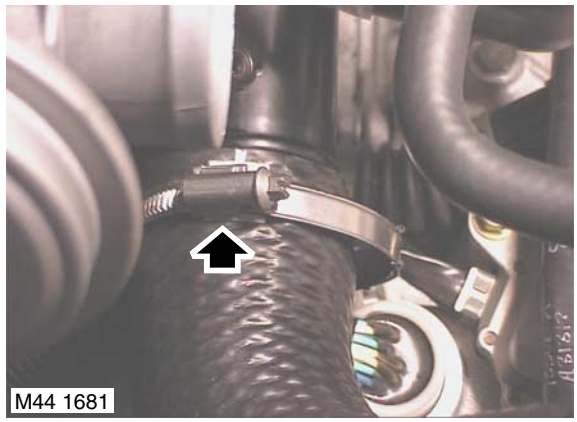
14. Disconnect multiplug from 1st gear switch.



15. Disconnect multiplug from reverse lamp switch.



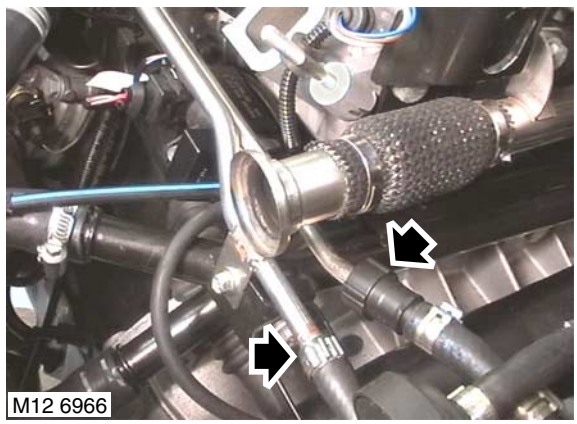
16. Release terminal cover, remove nut and disconnect 2 cables from starter motor solenoid.



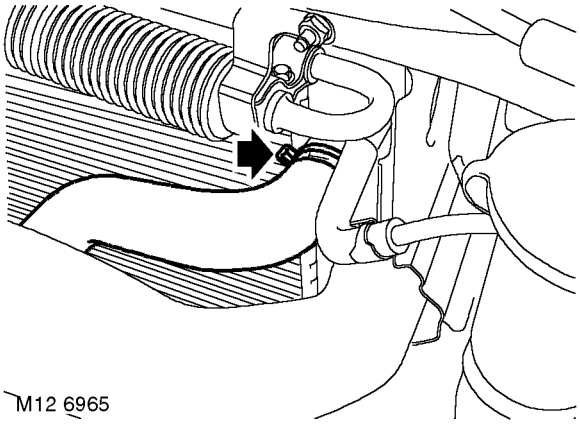
17. Loosen clip and remove intercooler inlet hose from engine.

CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

18. Position container to catch fuel spillage.



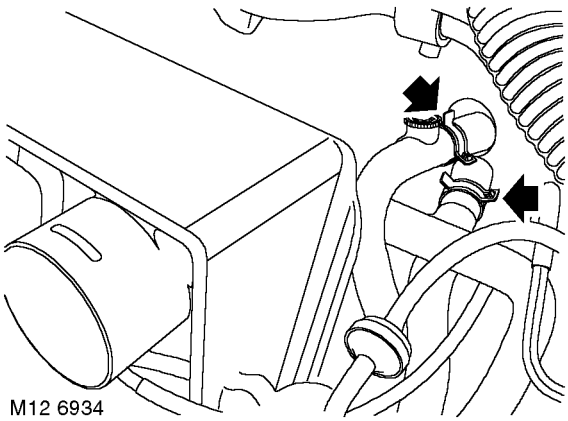
19. Release clips and disconnect fuel hoses from fuel rail.


M12 6965

20. Release clip and disconnect top hose from radiator.


M12 6974

21. Release clip and remove hose from coolant rail.


M12 6934

22. Release 2 clips securing heater hoses to heater and release hoses.


M12 6975

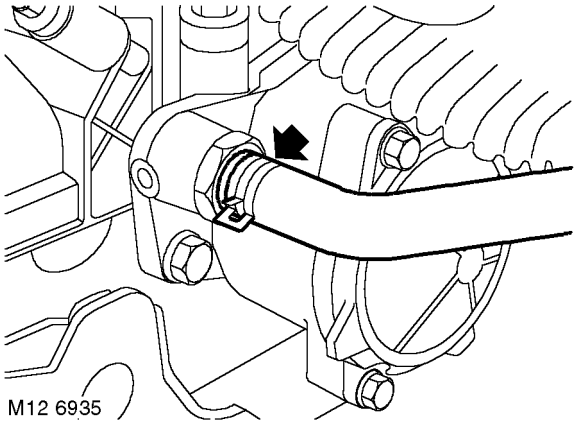
23. Remove bolt securing PAS pipe clip to engine lifting eye.


M12 6972

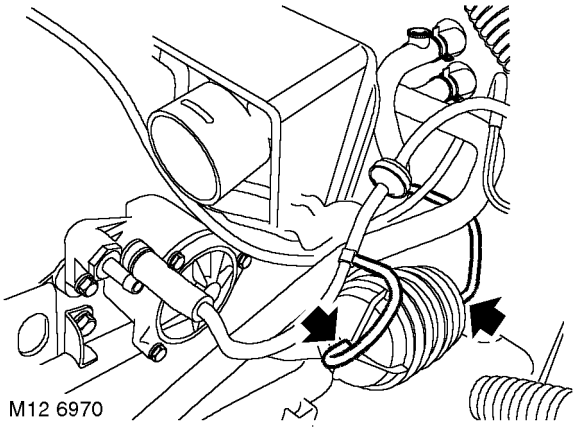
24. Place a suitable container beneath PAS reservoir, release clip and return hose from mount. Allow fluid to drain.

CAUTION: Care must be taken to ensure that oil or fluid does not enter or contaminate the alternator.

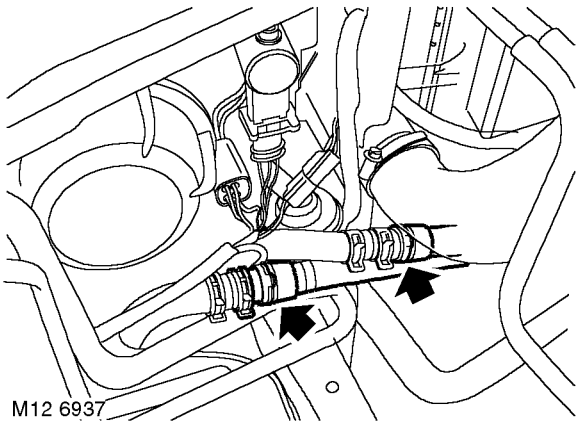
25. Cover alternator to prevent PAS oil contamination.



26. Release clip and disconnect hose from vacuum pump.

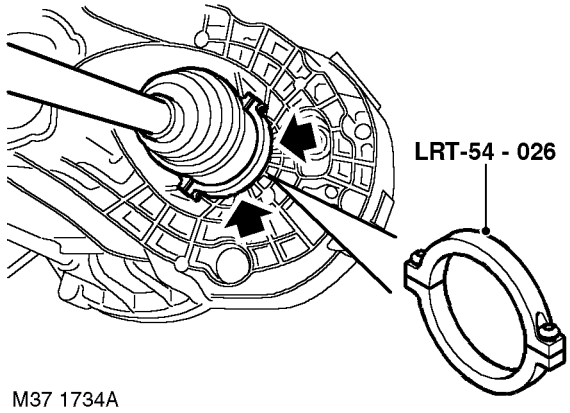


27. Note fitted position and carefully remove both vacuum hoses from reservoir.

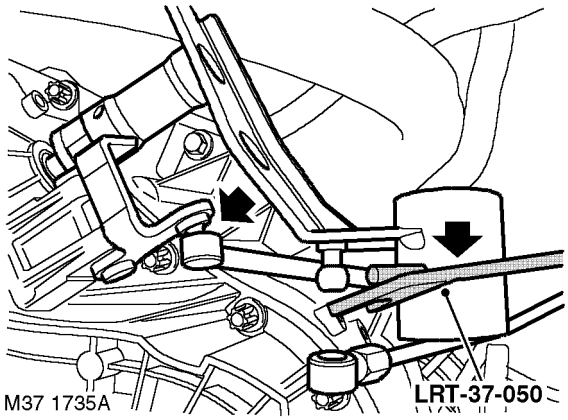


28. Release clips, disconnect coolant feed and return hoses from FBH.

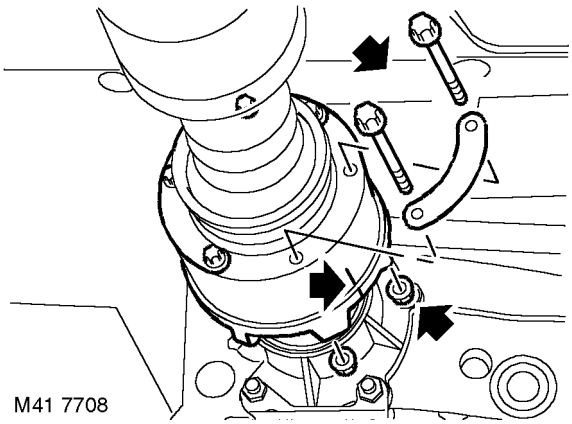
29. Remove rear beam.
☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**



30. Secure **LRT-54-026,** to drive shaft inboard joints. Using a suitable lever, release drive shafts from IRD unit and gearbox.
31. With assistance, pull hubs outwards and remove drive shafts from gearbox and IRD unit.
32. Remove front exhaust pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - front.**

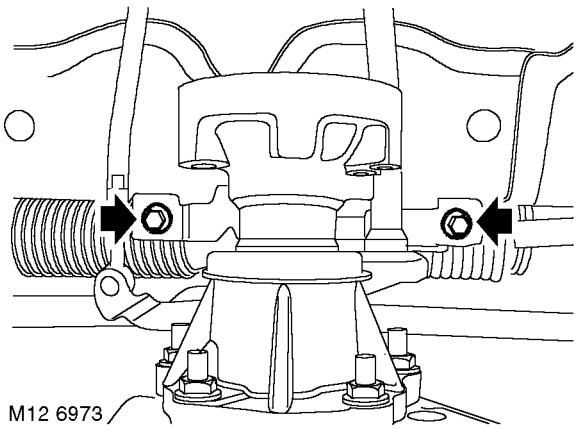


33. Use **LRT-37-050** and release gear change rods from quadrant.
34. Raise one rear wheel for rotation of propeller shaft to access bolts.



35. Reference mark position of viscous coupling flange to IRD unit flange to aid reassembly.
36. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
37. Release propeller shaft from IRD drive flange and tie shaft aside.

CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.

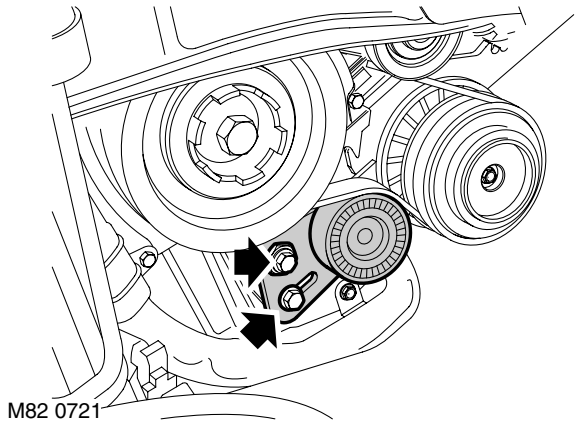


38. Remove 2 bolts securing gearchange linkage to bulkhead and tie aside.
39. Drain gearbox oil.

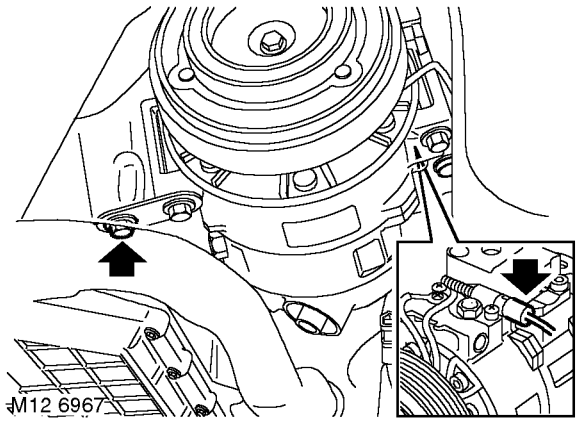
☞ **MANUAL GEARBOX - GETRAG, ADJUSTMENTS, Gearbox oil - drain and refill.**

40. Drain fluid from IRD.

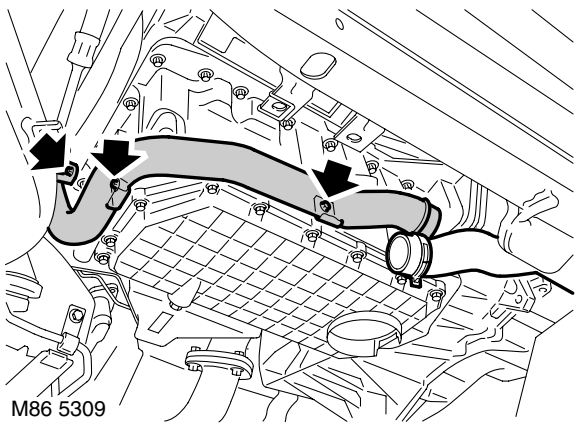
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**



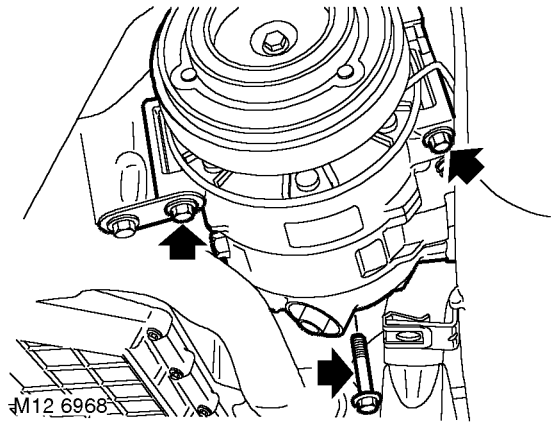
41. Models with A/C: Loosen pivot and clamp bolts on compressor drive belt tensioner.
42. Models with A/C: Remove compressor drive belt from compressor pulley.



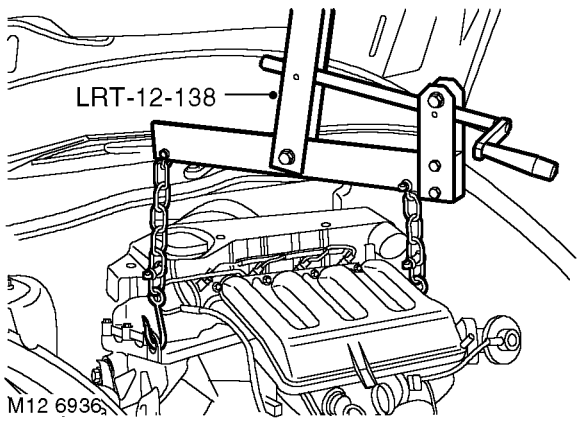
43. Models with A/C: Loosen bolt securing compressor support bracket to sump, do not remove.



44. Models with A/C: Remove 3 bolts securing coolant rail to sump and cylinder block.



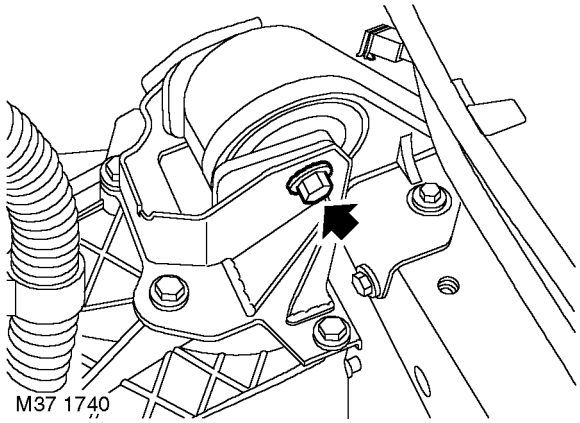
45. **Models with A/C:** Remove 3 bolts securing compressor to mounting bracket, release compressor and tie aside.



46. Fit tool **LRT-12-138** to suitable lifting chains and connect to lifting eyes on engine.

47. Remove hydramount

☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**



48. Remove through bolt securing LH engine mounting to gearbox bracket.

49. Manoeuvre engine and gearbox to floor.

Ensure turbocharger pipe does not foul intermediate gear linkage on bulkhead.

50. Lower hoist, disconnect and remove lifting bracket, **LRT-12-138.**

Refit

1. Using a hoist, connect adjustable lifting bracket, **LRT-12-138** to engine.

2. Fit snubber to mounting.

3. Raise engine and gearbox, align gearbox mounting bracket.

4. Adjust height of engine, fit through bolt securing gearbox mounting bracket to gearbox mounting on body and tighten bolt to 100 Nm (74 lbf.ft).

5. Fit hydramount.

☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**

6. Lower hoist, disconnect and remove lifting bracket, **LRT-12-138.**

7. Fit exhaust front pipe.

☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - front.**

8. Align gearchange linkage to bulkhead, fit bolts and tighten to 25 Nm (18 lbf.ft).

9. Fit upper and lower gearchange operating rods to quadrant.

10. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).

11. Fit rear beam.

☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**

12. Clean ends of drive shaft and locations in hub and differential.

13. With assistance, fit drive shafts to gearbox, keeping both shafts square to prevent damage to oil seals in gearbox.

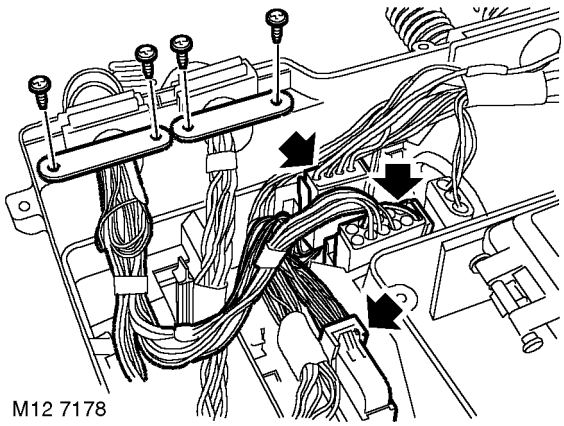
14. **Models with A/C:** Position A/C compressor, fit bolts and tighten to 25 Nm (18 lbf.ft).
15. **Models with A/C:** Align compressor support bracket to sump and tighten bolt to 10 Nm (7.5 lbf.ft).
16. **Models with A/C:** Fit lower coolant rail to sump and tighten bolts to 10 Nm (7.5 lbf.ft).
17. **Models with A/C:** Ensure compressor drive belt and compressor, crankshaft and tensioner pulleys are clean.
18. **Models with A/C:** Fit compressor drive belt to compressor pulley.
19. **Models with A/C:** Tension compressor drive belt.
    ☞ **AIR CONDITIONING, ADJUSTMENTS, Drive belt - compressor - Td4.**
20. Connect coolant hoses to FBH and secure with clips.
21. Clean hoses and vacuum reservoir connections.
22. Connect hoses to vacuum reservoir.
23. Clean hose and vacuum pump connections.
24. Fit vacuum hose and tighten clip.
25. Clean PAS reservoir hoses and connections.
26. Connect hoses to PAS reservoir and secure clips.
27. Fit bolt, securing PAS pipe clip to engine lifting eye and tighten to 10 Nm (7.5 lbf.ft).
28. Connect heater hoses and secure with clips.
29. Connect coolant hose to coolant rail and secure with clip.
30. Connect top hose to radiator and secure with clip.
31. Connect fuel hoses to clips on fuel rail.
32. Connect hose to intercooler and secure with clip.
33. Fit cables to starter motor solenoid and tighten nut to 13 Nm (10 lbf.ft).
34. Connect multiplug to 1st gear switch.
35. Connect reverse lamp switch multiplug.
36. Connect clutch pipe quick release connection.
37. Position earth lead to gearbox and tighten bolt to 25 Nm (18 lbf.ft).
38. Fit engine harness leads to 'E' box and locate grommets.
39. Fit 'E' box harness straps and tighten screws.
40. Connect multiplugs.
41. Fit ECM.
    ☞ **ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).**
42. Refill gearbox with oil.
    ☞ **MANUAL GEARBOX - GETRAG, ADJUSTMENTS, Gearbox oil - drain and refill.**
43. Untie and close bonnet.
44. Fit battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
45. Fit intake ducting assembly.
46. Refill cooling system.
    ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

Engine & automatic gearbox

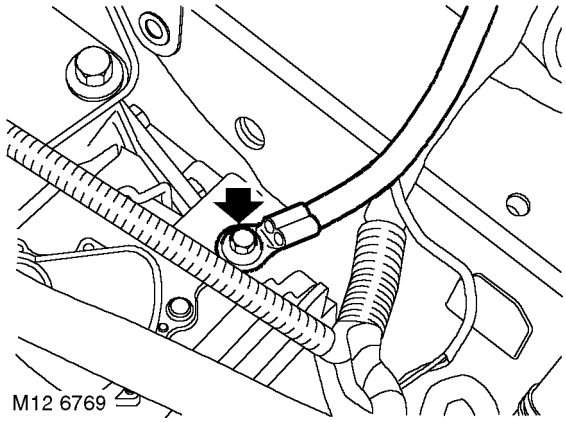
12.37.01.99

Remove

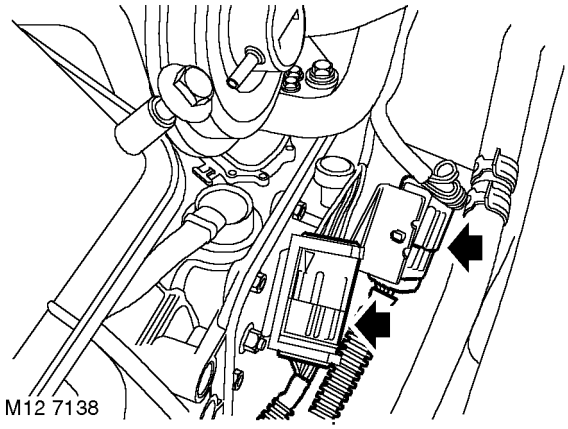
1. Position vehicle on a 2 post ramp.
2. Disconnect battery earth lead.
3. Tie bonnet back in upright position.
4. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
5. Remove intake ducting assembly.
6. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
7. Remove engine ECM.
   ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).


M12 7178

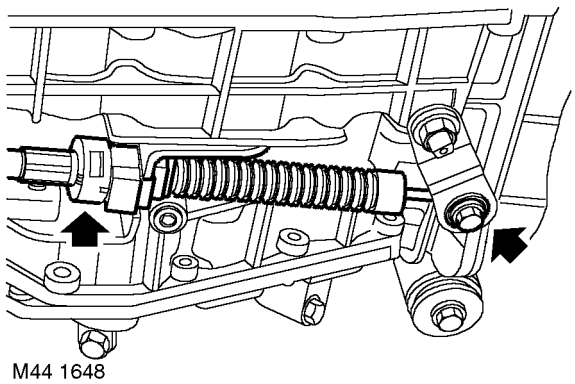
8. Disconnect multiplug from automatic gearbox ECU.
9. Disconnect multiplug from glowplug ECU.
10. Disconnect engine harness multiplug from 'E' box.
11. Remove 4 screws and remove 'E' box engine harness clamps.
12. Release engine harnesses from 'E' box and lay over engine.


M12 6769

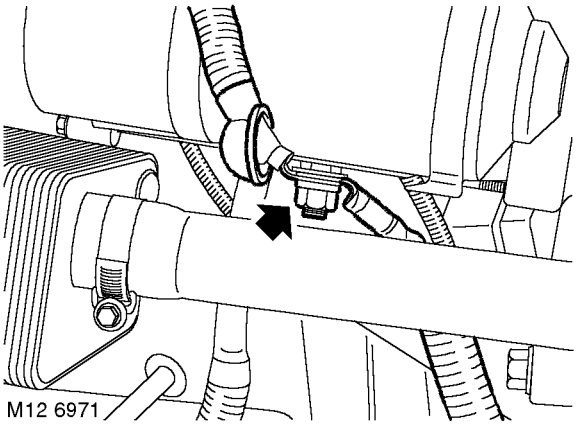
13. Remove bolt and release earth lead from gearbox.


M12 7138

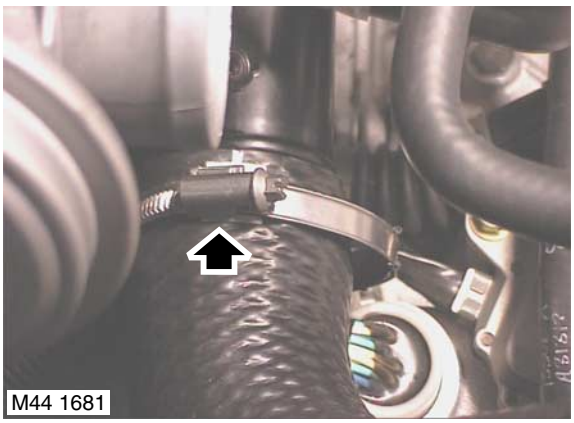
14. Release 2 gearbox harness multiplugs from mounting bracket clips and disconnect multiplugs.


M44 1648

15. Loosen selector cable trunnion nut.
16. Release clip, disconnect selector cable and remove trunnion.



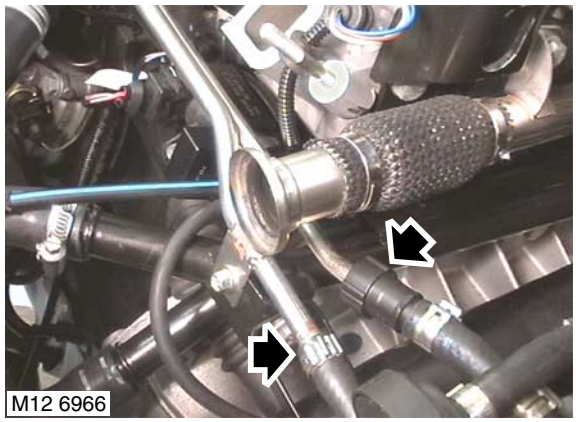
17. Release terminal cover, remove nut and disconnect 2 cables from starter motor solenoid.



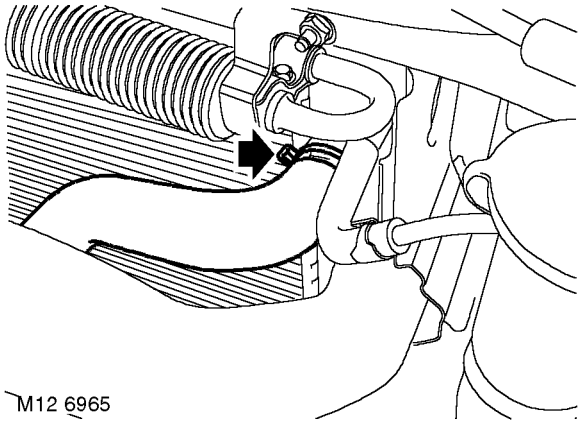
18. Loosen clip and remove intercooler inlet hose from engine.

CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

19. Position container to catch fuel spillage.

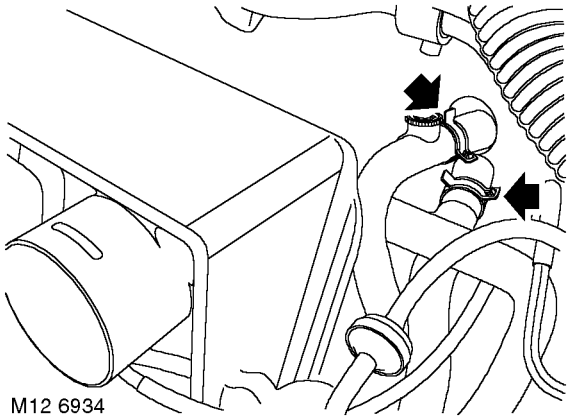


20. Release clips and disconnect fuel hoses from fuel rail.



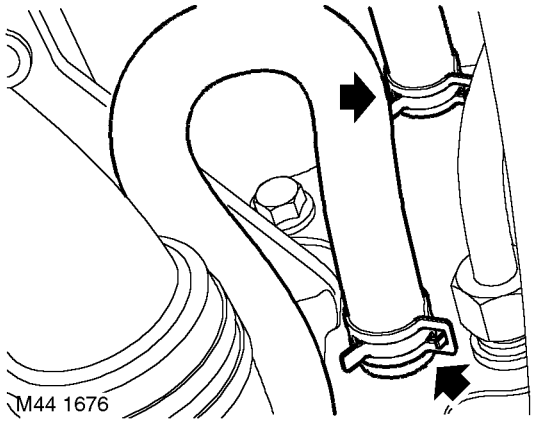
21. Release clip and disconnect top hose from radiator.

22. Release clip and disconnect hose from coolant rail.

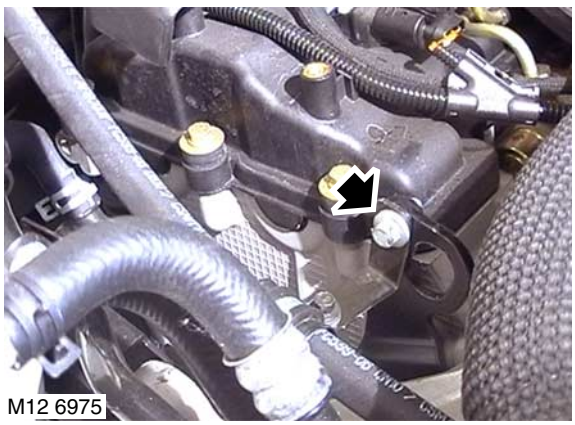


23. Release 2 clips securing heater hoses to heater and disconnect hoses.

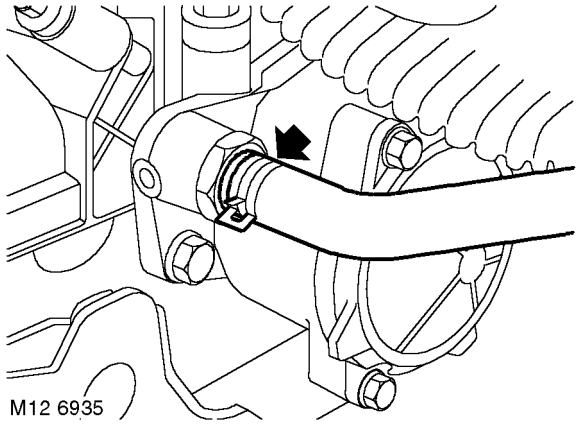
24. Position container beneath gearbox cooler hoses to contain fluid spillage.



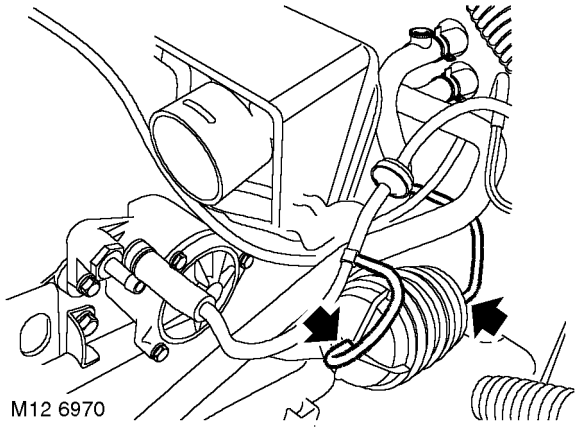
25. Release clips and disconnect coolant hoses from gearbox fluid cooler.



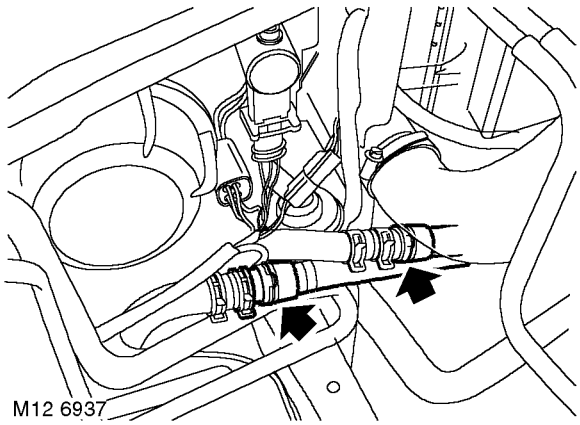
26. Remove bolt securing PAS pipe clip to engine lifting eye.



27. Release clip and disconnect hose from vacuum pump.



28. Note fitted position and carefully remove both vacuum hoses from reservoir.

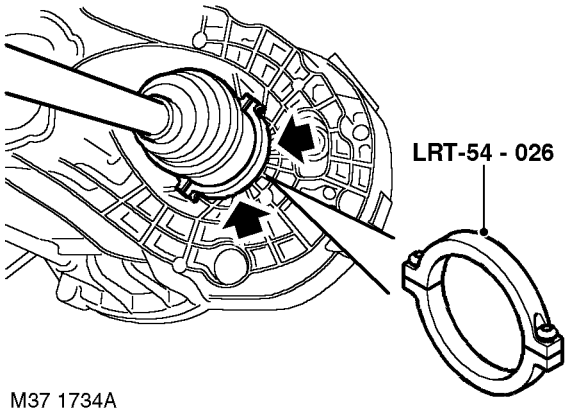


29. Release clips, disconnect coolant feed and return hoses from FBH.

30. Remove rear beam.
☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**

31. Drain gearbox fluid.
☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.**

32. Drain fluid from IRD.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**



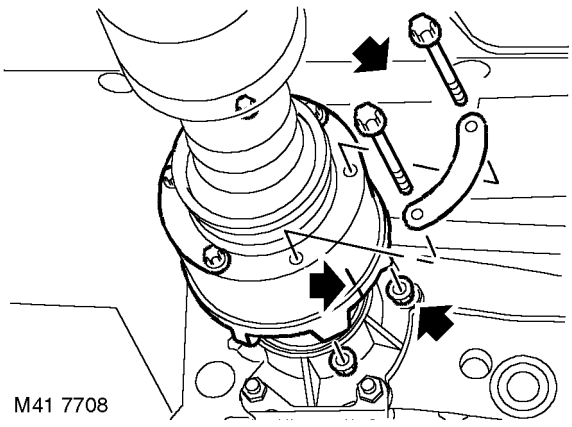
M37 1734A

33. Secure **LRT-54-026** to drive shaft inner joints. Using a suitable lever release drive shafts from IRD unit and gearbox.

34. With assistance, pull hubs outwards and remove drive shafts from gearbox.

35. Remove front exhaust pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - front.**

36. Raise one rear wheel for rotation of propeller shaft to access bolts.

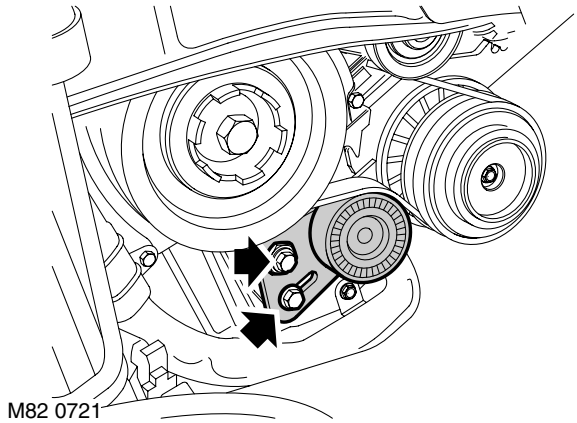

M41 7708

37. Reference mark position of viscous coupling flange to IRD unit flange to aid reassembly.

38. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.

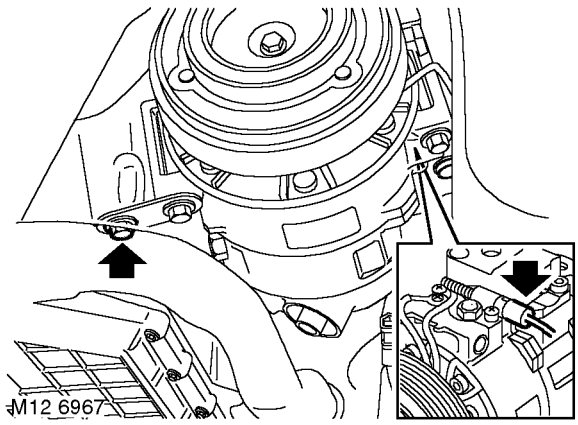
39. Release propeller shaft from IRD drive flange and tie shaft aside.

CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.


M82 0721

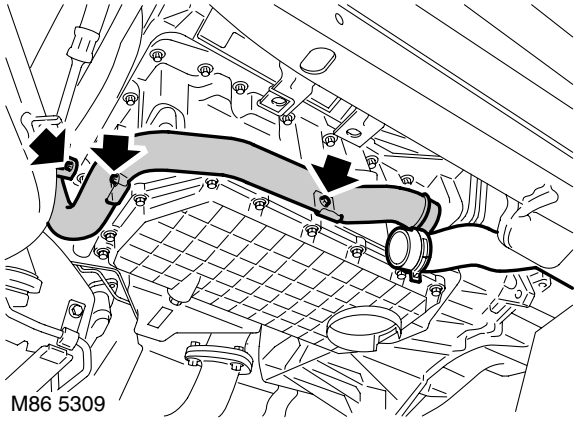
40. **Models with A/C:** Loosen pivot and clamp bolts on compressor drive belt tensioner.

41. **Models with A/C:** Remove compressor drive belt from compressor pulley.

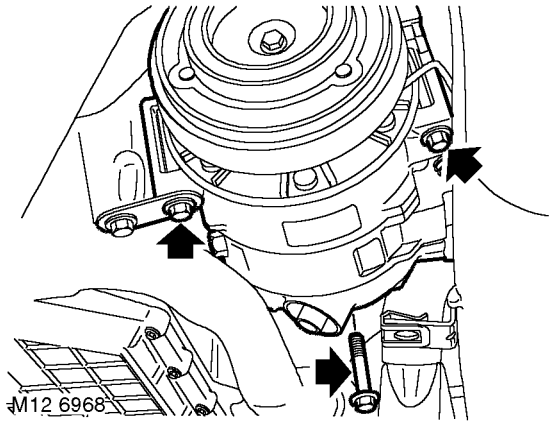

M12 6967

42. **Models with A/C:** Loosen bolt securing compressor support bracket to sump, do not remove.

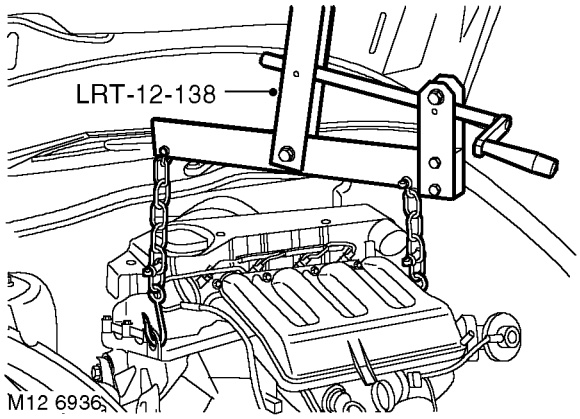
43. **Models with A/C:** Disconnect compressor multiplug.



44. **Models with A/C:** Remove 3 bolts securing coolant rail to sump and cylinder block.



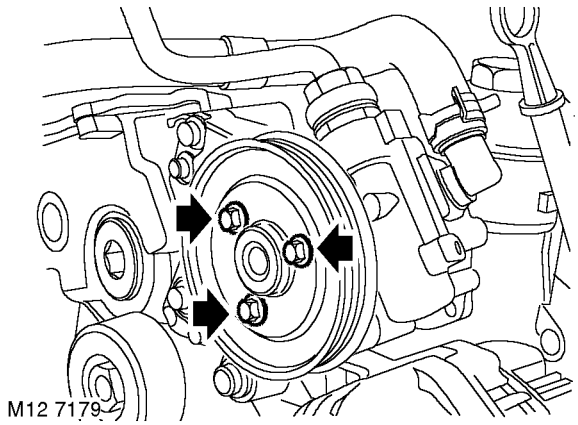
45. **Models with A/C:** Remove 3 bolts securing compressor to mounting bracket, release and tie compressor aside.



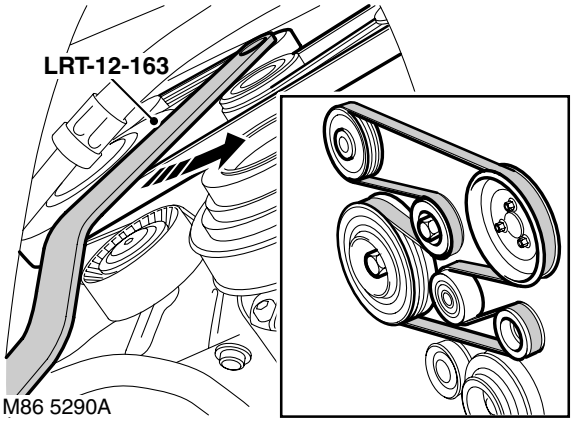
46. Fit tool **LRT-12-138** to suitable lifting chains and connect to lifting eyes on engine.

47. Remove hydramount

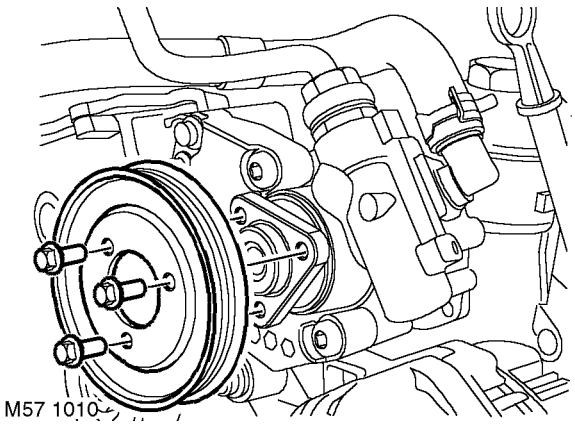
☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**



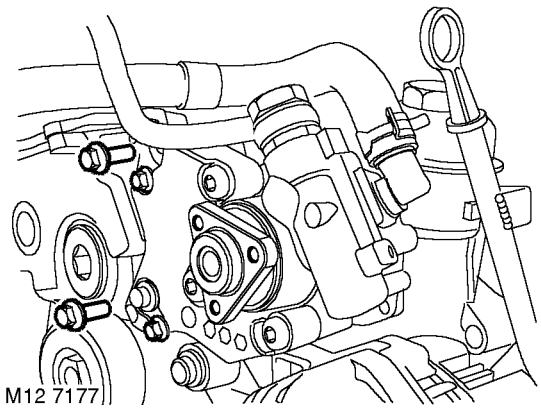
48. Loosen 3 PAS pump pulley bolts.



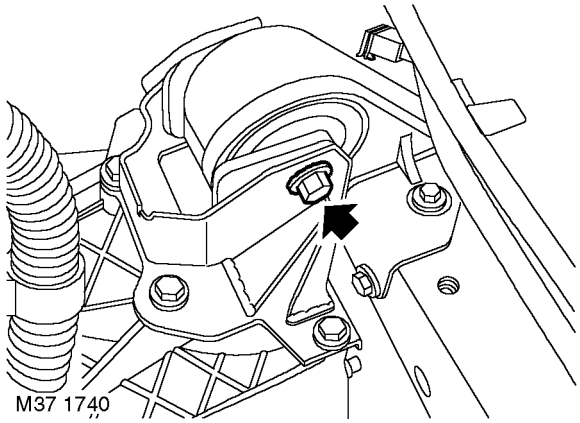
49. Fit **LRT-12-163** to ancillary belt tensioner pulley nut. Rotate tensioner anti-clockwise to release tension from belt and remove ancillary drive belt.



50. Remove bolts and remove PAS pump pulley.

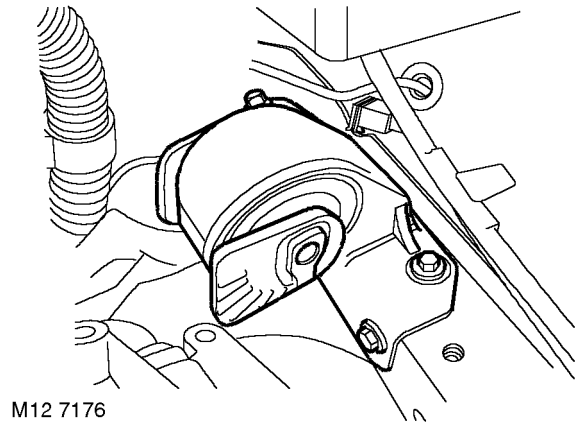


51. Remove 4 bolts securing PAS pump to mounting, release pump and tie aside.



52. Remove through bolt securing LH engine mounting to gearbox bracket.

53. With assistance, manoeuvre and lower engine and gearbox to floor.



54. Remove snubber from mounting.

Refit

1. Using a hoist, connect adjustable lifting bracket, **LRT-12-138** to engine.
2. Fit snubber to mounting.
3. Raise engine and gearbox, align gearbox mounting bracket.
4. Adjust height of engine, fit through bolt securing gearbox mounting bracket to gearbox mounting on body and tighten bolt to 100 Nm (74 lbf.ft).
5. Fit PAS pump. Tighten M6 bolts to 10 Nm. and M8 bolts to 24 Nm (18 lbf.ft).
6. Fit PAS pump pulley and align bolts holes. Ensure FRONT mark is facing outwards. Fit bolts finger tight.
7. Use **LRT-12-163** to hold belt tensioner off and with assistance, fit ancillary belt. Ensure belt is correctly located in pulley grooves.
8. Tighten PAS pump pulley bolts to 10 Nm (7.5 lbf.ft).

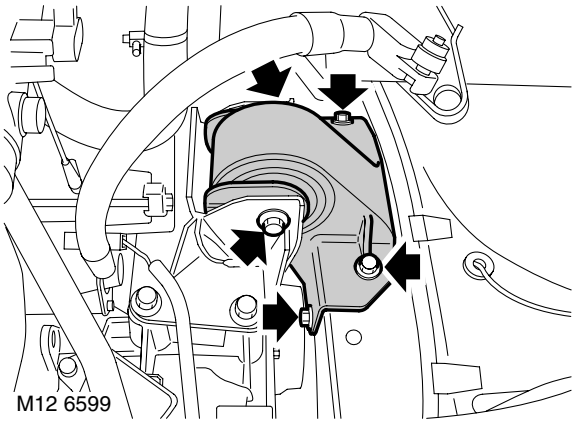
9. Fit hydramount.
   ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
10. Lower hoist, disconnect and remove lifting bracket, **LRT-12-138.**
11. Fit exhaust front pipe.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - front.**
12. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
13. Fit rear beam.
    ☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**
14. Clean ends of drive shaft and locations in hub and differential.
15. With assistance, fit drive shafts to gearbox, keeping both shafts square to prevent damage to oil seals in gearbox.
16. **Models with A/C:** Position compressor, fit bolts and tighten to 25 Nm (18 lbf.ft).
17. **Models with A/C:** Connect compressor multiplug.
18. **Models with A/C:** Align compressor support bracket to sump and tighten bolt to 10 Nm (7.5 lbf.ft).
19. **Models with A/C:**Fit lower coolant rail to sump and tighten bolts to 10 Nm (7.5 lbf.ft).
20. **Models with A/C:** Ensure compressor drive belt and compressor, crankshaft and tensioner pulleys are clean.
21. **Models with A/C:** Fit compressor drive belt to compressor pulley.
22. **Models with A/C:** Tension compressor drive belt.
    ☞ **AIR CONDITIONING, ADJUSTMENTS, Drive belt - compressor - Td4.**
23. Connect coolant hoses to FBH and secure with clips.
24. Clean hoses and vacuum reservoir connections.
25. Connect hoses to vacuum reservoir.
26. Clean hose and vacuum pump connections.
27. Fit vacuum hose and tighten clip.
28. Fit bolt, securing PAS pipe clip to engine lifting eye and tighten to 10 Nm (7.5 lbf.ft).
29. Connect heater hoses and secure with clips.
30. Connect coolant hoses to gearbox fluid cooler and secure clips.
31. Connect coolant hose to coolant rail and secure with clip.
32. Connect top hose to radiator and secure with clip.
33. Connect fuel hoses to clips on fuel rail.
34. Connect hose to intercooler and secure with clip.
35. Connect gearbox harness multiplugs and secure multiplugs in mounting bracket clips.
36. Fit trunnion to selector lever, fit inner cable to trunnion and secure outer cable to abutment bracket.
37. Adjust selector cable.
    ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Selector cable - adjust.**
38. Fit cables to starter motor solenoid and tighten nut to 13 Nm (10 lbf.ft).
39. Position earth lead to gearbox and tighten bolt to 25 Nm (18 lbf.ft).
40. Fit engine harness leads to 'E' box and locate grommets.
41. Fit 'E' box harness straps and tighten screws.
42. Connect multiplugs.
43. Connect multiplug to automatic gearbox ECU.
44. Fit ECM.
    ☞ **ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).**
45. Refill gearbox with transmission fluid.
    ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.**
46. Fill IRD to correct level with fluid.
    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
47. Fit battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
48. Fit intake ducting assembly.
49. Refill cooling system.
    ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
50. Untie and close bonnet.
51. Connect battery earth lead.

Engine mounting - LH

12.45.11

Remove

1. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
2. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
3. Tie bonnet back in upright position.
4. Fit lifting chains to lifting eye and take weight of engine.


M12 6599

5. Remove through bolt securing LH engine mounting to gearbox bracket.
6. Lower engine for access.
7. Remove 4 bolts securing LH mounting to body and remove mounting.
8. Remove snubber from mounting.

Refit

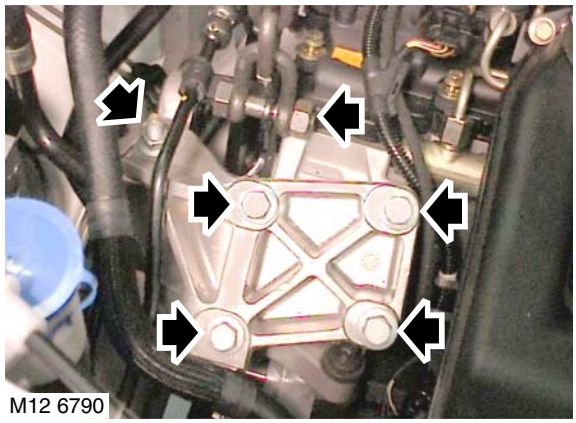
1. Clean mounting and mating faces.
2. Fit snubber to mounting.
3. Position LH mounting to body, fit and tighten bolts to 45 Nm (33 lbf.ft).
4. Align gearbox bracket to LH mounting, fit through bolt and tighten to 100 Nm (74 lbf.ft).
5. Remove engine lifting chains.
6. Fit battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
7. Fit intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
8. Untie and close bonnet.

Hydramount - engine - RH

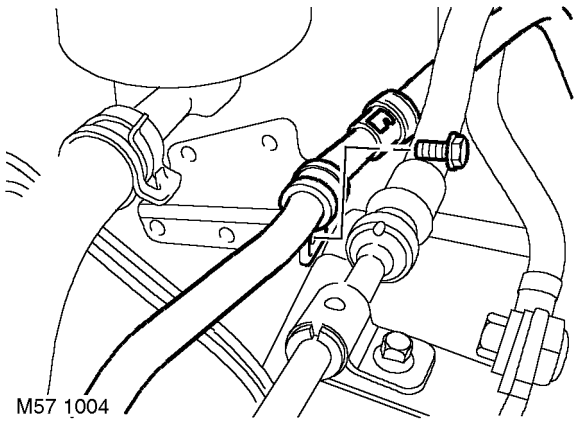
12.45.12

Remove

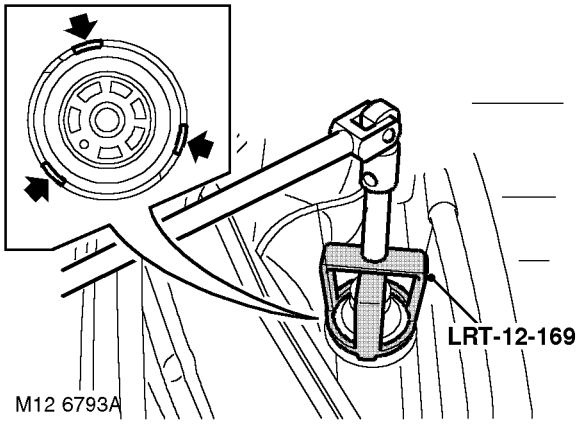
1. Disconnect battery earth lead.
2. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
3. Remove engine RH upper steady mounting.
   ENGINE - Td4, REPAIRS, Engine steady - upper - RH.
4. Tie bonnet back in upright position.


M12 6790

5. Fit lifting chains to lifting eye and take weight of engine.
6. Remove nut securing engine RH mounting bracket to hydramount.
7. Remove 4 bolts securing engine RH mounting bracket to engine.
8. Release bracket from dowel and remove from engine.


M57 1004

9. Remove bolt securing PAS pipe clip to body.



10. Using **LRT-12-169** loosen and remove hydramount.

Refit

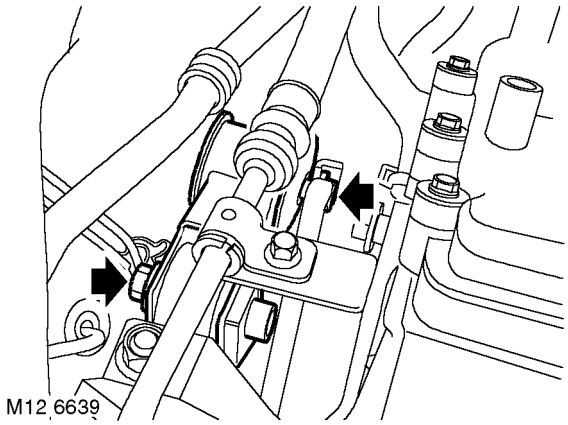
1. Clean hydramount and body mating faces.
2. Tighten hydramount to 85 Nm (63 lbf.ft).
3. Align PAS hose clip and tighten bolt to 10 Nm (7.5 lbf.ft).
4. Clean mounting bracket and engine mating face, dowel and dowel hole.
5. Fit engine mounting bracket assembly, locate on dowel and tighten bolts to 100 Nm (74 lbf.ft).
6. Lower engine onto mounting.
7. Remove engine lifting chains.
8. Fit nut securing mounting bracket to hydramount and tighten to 85 Nm (63 lbf.ft).
9. Fit engine RH upper steady mounting.
   ENGINE - Td4, REPAIRS, Engine steady - upper - RH.
10. Fit intake duct assembly.
    FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
11. Connect battery earth lead.
12. Untie and close bonnet.

Engine steady - upper - RH

12.45.16

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.



3. Remove bolt, steady to engine RH mounting bracket.
4. Remove bolt and steady. Remove bolt from steady.

Refit

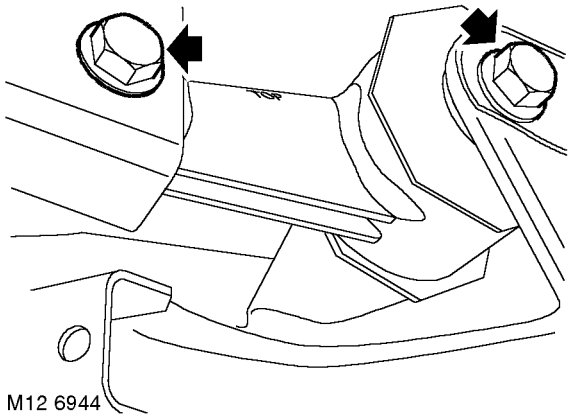
1. Fit steady and tighten bolts to 100 Nm(74 lbf.ft).
2. Fit engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
3. Fit battery earth lead

Engine steady - lower

12.45.17

Remove

1. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



2. Remove 2 bolts securing engine steady and remove engine steady.

Refit

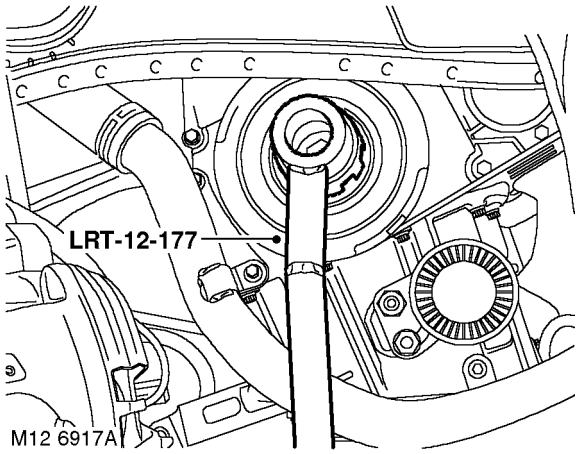
1. Fit steady and tighten bolts to 100 Nm (74 lbf.ft).
2. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.

Flywheel

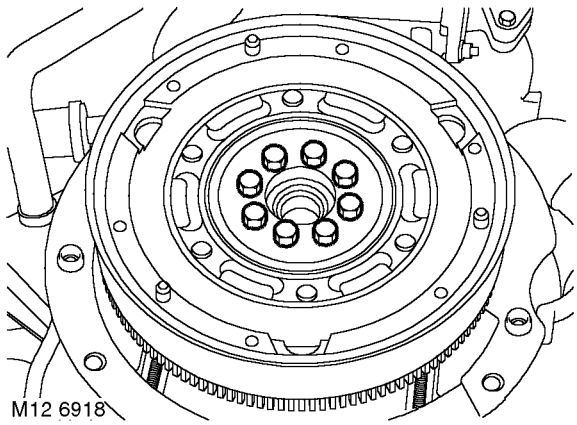
12.53.07

Remove

1. Disconnect battery earth lead.
2. Remove clutch assembly.
   CLUTCH, REPAIRS, Clutch assembly/drive plate & release bearing - Td4.



3. Position **LRT-12-177** to crankshaft pulley to restrain crankshaft.



4. Remove and discard 8 bolts securing flywheel to crankshaft.
5. Remove flywheel.

Refit

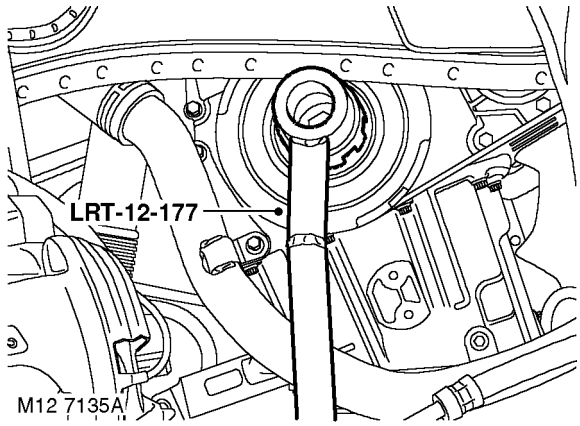
1. Clean bolt holes in crankshaft using an old flywheel bolt with two saw cuts at an angle of 45° to the bolt shank.
2. Clean flywheel and mating face of crankshaft.
3. Fit flywheel.
4. Fit new bolts securing flywheel to crankshaft and, working in a diagonal sequence, tighten progressively to 115 Nm (85 lbf.ft).
5. Fit clutch assembly.
   ☞ **CLUTCH, REPAIRS, Clutch assembly/drive plate & release bearing - Td4.**
6. Connect battery earth lead.

Torque converter drive plate

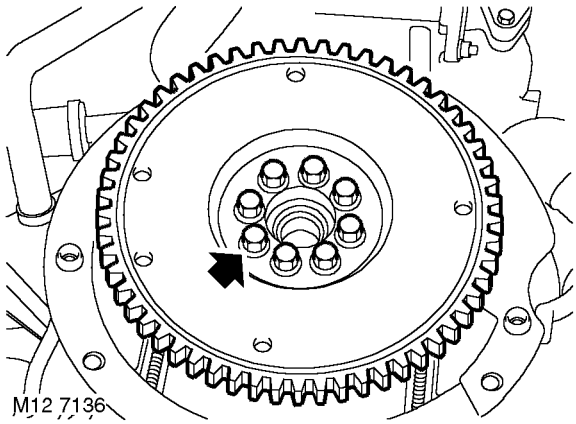
12.53.13

Remove

1. Remove gearbox assembly.
   ☞ **AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - Td4.**



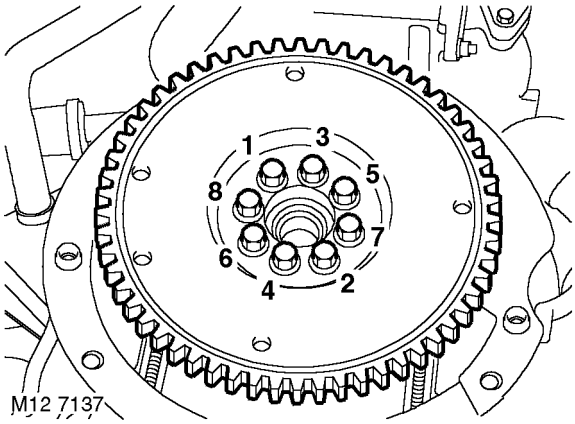
2. Fit **LRT-12-177** locking wrench with extension to crankshaft pulley.



3. Remove and discard 8 bolts securing drive plate to crankshaft.
4. Remove converter drive plate and starter ring.

Refit

1. Clean adhesive from threads of flywheel bolt holes in crankshaft using an old flywheel bolt, with 2 saw cuts at an angle of 45° to the bolt shank.
2. Clean drive plate and mating face of crankshaft.
3. Position drive plate to crankshaft.



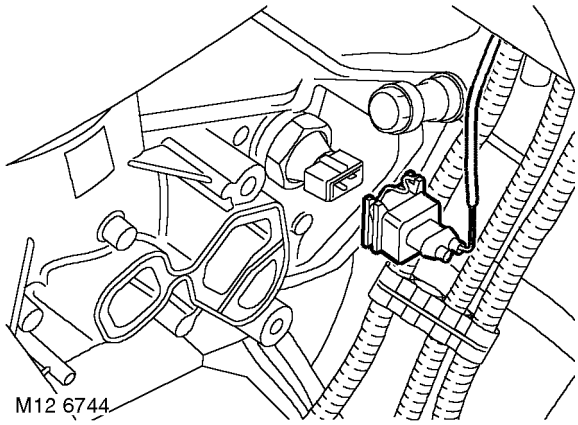
4. Fit new bolts securing drive plate to crankshaft and tighten progressively in the sequence shown to 115 Nm (85 lbf.ft).
5. Fit gearbox assembly.
   ☞ **AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - Td4.**

Gasket - housing - oil filter

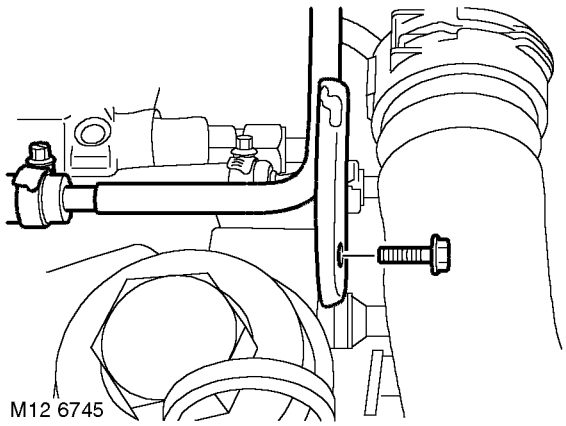
⊸ ***12.60.03***

Remove

1. Disconnect battery earth lead.
2. Remove oil cooler gasket.
   ☞ **ENGINE - Td4, REPAIRS, Gasket - cooler - engine oil.**

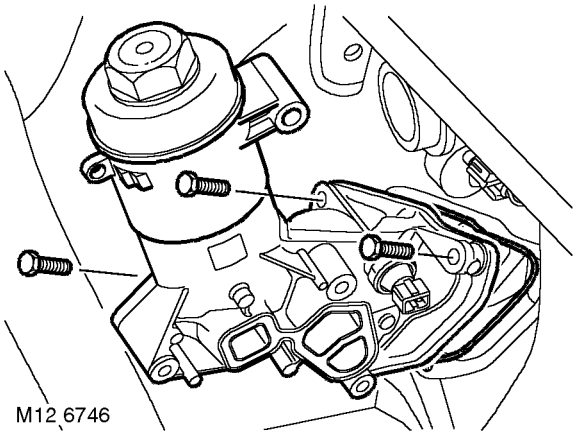


3. Disconnect multiplug from oil pressure switch.



4. Remove bolt securing fuel pipe bracket to oil filter housing.

5. Remove bolt securing dipstick tube to oil filter housing.
6. Position container underneath housing to collect any fluid spillage.



7. Remove 3 bolts securing oil filter housing to cylinder block and remove housing.
8. Remove and discard gasket from housing.

Refit

1. Clean mating face on filter housing and cylinder block.
2. Fit new gasket to oil filter housing.
3. Fit oil filter housing and tighten bolts to 25 (18 lbf.ft).
4. Fit and tighten bolt securing dipstick tube to filter housing to 10 Nm (7.5 lbf.ft).
5. Fit and tighten bolt securing fuel pipe bracket to filter housing to 10 Nm (7.5 lbf.ft).
6. Connect multiplug to oil pressure switch.
7. Fit oil cooler gasket.
   ☞ **ENGINE - Td4, REPAIRS, Gasket - cooler - engine oil.**
8. Connect battery earth lead.

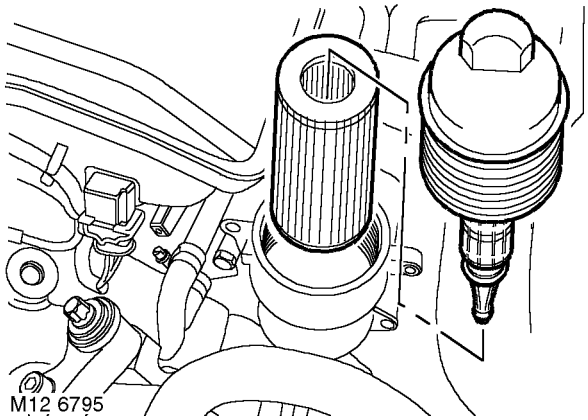
Filter - engine oil

12.60.04

Remove

1. Disconnect battery earth lead.
2. Remove acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
3. Remove dipstick for access.
4. Position cloth beneath oil filter case to collect spillage.

   CAUTION: Care must be taken to ensure that oil or fluid does not enter or contaminate the alternator.



5. Use a socket wrench to carefully loosen cap and allow oil to drain into sump.
6. Remove oil filter cap and discard 3 seals.
7. Remove and discard filter element.

Refit

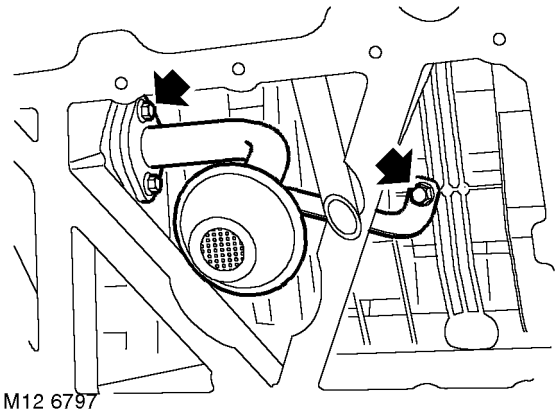
1. Clean filter cap and casing.
2. Fit new filter element to casing.
3. Fit new seals and lubricate with clean engine oil.
4. Fit oil filter cap and tighten to 25 Nm (18 lbf.ft).
5. Fit engine oil dipstick.
6. Fit engine acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
7. Connect battery lead.
8. Start engine and run at idle speed until oil pressure warning light extinguishes.
9. Stop engine. Recheck engine oil level.

Strainer - oil pick up

12.60.20

Remove

1. Disconnect battery earth lead.
2. Remove sump gasket.
   ENGINE - Td4, REPAIRS, Gasket - sump.


M12 6797

3. Remove bolt securing pick up strainer steady bracket.
4. Remove 2 bolts and remove oil strainer. Remove and discard gasket.

Refit

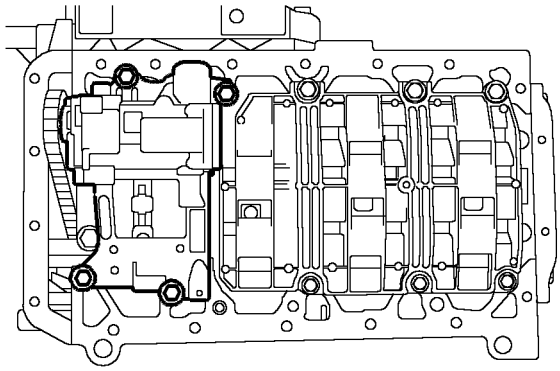
1. Clean oil pick up strainer and mating faces.
2. Fit new gasket to pick-up strainer, position strainer to oil pump, fit bolts and tighten to 10 Nm (7.5 lbf.ft).
3. Fit sump gasket.
   ENGINE - Td4, REPAIRS, Gasket - sump.
4. Connect battery earth lead.

Pump - oil

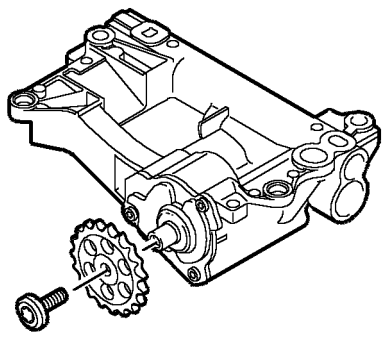
12.60.26

Remove

1. Disconnect battery earth lead.
2. Remove oil pick up strainer.
   ENGINE - Td4, REPAIRS, Strainer - oil pick up.


M12 6798

3. Remove 4 bolts securing oil pump to cylinder block.
4. Ease oil pump from dowels, release drive chain from oil pump drive gear and remove oil pump.


M12 6799

5. Position drive gear in a soft jawed vice and remove Torx bolt securing drive gear to oil pump, release vice and remove drive gear from oil pump.

Refit

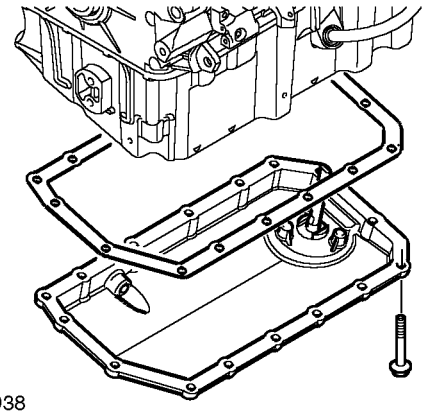
1. Clean drive gear and mating face on oil pump drive shaft.
2. Position drive gear to oil pump, fit Torx bolt.
3. Secure drive gear in soft jawed vice and tighten Torx bolt to 25 Nm (18 lbf.ft), remove assembly from vice.
4. Fit oil pump to drive chain and locate on dowels. Tighten bolts to 25 Nm (18 lbf.ft).
5. Fit oil pick-up strainer.
   ☞ **ENGINE - Td4, REPAIRS, Strainer - oil pick up.**
6. Connect battery earth lead.

Gasket - sump plate

🔧 ***12.60.37***

Remove

1. Disconnect battery earth lead.
2. Drain engine oil and remove filter.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.**



M12 6938

3. Remove 16 bolts securing sump plate.
4. Remove sump plate and discard gasket.

Refit

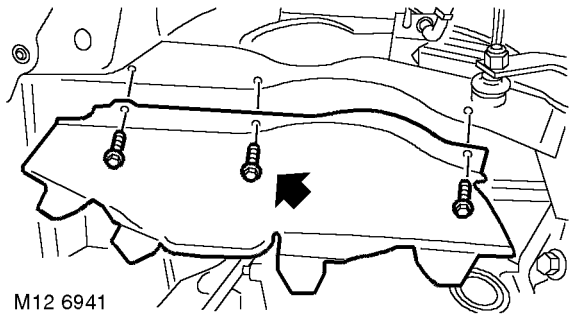
1. Ensure mating faces of sump plate and sump are clean.
2. Fit new gasket to sump plate.
3. Fit sump plate and tighten bolts to 10 Nm (7.5 lbf.ft).
4. Fit new oil filter and refill engine with oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.**
5. Connect battery earth lead.

Gasket - sump

12.60.38

Remove

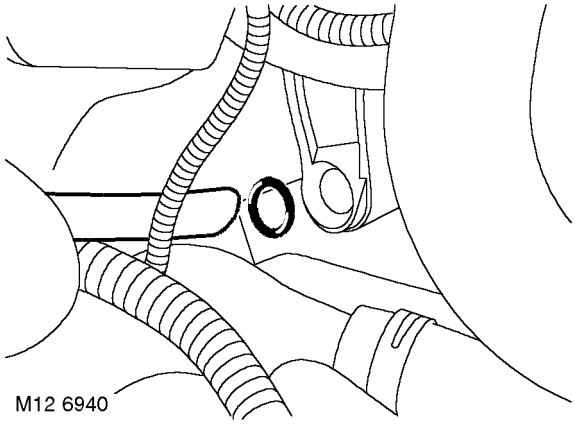
1. Disconnect battery earth lead.
2. Drain engine oil and remove filter.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.
3. Remove RH front wheel.


M12 6941

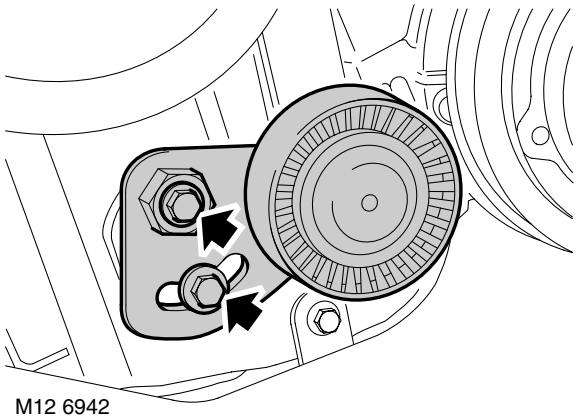
4. Remove 3 bolts and RH splash shield.


M12 5261

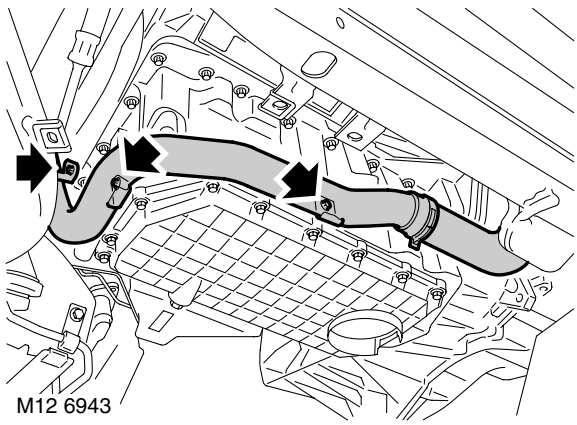
5. Remove bolt, dipstick tube to oil filter housing.


M12 6940

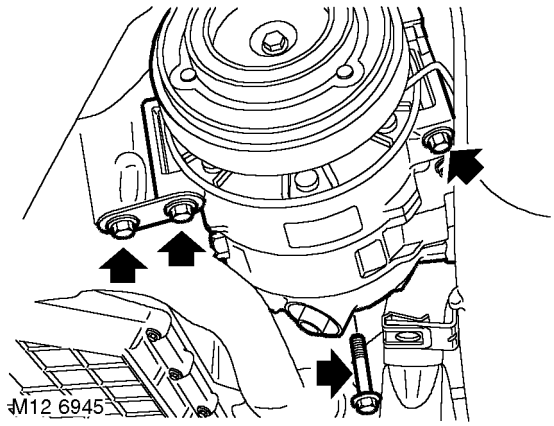
6. Remove dipstick tube and discard 'O' ring.


M12 6942

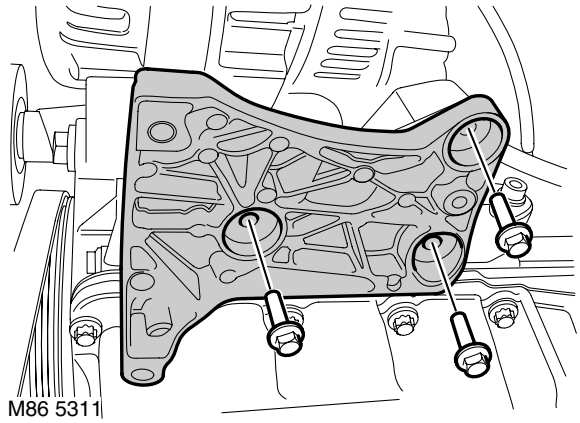
7. **Models with A/C:** Remove 2 bolts and compressor drive belt tensioner.


M12 6943

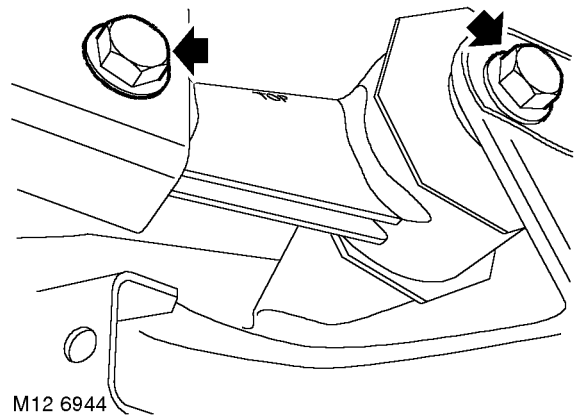
8. Remove 3 bolts securing coolant rail to sump and cylinder block.



9. **Models with A/C:** Loosen strap bolt, remove 3 bolts and tie compressor aside.

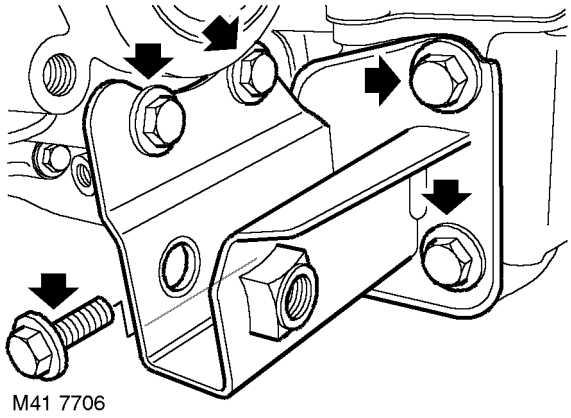


10. **Models with A/C:** Remove 3 bolts and remove compressor bracket.

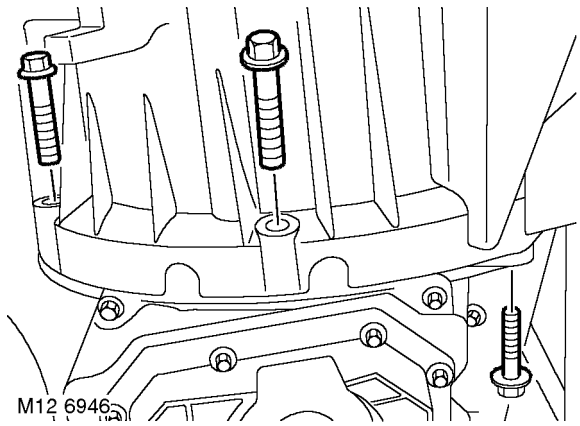


11. Loosen bolt securing engine lower steady to subframe.

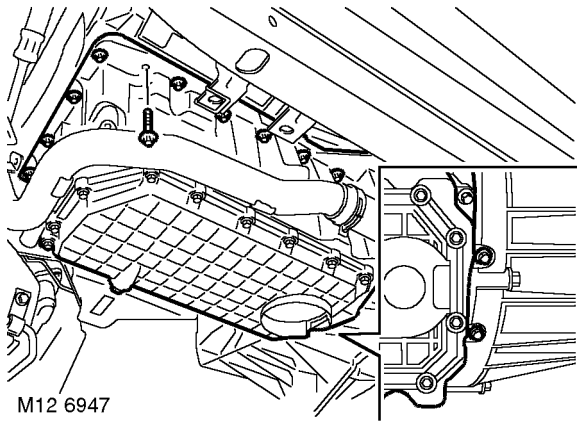
12. Remove bolt securing engine lower steady to bracket on sump.



13. Remove 5 bolts and remove steady bracket.



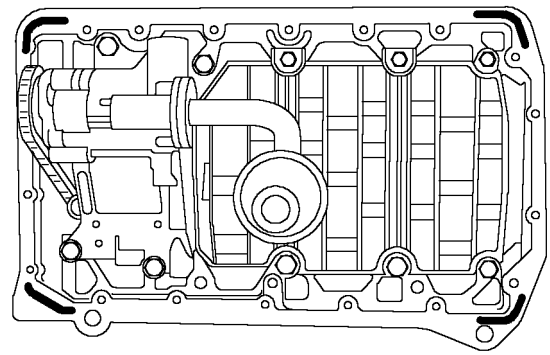
14. Remove 3 bolts securing sump to gearbox.



15. Remove 19 bolts and remove sump. Discard gasket.

Refit

1. Clean oil sump and mating face.



M12 6948

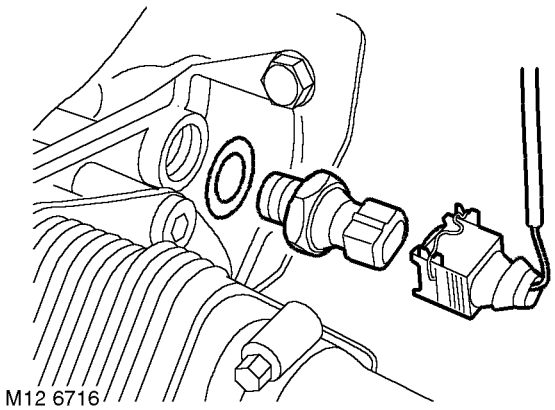
2. Apply a 2 mm bead of sealant Three Bond 1209 to area illustrated.
3. Fit new gasket to sump, position sump to cylinder block, fit bolts but do not tighten at this stage.
4. Fit bolts securing sump to gearbox housing, lightly tighten and then loosen bolts. This will align the rear sump flange to the gearbox.
5. Tighten M8 sump bolts evenly to 28 Nm (18 lbf.ft) and M6 bolts, accessed through gearbox housing, to 10 Nm (7.5 lbf.ft).
6. Tighten bolts securing gearbox housing to sump to 85 Nm (63 lbf.ft).
7. Fit engine lower steady bracket and tighten bolts evenly. Tighten M12 bolts to 50 Nm ((37 lbf.ft) and M10 bolts to 45 Nm (33 lbf.ft).
8. Tighten engine steady bolts to 100 ((74 lbf.ft).
9. **Models with A/C:** Fit compressor mounting bracket and tighten bolts to 25 Nm (18 lbf.ft).
10. **Models with A/C:** Fit compressor and tighten bolts to 25 Nm (18 lbf.ft).
11. Fit lower coolant rail to sump and tighten bolts to 10 Nm (7.5 lbf.ft).
12. **Models with A/C:** Fit compressor drive belt tensioner, fit bolts but do not tighten at this stage.
13. **Models with A/C:** Tension compressor drive belt.
    ☞ **AIR CONDITIONING, ADJUSTMENTS, Drive belt - compressor - Td4.**
14. Fit new 'O' ring and fit dipstick tube. Tighten bolt to 10 Nm (7.5 lbf.ft).
15. Fit splash shield and tighten bolts to 10 Nm (7.5 lbf.ft).
16. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
17. Fit new oil filter and refill engine with oil.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.**
18. Connect battery earth lead.

Switch - oil pressure

12.60.50

Remove

1. Disconnect battery earth lead.
2. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.



3. Disconnect multiplug from oil pressure switch.
4. Position absorbent cloth to catch oil spillage.
5. Remove oil pressure switch and discard sealing washer.

Refit

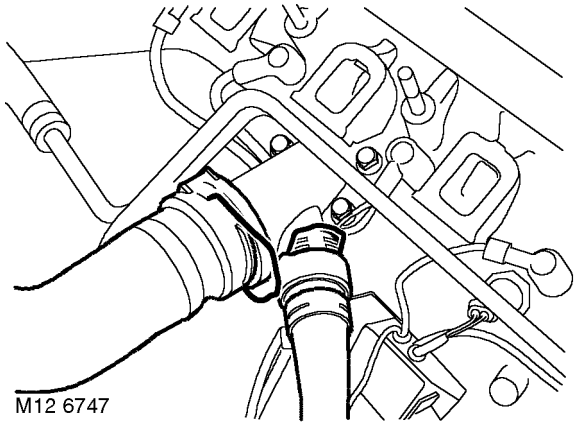
1. Clean oil pressure switch threads.
2. Fit new sealing washer to oil pressure switch.
3. Fit oil pressure switch and tighten to 38 Nm (28 lbf.ft).
4. Connect multiplug to oil pressure switch.
5. Fit starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.
6. Check and if necessary top up engine oil.
7. Connect battery earth lead.

Gasket - cooler - engine oil

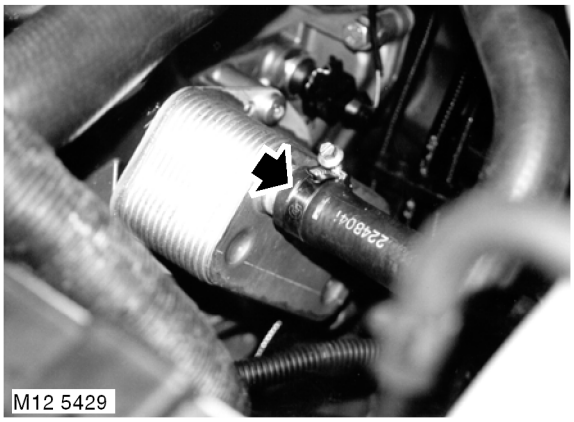
12.60.67

Remove

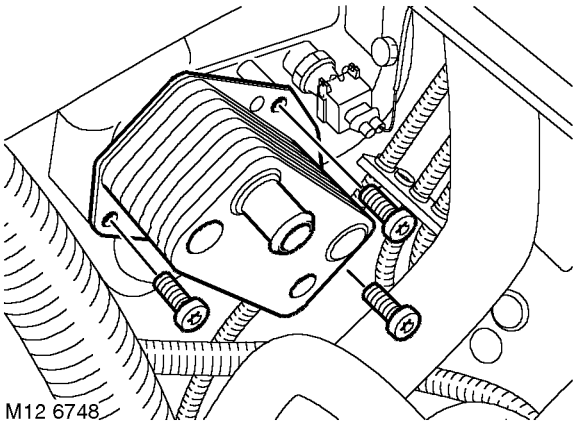
1. Disconnect battery earth lead.
2. Remove inlet manifold gasket.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.
3. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.



4. Release clips securing hoses to coolant elbow and disconnect hoses.
5. Remove and discard seals from coolant elbow quick release connections.
6. Move coolant hoses aside for access.
7. Drain engine oil and remove filter.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.
8. Remove starter motor
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.



9. Release clip securing hose to oil cooler and disconnect hose from cooler.
10. Position container to collect fluid spillage.



11. Remove 3 Torx bolts securing cooler to oil filter housing and remove cooler.
12. Remove and discard oil cooler gasket from oil filter housing.

Refit

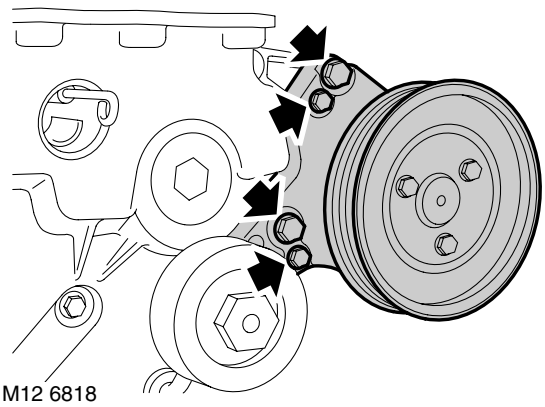
1. Clean oil cooler and mating face on oil filter housing.
2. Fit new gasket to oil filter housing.
3. Fit oil cooler to oil filter housing and tighten bolts to 22 Nm (16 lbf.ft).
4. Connect hose to oil cooler and secure with clip.
5. Fit starter motor.
   ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
6. Fit new oil filter and refill engine with oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – Td4.**
7. Fit new 'O' ring seals to coolant elbow hose connections.
8. Connect quick release hoses to coolant elbow.
9. Fit inlet manifold gasket.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.**
10. Connect battery earth lead.
11. Refill cooling system.
    ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

Gasket - timing gear cover

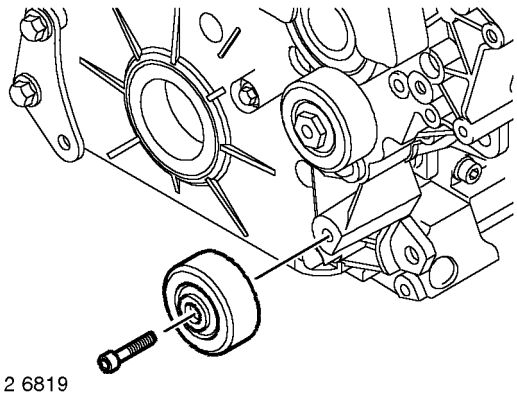
12.65.04

Remove

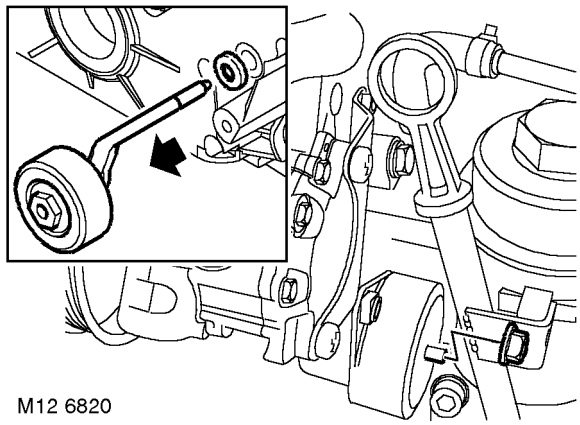
1. Disconnect battery earth lead.
2. Remove cylinder head gasket.
   ENGINE - Td4, REPAIRS, Gasket - cylinder head - manual models.
   ENGINE - Td4, REPAIRS, Gasket - cylinder head - automatic models.
3. Remove oil pump.
   ENGINE - Td4, REPAIRS, Pump - oil.
4. Remove alternator.
   CHARGING AND STARTING, REPAIRS, Alternator - Td4.
5. Remove crankshaft front oil seal.
   ENGINE - Td4, REPAIRS, Crankshaft front oil seal.


M12 6818

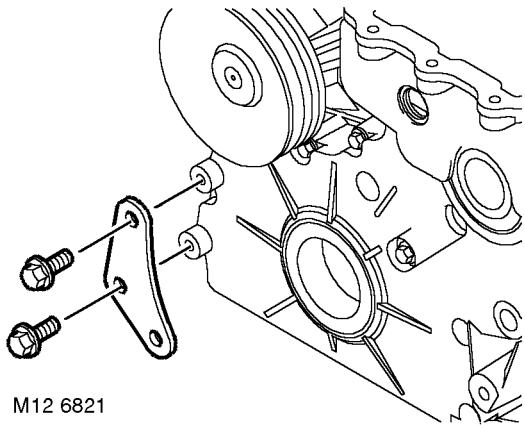
6. Remove 4 bolts and tie PAS pump aside.


M12 6819

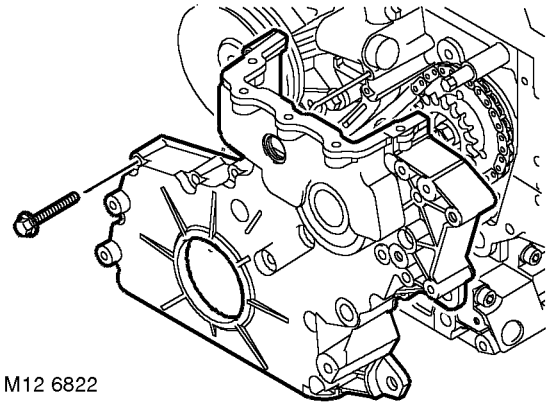
7. Remove Allen bolt and remove ancillary drive belt jockey pulley.


M12 6820

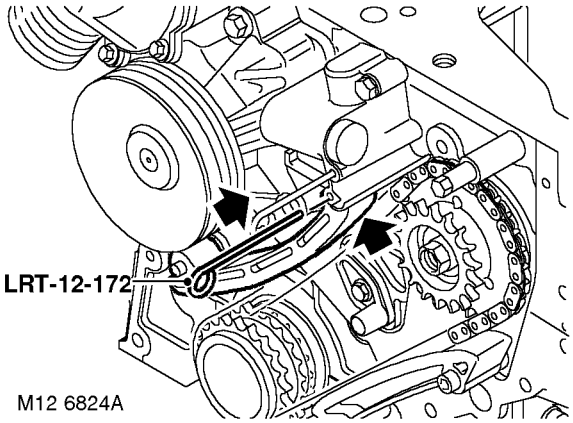
8. Remove nut and tensioner arm from spring housing.
9. Remove and discard tensioner arm seal.


M12 6821

10. Remove 2 bolts and remove lower coolant rail support bracket.

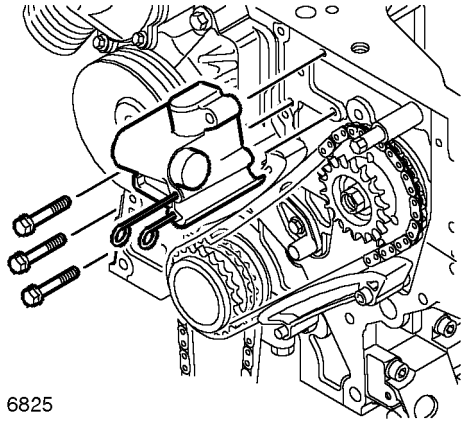

M12 6822

11. Remove 14 bolts, release and remove timing cover. Removal of bolts will release ancillary drive belt tensioner.
12. Remove camshaft drive chain from fuel pump sprocket.

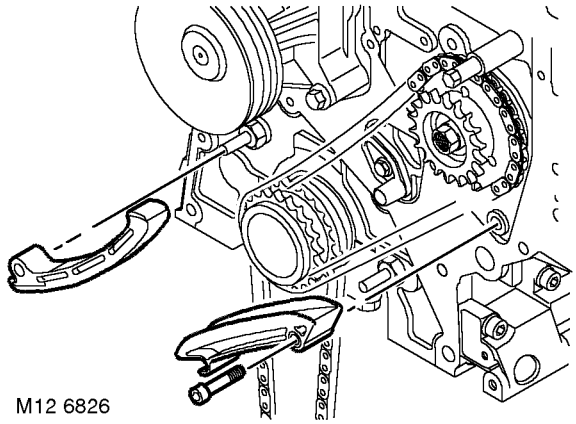


M12 6824A

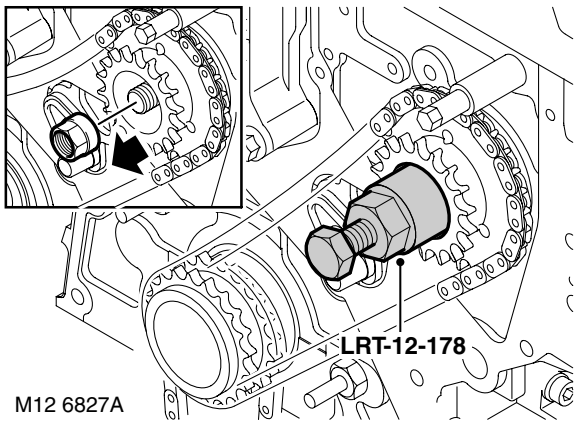
13. Press lower chain tensioner plunger fully into tensioner body and fit **LRT-12-172** to lock plunger.


M12 6825

14. Remove 3 bolts and remove timing chain tensioner.

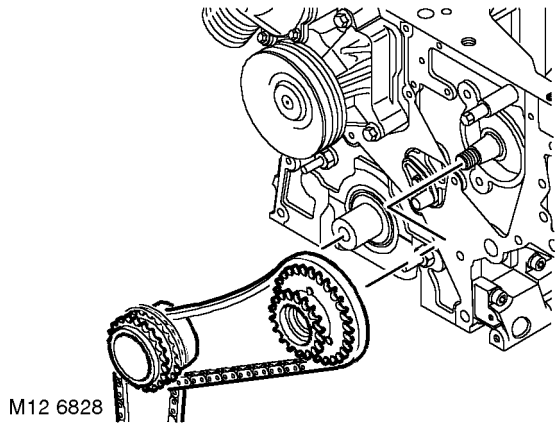

M12 6826

15. Remove fuel pump drive chain upper guide.
16. Remove Allen bolt and remove fuel pump drive chain lower guide. Discard Allen bolt.
17. Restrain fuel pump sprocket and remove securing nut.

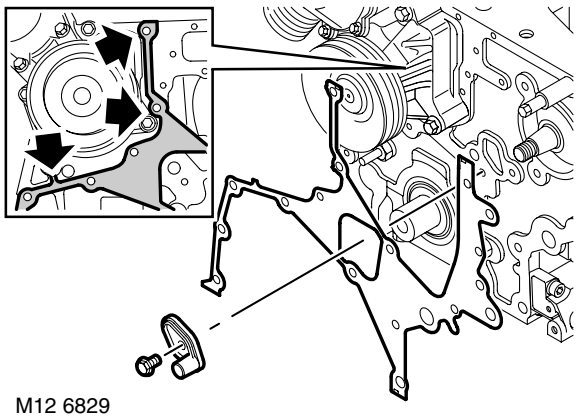


M12 6827A

18. Fit **LRT-12-178** to fuel pump sprocket and tighten centre screw to release sprocket from fuel pump.
19. Remove **LRT-12-178** from fuel pump sprocket.


M12 6828

20. Remove sprockets and chains from crankshaft and fuel pump.


M12 6829

21. Remove bolt and remove chain lubrication jet.
22. Cut to release and remove timing cover gasket.

Refit

1. Clean timing cover and mating face, clean dowels and dowel holes.
2. Cut to remove water pump gasket and fit new timing cover gasket to cylinder block.
3. Clean chain lubrication jet and mating face.
4. Fit chain lubrication jet and tighten bolt to 10 Nm (7.5 lbf.ft).
5. Clean crankshaft sprocket, fuel pump sprocket and mating faces.
6. Clean oil and fuel pump drive chains.
7. Lubricate chains and sprockets.
8. Assemble oil and fuel pump drive chains to crankshaft and fuel pump sprockets.
9. Fit sprockets and chains to crankshaft and fuel pump.
10. Fit fuel pump sprocket retaining nut and tighten to 65 Nm (48 lbf.ft).
11. Clean fuel pump drive chain guides.
12. Fit fuel pump drive chain lower guide to pin and tighten new Allen bolt to 24 Nm (18 lbf.ft).
13. Fit fuel pump drive chain upper guide to pin.
14. Clean timing chain tensioner and mating face. Ensure oil way is clear.
15. Fit timing chain tensioner and tighten bolts to 10 Nm (7.5 lbf.ft).
16. Hold tensioner lower plunger against spring pressure, remove **LRT-12-172** and release plunger onto chain guide.
17. Clean camshaft drive chain.
18. Lubricate camshaft drive chain.
19. Fit camshaft drive chain to fuel pump sprocket.
20. Clean timing cover.
21. Fit timing cover to cylinder block.
22. Temporary fit ancillary belt tensioner pulley arm to align tensioner.
23. Evenly and progressively tighten timing cover bolts to 15 Nm (11 lbf.ft).
24. Remove ancillary belt tensioner pulley arm.
25. Fit seal to ancillary drive belt tensioner arm bush.
26. Fit ancillary belt tensioner arm and tighten nut to 10 Nm (7.5 lbf.ft).
27. Fit lower coolant rail support bracket and tighten bolts to 15 Nm (11 lbf.ft).
28. Fit ancillary drive belt jockey pulley and tighten new Allen bolt to 24 Nm (18 lbf.ft).

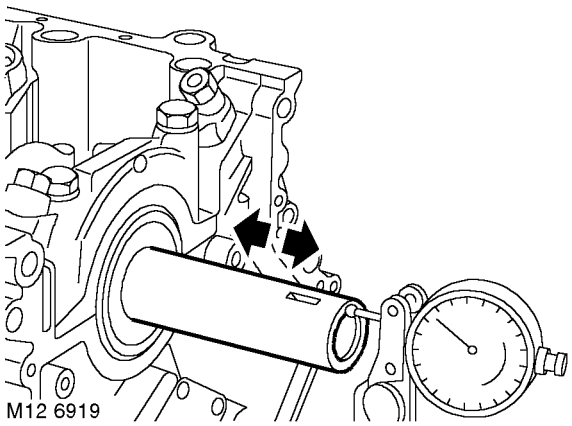
29. Position PAS pump and tighten, 6 mm bolts to 10 Nm (7.5 lbf.ft), and 8 mm bolts to 25 Nm (18 lbf.ft).
30. Fit crankshaft front oil seal.
☞ **ENGINE - Td4, REPAIRS, Crankshaft front oil seal.**
31. Fit alternator.
☞ **CHARGING AND STARTING, REPAIRS, Alternator - Td4.**
32. Fit oil pump.
☞ **ENGINE - Td4, REPAIRS, Pump - oil.**
33. Fit cylinder head gasket.
☞ **ENGINE - Td4, REPAIRS, Gasket - cylinder head - manual models.**
☞ **ENGINE - Td4, REPAIRS, Gasket - cylinder head - automatic models.**
34. Connect battery earth lead.

Crankshaft

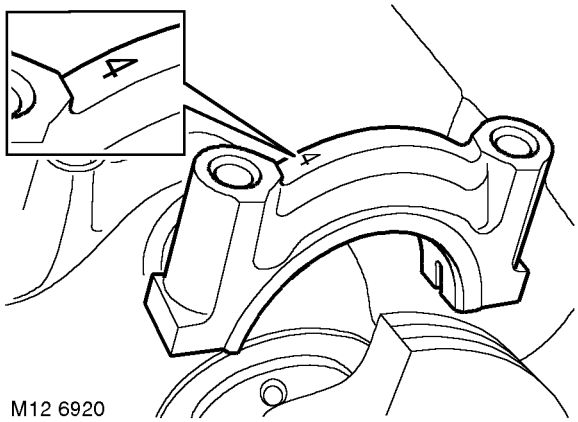
12.21.33.01

Remove

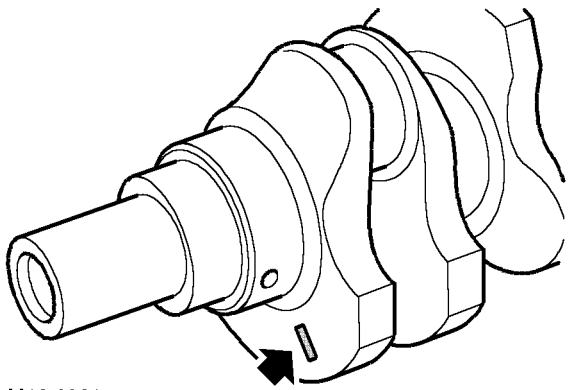
1. Remove timing cover gasket.
   ENGINE - Td4, REPAIRS, Gasket - timing gear cover.
2. Remove crankshaft rear oil seal.
   ENGINE - Td4, REPAIRS, Crankshaft rear oil seal.
3. Remove connecting rod bearings.
   ENGINE - Td4, REPAIRS, Connecting rod bearings - engine set.


M12 6919

4. Check crankshaft end-float, position DTI gauge as shown, push crankshaft away from DTI and zero gauge. Push crankshaft in the opposite direction and note reading.
   GENERAL DATA, Engine – Td4 Diesel.
5. Remove 10 bolts securing main bearing caps to cylinder block, do not discard bolts at this stage.


M12 6920

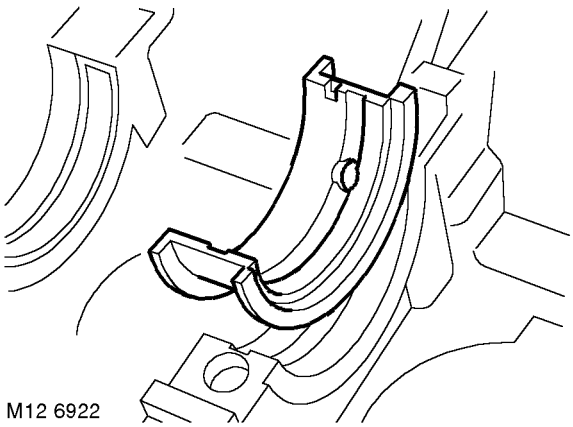
6. Carefully remove each main bearing cap noting that number 4 main bearing cap carries the integral thrust/main bearing shell. Keep main bearing caps in their fitted order.
7. Lift out crankshaft from cylinder block.
8. Remove and discard bearing shells from cylinder block and main bearing caps.
9. Clean crankshaft, ensure all oilways are clear of obstructions.
10. Clean main bearing caps and bearing shell locations in cylinder block; ensure bearing cap bolt holes are clean and dry.
11. Clean original main bearing cap bolts and lightly oil bolt threads.


M12 6921

12. To determine grinding stage, note paint mark on crankshaft front web, if visible. If paint mark is not visible measure journal diameters.
13. Measure and record each main journal diameter, taking 4 measurements of each journal at 90° intervals to check for appropriate specified size and ovality. Compare journal diameter specifications.
    GENERAL DATA, Engine – Td4 Diesel.

14. If standard or undersize 1 journals are found to be oval, the crankshaft may be ground to the next undersize.

15. If journals are worn below the original colour code size but ovality is within limits, then the next size main bearing shells should be fitted in the main bearing caps and cylinder block when carrying out the Plastigauge check.

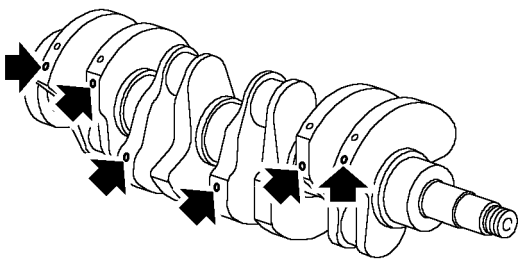


M12 6922

16. Fit new appropriate size main bearing shells to cylinder block, noting that the thrust/main bearing shell is fitted to No.4 journal position.

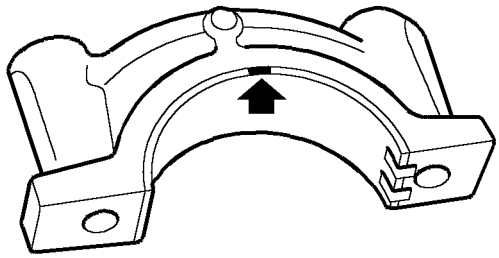
Note: Only fit yellow bearing shells into the crankcase. The clearance is adjusted by changing the bearing cap shells. Ignore the paint marks on cylinder block webs.

17. Position crankshaft to cylinder block.



M12 6923

18. Check colour coding on crankshaft webs as illustrated.



M12 6924

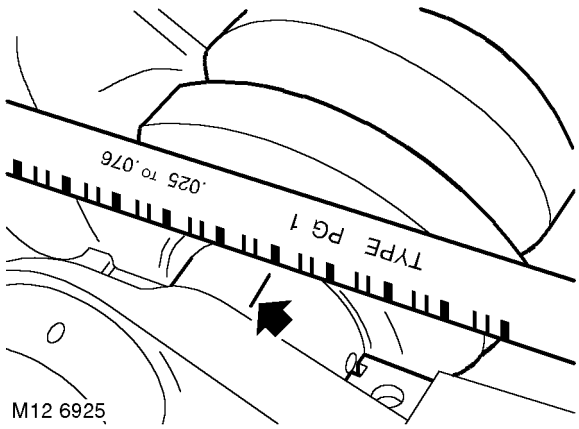
19. Fit new appropriate size main bearing shells of the same colour coding, colour marked on edge of bearing shell, to the main bearing caps, noting that the thrust / main bearing shell is fitted to No. 4 main bearing cap.

20. Place a strip of Plastigauge across each main bearing journal.

21. Position crankshaft, main bearing caps and original bolts. Tighten main bearing cap bolts in a diagonal sequence to 20 Nm 15 lbf.ft) then a further 70°. Recheck crankshaft end-float.

CAUTION: Do not rotate the crankshaft when plastigauge is being used.

22. Progressively loosen and remove main bearing bolts, bearing caps and shells.



M12 6925

23. Using the scale provided, measure the width of Plastigauge on each main bearing journal and compare with specified bearing clearances.

☞ **GENERAL DATA, Engine – Td4 Diesel.**

24. If clearances are incorrect, select alternative main bearing cap shell(s) from the range available and repeat check.

25. Lift out crankshaft, remove all traces of Plastigauge from main bearing journals using clean engine oil and a cloth.
26. Fit selected bearing shells to main bearing caps.
27. Lubricate bearing journals and main bearing shells with clean engine oil.
28. Position crankshaft, fit main bearing caps and original bolts.
29. Tighten bolts to 20 Nm (15 lbf.ft) then a further 70°.
30. Position DTI gauge to front end of crankshaft, push crankshaft fully rearwards and zero gauge.
31. Push crankshaft fully in the opposite direction and note crankshaft end-float reading on gauge.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**
32. If crankshaft end-float is incorrect, remove crankshaft and select combined thrust/main bearing shells from the range available to give the correct end-float, ensuring that correct colour coding/size of bearing shell is maintained. There are 3 widths of thrust/main bearing shells available.
33. Fit selected thrust/main bearing shells to cylinder block and main bearing cap.
34. Position crankshaft, main bearing caps and original bolts. Tighten main bearing cap bolts in a diagonal sequence to 20 Nm (15 lbf.ft) then a further 70°. Recheck crankshaft end-float.
    ☞ **GENERAL DATA, Engine – Td4 Diesel.**
35. **If crankshaft end-float is correct:** Progressively loosen and remove main bearing cap bolts, discard bolts.

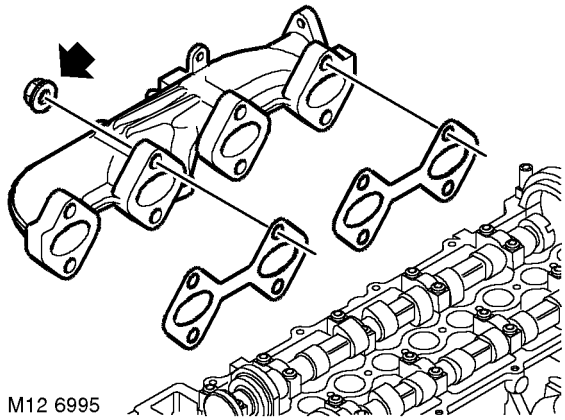
Refit

1. Lightly oil threads of new main bearing cap bolts and fit to cylinder block.
2. Tighten main bearing cap bolts in a diagonal sequence to 20 Nm (15 lbf.ft) then a further 70°.
3. Fit connecting rod bearings.
   ☞ **ENGINE - Td4, REPAIRS, Connecting rod bearings - engine set.**
4. Fit timing cover gasket.
   ☞ **ENGINE - Td4, REPAIRS, Gasket - timing gear cover.**
5. Fit crankshaft rear oil seal.
   ☞ **ENGINE - Td4, REPAIRS, Crankshaft rear oil seal.**

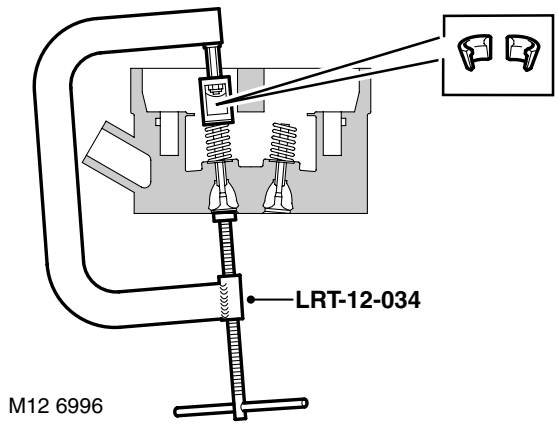
Cylinder head

12.29.19.01

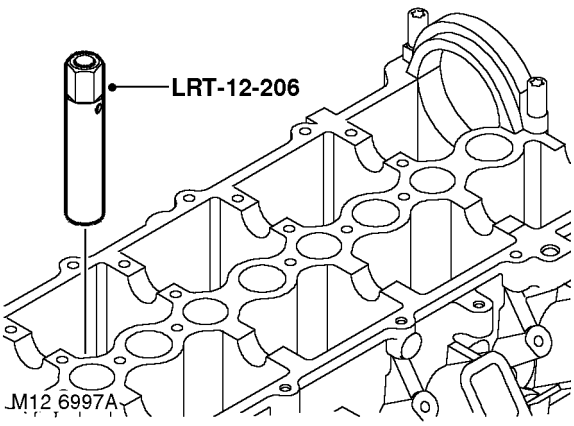
Remove



1. Remove 8 nuts and remove exhaust manifold. Discard gaskets.



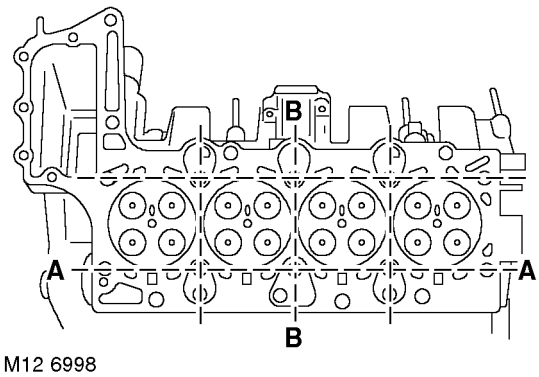
2. Using **LRT-12-034,** compress valve spring, remove 2 collets, release valve spring and remove **LRT-12-034.**
3. Remove valve spring and cap.
4. Remove valve from cylinder head.



5. Press **LRT-12-206**onto valve stem seal, rotate to lock and remove **LRT-12-206** with seal.
6. Repeat procedure for remaining valves, keeping components in their fitted order.

Refit

1. Clean cylinder head face.



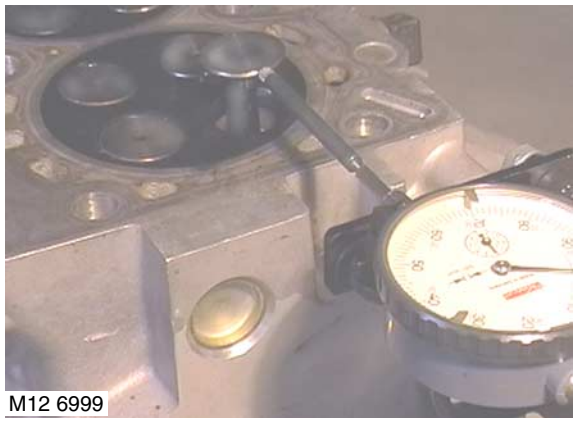
2. Using a straight edge and feeler gauges, check cylinder head for distortion along lines shown in illustration.

   GENERAL DATA, Engine – Td4 Diesel.

   CAUTION: Cylinder heads must not be refaced. Replace the head assembly if warping exceeds the limit.

3. Clean and inspect valve seat.

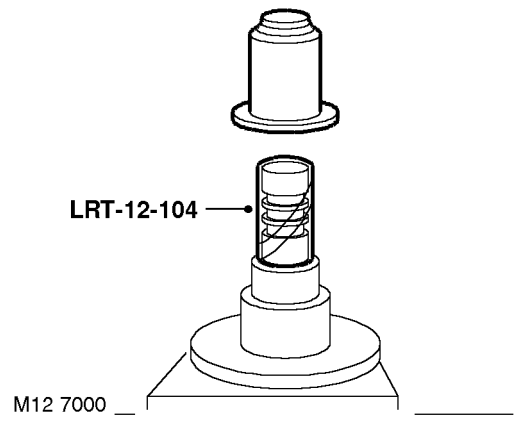
   CAUTION: Valves and valve seats must not be refaced.



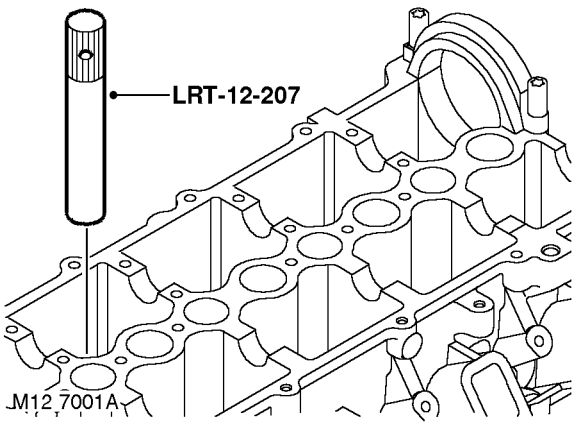
4. Fit new valve to valve guide, with end of valve stem level with valve guide.
5. Mount DTI onto cylinder head and zero gauge on valve head. Move valve from side to side measure valve guide wear. If guide wear exceeds 0.50 mm, replace cylinder head and valves.

   CAUTION: Valve guides cannot be replaced.

6. Carefully clean valve seats.
7. Clean combustion spaces and manifold ports.
8. Clean valve, spring, cap and collets.
9. Lubricate valve and guide with clean engine oil.
10. Fit valve.



11. Fit **LRT-12-104** over valve stem.
12. Fit new seal to valve and remove **LRT-12-104**.

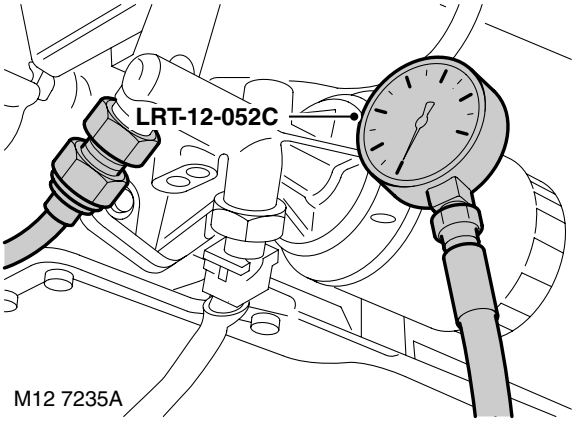


13. Fit seal fully onto valve guide with **LRT-12-207**.
14. Fit valve spring and cap.
15. Use **LRT-12-034** to compress valve spring. Fit collets, release spring and remove **LRT-12-034**.
16. Repeat above for remaining valves.
17. Clean exhaust manifold and cylinder head mating face.
18. Use new gaskets and fit exhaust manifold to cylinder head.
19. Fit nuts securing exhaust manifold and tighten to 24 Nm (18 lbf.ft).

Engine oil pressure check

12.90.09/01

1. Remove oil pressure switch.
   ENGINE - K SERIES 1.8, REPAIRS, Switch - oil pressure.



2. Top up engine oil if necessary.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.
3. Use pressure check kit **LRT-12-052C** fit adaptor and gauge to oil pump.
4. Run engine at idle speed and check for correct oil pressure.
   GENERAL DATA, Engine – K1.8 Petrol.
5. Switch off ignition.
6. Remove pressure gauge and adaptor.
7. Clean oil spillage.
8. Fit oil pressure switch.
   ENGINE - K SERIES 1.8, REPAIRS, Switch - oil pressure.
9. Top up engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.

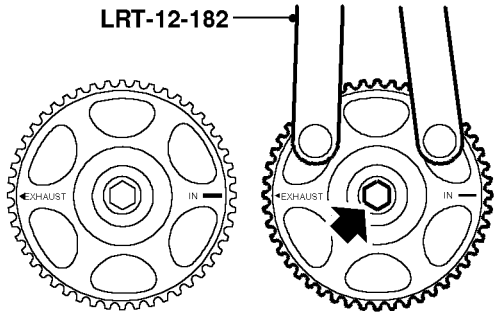
Oil seal - front - exhaust camshaft

12.13.07

This procedure is also applicable for inlet camshaft.

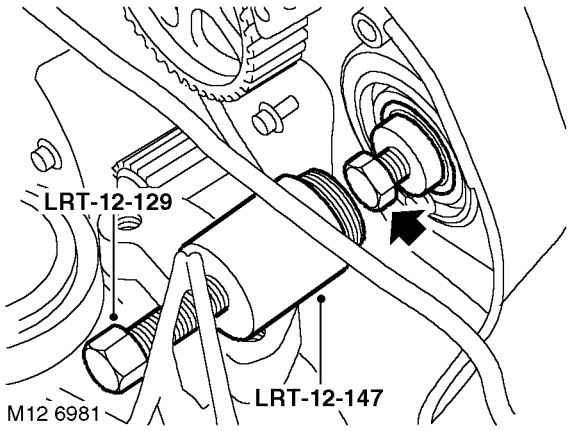
Remove

1. Disconnect battery earth lead.
2. Remove camshaft timing belt.
   ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.
3. Remove camshaft gear alignment tool **LRT-12-134.**



M12 6980A

4. Restrain camshaft gear using tool **LRT-12-182** and remove bolt and plain washer securing gear.
5. Remove camshaft gear.
6. Position cloth to absorb oil spillage.

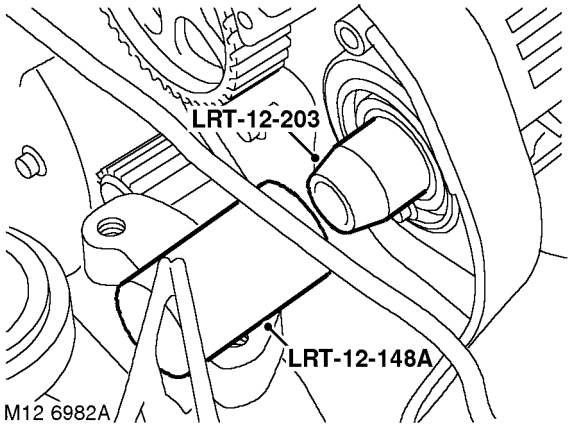


M12 6981

7. Fit camshaft gear retaining bolt to camshaft.
8. Remove camshaft oil seal using tool **LRT-12-147** and centre bolt from tool **LRT-12-129.**
9. Discard camshaft oil seal.
10. Remove bolt from camshaft.

Refit

1. Clean oil seal recess and camshaft.



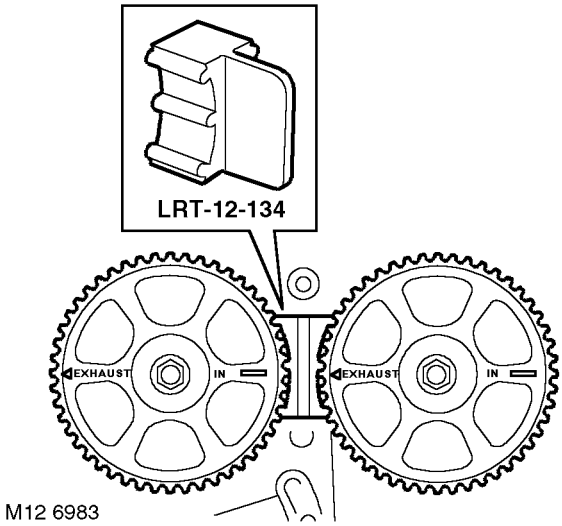
M12 6982A

2. Ensure oil seal protector sleeve **LRT-12-203**, is clean. Fit sleeve to camshaft.
3. Fit seal using tool **LRT-12-148A.**
   NOTE: Front oil seals are black.

   CAUTION: Oil seal must be fitted dry. Do not use tool LRT-12-148.

4. Clean camshaft gear and mating face.
   CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gear will emerge and contaminate the belt.

5. Fit gear to camshaft, fit plain washer and bolt. Using tool **LRT-12-182** to restrain camshaft, tighten bolt to 65 Nm (48 lbf.ft).



M12 6983

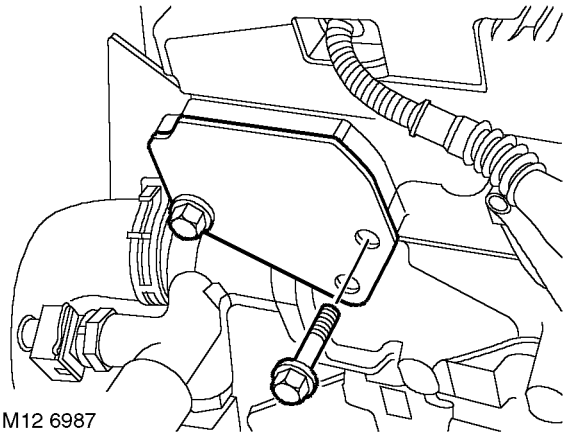
6. Align camshaft gears and fit tool **LRT-12-134.**
7. Fit camshaft timing belt.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**
8. Connect battery earth lead.
9. Top-up engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Oil seal - rear - exhaust camshaft

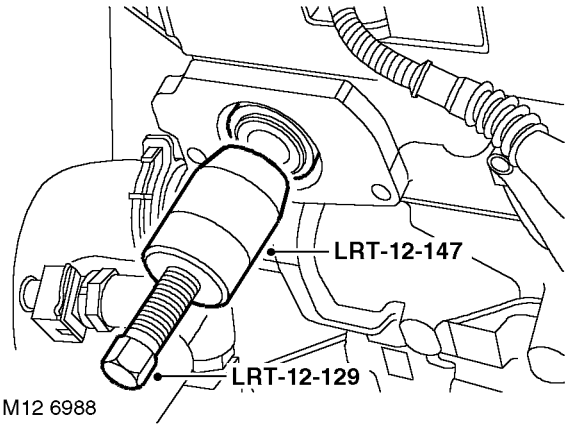
12.13.08

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner assembly.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
3. Position cloth to absorb oil spillage.


M12 6987

4. Remove 2 bolts securing oil seal cover plate to cylinder head and remove plate.

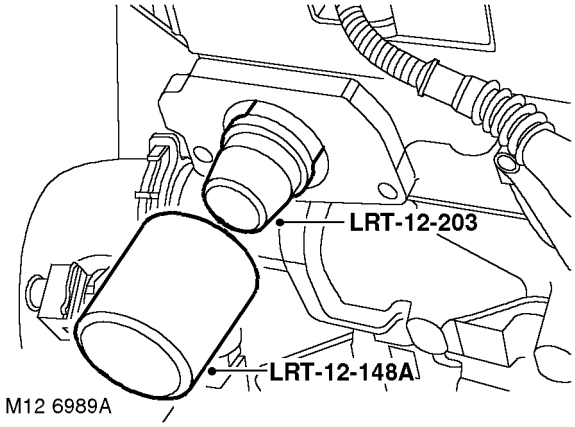


M12 6988

5. Remove camshaft oil seal using tool **LRT-12-147** and centre bolt from tool **LRT-12-129.**
6. Discard camshaft oil seal.

Refit

1. Clean oil seal recess and camshaft.



2. Position **LRT-12-203** oil seal protector onto end of camshaft.
3. Fit seal using tool **LRT-12-148A.**
   NOTE: Rear oil seals are red.

   CAUTION: Oil seal must be fitted dry. Do not use tool LRT-12-148.

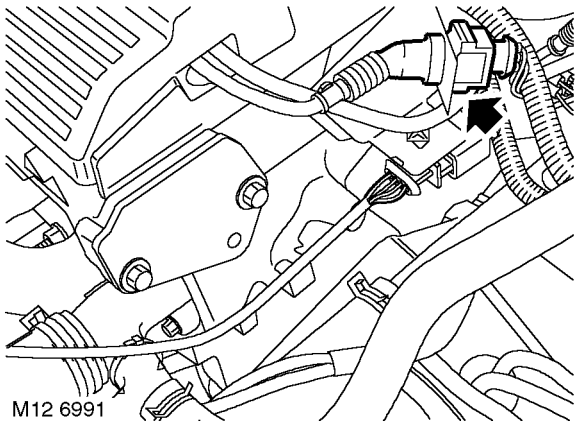
4. Clean cover plate and mating face.
5. Position cover plate, fit bolts and tighten to 25 Nm (18 lbf.ft).
6. Fit air cleaner assembly.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
7. Connect battery earth lead.
8. Top-up engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Oil seal - rear - inlet camshaft

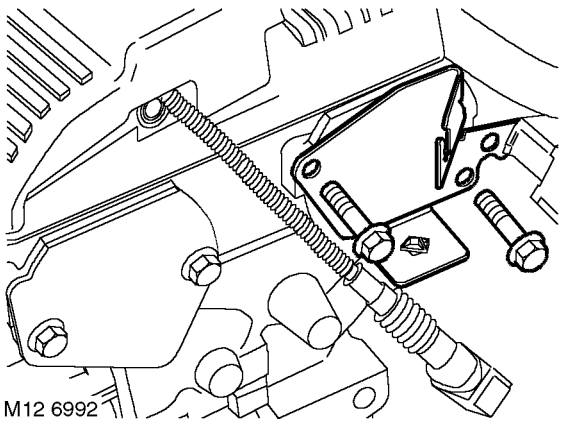
12.13.10

Remove

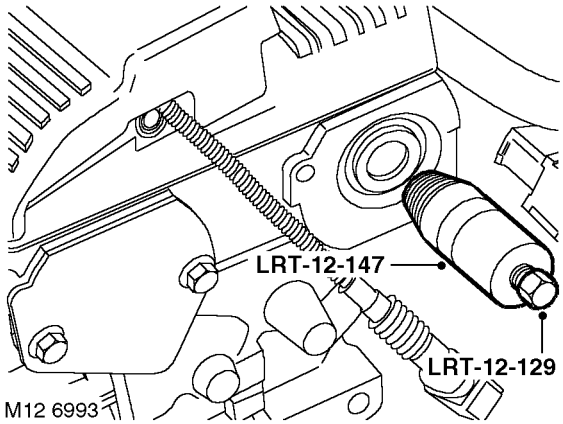
1. Disconnect battery earth lead.
2. Remove air cleaner assembly.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
3. Position cloth to absorb oil spillage.



4. Release CMP sensor multiplug from bracket and disconnect multiplug.



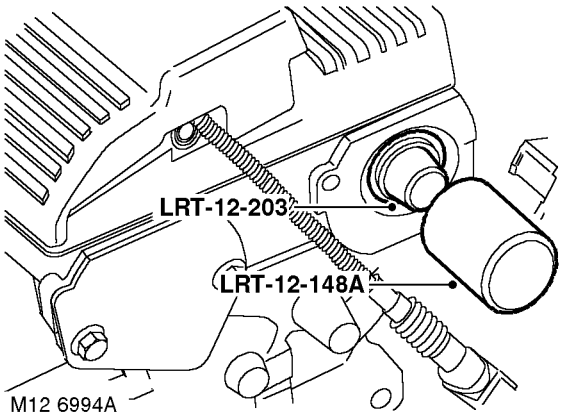
5. Remove 2 bolts securing oil seal cover plate to cylinder head and position aside.



6. Remove camshaft oil seal using tool **LRT-12-147** and centre bolt from tool **LRT-12-129.**
7. Discard camshaft oil seal.

Refit

1. Clean oil seal recess and camshaft.



2. Ensure oil seal protector sleeve **LRT-12-203**, is clean. Fit sleeve to camshaft.
3. Fit seal using tool **LRT-12-148A.**
   NOTE: Rear oil seals are red.

   CAUTION: Oil seal must be fitted dry. Do not use tool LRT-12-148

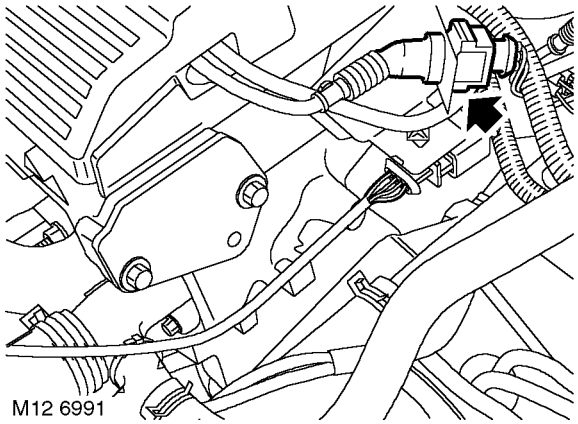
4. Clean cover plate and mating face.
5. Position cover plate, fit bolts and tighten to 6 Nm (4.5 lbf.ft).
6. Connect CMP multiplug and secure in bracket.
7. Fit air cleaner assembly.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
8. Connect battery earth lead.
9. Top-up engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Housing - camshafts - reseal & renew oil seals

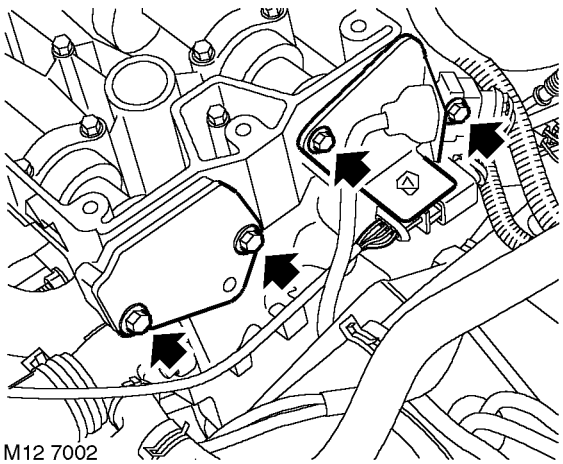
12.13.22

Remove

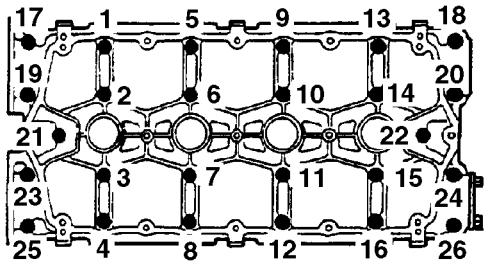
1. Remove camshaft timing belt rear cover.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - rear.
2. Remove camshaft cover.
   ENGINE - K SERIES 1.8, REPAIRS, Gasket - camshaft cover.


M12 6991

3. Release CMP multiplug from bracket and disconnect multiplug.

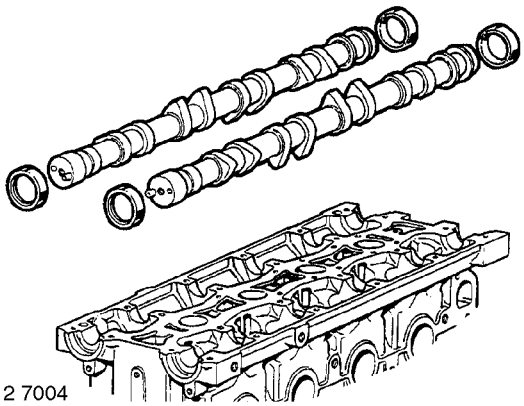

M12 7002

4. Remove 2 bolts securing oil seal cover plate to cylinder head and position aside.
5. Remove 2 bolts securing oil seal cover plate to cylinder head and remove plate.



M12 7003

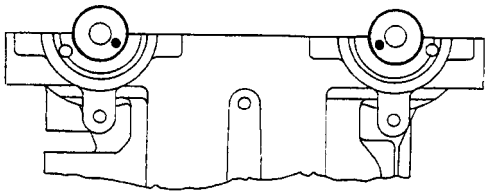
6. Working in the sequence shown, progressively loosen 26 bolts securing camshaft carrier to cylinder head until valve spring pressure is released.
7. Remove camshaft carrier.


M12 7004

8. Suitably identify each camshaft to its fitted position.
9. Remove both camshafts.
10. Remove and discard oil seals from camshafts.

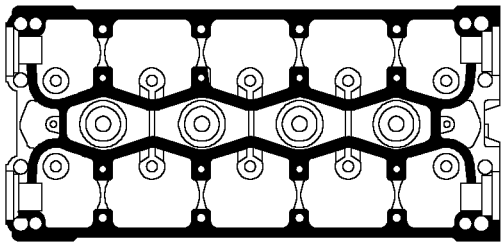
Refit

1. Clean camshafts.
2. Clean mating faces of cylinder head and camshaft carrier.
3. Clean camshaft carrier bolt holes and dowels.
4. Blow out oil ways and lubricate camshaft journals.



M12 7005

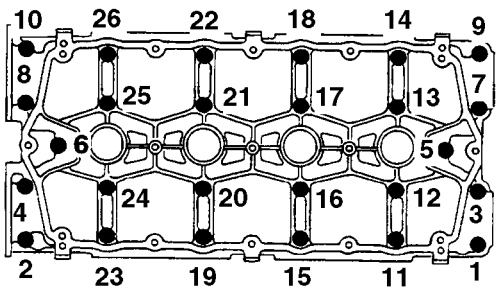
5. Fit camshafts and position inlet camshaft gear drive pin at 4 o'clock and exhaust camshaft gear drive pin at 8 o'clock.



M12 7006

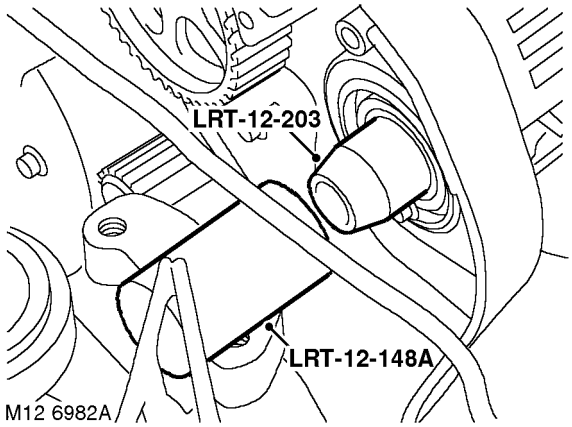
6. Apply continuous thin beads of sealant, Part No. STC 4600, to paths on camshaft carrier as shown. Spread sealant to an even film using a roller.

   CAUTION: Ensure sealant is kept clear of oil feed holes and lubrication grooves. To avoid risk of contamination, fit camshaft carrier immediately after application of sealant.



M12 7007

7. Fit camshaft carrier and progressively tighten bolts, in sequence shown to 10 Nm (7 lbf.ft).
8. Clean camshaft seal locations and running surfaces.



M12 6982A

9. Noting that the front camshaft oil seals are black in colour and the rear oil seals are red, fit new camshaft oil seals using **LRT-12-203** and **LRT– 12-148A**.

   CAUTION: Oil seals must be fitted dry. Do not use tool LRT-12-148.

10. Clean oil seal cover plates and mating faces.
11. Position exhaust camshaft rear oil seal cover plate, fit bolts and tighten to 25 Nm (18 lbf.ft).
12. Position inlet camshaft rear oil seal cover plate, fit bolts and tighten to 6 Nm (4.5 lbf.ft).
13. Connect CMP multiplug and secure to bracket.
14. Fit camshaft cover.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Gasket - camshaft cover.**
15. Fit camshaft timing belt rear cover.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - rear.**
16. Top-up engine oil.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

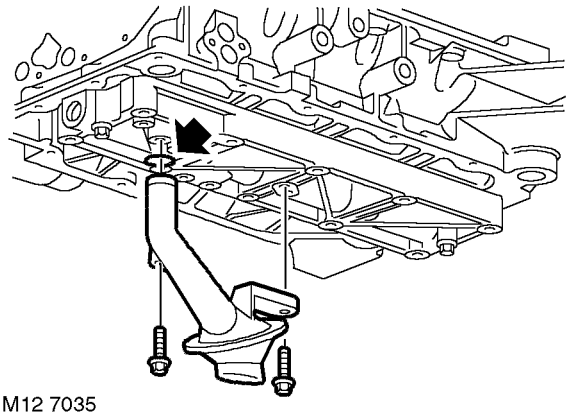
Connecting rod bearings - engine set

12.17.16

Remove

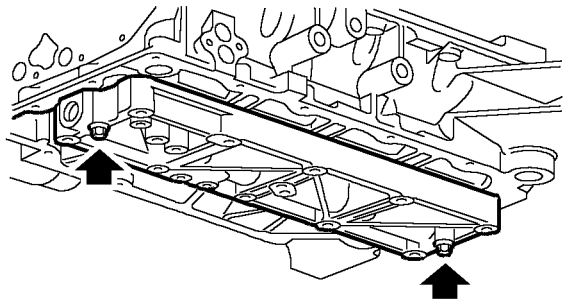
1. Disconnect battery earth lead.
2. Remove cylinder head.
   ENGINE - K SERIES 1.8, REPAIRS, Gasket - cylinder head.
3. Remove engine sump.
   ENGINE - K SERIES 1.8, REPAIRS, Sump - engine reseal.
4. Temporarily remove cylinder liner clamps, **LRT-12-144.** Do not rotate crankshaft with liner clamps removed.

   CAUTION: Ensure that cylinder head bolts are kept in their original fitted order.



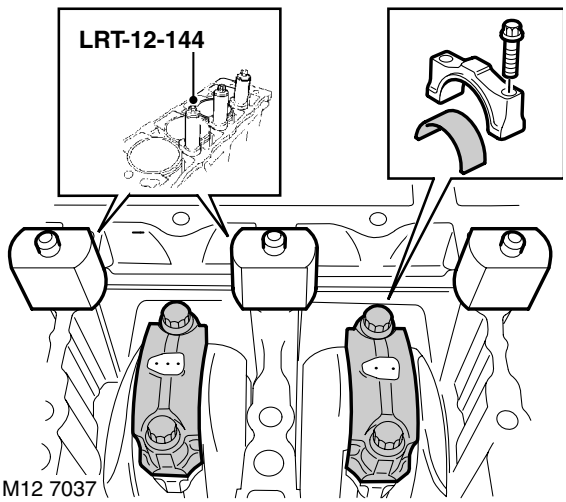
M12 7035

5. Remove 2 bolts securing oil pick-up strainer to oil rail.
6. Remove oil pick-up strainer.
7. Remove and discard 'O' ring from oil pick-up strainer.



M12 7036

8. Remove 2 nuts securing oil rail to bearing ladder and remove oil rail.



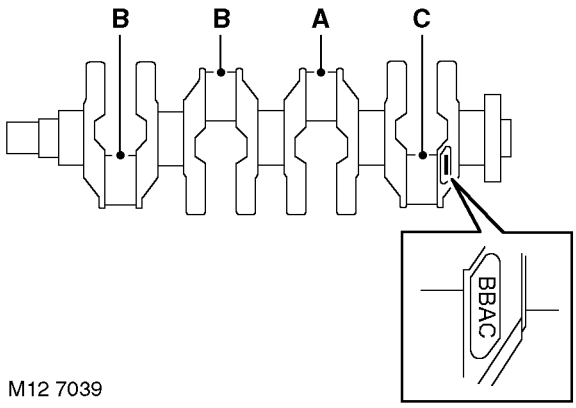
M12 7037

9. Fit cylinder liner clamps. **LRT-12-144,** using the nylon nuts supplied to retain liner clamps. Ensure that the feet of the liner clamps do not protrude over cylinder liner bores.
10. Retain clamps using cylinder head bolts ensuring that bolts used are those originally fitted in that location.
11. Temporarily fit crankshaft timing gear and pulley, fit retaining bolt and washer, lightly tighten bolt.
12. Rotate crankshaft clockwise and bring numbers 2 and 3 pistons to BDC.
13. Make cylinder number reference marks on big-end bearing caps.
14. Remove 4 dowel bolts and 2 big-end bearing caps from numbers 2 and 3 connecting rods, keep dowel bolts and bearing caps in their fitted order.

15. Release connecting rods from crankshaft journals and carefully push pistons to top of cylinder bore. Remove and discard bearing shells from connecting rods and bearing caps.
16. Rotate crankshaft clockwise and bring numbers 1 and 4 pistons to BDC.
17. Make cylinder number reference marks on big-end bearing caps.
18. Remove 4 dowel bolts and 2 big-end bearing caps from numbers 1 and 4 connecting rods. Keep dowel bolts and bearing caps in their fitted order.
19. Release connecting rods from crankshaft journals and carefully push pistons to top of cylinder bore. Remove and discard bearing shells from connecting rods and bearing caps.

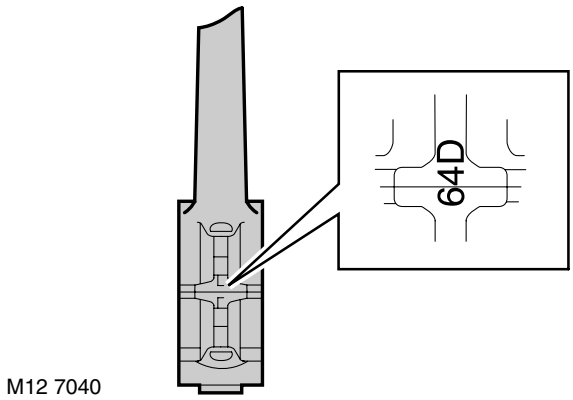
Refit

1. Using a micrometer, measure crankshaft big-end journal diameters, taking 4 measurements around each journal.



M12 7039

2. Record big-end journal code letters from crankshaft rear web. Reading from left to right, the first letter is Number 1 big-end bearing.
   ☞ **GENERAL DATA, Engine – K1.8 Petrol.**



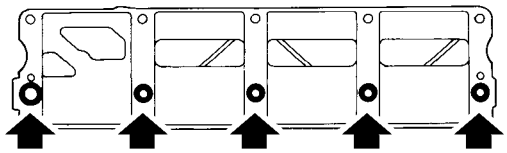
M12 7040

3. Record big-end bearing bore numbers. This will be 5, 6 or 7 located on the connecting rod bearing cap. Select required bearings.
   ☞ **GENERAL DATA, Engine – K1.8 Petrol.**
4. Colour code on edge of bearing denotes bearing thickness as follows: YELLOW = Thin, BLUE = Intermediate, RED = Thick. If two bearing colours are to be used, the thicker bearing must be fitted to the big-end bearing cap.
5. Clean crankshaft journals and bearing locations in connecting rods.
6. Select the appropriate big-end bearing shells.
7. Lubricate connecting rod journals and bearing shells with clean engine oil.
8. Fit bearing shells to connecting rods and caps.
9. Carefully pull connecting rods into place, fit big end caps noting that featherways are on opposite sides and lightly tighten dowel bolts.
10. Tighten big-end bearing dowel bolts to:
    - Stage 1 - 20 Nm (15 lbf.ft)
    - Stage 2 - Further 45°

    Note: Until the cylinder head is fitted, crankshaft will prove difficult to rotate once big-end bolts are tightened.
11. Using feeler gauges, check that end-float of each big-end bearing/connecting rod is between 0.10 (0.004 in) to 0.25 mm (0.010 in).
12. Clean oil rail, oil pick up and mating faces.
13. Blow out oil ways in oil rail and oil pick up.

    CAUTION: A new oil rail must be fitted if a thread is damaged. Thread inserts (Helicoil) are not acceptable.
14. Temporarily remove cylinder liner clamps, **LRT-12-144.**

    CAUTION: Do not rotate crankshaft with liner clamps removed. Ensure that cylinder head bolts used to retain clamps are kept in their original fitted order.



M12 7041

15. Apply continuous beads of sealant, Part Number STC 4600, to paths on oil rail as shown, then spread to an even film using a roller.

CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.

16. Position oil rail to bearing ladder, fit and tighten nuts to 9 Nm (7 lbf.ft).

17. Fit cylinder liner clamps **LRT-12-144** and lightly tighten bolts.

CAUTION: Ensure that bolts used are those originally fitted in that location.

18. Lubricate new 'O' ring with clean engine oil and fit to pick-up strainer.

19. Position oil pick-up strainer, fit and tighten bolts to 12 Nm (9 lbf.ft).

20. Remove crankshaft pulley bolt, washer and pulley.

21. Fit engine oil sump.

☞ **ENGINE - K SERIES 1.8, REPAIRS, Sump - engine reseal.**

22. Fit cylinder head.

☞ **ENGINE - K SERIES 1.8, REPAIRS, Gasket - cylinder head.**

23. Connect battery earth lead.

Pulley - crankshaft

12.21.01

Remove

1. Disconnect battery earth lead.

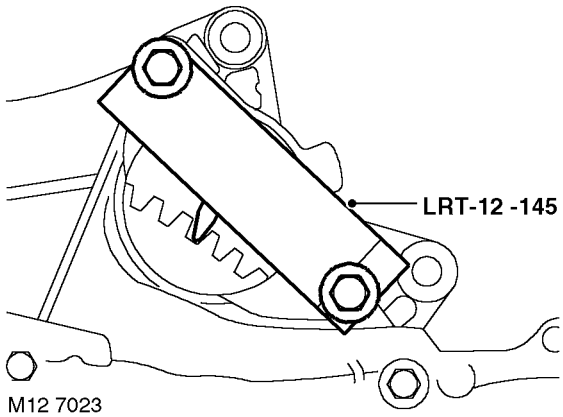
2. Remove ancillary drive belt.

☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - K1.8 without A/C.**

☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - K1.8 with A/C.**

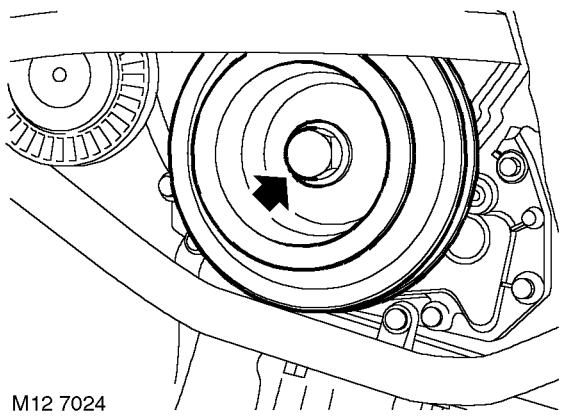
3. Remove starter motor.

☞ **CHARGING AND STARTING, REPAIRS, Starter motor - K1.8.**



M12 7023

4. Position flywheel locking tool, **LRT-12-145,** in starter motor aperture and secure with 2 bolts.



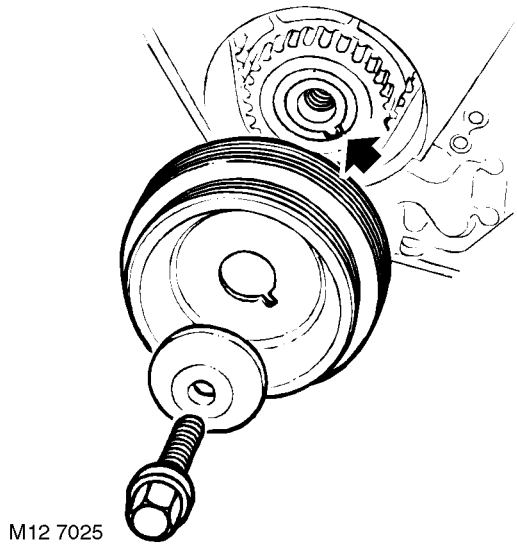
M12 7024

5. Remove bolt securing pulley to crankshaft and collect washer.

6. Remove crankshaft pulley.

Refit

1. Clean crankshaft pulley and mating face.



M12 7025

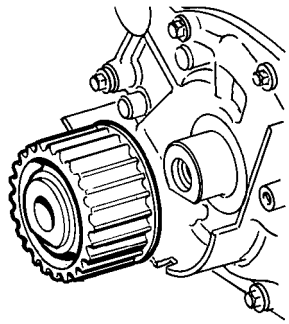
2. Fit crankshaft pulley to crankshaft gear and ensure that the indent on pulley locates over the lug on crankshaft gear.
3. Fit washer and bolt securing crankshaft pulley and tighten to 205 Nm (151 lbf.ft).
4. Remove bolts securing flywheel locking tool, **LRT-12-145** to starter motor aperture and remove locking tool.
5. Fit starter motor.
   ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - K1.8.**
6. Fit ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - K1.8 without A/C.**
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - K1.8 with A/C.**
7. Connect battery earth lead.

Seal - front - crankshaft

12.21.14

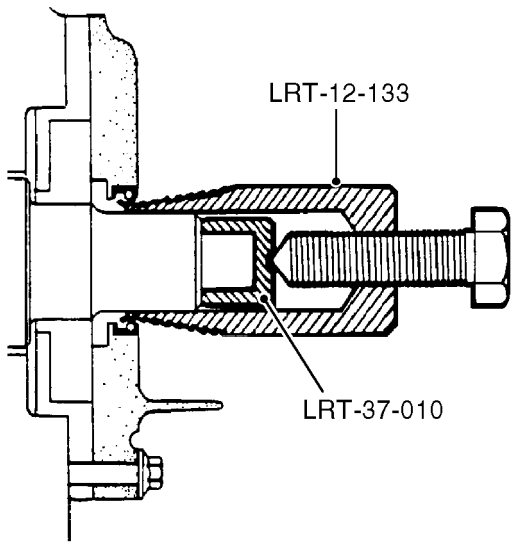
Remove

1. Remove camshaft timing belt.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**



M12 7236

2. Remove crankshaft gear.



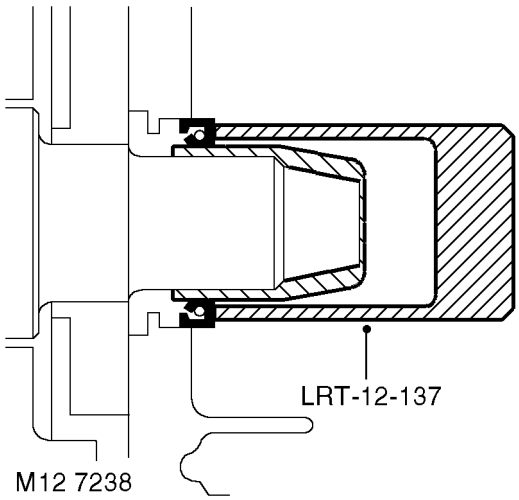
M12 7237

3. Fit thrust button, tool **LRT-37-010** to end of crankshaft.
4. Ensure bore of tool **LRT-12-133** is free from burrs.
5. Screw tool **LRT-12-133** into crankshaft front oil seal.
6. Tighten centre bolt of tool **LRT-12-133** to remove oil seal.

7. Discard oil seal.
8. Remove thrust button from crankshaft.

Refit

1. Using a lint free cloth, thoroughly clean oil seal recess and the running surface on crankshaft pulley.



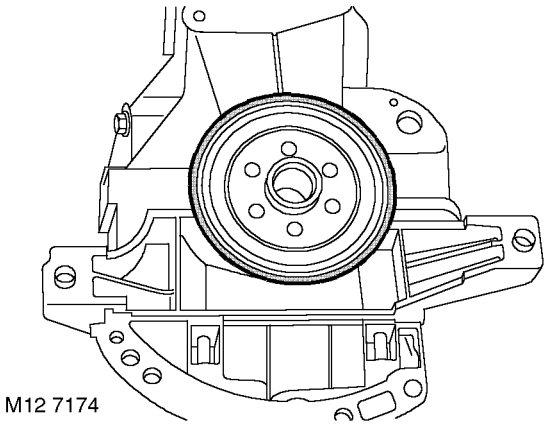
2. Fit oil seal guide from seal kit, over end of crankshaft.
3. Fit oil seal using tool **LRT-12-137.**
   CAUTION: Oil seal must be fitted dry.
4. Remove oil seal guide from crankshaft.
5. Clean crankshaft timing gear.
6. Fit gear to crankshaft.
7. Fit camshaft timing belt.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**
8. Check and top-up engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Seal - rear - crankshaft

12.21.20

Remove

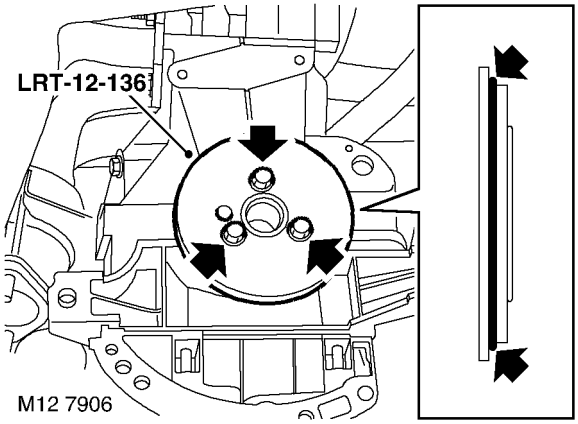
1. Remove flywheel.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Flywheel.**



2. Using a burr free, flat ended screwdriver, ease crankshaft rear oil seal from cylinder block; discard seal.
   CAUTION: Take care not to mark sealing surfaces on crankshaft.

Refit

1. Remove all traces of oil and sealant from cylinder block, oil seal recess and oil seal running surface on crankshaft.



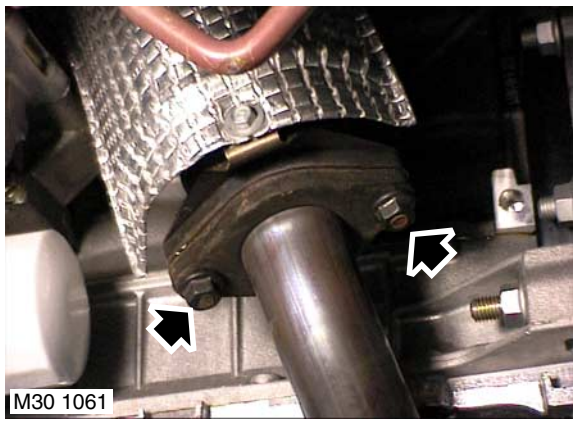
2. Apply a 1.5 mm (0.06 in) wide continuous bead of sealant, Part No. STC 50550 to replacement oil seal as shown.
3. Immediately position oil seal to cylinder block.
   CAUTION: Oil seal must be fitted dry.
4. Fit oil seal replacer, tool **LRT-12-136** to crankshaft, retain tool using 3 slave bolts.
5. Tighten bolts progressively to press oil seal into cylinder block.
6. Leave tool **LRT-12-136** in position for one minute.
7. Remove tool **LRT-12-136**.
   CAUTION: Allow sealant to cure for 30 minutes before rotating crankshaft or topping-up engine oil.
8. Fit flywheel.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Flywheel.**
9. Check and top-up engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Gasket - cylinder head

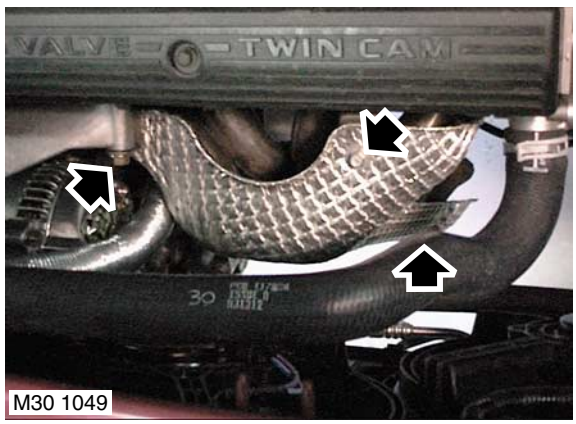
12.29.02

Remove

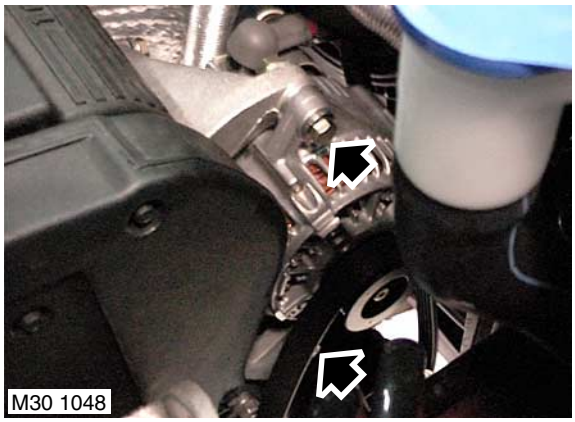
1. Disconnect battery earth lead.
2. Remove camshaft timing belt rear cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - rear.**



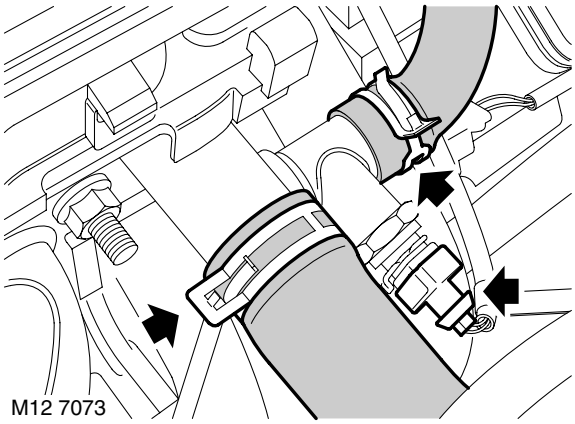
3. Remove 2 nuts securing exhaust front pipe to exhaust manifold.
4. Release exhaust front pipe from exhaust manifold and collect gasket.



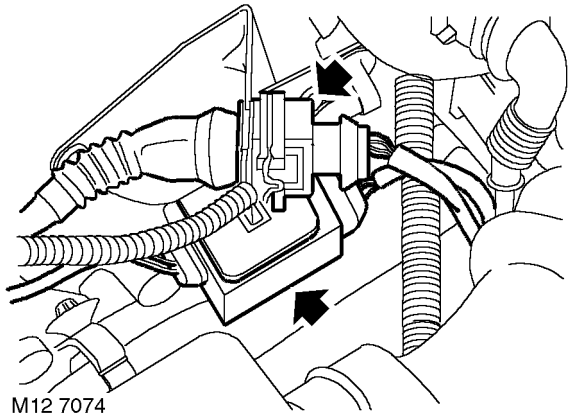
5. **Models with A/C:** Remove nut and 2 bolts securing exhaust manifold heat shield.



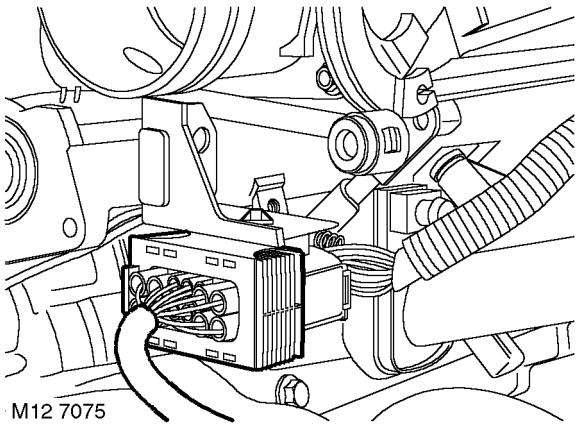
6. **Models with A/C:** Remove top bolt securing alternator and loosen lower bolt. Position alternator forward to clear heat shield.
7. **Models with A/C:** Remove heat shield.
8. Drain cooling system.
   ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**



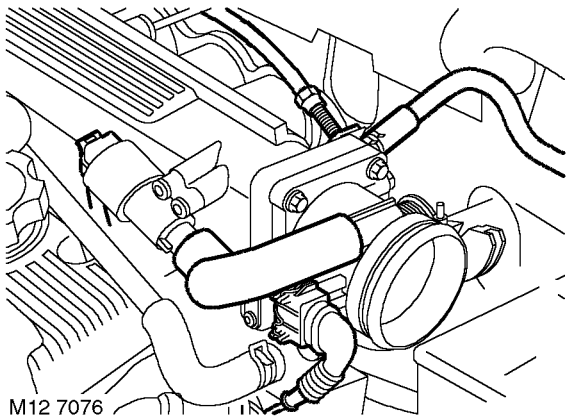
9. Release clip and disconnect top hose from coolant elbow.
10. Release clip and disconnect coolant hose from coolant outlet elbow.
11. Disconnect multiplug from ECT sensor.
12. Remove camshaft cover.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Gasket - camshaft cover.**



13. Release CMP sensor multiplug from bracket at rear of cylinder head.
14. Release and disconnect HO2S multiplug.



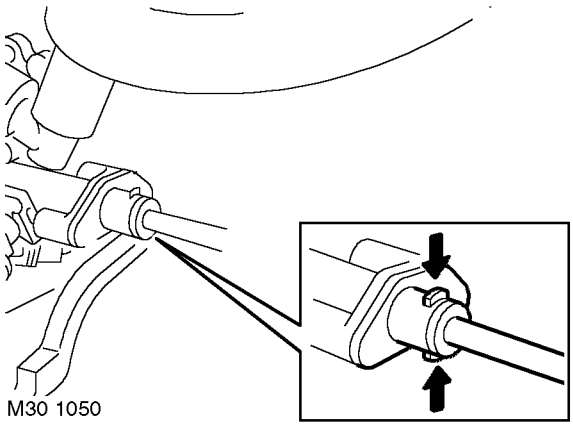
15. Disconnect multiplug from injector harness.



16. Disconnect multiplug from TP sensor.
17. Disconnect multiplug from IACV.
18. Release air bypass hose from IACV and remove from throttle body.

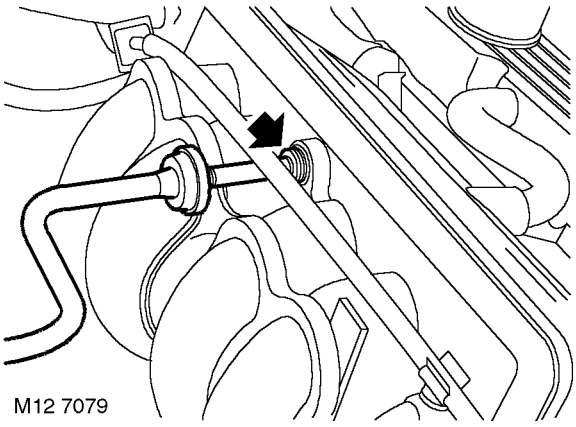
19. Release IACV harness clip from bracket under throttle housing.
20. Release clip and disconnect purge hose from inlet manifold.
21. Release throttle cable adjusting nut from abutment bracket.
22. Release throttle cable from throttle cam.
23. Position absorbent cloth to collect fuel spillage.

WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.

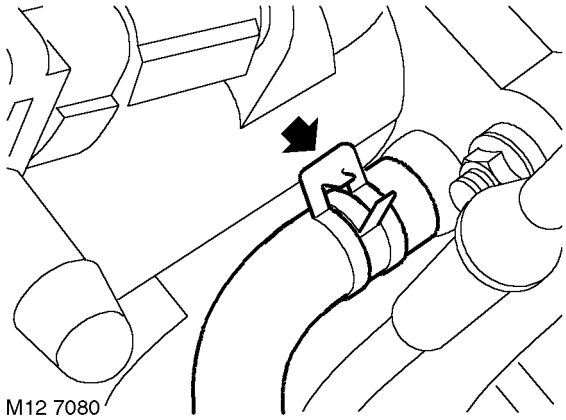

M30 1050

24. Disconnect fuel feed hose from fuel rail.

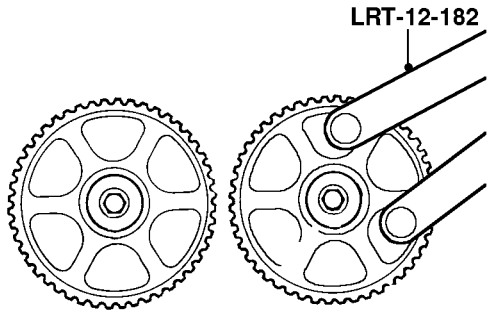
CAUTION: Always fit plugs to open connections to prevent contamination.

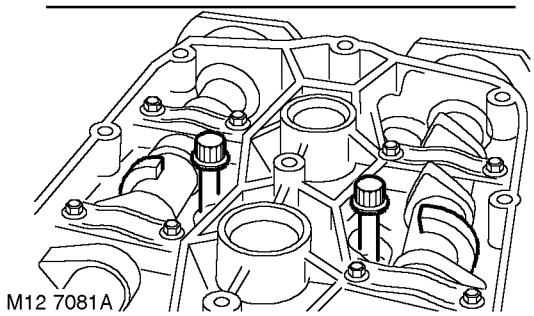

M12 7079

25. Depress plastic collar on quick release connector and disconnect brake servo vacuum hose from inlet manifold.

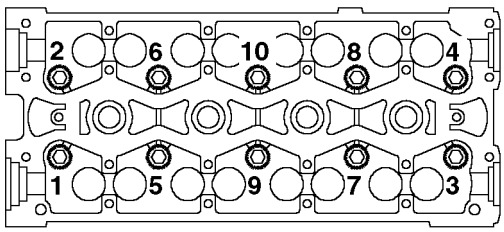

M12 7080

26. Release clip and disconnect expansion tank hose from inlet manifold.
27. Temporarily fit timing gears to camshafts, fit but do not fully tighten bolts.




M12 7081A

28. Using tool **LRT-12-182,** rotate camshafts to gain access to cylinder head bolts beneath camshaft reluctor rings.



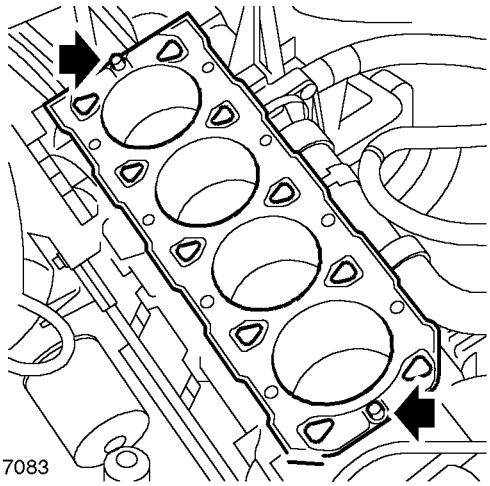
M12 7082

29. Working in the sequence shown, progressively loosen cylinder head bolts.

30. Remove cylinder head bolts and store in fitted order.

31. With assistance, remove cylinder head assembly.

CAUTION: Take care not to damage HO2S when removing cylinder head.

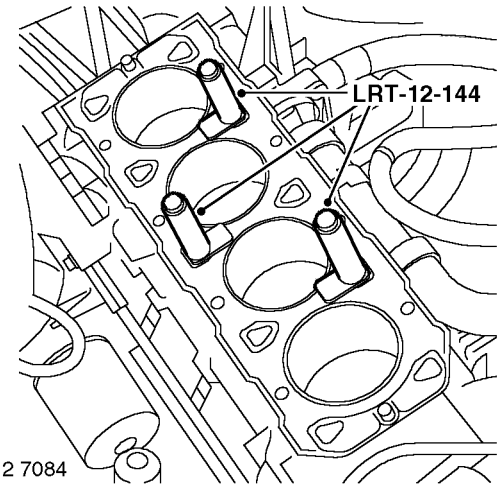


M12 7083

32. Remove and discard cylinder head gasket.

CAUTION: Removal of cylinder head bolts will result in a 'tightening up' of the crankshaft. Rotation of the crankshaft must, therefore, be kept to a minimum. Do not rotate crankshaft until cylinder liner clamps LRT-12-144 are fitted.

33. Identify type of location dowels fitted, nylon dowels must be removed and replaced with steel dowels. Steel dowels need not be removed.



M12 7084

34. Fit cylinder liner clamps, **LRT-12-144** to cylinder block and secure with cylinder head bolts. Ensure that feet of clamps do not protrude over cylinder liner bores.

CAUTION: Ensure that bolts used are those originally fitted in that location.

Refit

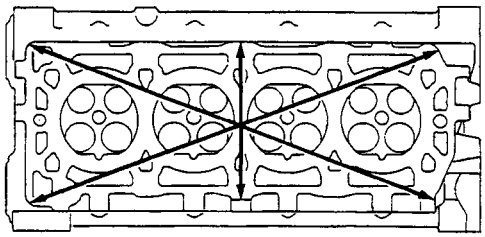
1. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.

CAUTION: Keep cylinder head bolts in their original fitted order. Do not rotate crankshaft with clamps removed. Take great care that, with clamps removed, cylinder liners are not disturbed.

2. Clean mating faces of cylinder head and cylinder block.

3. Ensure coolant and oil passages are clean.

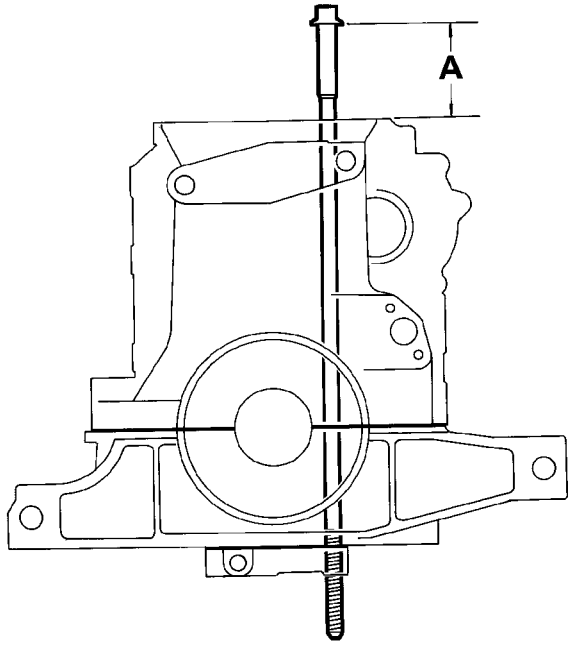
4. Check cylinder head and mating face of cylinder block for damage, pay particular attention to gasket face of cylinder head.



M12 7085

5. Check cylinder head face for warping, across centre and from corner to corner as shown.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**
Note: Cylinder heads may be refaced provided that head height is kept within specified limits.

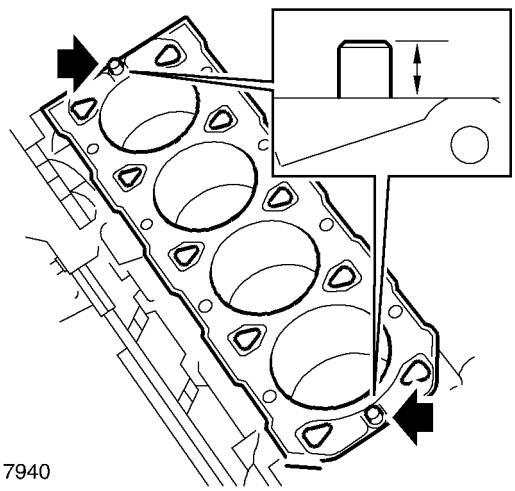
6. Thoroughly clean cylinder head bolts, wipe dry then lightly oil bolt threads and underside of heads.



M12 7898

7. Carefully enter cylinder head bolts in their original fitted order, DO NOT DROP. Tighten each bolt BY HAND into oil rail.
8. Measure distance from the cylinder block top face to underside of bolt head **'A'** in illustration:
- 97 mm (3.8 in) - Bolt may be re-used
- Over 97 mm (3.8 in) - New bolt must be fitted

9. If nylon locating dowels were removed, clean dowel holes and fit new steel dowels.

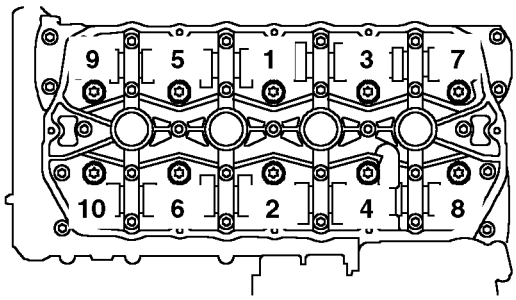


M12 7940

10. Check that fitted height of dowels is between 10 to 11 mm (0.40 to 0.43 in).

11. Temporarily fit camshaft gears to their respective camshafts, fit and lightly tighten bolts.
12. Fit new cylinder head gasket onto cylinder block with the word 'TOP' uppermost.
CAUTION: Gasket must be fitted dry.

13. Using assistance, fit cylinder head and locate onto dowels.
14. Using tool **LRT-12-182**, rotate camshafts to gain access to cylinder head bolts beneath camshaft reluctor rings.
15. Carefully enter cylinder head bolts in their original fitted order, DO NOT DROP. Tighten bolts into place by hand.



M12 7086

16. Working in the sequence shown, progressively tighten the cylinder head bolts to:
- Stage 1 - 20 Nm (15 lbf.ft)
- Further 180°
- Further 180°

CAUTION: Do not tighten bolts 360° in one operation.

Note: Use tool LRT-12-182 and rotate gears as necessary to gain access to cylinder head bolts.

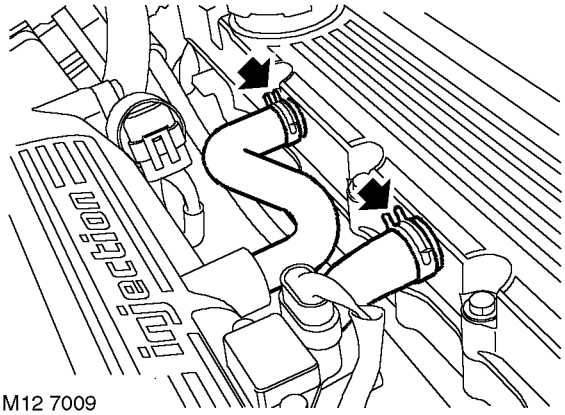
17. On completion of bolt tightening sequence, position camshafts with inlet camshaft gear drive pin at 4 o'clock and exhaust camshaft gear drive pin at 8 o'clock.
18. Restrain gears using tool **LRT-12-182** and remove bolts and washers securing gears to camshafts.
19. Remove camshaft gears.
20. Connect expansion tank hose and secure with clip.
21. Connect brake servo vacuum hose to inlet manifold.
22. Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket.
23. Connect purge hose to inlet manifold and secure with clip.
24. Connect fuel feed hose to fuel rail.
25. Connect multiplug to IACV and secure harness clip.
26. Fit air bypass hose to IACV and connect to throttle body.
27. Connect multiplug to ECT sensor.
28. Connect multiplug to TP sensor.
29. Connect multiplug to injector harness.
30. Connect HO2S multiplug and secure to support bracket.
31. Fit camshaft cover.
☞ **ENGINE - K SERIES 1.8, REPAIRS, Gasket - camshaft cover.**
32. Connect coolant hoses to elbow and secure with clips.
33. **Models with A/C:** Fit exhaust manifold heat shield.
34. **Models with A/C:** Align alternator to bracket and fit bolt. Tighten both alternator bolts to 45 Nm (33 lbf.ft).
35. **Models with A/C:** Locate heat shield to alternator bracket stud, fit nut and bolts. Tighten nut to 25 Nm (18 lbf.ft) and bolts to 10 Nm (7.5 lbf.ft).
36. Clean exhaust front pipe and exhaust manifold mating faces.
37. Using new gasket, connect front pipe to manifold, fit nuts and tighten to 60 Nm (44 lbf.ft).
38. Fit camshaft timing belt rear cover.
☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - rear.**
39. Adjust throttle cable.
☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - K1.8.**
40. Connect battery earth lead.
41. Refill cooling system.
☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**
42. Top-up engine oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Gasket - camshaft cover

12.29.40

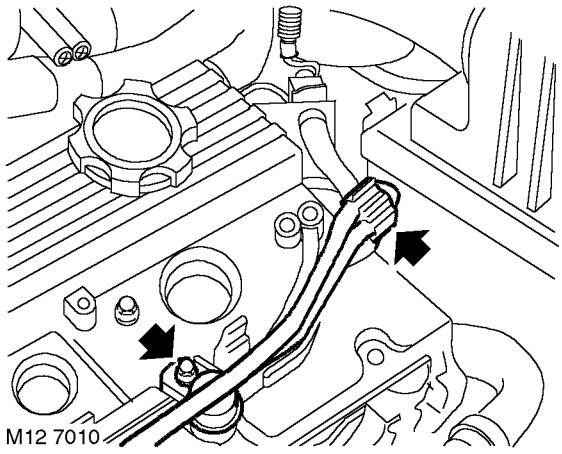
Remove

1. Disconnect battery earth lead.



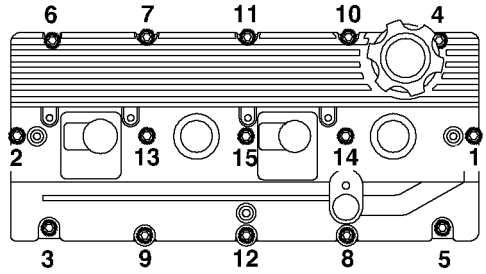
M12 7009

2. Release 2 clips and disconnect breather hoses from camshaft cover.
3. Remove ignition coils.
   ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Ignition coil.
4. Remove any debris from spark plug recesses.



M12 7010

5. Release coil and CMP sensor harness clip from camshaft cover.
6. Remove bolt securing CMP sensor to cover, release sensor and position aside.

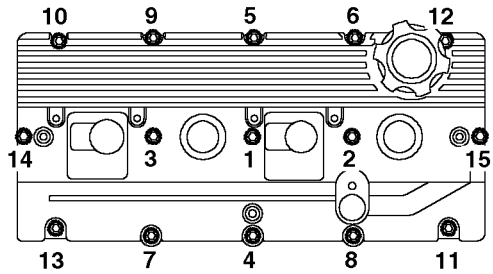


M12 7899

7. Using sequence shown, progressively loosen and remove 15 bolts securing camshaft cover.
8. Remove camshaft cover and discard gasket.

Refit

1. Clean mating surfaces of camshaft cover and carrier.
2. Clean inside of camshaft cover. If necessary, wash oil separator elements in solvent and blow dry.
3. Fit camshaft cover gasket.
   Note: Modified gasket having a 'crimped' edge should be fitted.



M127012

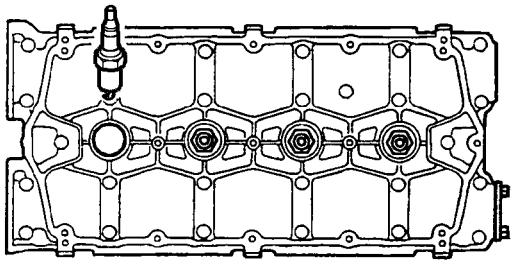
4. Position camshaft cover, fit and tighten bolts progressively in the sequence shown to 8 Nm (6 lbf.ft).
5. Clean CMP sensor and mating face. Fit sensor, fit bolt and tighten to 8 Nm (6 lbf.ft).
6. Secure harness clip to cover.
7. Fit ignition coils.
   ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Ignition coil.
8. Connect breather hoses and secure with clips.
9. Connect battery earth lead.

Valve stem oil seal

12.30.26

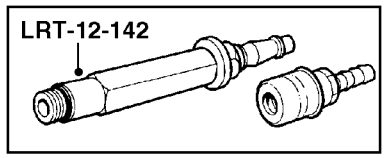
Remove

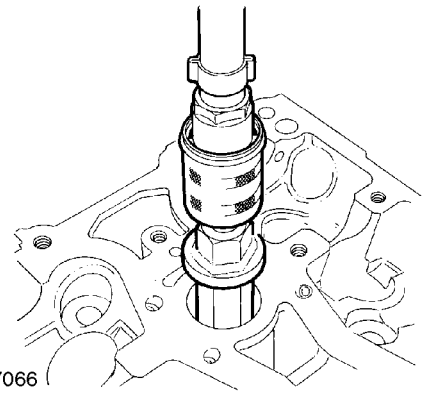
1. Disconnect battery earth lead.
2. Remove camshafts.
   ENGINE - K SERIES 1.8, REPAIRS, Housing - camshafts - reseal & renew oil seals.
3. Using a stick magnet, remove tappet from valve to be worked on.
   CAUTION: Store tappet(s) upright and in their fitted order.



M12 7065

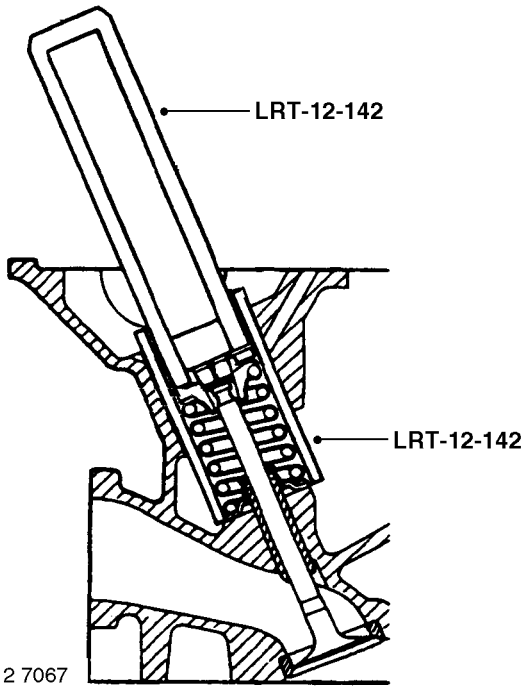
4. Using a 16 mm spark plug socket, remove spark plug.





M12 7066

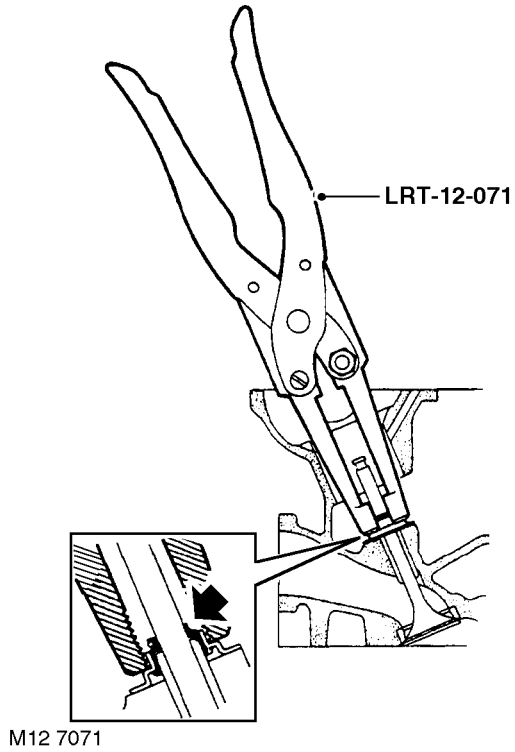
5. Fit and tighten air line adapter tool **LRT-12-142** into spark plug hole.
6. Connect an airline to adaptor and apply air pressure.



M12 7067

7. Fit sleeve part of tool **LRT-12-142** over valve spring.
8. Fit tool **LRT-12-142** to valve spring cap and strike head of tool firmly with hammer to release valve spring collets.

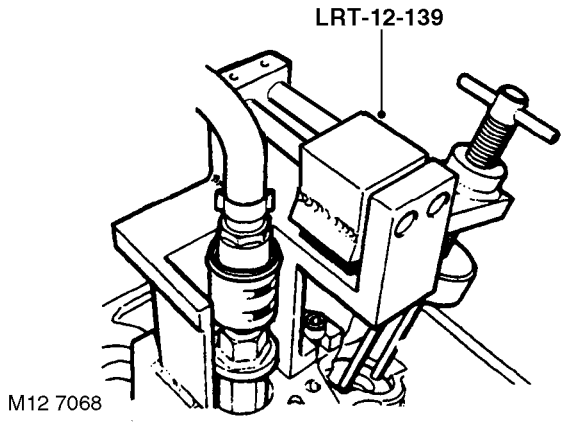
9. Remove collets from magnetic end of tool.
10. Remove sleeve.
11. Remove valve spring cap and valve spring.



12. Remove valve stem oil seal using **LRT-12-071.** Discard stem seal.

Refit

1. Lubricate new valve stem oil seal with engine oil.
2. Using tool **LRT-12-071** fit new valve stem oil seal.
3. Fit valve spring and cap.



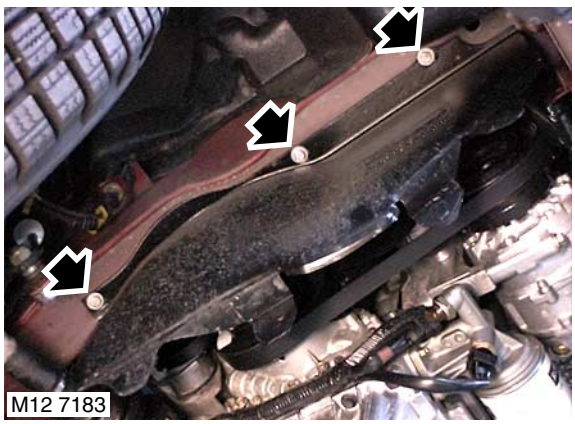
4. Assemble tool **LRT-12-139** over valve.
5. Locate valve spring cap with compressor tool **LRT-12-139.**
6. Compress valve spring until valve stem collet groove is level with top face of spring cap.
7. Attach collets to end of a small flat screwdriver with grease and locate collets in valve stem groove.
8. Release valve spring compressor ensuring collets are correctly located in valve spring cap.
9. Remove tool **LRT-12-139.**
10. Clean tappet and tappet bore.
11. Lubricate tappet and tappet bore with clean engine oil.
12. Fit tappet.
13. Disconnect air line and remove adapter tool **LRT-12-142.**
14. Clean spark plug and set gap to 1.00 mm.
15. Fit spark plug and tighten to 25 Nm (18 lbf.ft).
16. Fit camshafts.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Housing - camshafts - reseal & renew oil seals.**
17. Connect battery earth lead.

Engine and gearbox

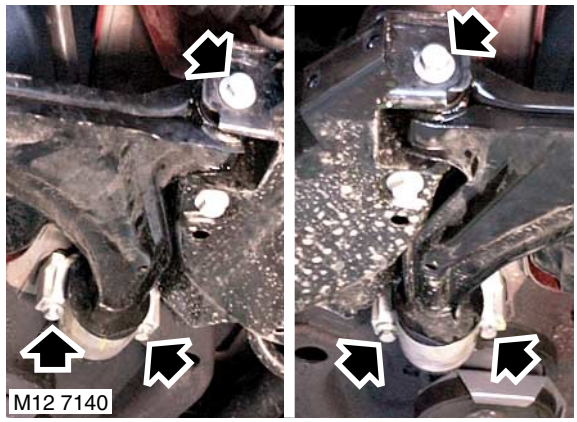
12.37.01.99

Remove

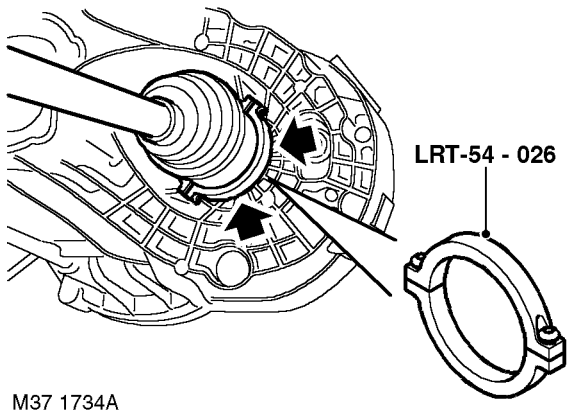
1. Disconnect battery earth lead.
2. Remove bonnet.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bonnet.**
3. Drain cooling system.
   ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**
4. Drain gearbox oil.
   ☞ **MANUAL GEARBOX - PG1, ADJUSTMENTS, Gearbox oil - drain and refill.**
5. Drain fluid from IRD.
   ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
6. If required, drain engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**


M12 7183

7. Remove 6 bolts securing RH and LH front splash shields and remove shields.

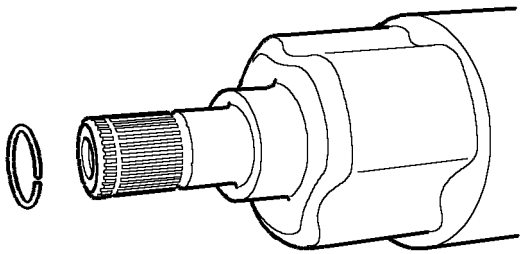

M12 7140

8. Loosen nuts securing lower arm rear mountings.
9. Remove 2 bolts securing each lower arm rear bush housing.
10. Remove lower arm pivot bush bolts.
11. Release lower arms from beam.



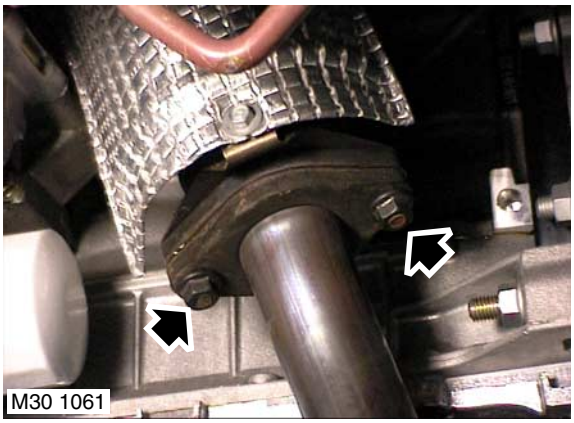
M37 1734A

12. Secure **LRT-54-026,** to inner joint. Using suitable lever, release drive shafts from IRD unit and gearbox.

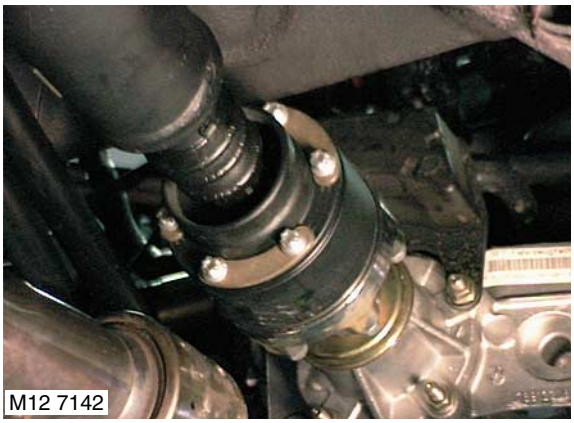


M41 7695

13. Remove and discard circlips from drive shafts.



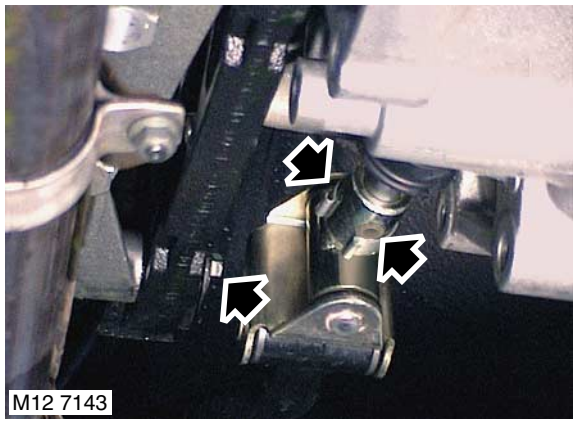
14. Remove 2 nuts securing exhaust front pipe to exhaust manifold, release exhaust from manifold and discard gasket.



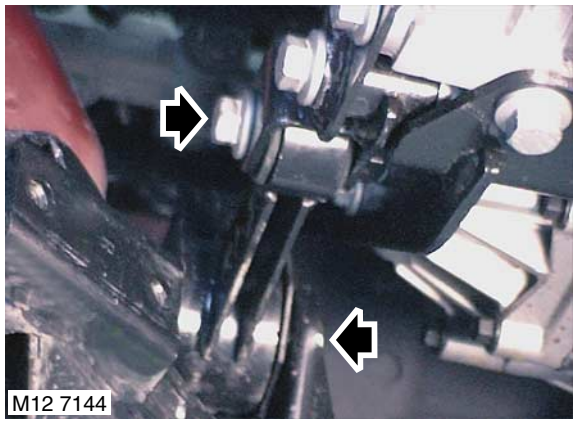
15. Reference mark front propeller shaft for reassembly.
16. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.

17. Release propeller shaft from IRD drive flange and tie shaft aside.

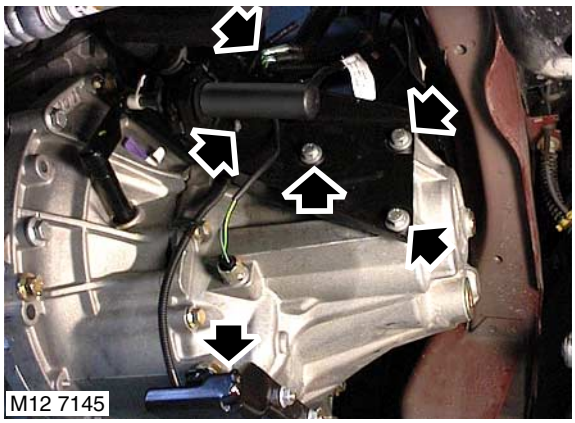
CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.



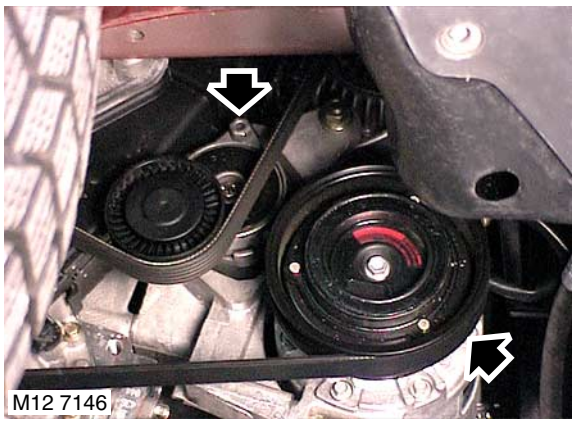
18. Release gear change rod roll pin cover, remove and discard roll pin.
19. Release gear change rod from gearbox selector shaft.
20. Remove bolt securing gear change steady rod to mounting bracket on IRD unit, release steady rod from bracket.



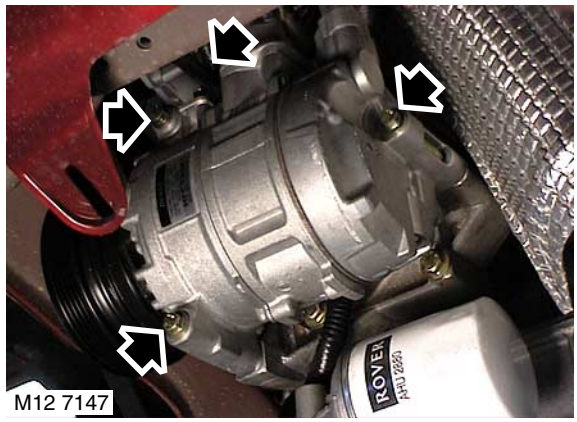
21. Remove bolt securing lower engine steady to sump mounting bracket.
22. Loosen bolt securing lower engine steady to rear beam and pivot engine steady away from sump mounting bracket.



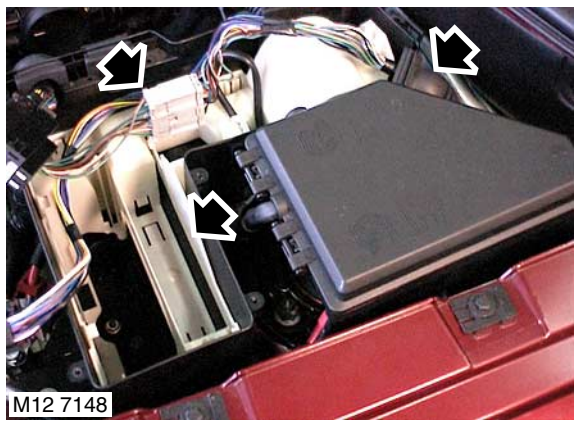
23. Disconnect reverse light switch connectors.
24. Disconnect multiplug from 1st gear switch.
25. Release clip securing 1st gear switch harness to clutch slave cylinder bracket.
26. Remove 3 bolts securing clutch slave cylinder mounting bracket to gearbox and tie bracket assembly aside.



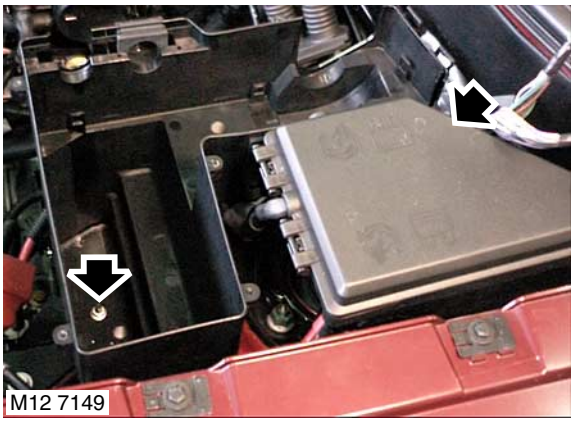
27. **Models with A/C:** Fit a 13 mm spanner to hexagon on ancillary timing belt tensioner and rotate fully clockwise to release tension on timing belt.
28. **Models with A/C:** Hold tensioner in this position, fit a suitable pin, not exceeding 3 mm in diameter, through centre of hexagon into tensioner backplate. Release timing belt from A/C compressor pulley.



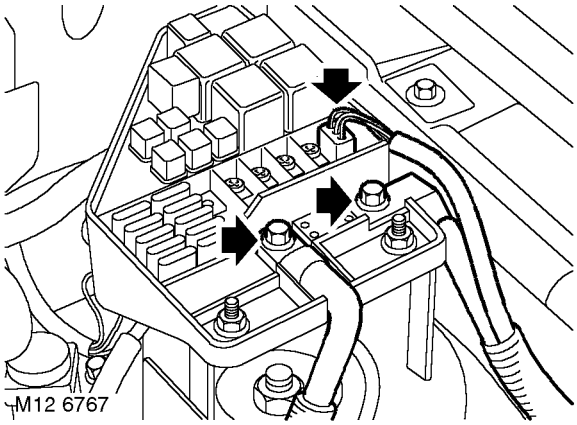
29. **Models with A/C:** Disconnect multiplug from A/C compressor.
30. **Models with A/C:** Remove 3 bolts securing A/C compressor to joint alternator/compressor mounting bracket, release compressor from bracket and tie aside.
31. Lower vehicle on ramp.
32. Remove air cleaner assembly.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
33. Remove battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
34. Remove engine ECM.
    ☞ **ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Engine control module (ECM) - combined ignition & fuel.**



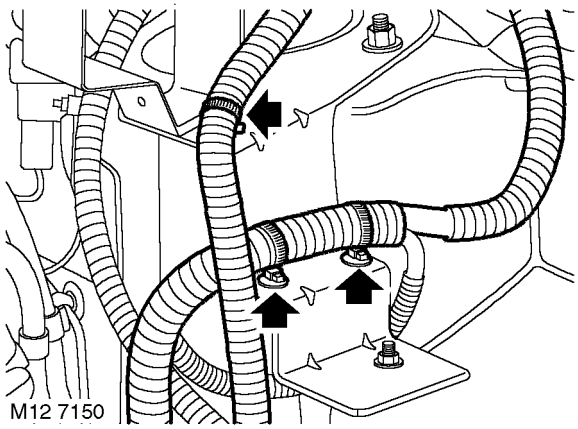
35. Disconnect engine harness multiplug in 'E' box.
36. Release air duct and harness rubber sleeve from 'E' box.
37. Release 4 clips securing carrier in 'E' box, remove carrier from 'E' box and position aside.



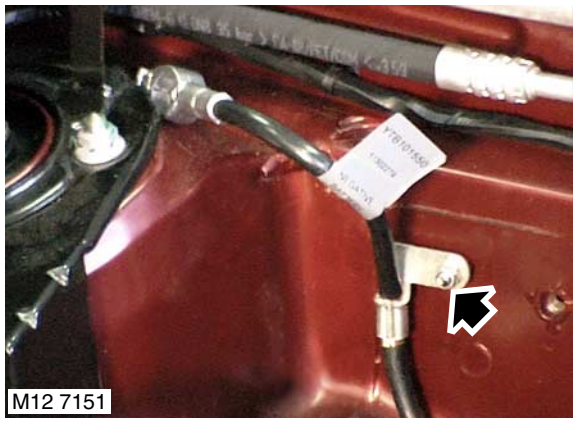
38. Remove nut, release retainer and remove 'E' box.
39. Remove engine compartment fuse box cover.



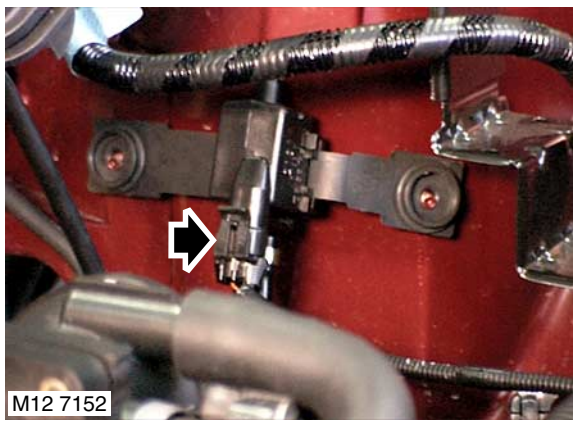
40. Remove 2 bolts securing battery and starter lead to fuse box.
41. Disconnect multiplug from fuse box.



42. Release clip securing battery lead to 'E' box mounting bracket.
43. Release 2 clips securing starter lead harness to 'E' box mounting bracket.



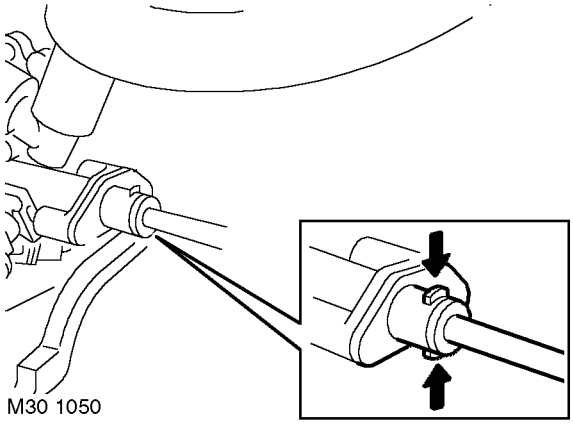
44. Remove nut securing engine earth lead to body and release earth lead from stud.



45. Disconnect multiplug from purge control valve.

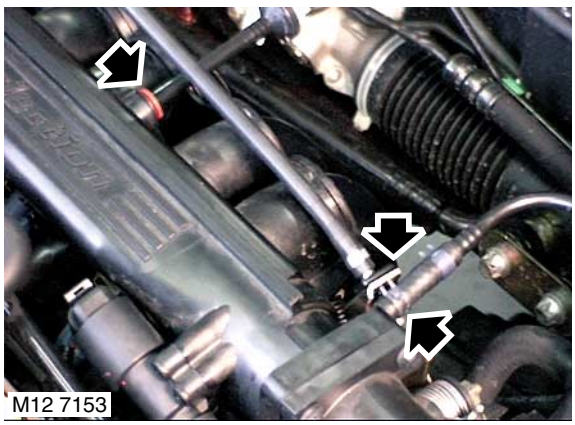
46. Position absorbent cloth around fuel feed pipe connection to collect spillage.

WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



47. Disconnect fuel feed hose from fuel rail.

CAUTION: Always fit plugs to open connections to prevent contamination.

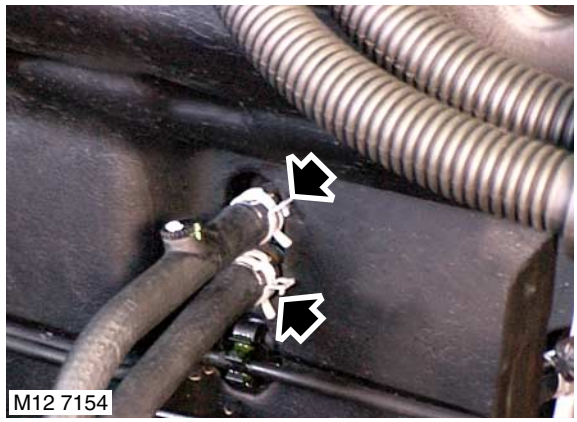


48. Release clip and disconnect purge control hose from inlet manifold.

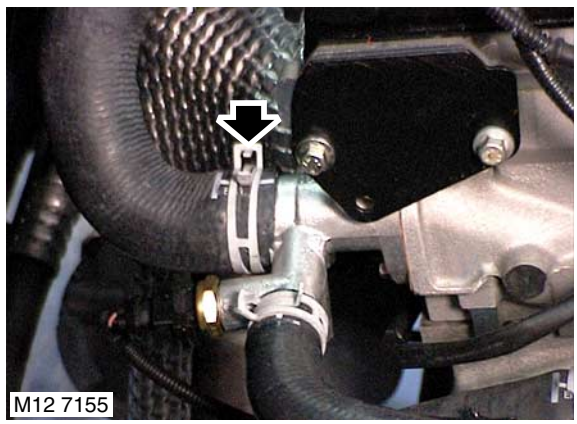
49. Release throttle cable adjusting nut from abutment bracket.

50. Release throttle cable from throttle cam.

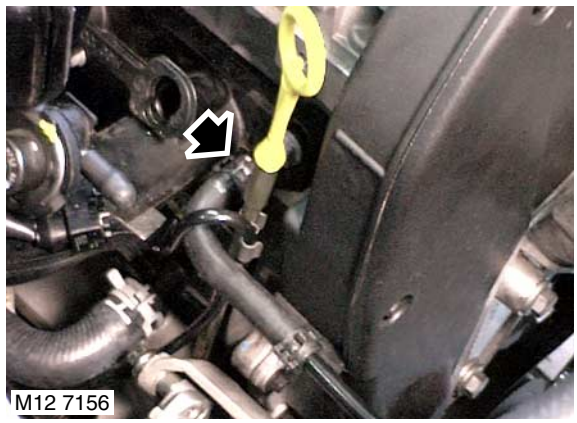
51. Depress plastic collar and disconnect brake servo hose from inlet manifold.



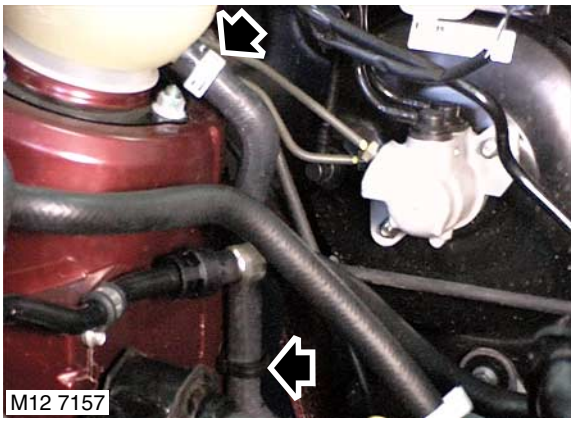
52. Release clips and disconnect heater feed and return hoses.



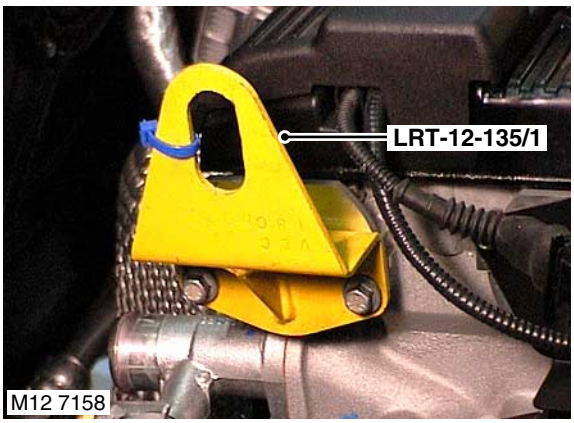
53. Release clip and disconnect top hose from coolant elbow.



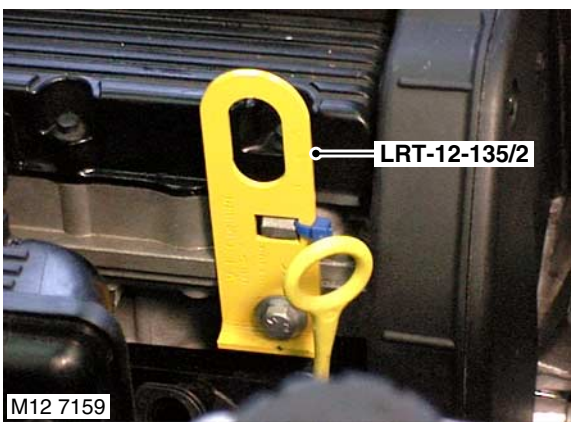
54. Release clip and disconnect expansion tank hose from inlet manifold.



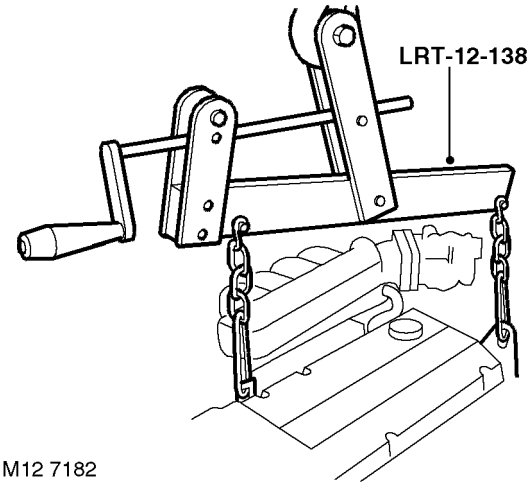
55. Release clip and disconnect hose from underside of expansion tank.
56. Release expansion tank hose from clip on body.



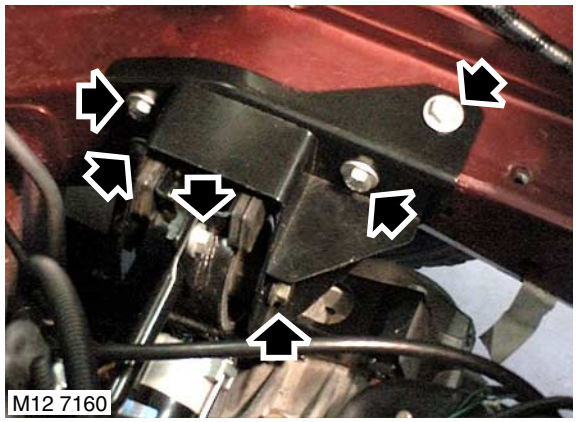
57. Remove 2 bolts securing oil seal cover plate to cylinder head and remove plate.
58. Fit lifting bracket **LRT-12-135/1** in place of cover plate, fit and tighten bolts.



59. Fit lifting bracket **LRT-12-135/2** to front of cylinder head and secure with bolt.

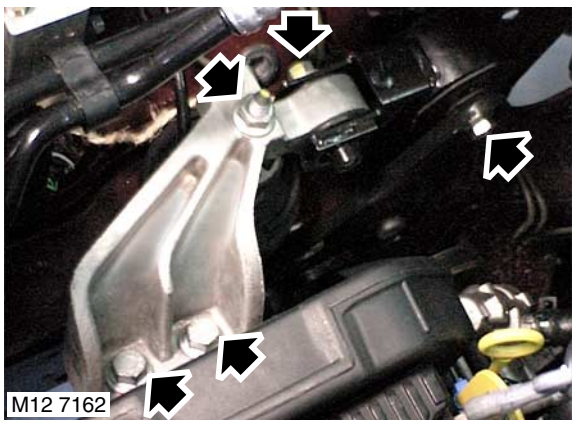


60. Using a hoist, connect adjustable lifting bracket, **LRT-12-138** to engine.

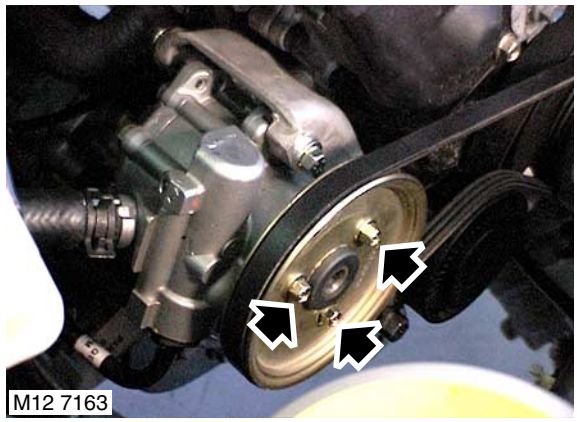


61. Remove bolt securing steady bar to LH engine mounting.
62. Loosen through bolt securing LH engine mounting to body mounting bracket.
63. Remove 4 bolts securing LH engine mounting bracket to body.
64. Remove through bolt securing LH engine mounting to mounting bracket and remove bracket.

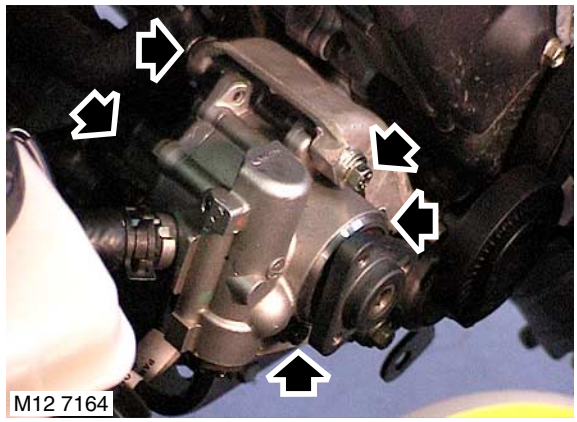
65. Release PAS reservoir from mounting bracket and position aside.



66. Remove bolt securing upper RH engine steady to top arm.
67. Loosen bolt securing upper RH engine steady to body, pivot engine steady away from top arm.
68. Remove nut securing top arm to RH hydramount, remove 2 bolts securing top arm to engine and remove top arm.
69. Raise engine and gearbox sufficient to gain access to PAS pump.



70. Loosen 3 PAS pump pulley bolts.
71. Using a 13 mm spanner, rotate PAS timing belt tensioner and insert a suitable 4 mm diameter pin through centre of hexagon into tensioner backplate. Remove PAS timing belt.
72. Remove 3 bolts securing PAS pump pulley and remove pulley.



73. Remove 5 bolts securing PAS pump to mounting bracket, release PAS pump and tie aside.
74. With assistance, manoeuvre and raise engine and gearbox from vehicle.

Refit

1. Connect hoist to adjustable lifting bracket, **LRT-12-138** on engine.
2. With assistance, manoeuvre and lower engine and gearbox into engine compartment sufficient to fit PAS pump.
3. Position PAS pump to mounting bracket, fit and tighten bolts to 25 Nm (18 lbf.ft).
4. Position pulley to PAS pump, fit and tighten bolts to 10 Nm (7.5 lbf.ft).
5. Position PAS timing belt to pulleys, relieve tensioner pressure, remove retaining pin and release tensioner.

6. Lower engine and gearbox to position mountings.
7. Position mounting bracket to LH engine mounting, fit through bolt but do not tighten at this stage.
8. Align LH engine mounting bracket to body, fit and tighten bolts to 45 Nm (33 lbf.ft).
9. Tighten through bolt securing LH engine mounting to 80 Nm (59 lbf.ft).
10. Manoeuvre engine to position top arm.
11. Position top arm to RH hydramount and engine, fit bolts and tighten to 170 Nm (125 lbf.ft), fit nut and tighten to 85 Nm.
12. Lower hoist, disconnect and remove lifting bracket, **LRT-12-138.**
13. Position upper RH engine steady to top arm, fit and tighten bolt to 80 Nm (59 lbf.ft).
14. Tighten bolt securing upper RH engine steady to body to 80 Nm (59 lbf.ft).
15. Secure PAS fluid reservoir in mounting bracket.
16. Remove bolt securing engine lifting bracket, **LRT-12-135/2** to front of cylinder head and remove bracket.
17. Remove 2 bolts securing engine lifting bracket, **LRT-12-135/1** to rear of cylinder head and remove bracket.
18. Clean cover plate and mating face.
19. Position cover plate, fit bolts and tighten to 25 Nm (18 lbf.ft).
20. Connect hose to underside of expansion tank and secure with clip. Secure hose in clip on body.
21. Connect expansion tank hose to inlet manifold and secure clip.
22. Connect top hose to coolant elbow and secure with clip.
23. Connect heater feed and return hoses and secure with clips.
24. Connect brake servo vacuum hose to inlet manifold.
25. Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket.
26. Connect fuel feed hose to fuel rail.
27. Connect multiplug to purge control valve .
28. Position engine earth lead to body, fit and tighten nut to 9 Nm (7 lbf.ft).
29. Position battery lead to 'E' box mounting bracket and secure with clip.
30. Position battery and starter motor lead to underbonnet fuse box, fit and tighten bolts to 8 Nm (6 lbf.ft).
31. Secure starter lead harness clips in 'E' box mounting bracket.
32. Connect multiplug to fusebox.
33. Fit engine compartment fuse box cover.
34. Position 'E' box, secure in retaining clip, fit and tighten nut to 9 Nm (7 lbf.ft).
35. Position carrier in 'E' box and secure with clips.
36. Position and secure air duct and harness rubber sleeve in 'E' box.
37. Connect engine harness multiplug in 'E' box.
38. Fit engine ECM.
    ☞ **ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Engine control module (ECM) - combined ignition & fuel.**
39. Raise vehicle on a ramp.
40. **Models with A/C:** Position A/C compressor to mounting bracket, fit and tighten bolts to 25 Nm (18 lbf.ft).
41. **Models with A/C:** Connect multiplug to A/C compressor.
42. **Models with A/C:** Position timing belt to compressor pulley, release tension, remove retaining pin and lower tensioner pulley onto timing belt
43. Position clutch slave cylinder mounting bracket to gearbox, fit and tighten bolts to 25 Nm (18 lbf.ft).
44. Connect multiplug to 1st gear switch and secure harness with clip to clutch slave cylinder bracket.
45. Connect reverse light switch connectors.
46. Position lower engine steady to sump mounting bracket, fit and tighten bolt to 80 Nm (59 lbf.ft).
47. Tighten bolt securing lower engine steady to rear beam to 80 Nm (59 lbf.ft).
48. Position gear change steady rod, fit and tighten bolt to 25 Nm (18 lbf.ft).
49. Position gear change rod to selector shaft, fit NEW roll pin and secure cover.
50. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 42 Nm (31 lbf.ft).
51. Fit new gasket to exhaust manifold flange, connect exhaust front pipe and tighten nuts to 75 Nm (55 lbf.ft).
52. Clean ends of drive shafts and mating splines in gearbox.
53. Fit drive shafts to IRD and gearbox, ensuring that the circlip on each driveshaft is fully engaged.
54. Locate lower arm bushes, fit but do not fully tighten bolts.

    CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.

55. Clean bush housing and mating faces on beam.
56. Align bush housings ensuring roll pin is correctly located. Fit bolts and tighten to 105 Nm (77 lbf.ft).
57. Position LH and RH splash shields, fit and tighten bolts.
58. Lower vehicle.
59. Tighten lower arm front bush bolts to 175 Nm (129 lbf.ft).

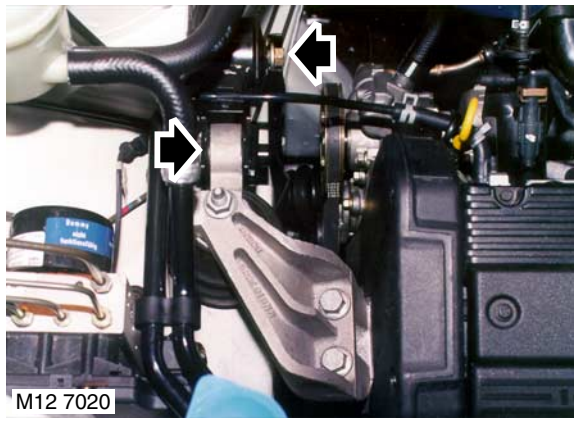
60. Tighten lower arm rear bush nuts to 140 Nm (103 lbf.ft).
61. Fit battery carrier.
☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
62. Adjust throttle cable.
☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - K1.8.**
63. Fit air cleaner.
☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
64. If required, refill engine with oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**
65. Fill IRD to correct level with fluid.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
66. Refill gearbox with oil.
☞ **MANUAL GEARBOX - PG1, ADJUSTMENTS, Gearbox oil - drain and refill.**
67. Refill cooling system.
☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**
68. Connect battery earth lead.
69. Fit bonnet.
☞ **EXTERIOR FITTINGS, REPAIRS, Bonnet.**

Arm assembly - engine mounting RH

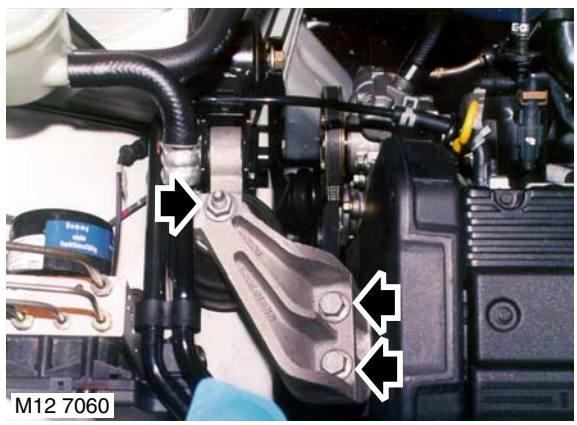
12.45.06

Remove

1. Remove underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M12 7020

2. Remove bolt securing upper RH engine steady to top arm.
3. Loosen bolt securing upper RH engine steady to body, pivot engine steady away from top arm.
4. Fit wooden block to jack, position jack under engine sump to support engine.


M12 7060

5. Remove nut securing engine top arm bracket to RH engine hydramount.
6. Remove 2 bolts securing top arm to engine front mounting bracket.
7. Remove top arm.

Refit

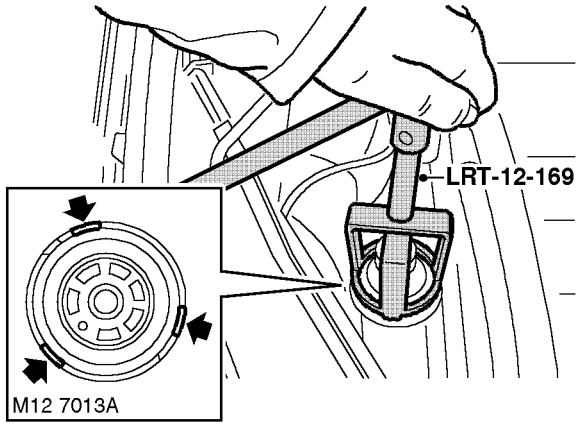
1. Fit top arm.
2. Fit bolts securing top arm to engine front mounting bracket and tighten to 170 Nm (125 lbf.ft).
3. Lower and remove jack supporting engine.
4. Fit nut securing top arm to RH hydramount and tighten to 85 Nm (63 lbf.ft).
5. Position upper RH engine steady to top arm, fit and tighten bolt to 80 Nm (59 lbf.ft).
6. Tighten bolt securing upper RH engine steady to body to 80 Nm (59 lbf.ft).
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Hydramount - engine - RH

12.45.12

Remove

1. Disconnect battery earth lead.
2. Remove engine RH mounting arm assembly.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Arm assembly - engine mounting RH.**



3. Using **LRT-12-169** loosen and remove hydramount.

Refit

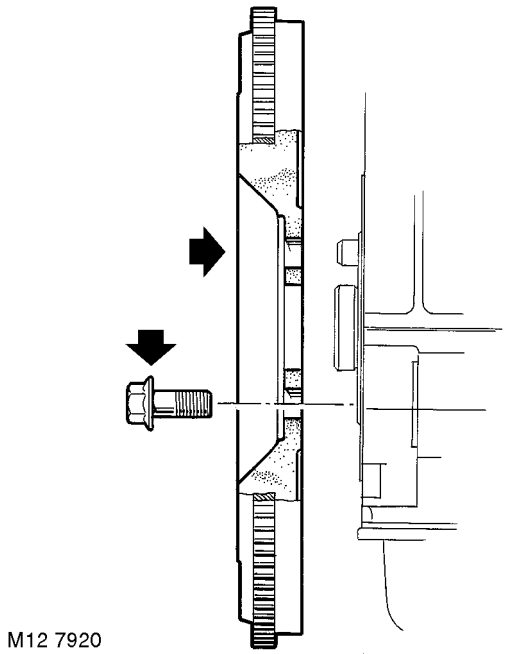
1. Clean hydramount and body mating faces.
2. Fit hydramount.
3. Fit RH engine mounting arm assembly.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Arm assembly - engine mounting RH.**
4. Connect battery earth lead.

Flywheel

12.53.07

Remove

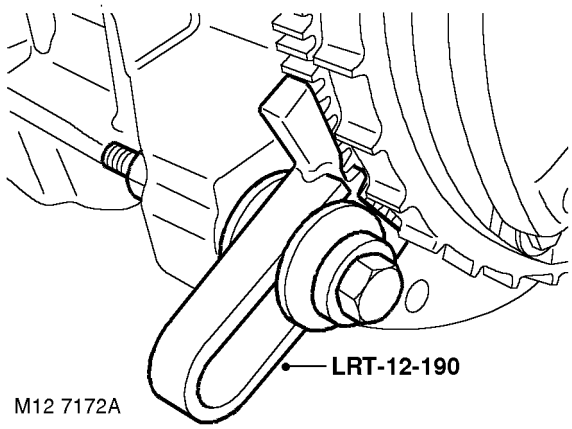
1. Remove clutch.
   CLUTCH, REPAIRS, Clutch assembly/drive plate and release bearing - K1.8.


M12 7920

2. Loosen but do not remove 6 bolts securing flywheel.
3. Remove tool **LRT-12-190**.
4. Remove and discard 6 bolts securing flywheel.
5. Using assistance, remove flywheel.

Refit

1. Clean flywheel and crankshaft faces.
2. Use an old flywheel bolt with 2 saw cuts at 45° along bolt threads and clean thread locking agent from tapped holes in crankshaft.
3. Using assistance, fit flywheel, fit and lightly tighten new Patchlok bolts to secure flywheel.



M12 7172A

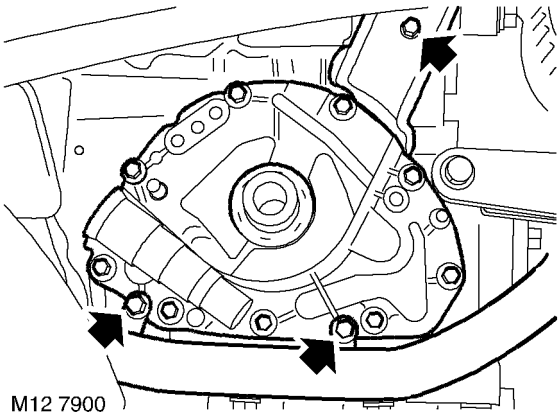
4. Position flywheel locking tool **LRT-12-190**, secure tool with 2 bolts.
5. Tighten flywheel securing bolts by diagonal selection to 80 Nm (59 lbf.ft).
6. Fit clutch.
   CLUTCH, REPAIRS, Clutch assembly/drive plate and release bearing - K1.8.

Pump - engine oil

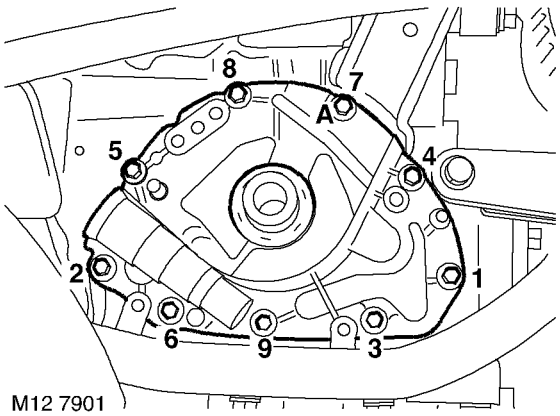
12.60.26

Remove

1. Remove camshaft timing belt.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**
2. Remove crankshaft gear.



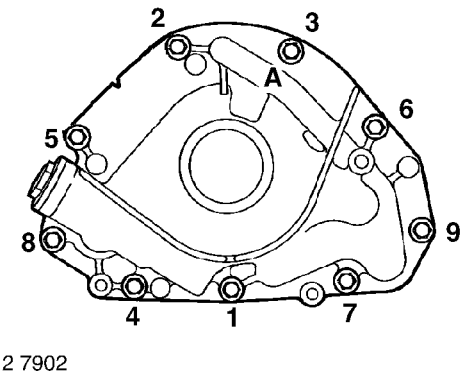
3. Remove 2 bolts securing engine harness to oil pump.
4. Remove lower bolt from timing belt rear cover.



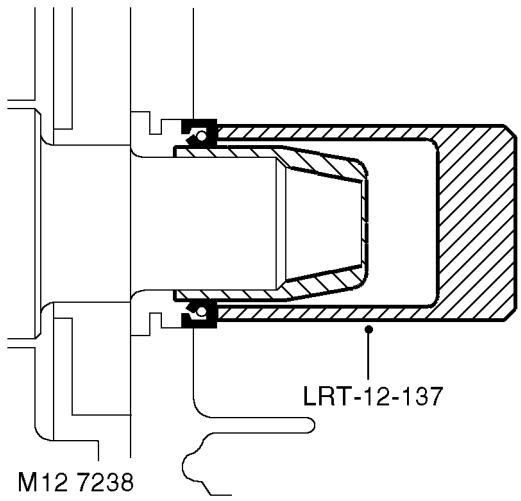
5. Noting fitted position of M6 x 20 bolt **'A'** and using the sequence shown, remove and discard 9 bolts securing oil pump to cylinder block.
6. Release rear cover to facilitate oil pump removal.
7. Remove oil pump, remove and discard gasket.
   Note: Dowel located.
8. Remove and discard crankshaft front oil seal from oil pump.

Refit

1. Clean oil pump and mating face.
2. Clean oil seal running surface on crankshaft.
3. Fit new oil pump gasket, align and fit oil pump.
   CAUTION: Gasket must be fitted dry.



4. Fit new Patchlok bolts ensuring M6 x 20 bolt is in position **'A'**. Tighten bolts securing oil pump in sequence shown to 10 Nm (7.5 lbf.ft).
5. Fit bolt securing timing belt rear cover and tighten to 9 Nm (7 lbf.ft).
6. Align engine harness to oil pump, fit bolts and tighten to 10 Nm (7.5 lbf.ft).



7. Fit seal guide from crankshaft front oil seal kit over front of crankshaft.
8. Fit new oil seal using tool **LRT-12-137**
   CAUTION: Oil seal must be fitted dry.

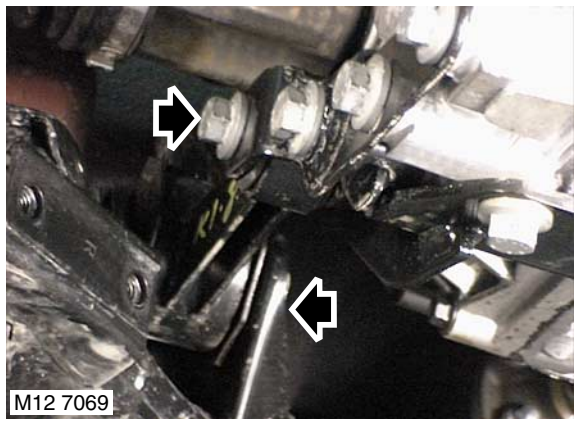
9. Clean crankshaft timing gear.
10. Fit crankshaft timing gear.
11. Fit camshaft timing belt.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**

Sump - engine reseal

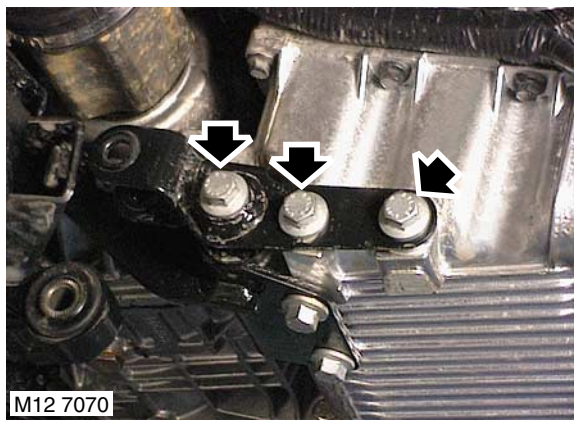
12.60.38

Remove

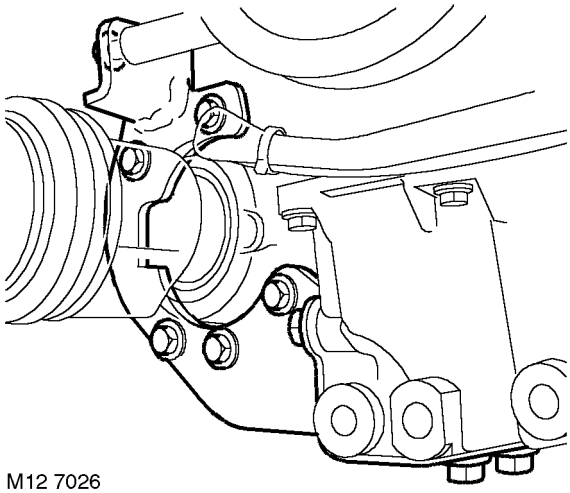
1. Remove exhaust front pipe.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - front.**
2. Drain engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**


M12 7069

3. Remove bolt securing lower engine steady to sump mounting bracket.
4. Loosen bolt securing lower engine steady to subframe, pivot steady away from sump mounting bracket.

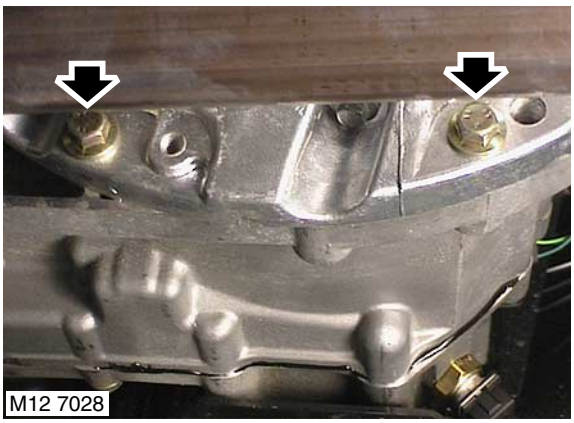

M12 7070

5. Remove 3 bolts securing lower engine steady bracket to sump and remove bracket.



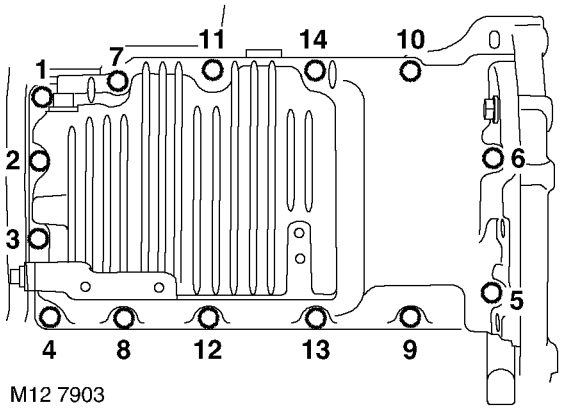
M12 7026

6. Remove upper bolt securing IRD support bracket to cylinder block.
7. Remove 5 bolts securing support bracket to IRD.
8. Remove 3 bolts securing IRD support bracket to sump.
9. Position IRD support bracket to gain access for sump removal.



M12 7028

10. Remove 2 bolts securing sump to gearbox.



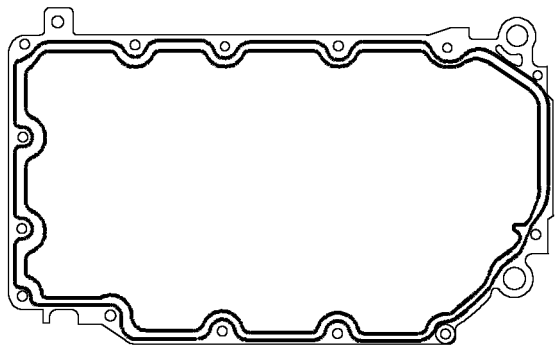
M12 7903

11. Noting the fitted position of 2 M8 x 60 mm longest bolts and using the sequence shown, remove 14 bolts securing sump to bearing ladder.
12. Using a mallet, gently tap sump sideways to release sealant bond, remove sump.

    CAUTION: Do not lever between sump and bearing ladder.

Refit

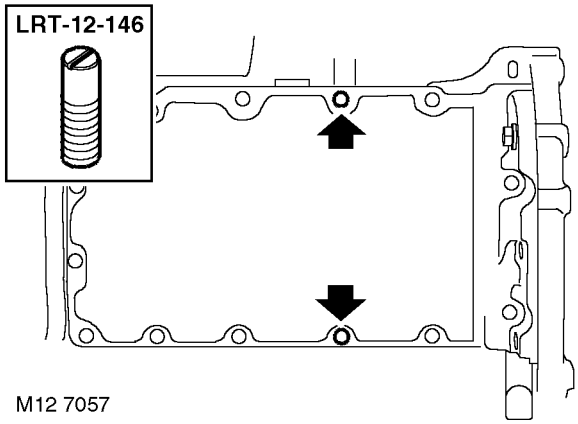
1. Clean inside of sump. Use a lint-free cloth and suitable solvent to clean mating faces of sump and bearing ladder.



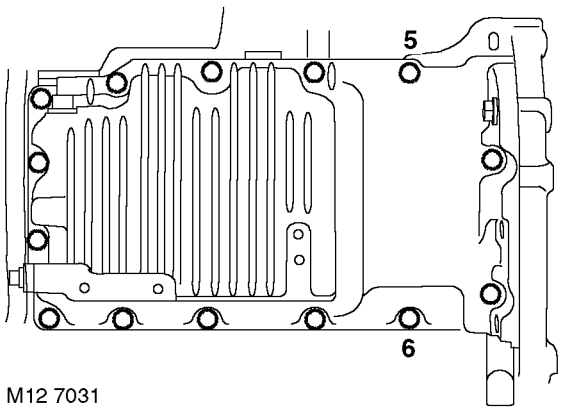
M12 7030

2. Apply a continuous bead of sealant, STC 4600, to sump face and spread to an even film using a roller.

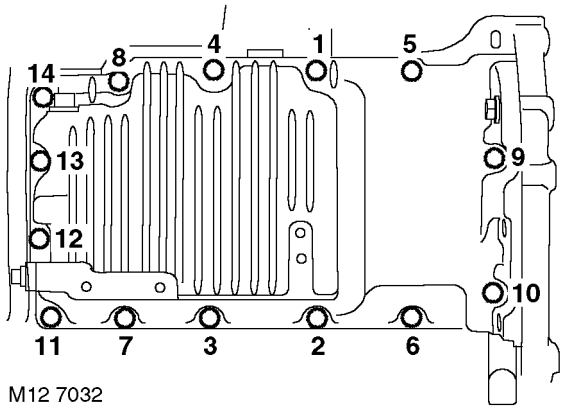
   CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.



3. Fit alignment pins, **LRT-12-146,** to positions shown.



4. Position sump to bearing ladder, fit 2 bolts at positions 5 and 6 and tighten to 4 Nm (3 lbf.ft).
5. Fit 10 bolts into remaining holes, lightly tighten all bolts. Ensure that the two M8 x 60 longer bolts are fitted into rearmost holes in sump.
6. Fit bolts securing sump to gearbox housing, lightly tighten and then loosen bolts. This will correctly align the rear sump flange to gearbox.
7. Remove alignment pins, **LRT-12-146,** fit and lightly tighten 2 remaining bolts.



8. Ensure that the rear sump flange is aligned to gearbox housing and progressively tighten sump bolts in the sequence shown, M8 x 25 bolts to 25 Nm (18 lbf.ft) and M8 x 60 bolts to 30 Nm (22 lbf.ft).
9. Tighten bolts securing gearbox to sump to 45 Nm (33 lbf.ft).
10. Position support bracket to IRD unit and engine sump, fit and tighten bolts securing support bracket to IRD to 50 Nm (37 lbf.ft) and bolts securing support bracket to engine sump to 45 Nm (33 lbf.ft).
11. Fit and tighten upper bolt securing IRD support bracket to cylinder block to 45 Nm (33 lbf.ft).
12. Position engine lower steady bracket to sump, fit and tighten bolts to 100 Nm (74 lbf.ft).
13. Position lower engine steady to sump mounting bracket, fit and tighten bolt to 80 Nm (59 lbf.ft).
14. Tighten bolt securing lower engine steady to subframe to 80 Nm (59 lbf.ft).
15. Fit front exhaust pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - front.**
16. Fill engine with oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Switch - oil pressure

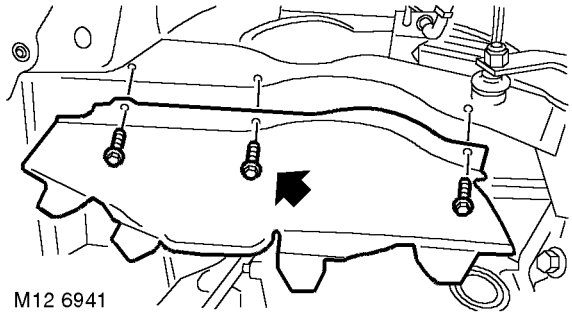
12.60.50

Remove

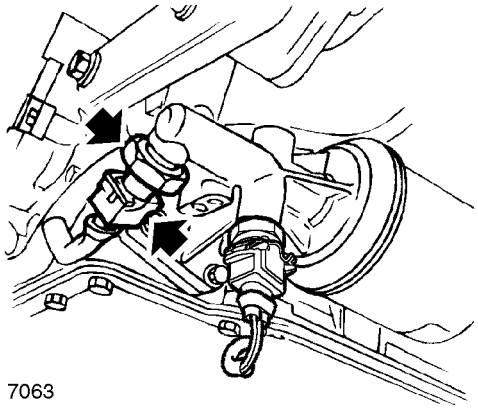
1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Turn steering on RH lock.



4. Remove 3 bolts securing RH splash shield to body and remove shield.



5. Disconnect multiplug from oil pressure switch.
6. Position container below switch to catch oil spillage.
7. Remove oil pressure switch.

Refit

1. Clean threads of oil pressure switch and ensure mating face is clean.
2. Apply Loctite 577 to threads of switch.
3. Fit oil pressure switch and tighten to 17 Nm (12.5 lbf.ft).
4. Connect oil pressure switch multiplug.
5. Fit splash shield and secure with bolts.
6. Position steering wheel straight ahead.
7. Connect battery earth lead.
8. Check and top up engine oil.

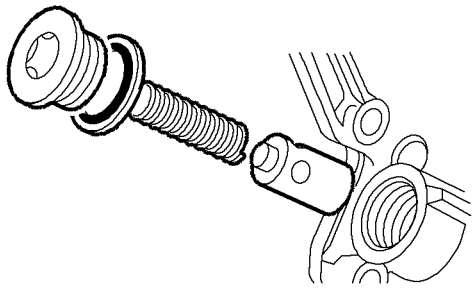
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Valve - oil pressure relief

12.60.56

Remove

1. Remove camshaft timing belt front lower cover.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - without A/C.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - with A/C.



M12 7904

2. Unscrew plug, discard sealing washer.
3. Remove spring and relief valve.
   CAUTION: Suitably protect timing belt from oil contamination.
4. Check that valve slides freely in bore and that bore and valve are free from scoring and corrosion.
   Note: Light corrosion may be removed using grade 600 emery cloth soaked in oil.
5. Check spring free length.
   GENERAL DATA, Engine – K1.8 Petrol.
   CAUTION: Replace relief as an assembly if scoring of valve is evident or free length of spring is less than specified. Replace oil pump as an assembly if relief valve bore is scored.

Refit

1. Remove all traces of Loctite from plug and relief valve bore.
   CAUTION: Do not use a tap.
2. Apply clean engine oil to valve and spring.
3. Fit valve and spring.
4. Fit a new sealing washer to plug and apply Loctite 577 to threads of plug.
5. Fit plug and tighten to 25 Nm (18 lbf.ft).
6. Fit camshaft timing belt lower cover.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - without A/C.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - with A/C.
7. Check and top-up engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.

Sensor - oil temperature

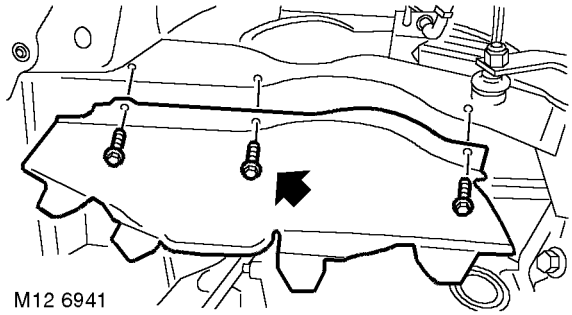
12.60.65

Remove

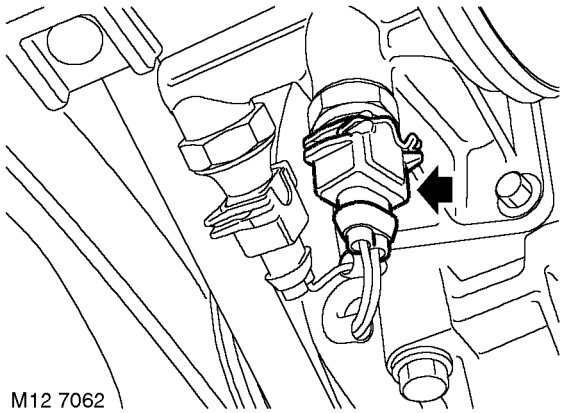
1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Turn steering on RH lock.



4. Remove 3 bolts securing RH splash shield to body and remove shield.
5. Position container to catch oil spillage



6. Disconnect oil temperature sensor multiplug.
7. Remove oil temperature sensor.

Refit

1. Clean threads of oil temperature sensor, ensure mating face is clean.
2. Apply Loctite 577 to threads of sensor.
3. Fit oil temperature sensor and tighten to 17 Nm (12.5 lbf.ft).
4. Connect oil temperature sensor multiplug.
5. Fit splash shield and secure with bolts.
6. Position steering wheel straight ahead.
7. Remove stands and lower vehicle.
8. Connect battery earth lead.
9. Check and top up engine oil.

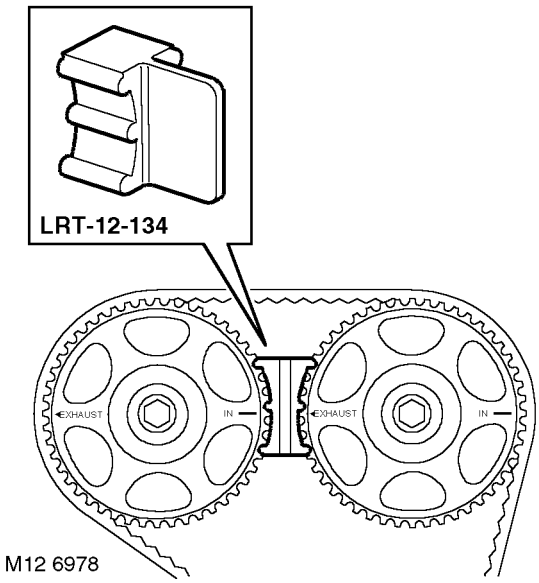
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Camshaft timing belt

12.65.18

Remove

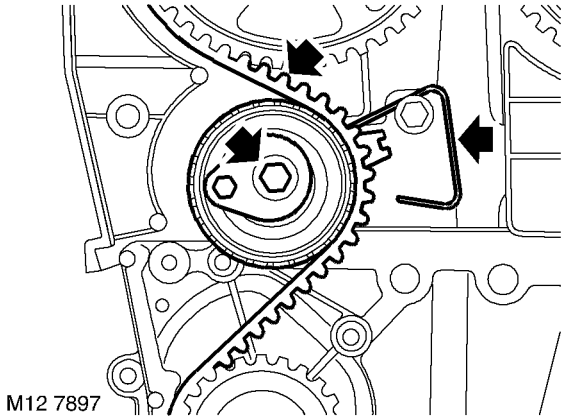
1. Disconnect battery earth lead.
2. Remove hydramount.
   ENGINE - K SERIES 1.8, REPAIRS, Hydramount - engine - RH.
3. Remove camshaft timing belt upper cover.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.
4. Remove camshaft timing belt lower cover.
   ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - without A/C.
5. Temporarily assemble pulley to crankshaft, fit and lightly tighten bolt.
6. Remove bolts securing flywheel locking tool, **LRT-12-145** to starter motor aperture and remove locking tool.



7. Rotate crankshaft clockwise to align camshaft gear timing marks.

   CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to rotate the crankshaft.

8. Fit camshaft gear alignment tool **LRT-12-134.**
9. Remove crankshaft pulley.



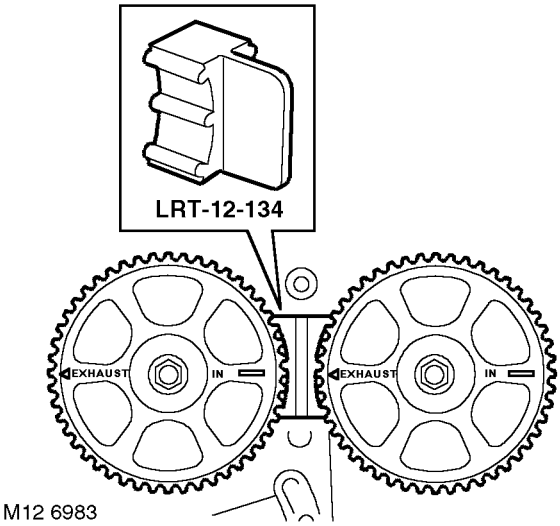
10. Remove and discard timing belt tensioner bolt.
11. Disengage index wire from its fitted position whilst at the same time removing timing belt tensioner.
12. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt.
13. Remove camshaft timing belt.

    CAUTION: Ease the timing belt off the gears using fingers only. Metal levers may damage the belt and gears. Do not rotate crankshaft or camshafts with timing belt removed and cylinder head fitted. Timing belt must be replaced if cylinder head is to be removed or new drive gears, tensioner or coolant pump are to be fitted. Timing belts must be stored and handled with care. Always store a timing belt on its edge with a bend radius greater than 50 mm (2.0 in). Do not use a timing belt that has been twisted or bent double as this will damage the reinforcing fibres. Do not use a timing belt if debris other than belt dust is found in timing belt covers. Do not use a timing belt if mileage exceeds 72,000 km (45, 000 miles) . Do not use an oil or coolant contaminated timing belt, cause of contamination must be rectified.

Refit

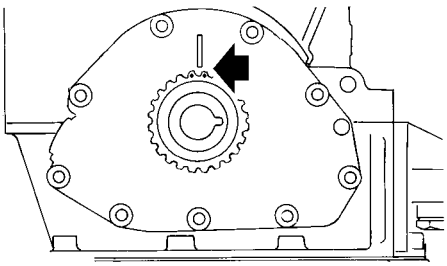
1. Clean crankshaft timing gear, camshaft timing gears, coolant pump timing gear and tensioner pulley.

   CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gear will emerge and contaminate the belt.

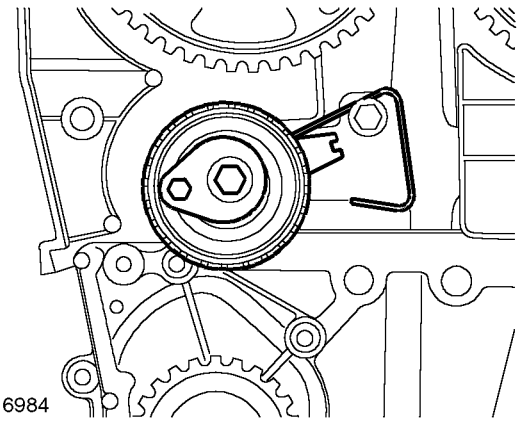


M12 6983

2. Check correct alignment of camshaft timing marks and that tool **LRT-12-134** is locking camshaft gears.


M12 7059

3. Check correct alignment of dots on crankshaft gear with flange on oil pump - 90° BTDC.


M12 6984

4. Fit timing belt tensioner ensuring that index wire is positioned over pillar bolt and tensioner lever is at 9 o'clock position.

5. Fit a new Patchlok bolt and tighten until it is just possible to move tensioner lever.

6. Using fingers only, fit timing belt. Ensure belt run between the crankshaft gear and the exhaust camshaft gear is kept taut during the fitting procedure.

CAUTION: If the original timing belt is being refitted, ensure the direction of rotation mark is facing the correct way.

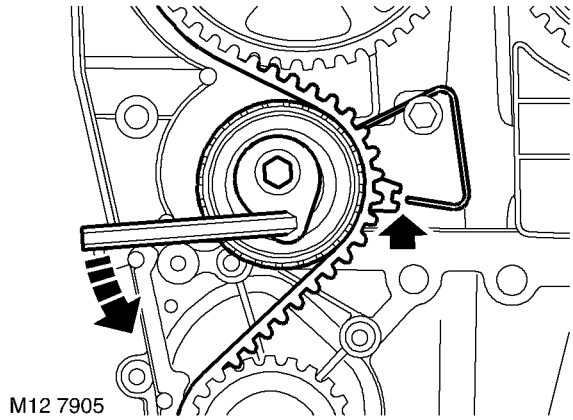
7. Check that timing belt is positioned centrally around all gears and tensioner pulley.

8. Fit timing belt lower cover.

☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - without A/C.**

9. Temporarily assemble pulley to crankshaft, fit and lightly tighten bolt.

10. Remove camshaft gear alignment tool **LRT-12-134.**

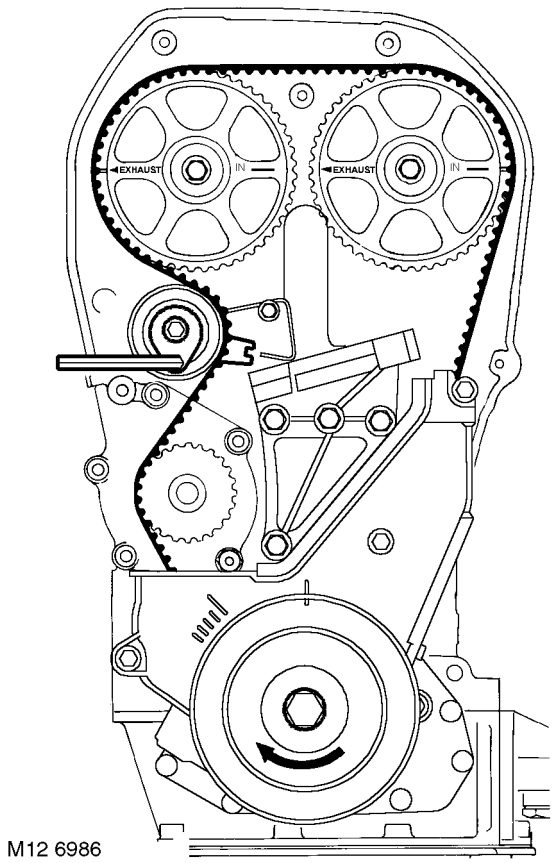

M12 7905

11. Using a 6 mm Allen key, rotate tensioner anti-clockwise and align the centre of the indent on the tensioner pointer to the index wire.

NOTE: If original belt is being refitted, align index wire to lower land of pointer.

CAUTION: Ensure that pointer approaches index wire from above. Should pointer go past index wire, release tension completely and repeat tensioning procedure.

12. Ensuring pointer maintains correct position, tighten tensioner bolt to 22 Nm (16 lbf.ft).



M12 6986

13. Rotate crankshaft 2 turns clockwise and align camshaft gear timing marks.

CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.

14. Check that pointer is correctly aligned with index wire.

15. If pointer is not correctly aligned, loosen bolt until it is just possible to move tensioner lever. Rotate tensioner lever clockwise until tension is completely backed off, then rotate tensioner lever anti-clockwise until pointer is aligned correctly to index wire.

16. Ensuring pointer maintains correct position, tighten tensioner bolt to 22 Nm (16 lbf.ft).

17. Rotate crankshaft 2 turns clockwise and align camshaft gear timing marks.

18. Check alignment of pointer to index wire, if incorrect, repeat adjustment procedure.

19. Remove crankshaft pulley.

20. Position flywheel locking tool, **LRT-12-145,** in starter motor aperture and secure with 2 bolts.

21. Fit camshaft timing belt upper cover.

☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**

22. Fit hydramount.

☞ **ENGINE - K SERIES 1.8, REPAIRS, Hydramount - engine - RH.**

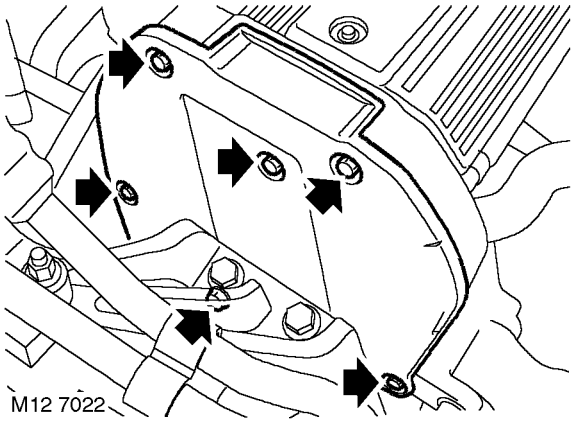
23. Connect battery earth lead.

Cover - timing gear - upper

12.65.41

Remove

1. Disconnect battery earth lead.



2. Loosen lower bolt securing camshaft timing belt upper cover.
3. Remove 5 bolts securing camshaft timing belt upper cover to rear cover.
4. Remove camshaft timing belt upper cover and seal.

Refit

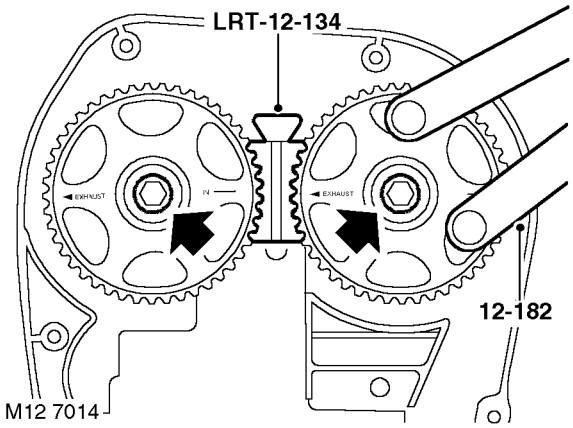
1. Clean timing belt upper cover.
2. Fit timing belt upper cover, ensuring correct position of seal.
3. Fit bolts securing camshaft upper cover and tighten to 5 Nm (3.5 lbf.ft).
4. Tighten lower bolt securing camshaft timing belt upper cover to engine to 5 Nm (3.5 lbf.ft).
5. Connect battery earth lead.

Cover - timing belt - rear

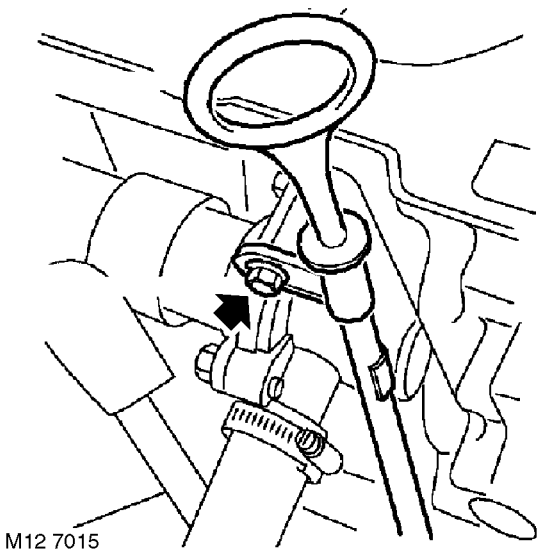
12.65.42

Remove

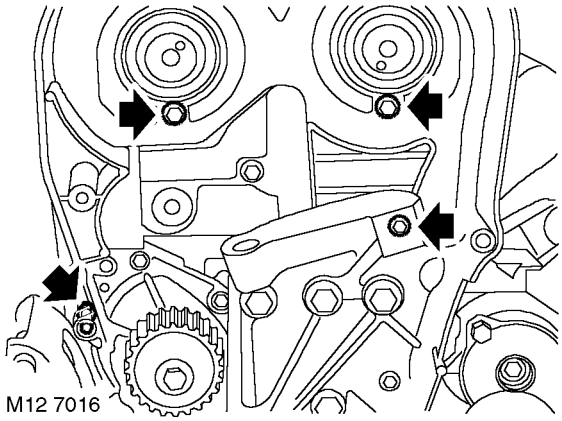
1. Remove camshaft timing belt.
   ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.



2. Remove camshaft gear alignment tool **LRT-12-134.**
3. Suitably identify each camshaft gear to its respective camshaft.
4. Restrain gears using tool **LRT-12-182** and remove bolts and washers securing gears to camshafts.
5. Remove 2 camshaft gears.



6. Remove bolt securing dipstick tube support bracket to thermostat housing.



7. Remove 4 bolts securing camshaft timing belt rear cover to cylinder head and block.
8. Remove rear cover.

Refit

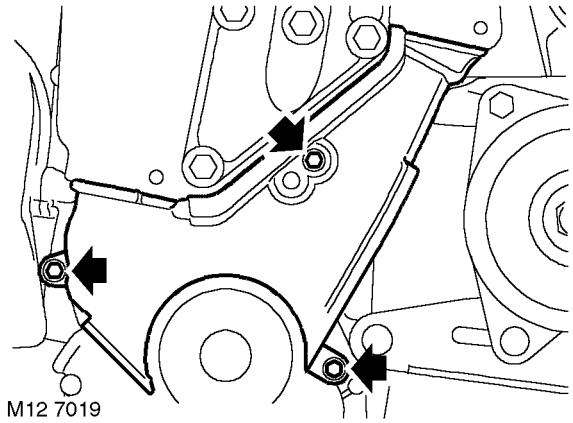
1. Fit timing belt rear cover and tighten bolts to 9 Nm (7 lbf.ft).
2. Fit bolt securing dipstick tube support bracket and tighten to 9 Nm (7 lbf.ft).
3. Clean camshaft timing gears.
4. Fit camshaft gears to their respective camshafts.
5. Fit bolts and washers securing camshaft gears to camshafts. Using tool **LRT-12-182** restrain camshaft gears and tighten bolts to 65 Nm (48 lbf.ft).
6. Align camshaft gear timing marks and fit tool **LRT-12-134.**
7. Fit camshaft timing belt.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Camshaft timing belt.**

Cover - timing belt - front lower - without A/C

⊸ ***12.65.43***

Remove

1. Disconnect battery earth lead.
2. Remove timing belt upper cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**
3. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
4. Remove crankshaft pulley.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Pulley - crankshaft.**



5. Remove 3 bolts securing camshaft timing belt lower cover to cylinder block and remove cover.

Refit

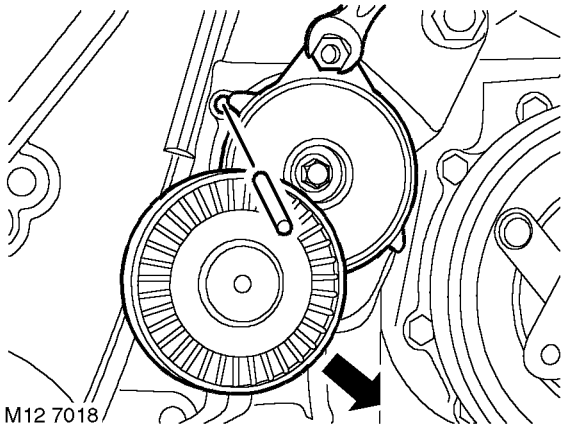
1. Clean lower timing belt cover.
2. Fit timing belt lower cover ensuring correct position of rubber seal.
3. Fit bolts securing timing belt lower cover and tighten to 9 Nm (7 lbf.ft).
4. Fit crankshaft pulley.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Pulley - crankshaft.**
5. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
6. Fit timing belt upper cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**
7. Connect battery earth lead.

Cover - timing belt - front lower - with A/C

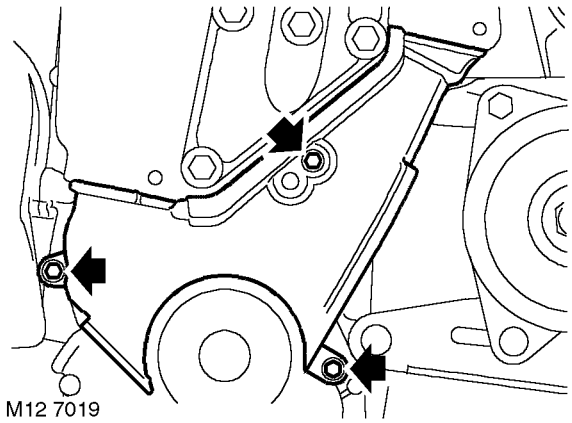
12.65.43

Remove

1. Disconnect battery earth lead.
2. Remove timing belt upper cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**
3. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
4. Remove crankshaft pulley.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Pulley - crankshaft.**



5. Hold ancillary timing belt tensioner, remove pin and allow tensioner to move fully anti-clockwise



6. Remove 3 bolts securing camshaft timing belt lower cover to cylinder block and remove cover.

Refit

1. Clean lower timing belt cover.
2. Fit timing belt lower cover ensuring correct position of rubber seal.
3. Fit bolts securing timing belt lower cover and tighten to 9 Nm (7 lbf.ft).
4. Rotate ancillary timing belt tensioner fully clockwise. Whilst holding tensioner in this position, fit pin into hole in tensioner backplate.
5. Fit crankshaft pulley.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Pulley - crankshaft.**
6. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
7. Fit timing belt upper cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**
8. Connect battery earth lead.

Piston assembly - engine set

12.17.03.01

Remove

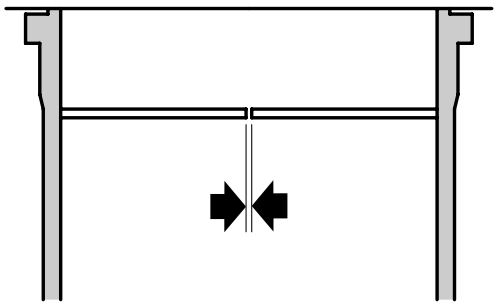
1. Remove connecting rod bearings.
   ENGINE - K SERIES 1.8, REPAIRS, Connecting rod bearings - engine set.
2. Remove ridge of carbon from top of cylinder liner bores.
3. Ensure that the feet of cylinder liner clamps, **LRT-12-144**, do not protrude over cylinder liner bores.
4. Suitably identify each piston and connecting rod assembly to its respective bore.
5. Carefully push each piston to top of cylinder liner bores.
6. Carefully push out each piston assembly taking care that the big-ends do not contact surface of cylinder liners.

   CAUTION: Removal of pistons will necessitate removal and re-sealing of cylinder liners.

7. Using an expander, remove and discard old piston rings.

Refit

1. Clean ring grooves in pistons and blow out oil holes in ring grooves.



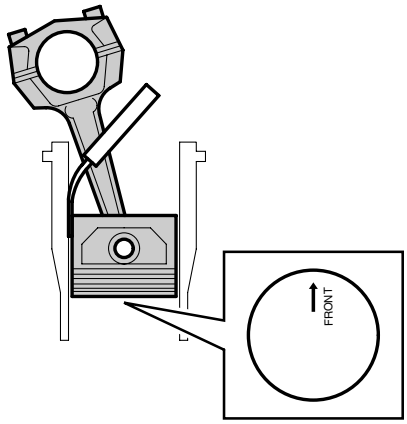
M12 7042

2. Check compression and oil control ring gaps, positioning each piston ring 20 mm (0.75 in) from top of cylinder liner as shown.
   GENERAL DATA, Engine – K1.8 Petrol.

   CAUTION: Ensure rings are suitably identified with the cylinder in which they were checked and fitted to the piston for that bore.

3. Check pistons for distortion and cracks.
4. Measure and record piston diameter at right angles to gudgeon pin and 8 mm (0.3 in) from bottom of skirt.
   GENERAL DATA, Engine – K1.8 Petrol.

   NOTE: Piston grades A or B are stamped on the crown of the piston.



M12 7043

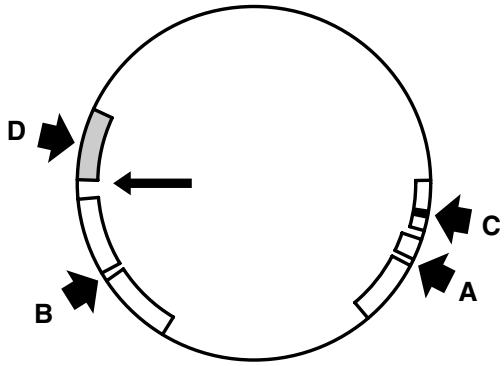
5. Starting with number 1 piston, invert piston and connecting rod and with the word 'FRONT' or arrow on piston crown facing towards 'REAR' of cylinder block, insert piston in cylinder liner.

   CAUTION: Ensure piston is checked in its correct bore.

6. Position piston with bottom of skirt 30 mm (1.2 in) from top of cylinder liner.
7. Using feeler gauges, measure and record clearance between piston and left hand side of cylinder liner - viewed from the front of the cylinder block.
   GENERAL DATA, Engine – K1.8 Petrol.
8. Repeat procedure for remaining pistons.

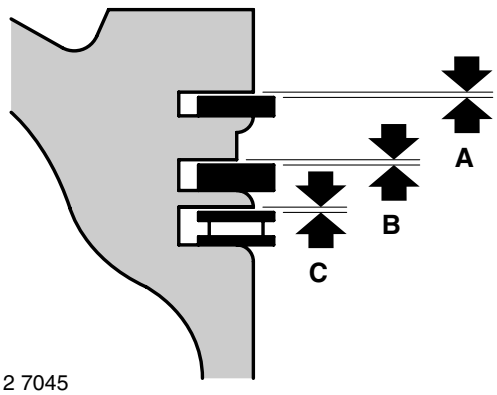
   NOTE: Piston and connecting rods are only supplied as an assembly.

9. Fit oil control spring.
10. With 'TOP' or identification markings to top of piston, use an expander to fit piston rings in sequence; oil control, 2nd compression and top compression.



M12 7044

11. Ensure rings are free to rotate, position compression ring gaps A and B at 120° to each other and away from thrust side. Position oil control ring gap C and spring gap D at 30° on opposite side of gudgeon pin axis



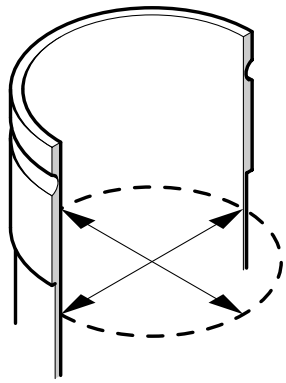
M12 7045

12. Check new ring to groove clearance.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

13. Remove bolts securing cylinder liner clamps **LRT-12-144** and remove clamps. If original cylinder liner is to be refitted, use a felt tipped pen to make suitable alignment marks between liner and cylinder block. DO NOT etch or stamp liners.

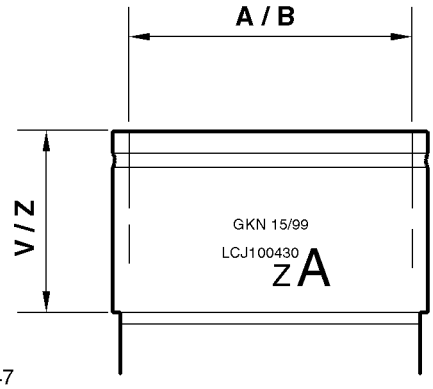
CAUTION: Keep bolts in their original fitted order.

14. Using hand pressure, push cylinder liners out towards cylinder head face of block and remove liners.


M12 7046

15. Measure wear and taper in two axes, 65 mm (2.5 in) from top of cylinder liner bore. RED grade = 80.000 to 80.015 mm (3.1496 to 3.1501 in). BLUE grade = 80.016 to 80.030 mm (3.1502 to 3.1508 in). Service cylinder liners are grade A and B, marked on the outside diameter of the liner.

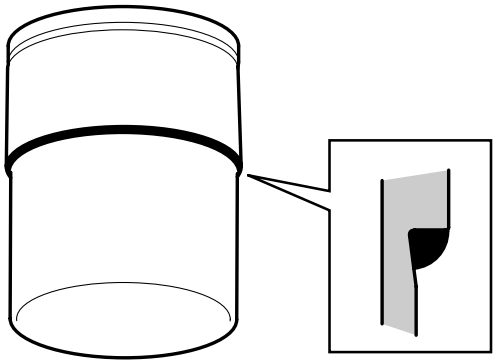
CAUTION: Cylinder liners with excessively glazed, worn, scratched or scored bores must be replaced. DO NOT attempt to hone or remove glazing from bore. Ensure that if original liners are to be refitted , reference marks made during dismantling are not erased.



M12 7047

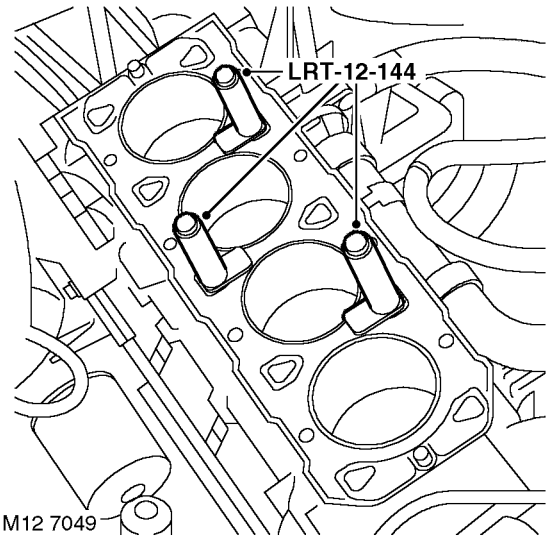
16. Cylinder liners have their bore/grade and step height determined at manufacture. The bore/grade, red, A or B, blue and step heights V or Z together with the cylinder liner part number and colour code are marked on the external diameter of the cylinder liners. If cylinder(s) are to be replaced, the replacement liner(s) must have the same step height as the original liner(s). Both step heights are available in red, A and blue B grades of cylinder liners.

17. Remove sealant from cylinder block and if original cylinder liner is to be refitted, from shoulders of liner.
18. Clean cylinder liners and wipe dry.



M12 7048

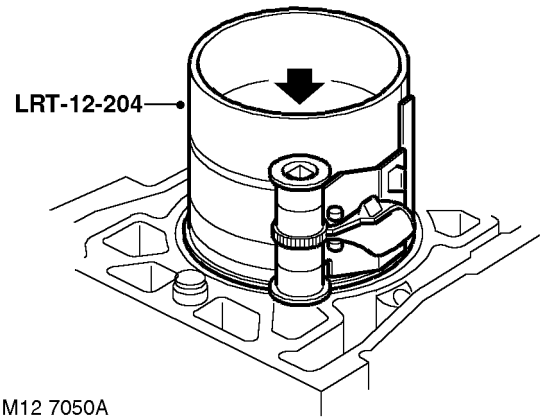
19. Apply a 2.00 mm (0.1 in) thick continuous bead of sealant, Part No. RTC 3347 around shoulder of each cylinder liner as shown.
20. Keeping cylinder liner 'square' to block, push liner fully down until shoulder of liner seats against cylinder block. DO NOT drop liners into position.



M12 7049

21. Fit cylinder liner clamps **LRT-12-144** and nylon nuts supplied with tool and secure with cylinder head bolts. Ensure that feet of clamps do not protrude over bores.
CAUTION: Ensure that bolts used are those originally fitted in that location.

22. Lubricate cylinder liner bores, pistons and rings with engine oil, ensure ring gaps are correctly spaced.



M12 7050A

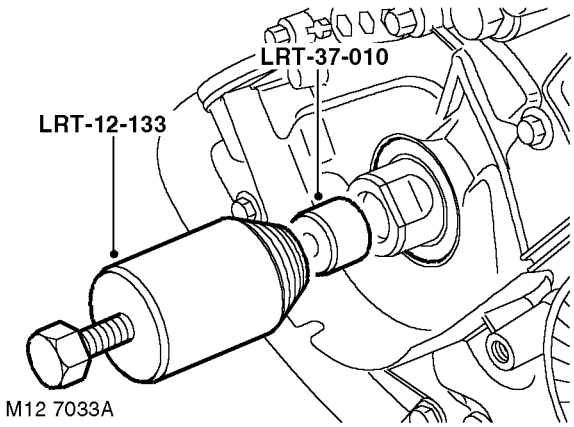
23. Fit piston ring clamp, **LRT-12-204**, to each piston in turn and with 'FRONT' mark on piston crown to engine front, push piston into its respective bore until flush with top of cylinder liner. Remove ring clamp.
24. Fit connecting rod bearings.
☞ **ENGINE - K SERIES 1.8, REPAIRS, Connecting rod bearings - engine set.**

Oil seal - crankshaft - front

12.21.14.01

Remove

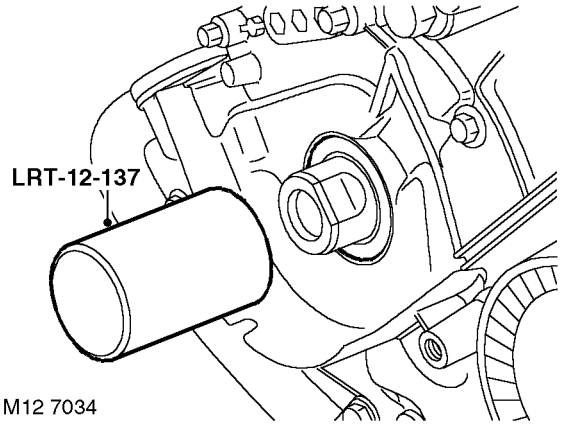
1. Remove camshaft timing belt.
   ENGINE - K SERIES 1.8, OVERHAUL, Camshaft timing belt.
2. Remove crankshaft gear.



3. Fit thrust button, tool **LRT-37-010** to end of crankshaft.
4. Ensure bore of tool **LRT-12-133** is free from burrs.
5. Screw tool **LRT-12-133** into crankshaft front oil seal.
6. Tighten centre bolt of tool **LRT-12-133** to remove oil seal.
7. Discard oil seal.
8. Remove thrust button from crankshaft.

Refit

1. Using a lint free cloth, thoroughly clean oil seal recess and the running surface on crankshaft pulley.



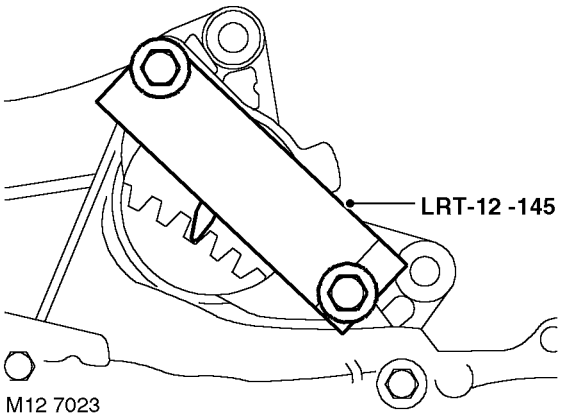
2. Fit oil seal guide from seal kit, over end of crankshaft.
3. Fit oil seal using tool **LRT-12-137.**
   CAUTION: Oil seal must be fitted dry.
4. Remove oil seal guide from crankshaft.
5. Clean crankshaft timing gear.
6. Fit gear to crankshaft.
7. Fit camshaft timing belt.
   ENGINE - K SERIES 1.8, OVERHAUL, Camshaft timing belt.
8. Top-up engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.

Pulley - crankshaft

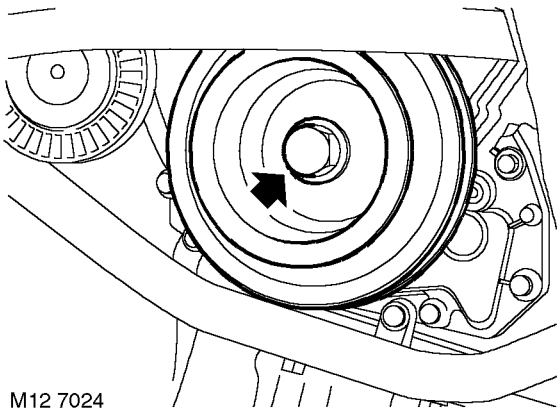
12.21.01.01

Remove

1. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - K1.8.



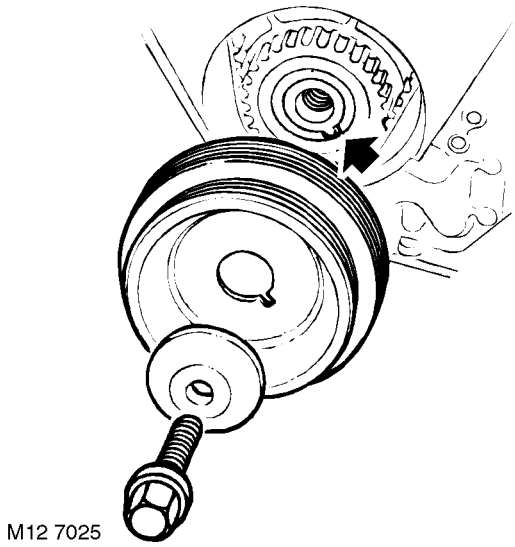
2. Position flywheel locking tool, **LRT-12-145,** in starter motor aperture and secure with 2 bolts.



3. Remove bolt securing pulley to crankshaft and collect washer.
4. Remove crankshaft pulley.

Refit

1. Clean crankshaft pulley and mating face.

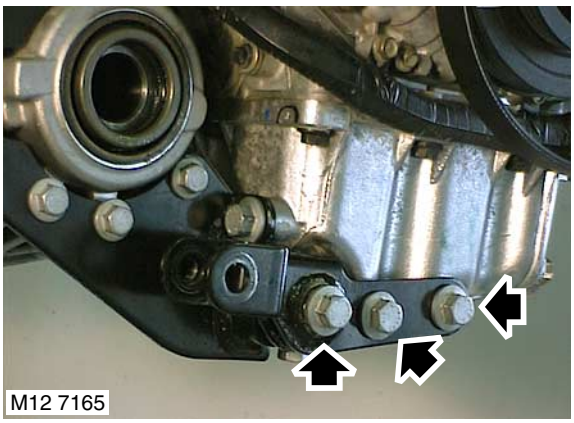


2. Fit crankshaft pulley to crankshaft gear and ensure that the indent on pulley locates over the lug on crankshaft gear.
3. Fit washer and bolt securing crankshaft pulley and tighten to 205 Nm (151 lbf.ft).
4. Remove bolts securing flywheel locking tool, **LRT-12-145** to starter motor aperture and remove locking tool.
5. Fit starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - K1.8.

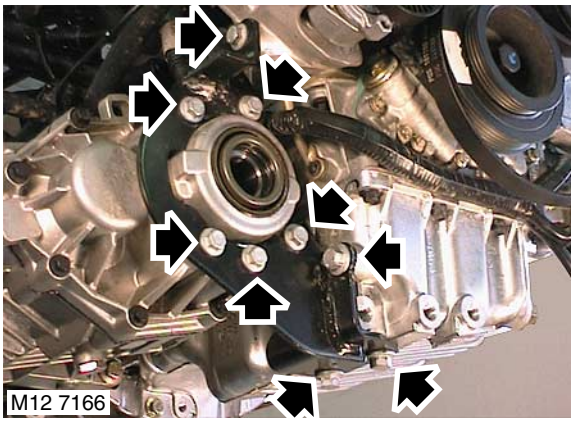
Crankshaft rear oil seal

12.21.20.01

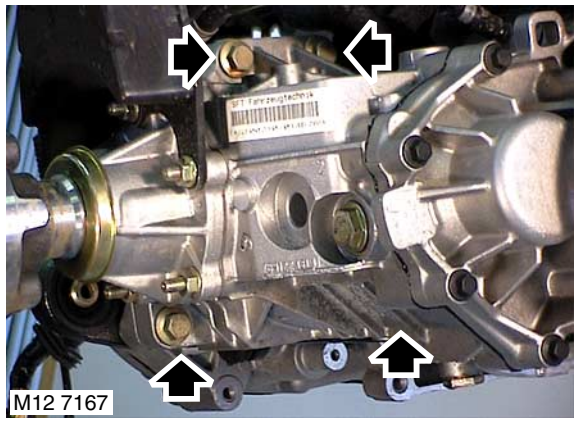
Remove



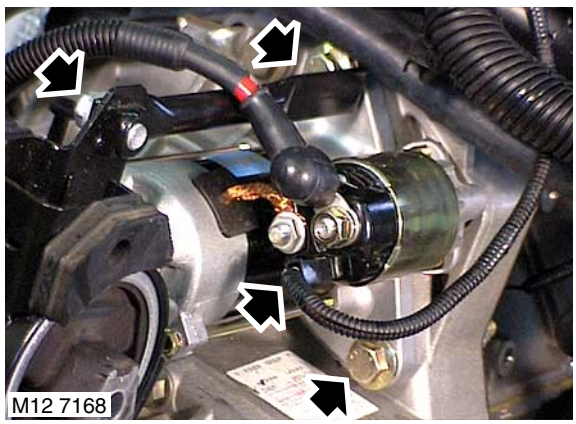
1. Remove 3 bolts securing lower engine steady bracket to sump and remove bracket.



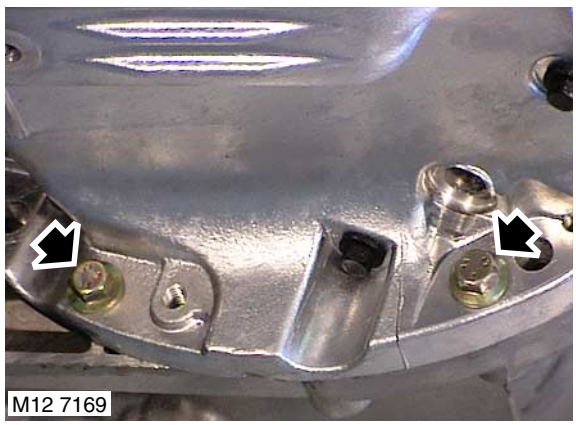
2. Remove upper bolt securing IRD support bracket to cylinder block.
3. Remove 5 bolts securing support bracket to IRD.
4. Remove 3 bolts securing IRD support bracket to sump and remove bracket
5. Release IRD unit breather hose from clip on dipstick tube.
6. Release clips and disconnect coolant hoses from IRD.



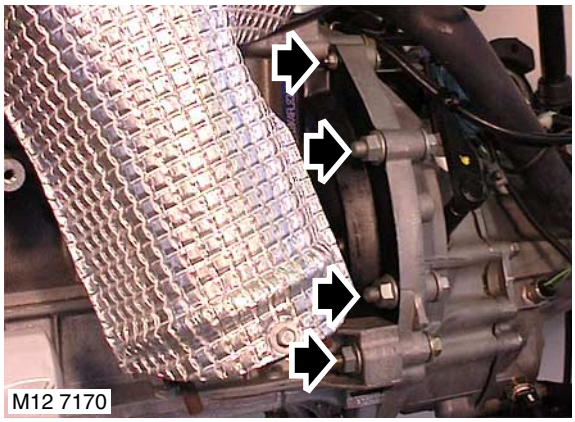
7. Remove 4 bolts securing IRD unit to gearbox and remove IRD unit.



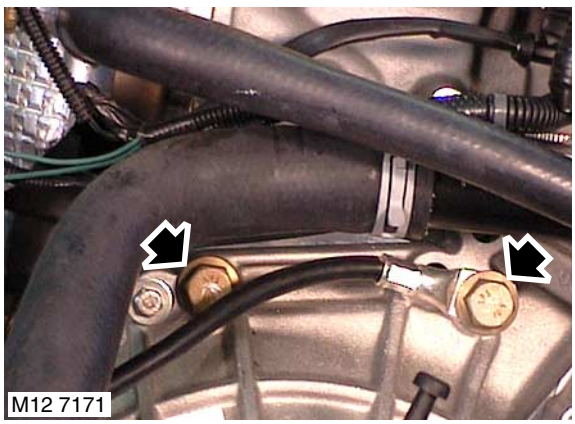
8. Disconnect Lucar connector from starter motor.
9. Remove bolt securing steady bar to LH engine mounting.
10. Remove 2 nuts and bolts securing starter motor to gearbox housing, remove starter motor, collect engine steady bar and rear cover plate.



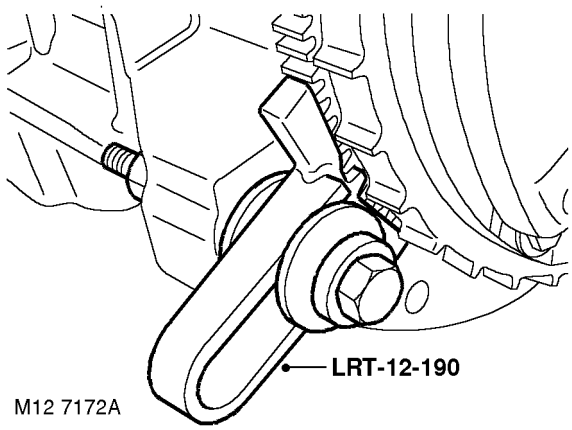
11. Remove 2 bolts securing sump to gearbox.



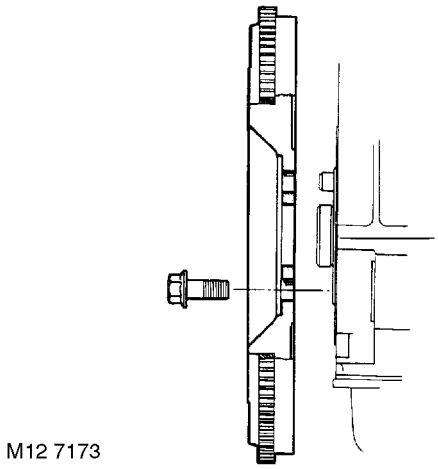
12. Note fitted position of plain washer and remove M6 nut and bolt securing front cover plate to gearbox.
13. Remove front upper nut and bolt securing gearbox to engine.
14. Remove 2 front nuts and bolts securing gearbox to engine, collect front cover plate.



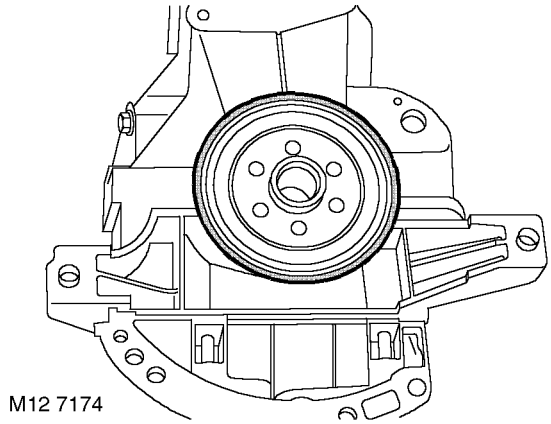
15. Note fitted position of engine earth lead and remove 2 top bolts securing gearbox to engine.
16. With assistance remove gearbox from engine.



17. Position flywheel locking tool, **LRT-12-190** to engine and secure with bolt.
18. Progressively loosen and then remove 6 bolts securing clutch cover assembly to flywheel.
19. Remove clutch cover and drive plate.



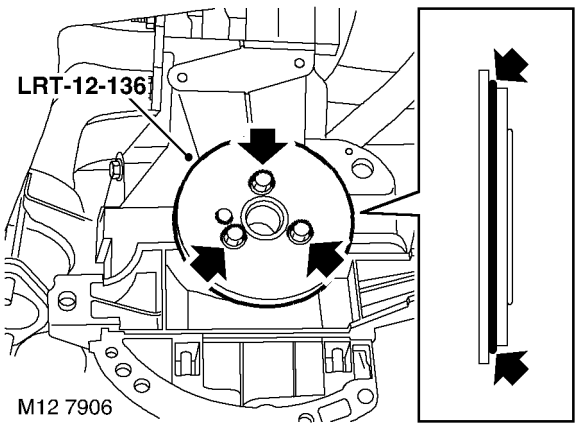
20. Remove and discard 6 bolts securing flywheel to crankshaft.
21. Remove flywheel locking tool, **LRT-12-190**.


M12 7174

22. Using a burr free flat ended screwdriver, ease crankshaft rear oil seal from cylinder block and discard seal. Take care to not mark sealing surface on crankshaft.

Refit

1. Remove all traces of oil and sealant from cylinder block, oil seal recess and running surface of crankshaft.



M12 7906

2. Apply a 1.5 mm (0.06 in) bead of sealant, Part Number STC 50550 to new oil seal as shown.
3. Immediately position oil seal to cylinder block.
CAUTION: Oil seal must be fitted dry.

4. Fit oil seal replacer **LRT-12-136** to crankshaft, retain using 3 bolts.
5. Tighten oil seal replacer bolts progressively to press oil seal into cylinder block, leave tool **LRT-12-136** in position for 1 minute.
6. Remove tool **LRT-12-136**.
CAUTION: Allow sealant to cure for 30 minutes before rotating crankshaft or topping-up engine oil.
7. Clean bolt holes in crankshaft using an old drive plate bolt with two saw cuts at an angle of 45 ° to the bolt shank.
8. Clean flywheel and mating face of crankshaft.
9. Fit flywheel to crankshaft.
10. Position flywheel locking tool, **LRT-12-190** to engine and secure with bolt.
11. Fit new Patchlok bolts securing flywheel to crankshaft and working in a diagonal sequence, tighten bolts to 80 Nm (59 lbf.ft).
12. Position drive plate to flywheel with 'FLYWHEEL SIDE' marking towards flywheel.
13. Fit pressure plate to flywheel and position clutch alignment tool, **LRT-12-151.**
14. Fit 6 bolts securing pressure plate to flywheel, tighten bolts sufficiently until drive plate is held in its central position. Remove **LRT-12-151** from pressure plate.
15. Working in a diagonal sequence, progressively tighten pressure plate bolts to 25 Nm (18 lbf.ft).
16. Remove flywheel locking tool, **LRT-12-190**
17. Clean mating faces of engine and gearbox, dowel and dowel holes.
18. With assistance, position gearbox to engine, align to clutch assembly then locate on dowels.
19. Correctly position engine earth lead, fit top 2 bolts securing gearbox to engine.
20. Position front cover plate and fit nuts and bolts.
21. Tighten top bolts and front nuts and bolts to 80 Nm (59 lbf.ft) and gearbox to sump to 45 Nm (33 lbf.ft).
22. Position plain washer to M6 bolt, fit bolt and nut and tighten to 9 Nm (7 lbf.ft).
23. With assistance position IRD unit to gearbox, fit and tighten bolts to 90 Nm (66 lbf.ft).
24. Position support bracket to IRD unit and engine sump, fit and tighten bolts securing support bracket to IRD to 50 Nm (37 lbf.ft) and bolts securing support bracket to engine sump to 45 Nm.
25. Fit and tighten upper bolt securing IRD support bracket to cylinder block to 45 Nm (33 lbf.ft).
26. Position engine lower steady bracket to sump, fit and tighten bolts to 100 Nm (74 lbf.ft).
27. Connect coolant hoses to IRD unit and secure with clips.
28. Secure IRD unit breather hose in clip on dipstick tube.
29. Clean starter motor and mating face on gearbox.
30. Position rear cover plate to cylinder block.
31. Fit starter motor and lower nut and bolt but do not tighten at this stage.
32. Fit engine steady bar, fit bolt securing steady bar to LH engine mounting but do not tighten at this stage.
33. Fit starter motor upper nut and bolt.

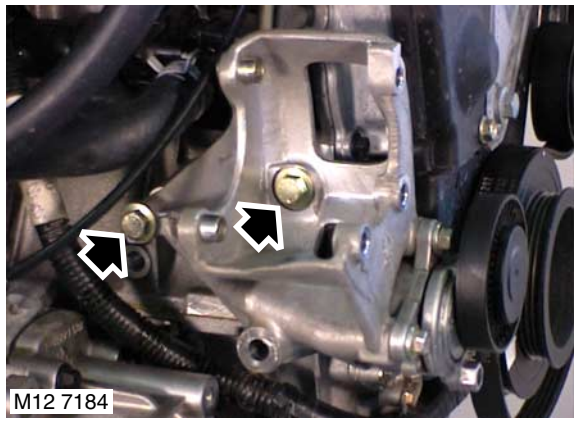
34. Tighten starter motor upper and lower nuts and bolts to 80 Nm (59 lbf.ft).
35. Connect Lucar to starter solenoid.
36. Top-up engine oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**

Crankshaft and main bearings

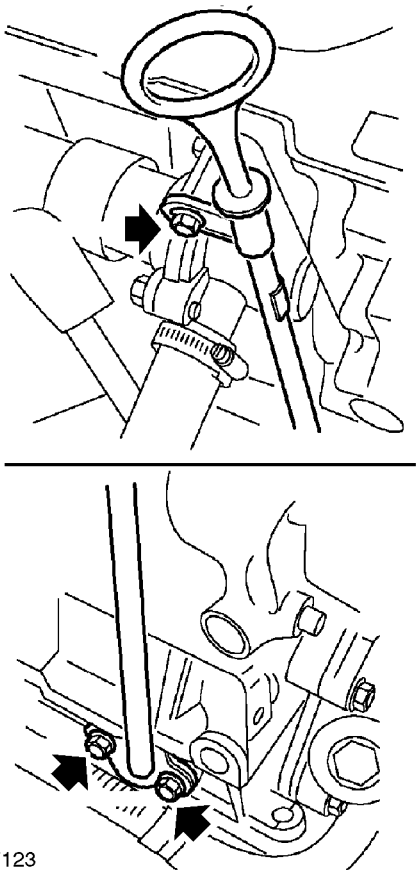
12.21.33.01

Remove

1. Remove cylinder head.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Gasket - cylinder head - unit removed.**
2. Remove crankshaft rear oil seal.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Crankshaft rear oil seal.**
3. Remove timing belt drive gear from crankshaft.
4. Remove oil filter and discard.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – K1.8.**
5. Remove oil pump.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Oil pump.**

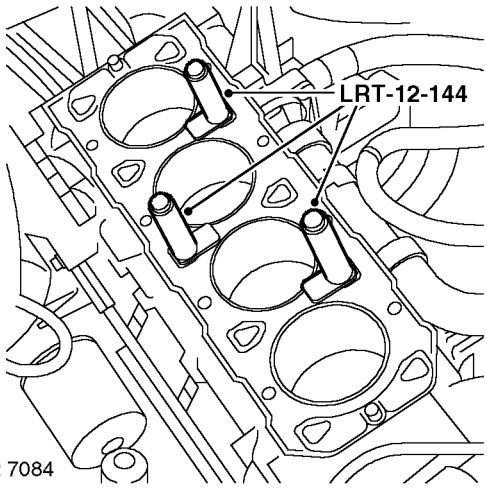


6. Remove 2 bolts securing PAS pump mounting bracket to cylinder block and remove bracket.



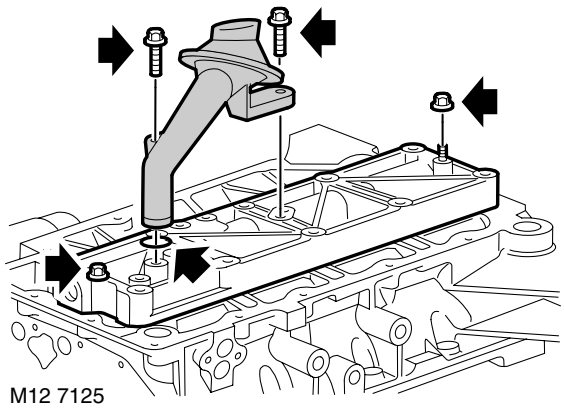
M12 7123

7. Remove dipstick.
8. Remove bolt securing thermostat housing and dipstick tube to cylinder block.
9. Remove 2 bolts securing dipstick tube to cylinder block.
10. Remove dipstick tube and discard gasket.
11. Remove sump.
    ☞ **ENGINE - K SERIES 1.8, OVERHAUL, Sump.**



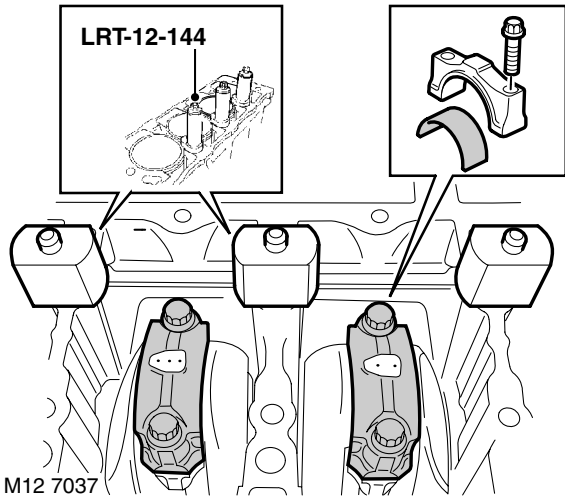
M12 7084

12. Remove bolts securing cylinder liner clamps **LRT-12-144** and remove clamps.
    CAUTION: Retain bolts in their original fitted order. Do not rotate crankshaft with clamps removed.



M12 7125

13. Remove 2 bolts securing oil pick-up strainer to oil rail.
14. Remove oil pick-up strainer.
15. Remove and discard 'O' ring from oil pick-up strainer.
16. Remove 2 nuts securing oil rail to bearing ladder and remove oil rail.



17. Fit cylinder liner clamps, **LRT-12-144**, using the nylon nuts supplied to retain liner clamps. Ensure that the feet of the liner clamps do not protrude over cylinder liner bores. Tighten cylinder head bolts sufficiently to retain liner clamps.

CAUTION: Ensure that bolts used are in their original fitted locations.

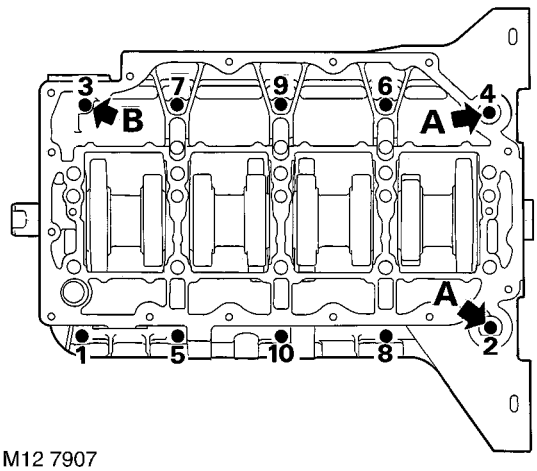
18. Temporarily fit crankshaft timing gear and pulley, fit retaining bolt and washer, lightly tighten bolt.
19. Mark connecting rod bearing caps for refitment.
20. Rotate crankshaft to bring numbers 2 and 3 pistons to BDC.
21. Remove 4 dowel bolts and 2 big-end bearing caps from numbers 2 and 3 connecting rods, keep dowel bolts and bearing caps in their fitted order.
22. Release connecting rods from crankshaft journals and carefully push pistons to top of cylinder bore. Remove and discard bearing shells from connecting rods and bearing caps.
23. Rotate crankshaft to bring numbers 1 and 4 pistons to BDC.
24. Remove 4 dowel bolts and 2 big-end bearing caps from numbers 1 and 4 connecting rods.

CAUTION: Keep dowel bolts and bearing caps in their fitted order.

25. Release connecting rods from crankshaft journals and carefully push pistons to top of cylinder bore. Remove and discard bearing shells from connecting rods and bearing caps.
26. Remove crankshaft pulley bolt, pulley and timing belt drive gear from crankshaft.

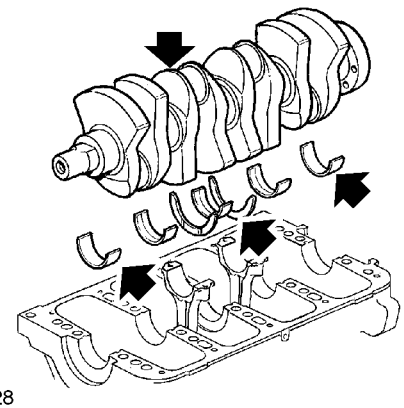
27. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.

CAUTION: Keep bolts in their fitted order. Do not rotate crankshaft with clamps removed.



28. Using sequence shown, remove 10 bolts securing bearing ladder to cylinder block and remove ladder.

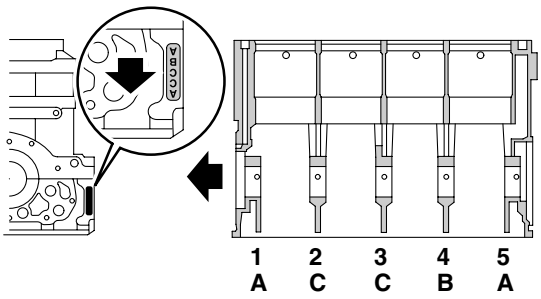
Note: 2 bolts 'A' in illustration are beneath flanges of rear mountings. Also, note position of flanged head bolt 'B' at front end of bearing ladder.



29. Remove crankshaft from cylinder block.
30. Remove 2 thrust washers from No. 3 bearing position.
31. Remove main bearing shells from cylinder block and bearing ladder.

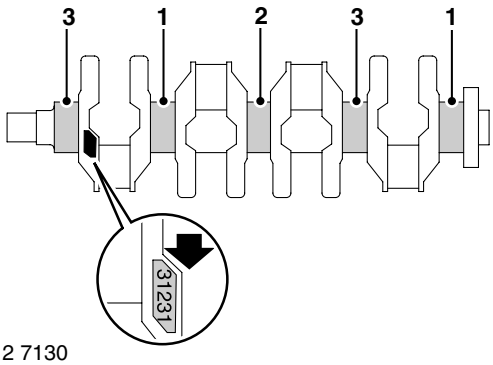
Refit

1. Using a suitable cleaning solvent, clean mating faces of cylinder block and bearing ladder.
   CAUTION: Do not use a metal scraper on sealing surfaces.
2. Clean bearing and thrust washer locations in cylinder block.
3. Clean bearing locations in bearing ladder.
4. Clean bearing locations on connecting rods and caps.
5. Clean dowels and dowel holes.
6. Clean crankshaft main bearing and big-end journals.
7. Clean crankshaft rear oil seal location.



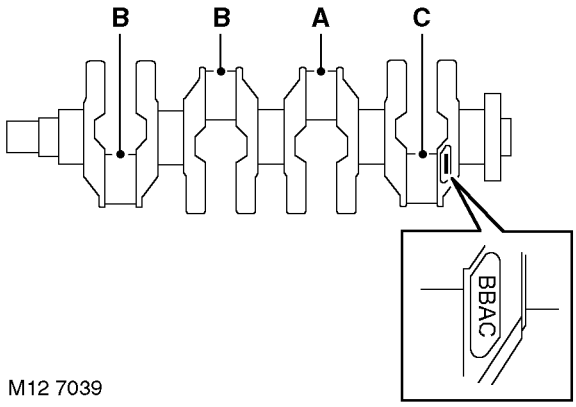
M12 7129

8. Record main bearing code letters from bearing ladder.



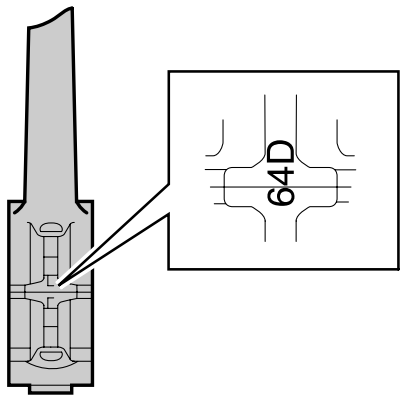
M12 7130

9. Record main bearing code numbers from crankshaft front web.
10. Check crankshaft main journal diameters.
    ☞ **GENERAL DATA, Engine – K1.8 Petrol.**
11. Determine appropriate main bearing shells to be fitted from size selection and type.
    ☞ **GENERAL DATA, Engine – K1.8 Petrol.**
12. Colour code on edge of bearing shell denotes bearing thickness as follows: GREEN = thin, BLUE = intermediate, RED = thick.
    CAUTION: If two bearing colours are to be used, the thicker bearing must be fitted to bearing ladder. When original crankshaft is to be refitted, bearing shells must be as selected from table. Do not fit undersize bearings.



M12 7039

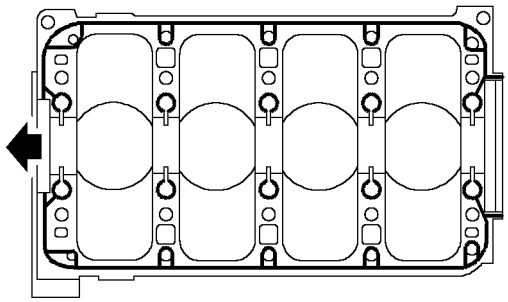
13. Record big-end journal code letters from crankshaft rear web. Reading from left to right, the first letter is Number 1 big-end bearing.



M12 7040

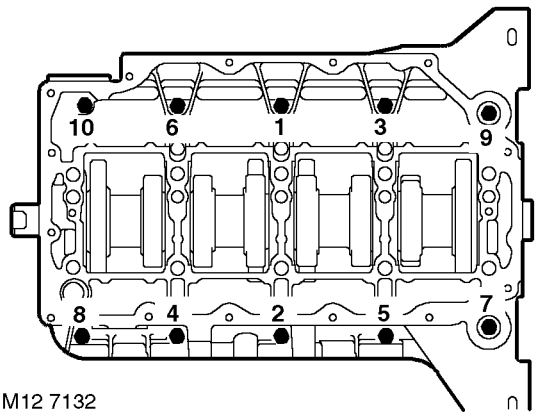
14. Record big-end bearing bore numbers. This will be 5, 6 or 7 located on the connecting rod bearing cap. Select required bearings.
    ☞ **GENERAL DATA, Engine – K1.8 Petrol.**
15. Colour code on edge of bearing denotes bearing thickness as follows: YELLOW = Thin, BLUE = Intermediate, RED = Thick. If two bearing colours are to be used, the thicker bearing must be fitted to the big-end bearing cap.
16. Fit selected main bearing shells, grooved into cylinder block and plain into bearing ladder.

17. Clean and fit new thrust washers into block, each side of No. 3 main bearing with oil grooves facing outwards.
18. Lubricate crankshaft main bearing journals with clean engine oil.
19. Hold crankshaft with big end journals horizontal, lower crankshaft onto main bearings.
20. Ensure that mating faces of bearing ladder and cylinder block are clean and dry.



M12 7131

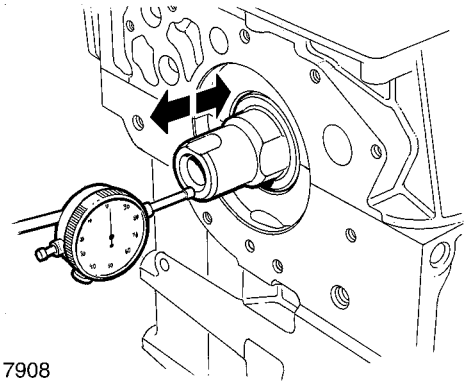
21. Apply a continuous bead of sealant, Part Number STC 4600, to paths shown on cylinder block then spread to an even film using a roller.
CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.



M12 7132

22. Lubricate main bearing journals with engine oil. Fit bearing ladder to block, fit bolts ensuring that flanged head bolt is fitted at position 10.
23. Tighten bolts in the sequence shown:
- Stage 1 - 5 Nm (3.5 lbf.ft)
- Stage 1 - 30 Nm (22 lbf.ft)

24. Fit cylinder liner clamps, **LRT-12-144**, using the nylon nuts supplied to retain liner clamps. Ensure that the feet of the liner clamps do not protrude over cylinder liner bores. Tighten cylinder head bolts sufficiently to retain liner clamps.
CAUTION: Ensure that bolts used are those originally fitted in that location.



M12 7908

25. Position DTI to front of cylinder block with stylus of gauge contacting front of crankshaft.
26. Move crankshaft rearwards and zero gauge.
27. Move crankshaft forwards and note end-float reading on gauge.
28. Compare figure obtained with specified end-float.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**
CAUTION: If end-float exceeds service limit with new thrust washers fitted, crankshaft must be replaced.

29. Remove DTI.
30. Temporarily fit crankshaft timing gear and pulley, fit retaining bolt and washer, lightly tighten bolt.
31. Fit selected big-end bearing shells to connecting rods and caps.
32. Lubricate connecting rod journals and bearing shells with clean engine oil.
33. Carefully pull connecting rods into place, fit connecting rod caps noting that featherways are on opposite sides and tighten dowel bolts finger tight.
34. Tighten big-end bearing dowel bolts to:
- Stage 1 - 20 Nm (15 lbf.ft)
- Stage 2 - Further 45°

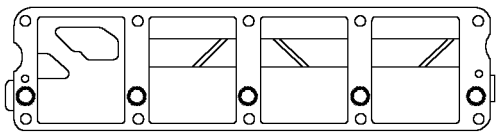
Note: Until cylinder head is fitted, crankshaft will be difficult to rotate once big-end bolts are tightened.

35. Using feeler gauges, check end-float of each big-end/connecting rod.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

36. Using a lint free cloth and suitable solvent, wipe clean sealing surfaces on bearing ladder and oil rail.

37. Temporarily remove cylinder liner clamps, **LRT-12-144.**.

CAUTION: Do not rotate crankshaft with cylinder liner clamps removed.



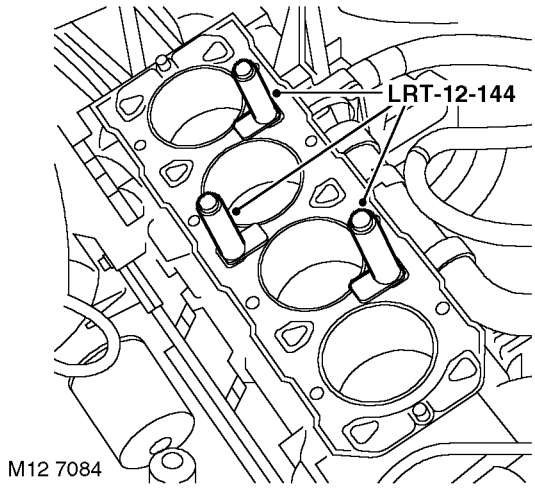
M12 7133

38. Apply continuous beads of sealant, Part Number STC 4600, to paths on oil rail as shown, then spread to an even film using a roller.

CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.

39. Position oil rail to bearing ladder, fit and tighten nuts to 9 Nm (7 lbf.ft).

CAUTION: A new oil rail together with oil pick-up pipe must be fitted if cylinder head bolt threads are damaged. Thread inserts (Helicoil) are not acceptable.



M12 7084

40. Fit cylinder liner clamps, **LRT-12-144** and lightly tighten cylinder head bolts.

CAUTION: Ensure bolts used are those originally fitted in that location.

41. Remove crankshaft pulley bolt, washer and pulley.

42. Clean oil pick-up strainer and mating face.

43. Lubricate new 'O' ring with clean engine oil and fit to pick-up strainer.

44. Position oil pick-up strainer, fit and tighten bolts to 10 Nm (7.5 lbf.ft).

45. Fit sump.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Sump.**

46. Clean dipstick tube and mating face.

47. Fit new gasket and dipstick tube to cylinder block.

48. Fit bolts securing dipstick tube to cylinder block and tighten to 10 Nm (7.5 lbf.ft).

49. Fit bolt securing dipstick tube and thermostat housing to cylinder block, tighten to 10 Nm (7.5 lbf.ft).

50. Fit dipstick.

51. Fit oil pump.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Oil pump.**

52. Position PAS pump mounting to cylinder block, fit and tighten bolts to 45 Nm (33 lbf.ft).

53. Fit new oil filter and tighten by hand until it seats, then tighten a further half turn.

54. Fit crankshaft timing gear.

55. Fit crankshaft rear oil seal.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Crankshaft rear oil seal.**

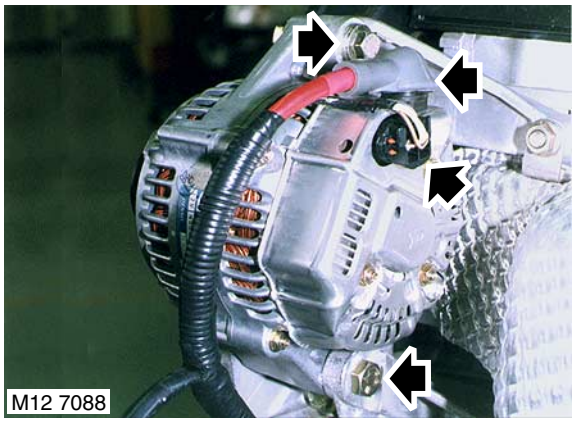
56. Fit cylinder head.
☞ **ENGINE - K SERIES 1.8, OVERHAUL, Gasket - cylinder head - unit removed.**

Gasket - cylinder head - unit removed

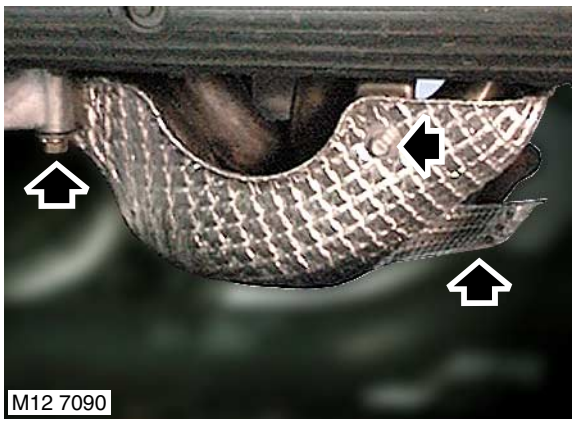
12.29.02.01

Remove

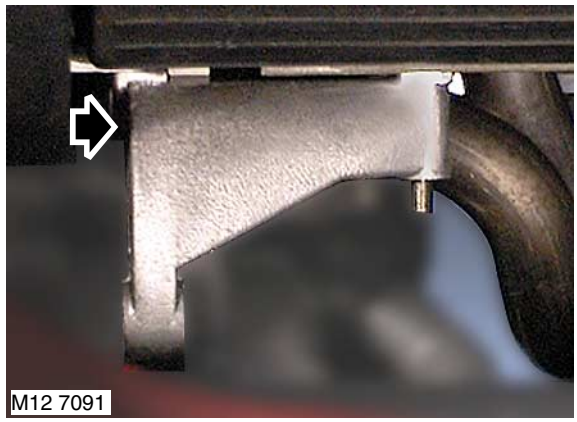
1. Remove camshaft timing belt rear cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - rear.**
2. Remove camshaft cover gasket.
   ☞ **ENGINE - K SERIES 1.8, OVERHAUL, Gasket - camshaft cover.**



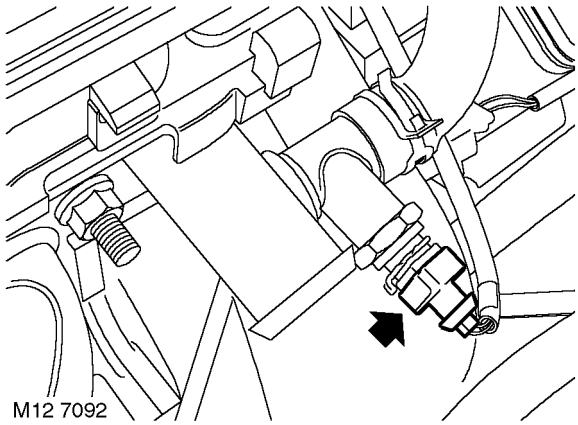
3. **Models with A/C:** Release cover, loosen nut and disconnect battery lead from alternator. Disconnect multiplug from alternator.
4. **Models with A/C:** Remove upper and lower bolts securing alternator and remove alternator.



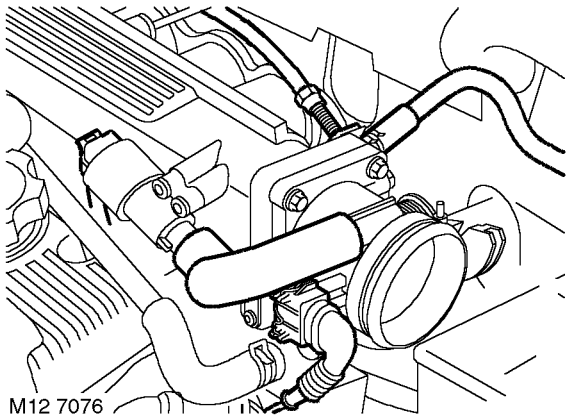
5. **Models with A/C:** Remove nut and 2 bolts securing heat shield to exhaust manifold and remove heat shield.



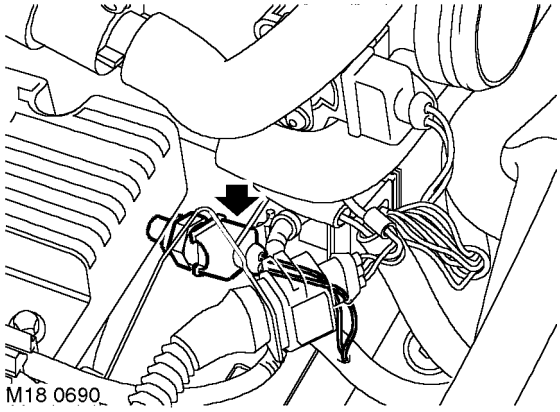
6. **Models with A/C:** Remove bolt securing alternator top support bracket to cylinder head and remove bracket.



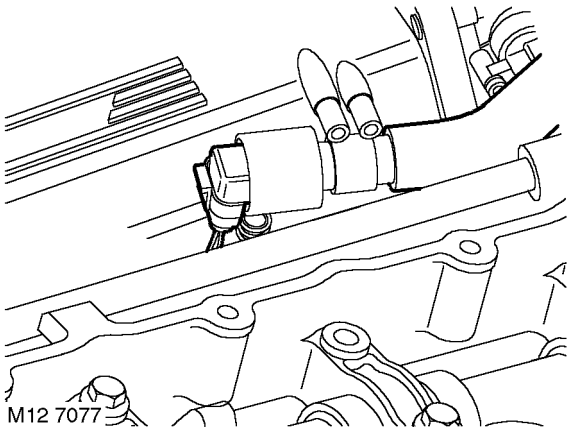
7. Disconnect multiplug from ECT sensor.



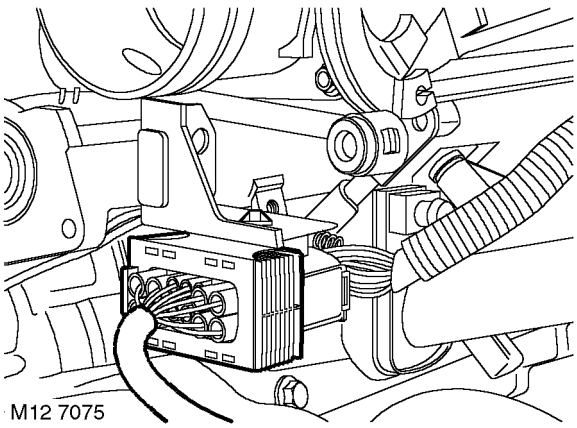
8. Disconnect multiplug from TP sensor.



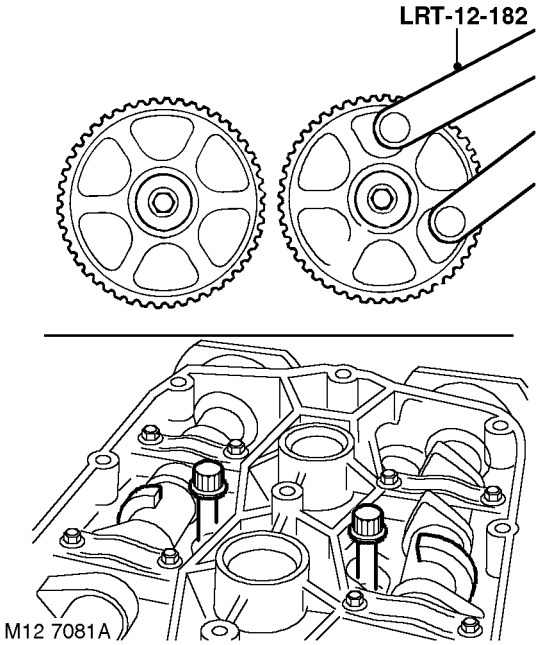
9. Disconnect multiplug from IAT sensor.



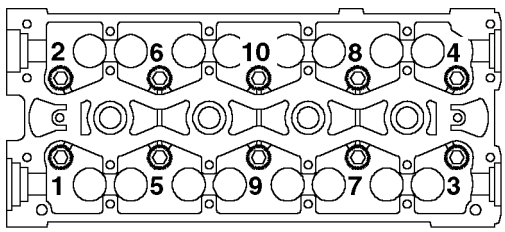
10. Disconnect multiplug from IACV.



11. Disconnect multiplug from injector harness.
12. Temporarily fit timing gears to their respective camshafts, fit but do not fully tighten bolts.



13. Using tool **LRT-12-182**, rotate camshafts to access cylinder head bolts beneath camshaft reluctor rings.

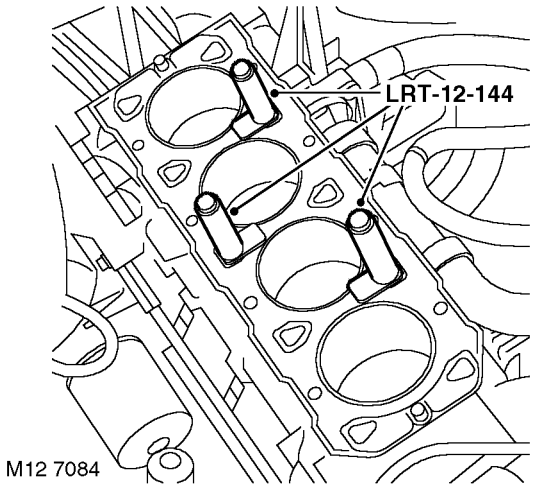


M12 7082

14. Working in the sequence shown, progressively loosen cylinder head bolts.
15. Remove cylinder head bolts and store in fitted order.
16. Remove and discard cylinder head gasket.

CAUTION: Removal of cylinder head bolts results in a 'tightening up' of the crankshaft. Crankshaft rotation must, therefore, be kept to a minimum. Do not rotate crankshaft until cylinder liner clamps LRT-12-144 are fitted.

17. Identify type of locating dowels fitted, nylon dowels must be replaced with steel dowels.



M12 7084

18. Fit cylinder liner clamps **LRT-12-144** to cylinder block and secure with cylinder head bolts. Make sure that feet of the cylinder liner clamps do not protrude over cylinder liner bores.

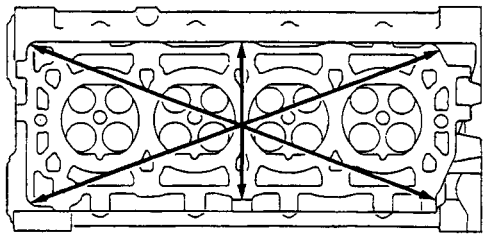
CAUTION: Ensure that bolts used are those originally fitted in that location.

Refit

1. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.

CAUTION: Keep bolts in their original fitted order. Do not rotate crankshaft with clamps removed.

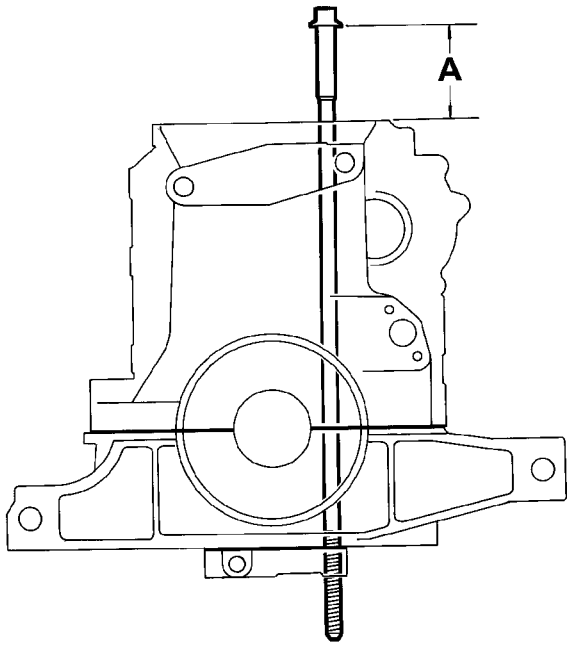
2. Clean mating faces of cylinder head and cylinder block.
3. Check cylinder head and mating face of cylinder block for damage, pay particular attention to gasket face of cylinder head.
4. Ensure coolant and oil passages are clean.


M12 7085

5. Check cylinder head face for warping, across centre and from corner to corner as shown.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

Note: Cylinder head may be refaced provided height is kept within specified limits.

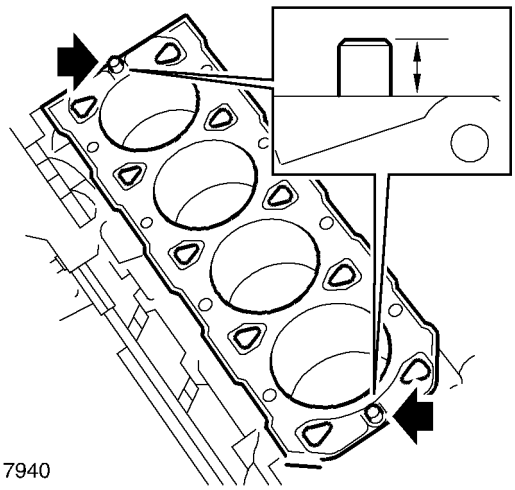
6. Wash cylinder head bolts and wipe dry.
7. Apply a light film of oil to bolt threads and underside of bolt heads.



M12 7898

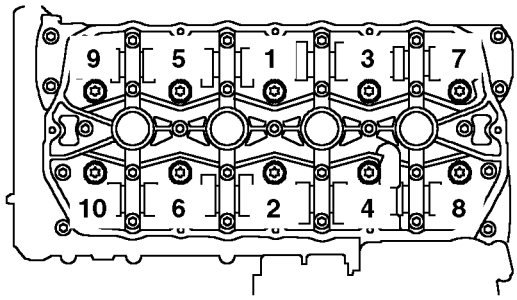
8. Carefully enter cylinder head bolts in their original fitted location, DO NOT DROP. Tighten each bolt by hand into oil rail.

9. Measure distance from the cylinder block face to underside of bolt head 'A' in illustration:
   - 97 mm (3.8 in) - Bolt may be re-used
   - Over 97 mm (3.8 in) - Bolt must be replaced
10. If nylon locating dowels were removed, clean dowel holes and fit new steel dowels to cylinder block.



M12 7940

11. Check that fitted height of dowels is between 10 to 11 mm (0.40 to 0.43 in).
12. Fit new cylinder head gasket, dry, to cylinder block.
13. With assistance, fit cylinder head and carefully position cylinder onto dowels.
14. Clean camshaft timing gears.
15. Temporarily fit timing gears to camshafts, fit but do not fully tighten bolts.
16. Using tool **LRT-12-182,** rotate camshafts to gain access to cylinder head bolts beneath camshaft reluctor rings.
17. Carefully enter cylinder head bolts in their original fitted order, DO NOT DROP. Tighten bolts into place by hand.



M12 7086

18. Working in the sequence shown, progressively tighten the cylinder head bolts to:
    - Stage 1 - 20 Nm (15 lbf.ft)
    - Stage 2 - 180°
    - Stage 3 - Further 180°

    CAUTION: Do not tighten bolts 360° in one operation.

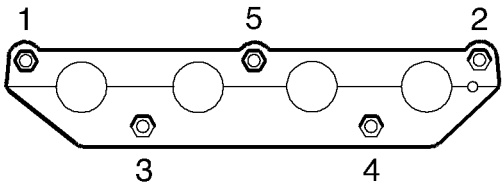
19. Remove camshaft timing gears.
20. Fit camshaft timing belt rear cover.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - rear.**
21. Fit camshaft cover gasket.
    ☞ **ENGINE - K SERIES 1.8, OVERHAUL, Gasket - camshaft cover.**
22. Connect multiplugs to IACV, IAT, TP and ECT sensors. Connect multiplug to injector harness.
23. **Models with A/C:** Position alternator support bracket, fit and tighten bolt to 25 Nm (18 lbf.ft).
24. **Models with A/C:** Position heat shield to exhaust manifold. Fit and tighten nut to 25 Nm (18 lbf.ft) and bolts to 10 Nm (7.5 lbf.ft).
25. **Models with A/C:** Position alternator, fit upper and lower bolts and tighten to 45 Nm (33 lbf.ft).
26. **Models with A/C:** Position battery cable to alternator and tighten nut to 8 Nm (6 lbf.ft).
27. **Models with A/C:** Connect multiplug to alternator.

Cylinder head - overhaul

12.29.19.01

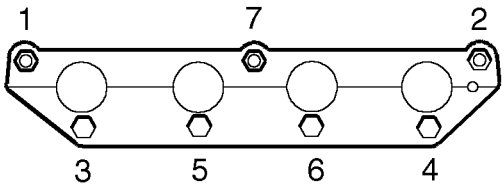
Remove

1. Remove cylinder head.
   ☞ **ENGINE - K SERIES 1.8, OVERHAUL, Gasket - cylinder head - unit removed.**



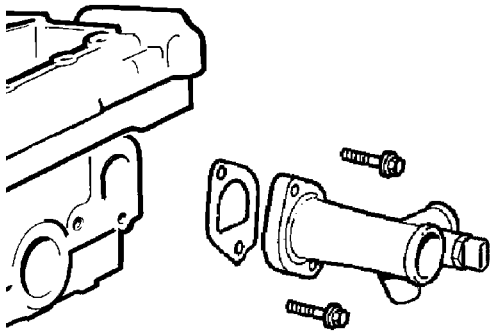
M12 7909

2. Using sequence shown, progressively loosen and remove 5 nuts securing exhaust manifold to cylinder head and remove manifold.
3. Remove and discard exhaust manifold gasket.



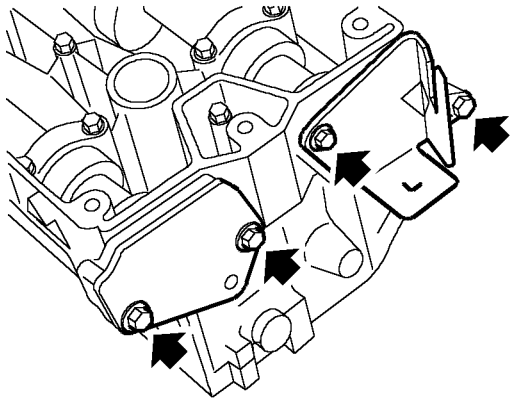
M30 1057

4. Using sequence shown, progressively loosen and remove 7 nuts securing inlet manifold to cylinder head.
5. Remove inlet manifold and discard gasket.



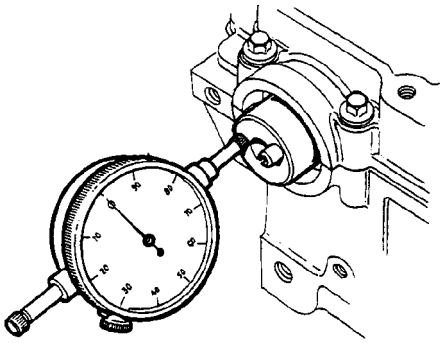
M12 7099

6. Remove 2 bolts securing coolant outlet elbow to cylinder head. Remove elbow and discard gasket.
7. Remove spark plugs.

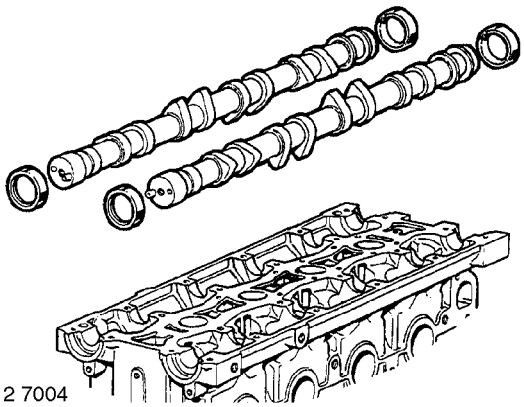


M12 7100

8. Remove 4 bolts securing front and rear camshaft end covers to cylinder head and remove end covers.



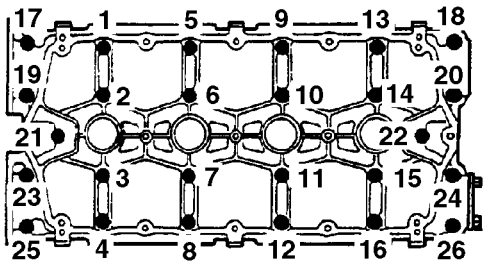
M12 7102



M12 7004

9. Check camshaft end-float using a DTI.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

10. If end-float is excessive, repeat check with new camshaft(s); if end-float is still excessive, replace cylinder head and camshaft carrier as an assembly.

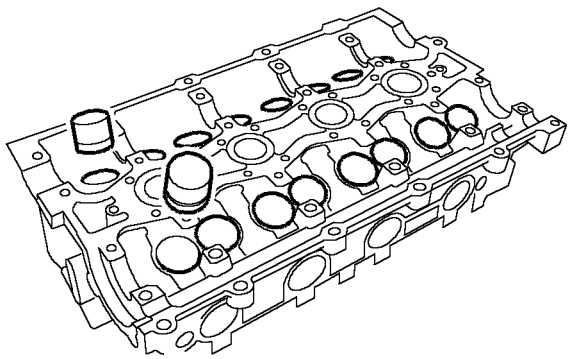


M12 7003

11. Working in the sequence shown, progressively loosen 26 bolts securing camshaft carrier to cylinder head, until valve spring pressure is released.

12. Remove camshaft carrier.

13. Suitably identify each camshaft to its fitted position and remove inlet and exhaust camshafts. Remove and discard 4 oil seals from camshafts.

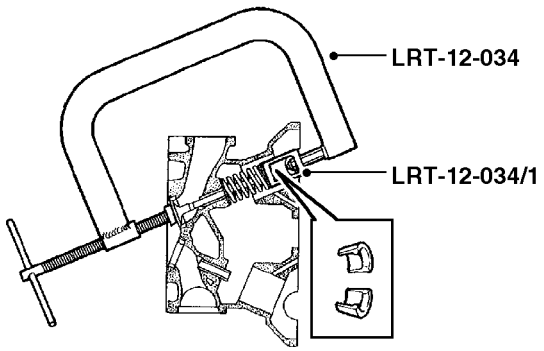


M12 7103

14. Using a stick magnet, remove 16 hydraulic tappets from cylinder head. Retain tappets in their fitted order and invert to prevent oil loss.

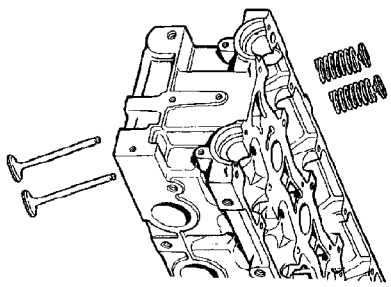
15. Check hydraulic tappets for signs of wear, scoring and overheating.

16. Measure outside diameter of each hydraulic tappet, measurement must be taken half-way along tappet body.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**



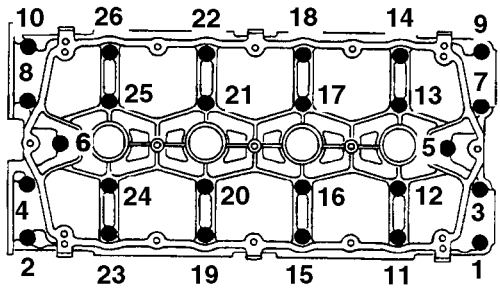
M12 7106

17. Using tool **LRT-12-034** and adapter **LRT-12-034/1**, compress valve spring, remove 2 collets, release valve spring and remove **LRT-12-034**.



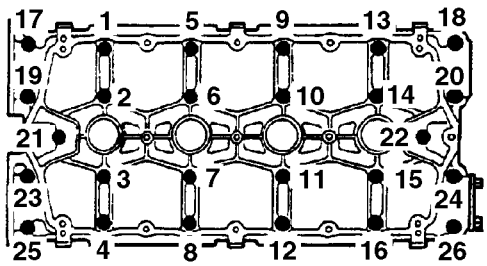
M12 7107

18. Remove valve spring cap and spring.
19. Remove valve from cylinder head.
20. Using tool **LRT-12-071**, remove and discard valve stem seal.
21. Repeat operations to remove remaining inlet valves, keeping valves and springs in their fitted order.
22. Position cylinder head on its inlet manifold face and support on wooden blocks.
23. Repeat operations to remove exhaust valves and valve stem seals.
24. Clean camshafts, bearing running surfaces in carrier and cylinder head, carrier and cylinder head mating faces.
25. Inspect camshafts and replace camshafts if scored, pitted or excessively worn.
26. Position camshafts in cylinder head and place Plastigauge across each journal.



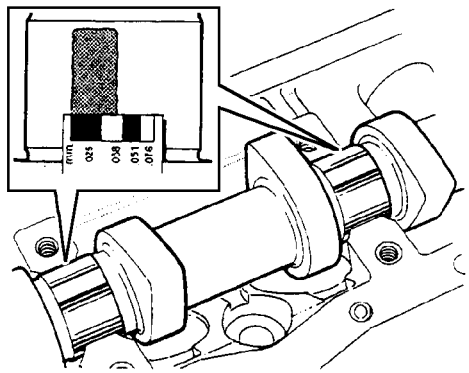
M12 7007

27. Refit camshaft carrier and tighten bolts in sequence to 10 Nm (7.5 lbf.ft). DO NOT rotate camshafts.



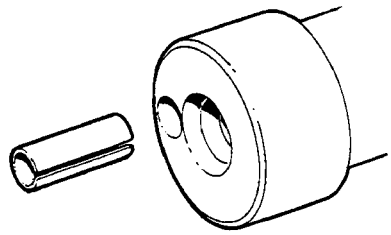
M12 7003

28. Using sequence shown, progressively loosen and remove bolts; remove camshaft carrier.



M12 7104

29. Measure widest portion of Plastigauge on each journal: Camshaft bearing clearance = 0.060 to 0.094 mm. Service limit = 0.15 mm.
30. If clearance is excessive, fit new camshafts and repeat check. If clearance is still excessive renew cylinder head.
31. Remove all traces of Plastigauge using an oily rag.



M12 7105

32. Remove drive pin from old camshaft and fit new pin with split towards centre of camshaft.

33. Clean timing gears, check gear teeth for damage and drive pin slots for wear.

CAUTION: If gears have been subjected to prolonged oil contamination, they must be soaked in a solvent bath and then thoroughly washed in clean solvent prior to refitment.

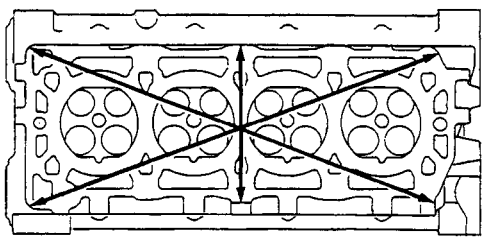
34. Clean sealing surfaces of cylinder head and camshaft carrier. Clean inlet and exhaust manifold mating surfaces.

CAUTION: Do not use a metal scraper.

35. Decarbonise combustion areas of cylinder head.

36. Blow out all oilways and coolant passages.

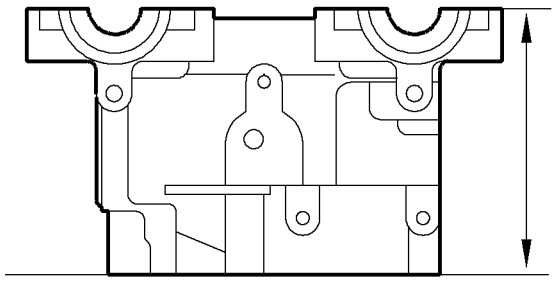
37. Check cylinder head for damage, pay particular attention to gasket face of cylinder head.



M12 7085

38. Check cylinder head face for warping, across centre and from corner to corner.

☞ **GENERAL DATA, Engine – K1.8 Petrol.**



M12 7890

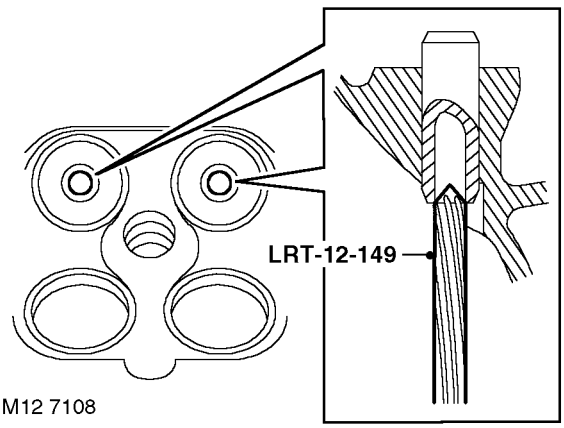
39. Check cylinder head height.

☞ **GENERAL DATA, Engine – K1.8 Petrol.**

Note: Provided cylinder head height is kept within limits, cylinder head may be refaced.

40. Check condition of valve springs and measure free length of springs.

☞ **GENERAL DATA, Engine – K1.8 Petrol.**

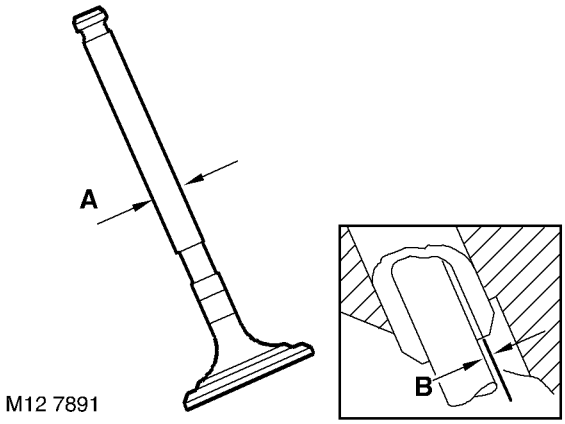


M12 7108

41. Remove carbon deposits from exhaust valve guides using tool **LRT-12-149.**

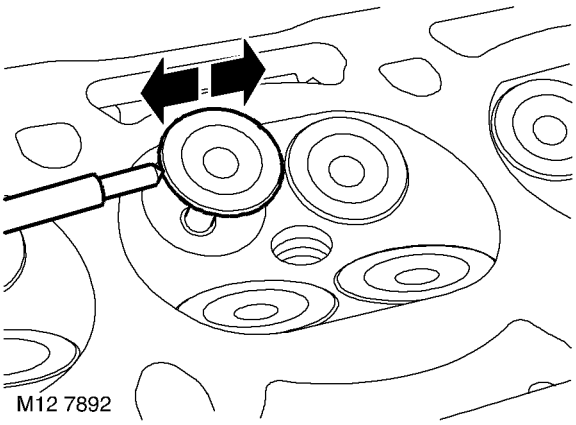
CAUTION: Tool must be inserted into valve guide from combustion face side of cylinder head.

42. Remove carbon from inlet valve guides, inlet and exhaust valves, valve seat inserts and combustion areas. Remove all loose particles of carbon on completion.



43. Check and record existing valve stem diameters **'A'**, replace any valve if valve stem is less than specified.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

44. Check inlet and exhaust valve to guide clearances **'B'** using the following procedures.



45. Insert valve into its respective guide.

46. Extend valve head 10 mm (0.4 in) out of valve guide and position suitable DTI gauge to rear of valve head.

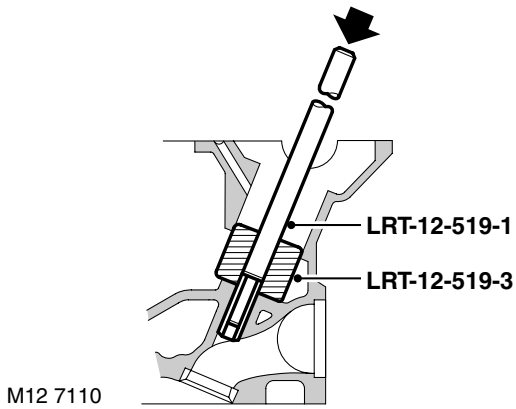
47. Move valve towards front of cylinder head and zero gauge ensuring that stylus of gauge remains in contact with valve head.

48. Move valve towards rear of cylinder head record reading obtained to give valve stem to guide clearance **'B'**
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

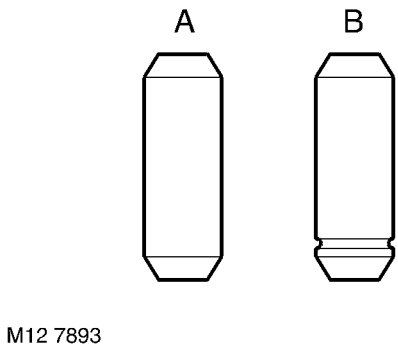
49. Repeat above procedures for each valve in turn.
CAUTION: Keep valves in their fitted order.

50. Renew valves and guides as necessary.
☞ **GENERAL DATA, Engine – K1.8 Petrol.**

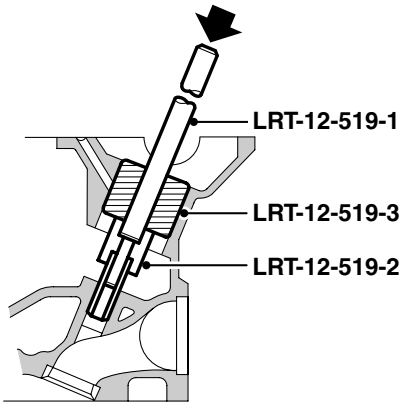
51. Support cylinder head face down on wooden blocks.



52. Position **LRT-12-519-3** in tappet bore and drift out valve guide using **LRT-12-519-1.**
NOTE: Retain valve guides in their fitted order.



53. Identify type of valve guide fitted: **'A'** - Standard production **'B'** - Service replacement
CAUTION: Standard production valve guides 'A' must be replaced with service replacement guides 'B'.

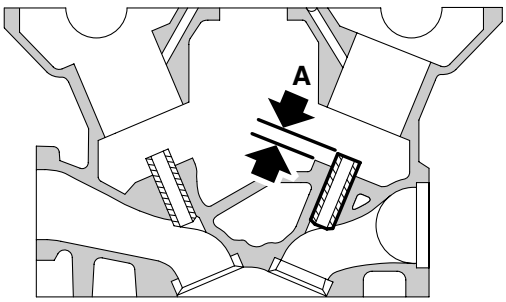


M12 7112

54. Locate valve guide in valve guide bore with identification groove towards valve seat and position depth gauge **LRT-12-519-2** onto valve guide.

Note: Cylinder head and valve guides must be at room temperature when replacing guides.

55. Position nylon guide **LRT-12-519-3** in cylinder head, press guide into bore using driver **LRT-12-519-1** until depth gauge contacts cylinder head.



M12 7894

56. Check fitted height **'A'** of valve guide: = 6.00 mm (0.24 in).

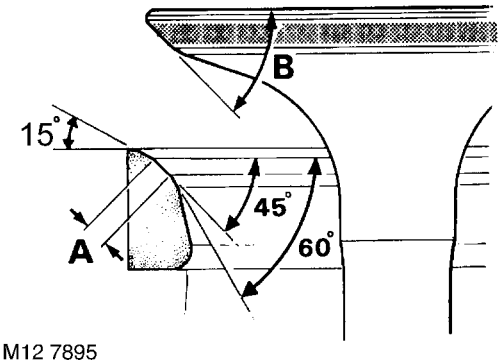
57. Check condition of valve seats and existing valves that are to be re-used.

58. Replace valve seat inserts as necessary.

CAUTION: Do not damage counterbore when removing insert.

59. Cool replacement valve seats using liquid nitrogen and press into cylinder head in one continuous operation.

CAUTION: Do not heat cylinder head. Inserts must not stand proud of combustion face on completion of cutting operation.



M12 7895

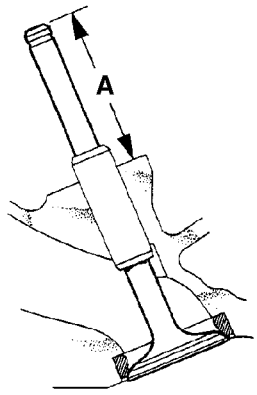
60. Cut valve seats using a suitable pilot and cutters having the following angles:
- 15° - To cut first angle
- 45° - Make final cut and remove any burrs
- 60° - To narrow valve seat and obtain correct valve seat width

61. Check valve seat width and face angle:
- Seat width **'A'** - Inlet = 1.2 mm (0.05 in) Exhaust = 1.6 mm (0.06 in)
- Valve face angle **'B'** - Inlet and Exhaust = 45°

62. Lap each valve in using a fine grinding paste.

63. Apply Prussian Blue to valve seat, insert valve and press into position without rotating. Remove and check for even and central seating. Seating position shown by blue should be in centre of valve face.

64. Lap and re-check valve seating.



M12 7115

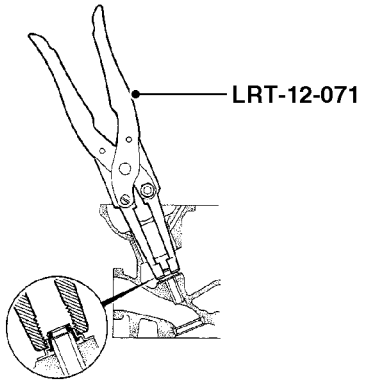
65. Check valve stem fitted height - **'A'**.

☞ **GENERAL DATA, Engine – K1.8 Petrol.**

66. If valve stem fitted height is above service limit, fit new valve and re-check. If still over limit renew valve seat insert.

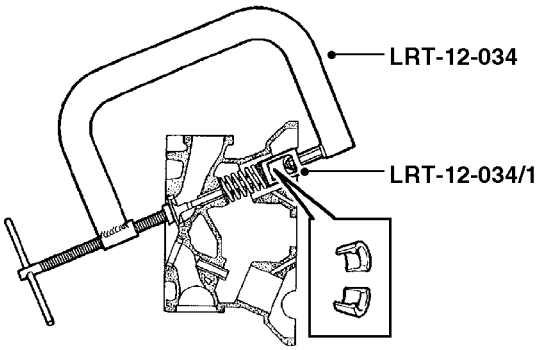
Refit

1. Clean inlet and exhaust valves, caps, collets and valve springs.



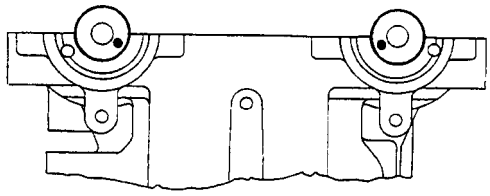
M12 7117

2. Lubricate new valve stem seal with clean engine oil, fit seal to valve guide using tool **LRT-12-071.**
3. Lubricate valve with clean engine oil and fit valve.



M12 7106

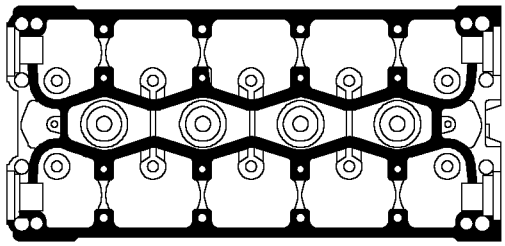
4. Fit spring and cap, compress spring using tool **LRT-12-034** and adaptor **LRT-12-034/1**; fit collets.
5. Repeat procedure and fit remaining valves.
6. Using a wooden dowel and mallet, lightly tap top of each valve two or three times to seat valves and collets.
7. Lubricate tappets with clean engine oil and refit in original positions.



M12 7005

8. Lubricate bearings, fit camshafts and position inlet drive pin at 4 o'clock and exhaust drive pin at 8 o'clock.

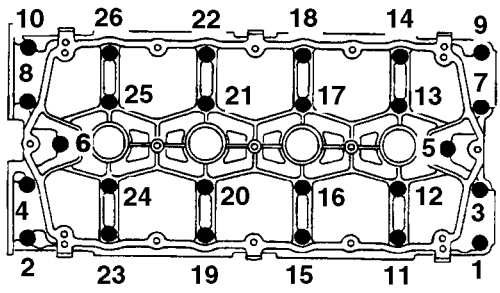
   CAUTION: Ensure that camshafts are in their correct fitted location.



M12 7006

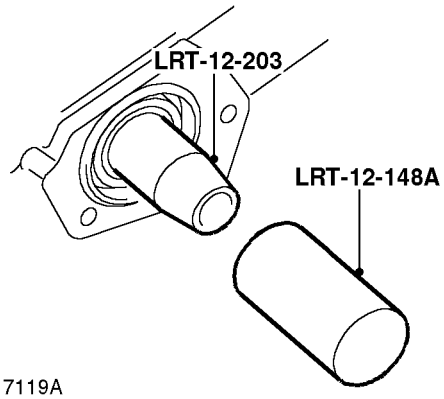
9. Apply continuous thin beads of sealant, Part No. STC 4600, to paths on camshaft carrier as shown. Spread sealant to an even film using a roller.

   CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.



M12 7007

10. Fit camshaft carrier and progressively tighten bolts, in sequence shown to 10 Nm (7.5 lbf.ft).

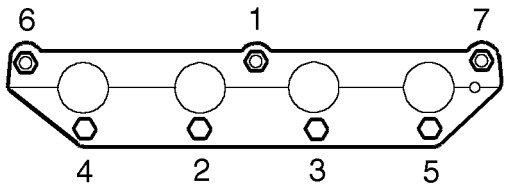


M12 7119A

11. Noting that the front camshaft oil seals are black in colour and the rear oil seals are red, fit new camshaft oil seals using tools **LRT-12-203** and **LRT-12-148A**

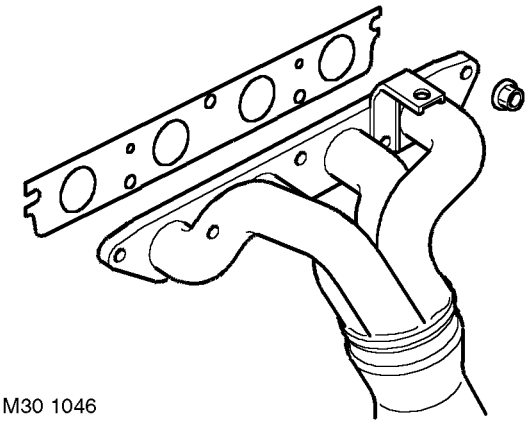
CAUTION: Oil seals must be fitted dry. Do not use tool LRT-12-148 for fitting seals.

12. Clean oil seal cover plates and mating faces.
13. Position exhaust camshaft rear oil seal cover plate, fit bolts and tighten to 25 Nm (18 lbf.ft).
14. Position inlet camshaft rear oil seal cover plate, fit bolts and tighten to 6 Nm (4.5 lbf.ft).
15. Set gap of each new spark plug to 1.00 mm.
16. Fit spark plugs and tighten to 27 Nm (20 lbf.ft).
17. Fit a new coolant outlet elbow gasket to cylinder head, fit elbow and tighten bolts to 9 Nm (7 lbf.ft).
18. Clean inlet manifold and cylinder head mating faces.



M30 1055

19. Fit new inlet manifold gasket to cylinder head, position inlet manifold, fit and tighten nuts in the sequence shown to 17 Nm (12.5 lbf.ft).
20. Clean exhaust manifold and cylinder head mating faces.



M30 1046

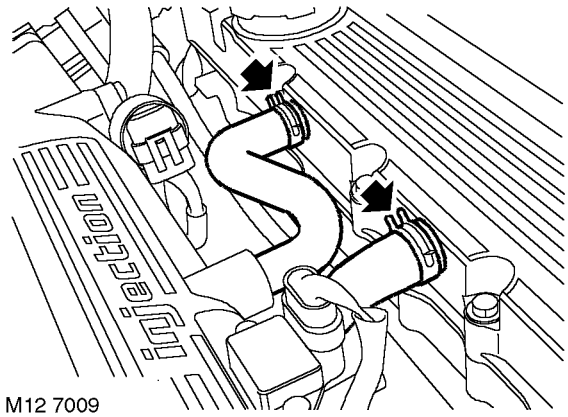
21. Fit new exhaust manifold gasket, position exhaust manifold, fit nuts and tighten to 45 Nm (33 lbf.ft).
22. Fit cylinder head.

☞ **ENGINE - K SERIES 1.8, OVERHAUL, Gasket - cylinder head - unit removed.**

Gasket - camshaft cover

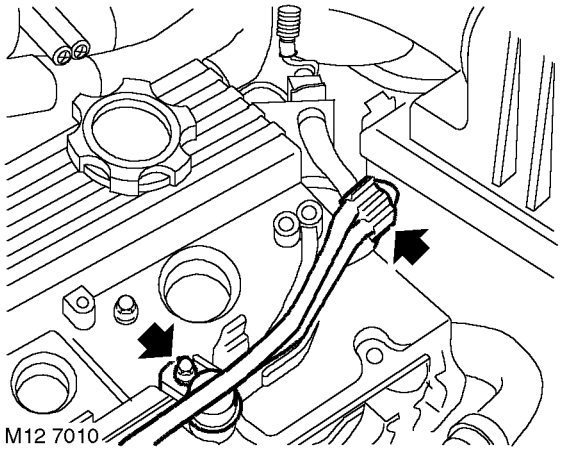
12.29.40.01

Remove



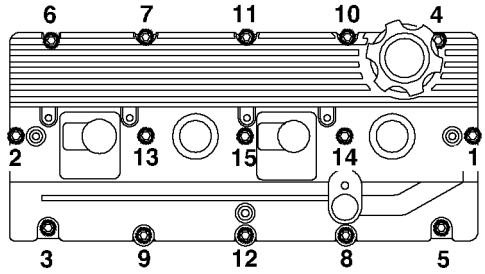
M12 7009

1. Release 2 clips and disconnect breather hoses from camshaft cover.
2. Remove ignition coils.
   ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Ignition coil.
3. Remove any debris from spark plug recesses.



M12 7010

4. Release coil and CMP sensor harness clip from camshaft cover.
5. Remove bolt securing CMP sensor to cover, release sensor and position aside.

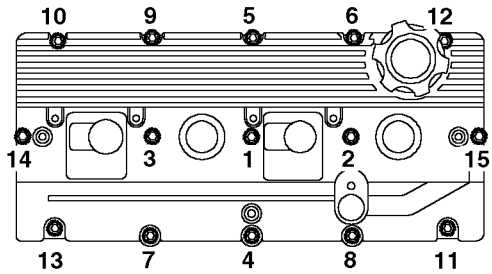


M12 7899

6. Using sequence shown, progressively loosen and remove 15 bolts securing camshaft cover.
7. Remove camshaft cover and discard gasket.

Refit

1. Clean mating surfaces of camshaft cover and carrier.
2. Clean inside of camshaft cover. If necessary, wash oil separator elements in solvent and blow dry.
3. Fit camshaft cover gasket.
   Note: Modified gasket having a 'crimped' edge should be fitted.



M127012

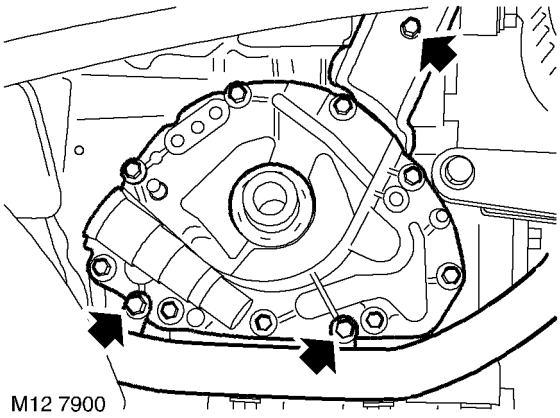
4. Position camshaft cover, fit and tighten bolts progressively in the sequence shown to 8 Nm (6 lbf.ft).
5. Clean CMP sensor and mating face. Fit sensor, fit bolt and tighten to 8 Nm (6 lbf.ft).
6. Secure harness clip to cover.
7. Fit ignition coils.
   ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Ignition coil.
8. Connect breather hoses and secure with clips.

Oil pump

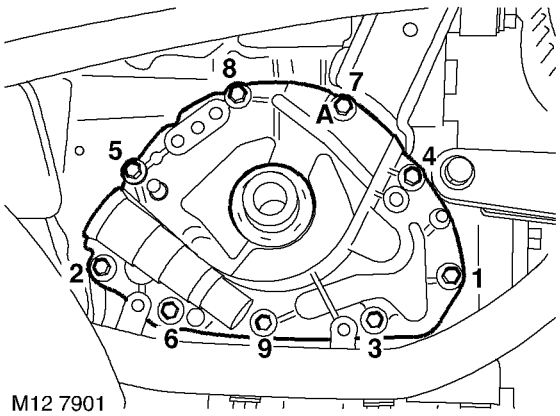
12.60.26.02

Remove

1. Remove camshaft timing belt.
   ENGINE - K SERIES 1.8, OVERHAUL, Camshaft timing belt.
2. Remove crankshaft gear.


M12 7900

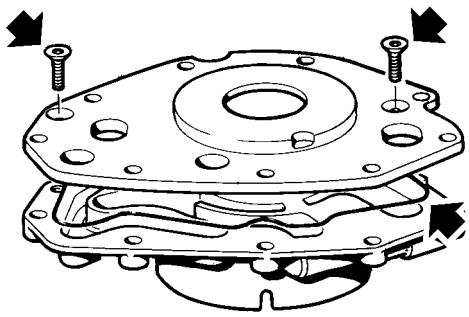
3. **If fitted:** Remove 2 bolts securing engine harness to oil pump.
4. Remove lower bolt from timing belt rear cover.



M12 7901

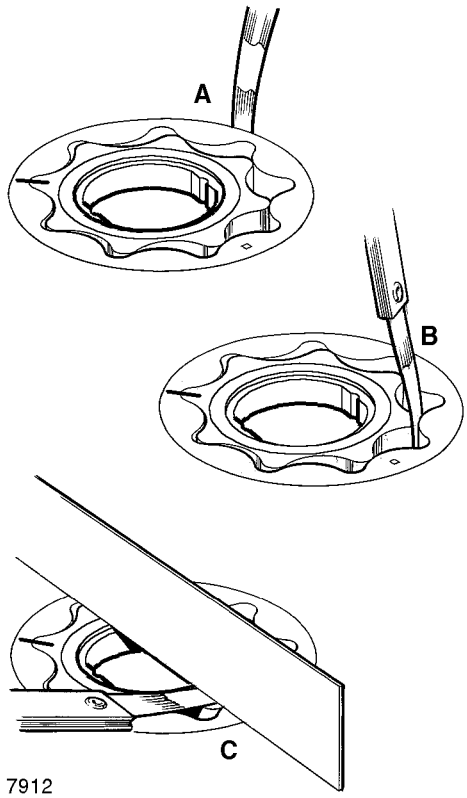
5. Noting fitted position of M6 x 20 bolt 'A' and using sequence shown, remove and discard 9 bolts securing oil pump to cylinder block.
6. Release timing belt rear cover to facilitate oil pump removal.
7. Remove oil pump, remove and discard gasket.
   Note: Dowel located.
8. Remove and discard crankshaft front oil seal from oil pump.

Disassembly


M12 7911

1. Remove 2 Torx screws, remove cover plate.
2. Remove and discard cover plate seal.

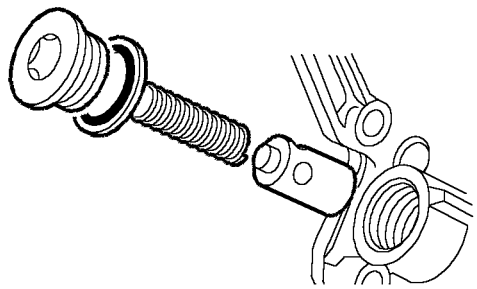
Inspect



M12 7912

1. Make suitable alignment marks between inner and outer rotors and oil pump body.
2. Remove inner and outer rotors.
3. Clean inner and outer rotors and rotor housing.
4. Fit inner and outer rotors ensuring that reference marks are aligned.

5. Check rotor clearances:
   - 'A' Outer rotor to housing = 0.28 - 0.36 mm (0.011 - 0.014 in)
   - 'B' Inner rotor tip = 0.05 - 0.13 mm (0.002 - 0.005 in)
   - 'C' Rotor end-float = 0.02 - 0.06 mm (0.001 - 0.002 in)
6. Renew oil pump as an assembly if clearances are excessive.



M12 7914

7. Remove relief valve plug, discard sealing washer.
8. Remove spring and relief valve .
9. Check that valve slides freely in bore and that bore and valve are free from scoring and corrosion.

   Note: Light corrosion may be removed using grade 600 emery cloth soaked in oil.

10. Check free length of spring.
    ☞ **GENERAL DATA, Engine – K1.8 Petrol.**
11. Replace relief valve as an assembly if scoring of valve is evident or free length of spring is less than specified. Replace oil pump as an assembly if relief valve bore is scored.

Reassembly

1. Remove all traces of Loctite from Torx screws, oil pressure relief valve plug and threads in pump body and relief valve bore.

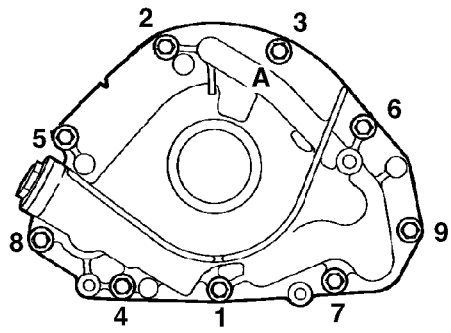
   CAUTION: Do not use a tap.

2. Clean cover plate.
3. Lubricate relief valve, bore and spring with clean engine oil.
4. Fit valve and spring.
5. Fit a new sealing washer to plug and apply Loctite 577 to threads of plug.
6. Fit plug and tighten to 25 Nm (18 lbf.ft).
7. Lubricate rotors and rotor housing with clean engine oil.
8. Ensuring that outer rotor identification mark is facing outwards and reference marks are aligned, fit inner and outer rotors.
9. Lubricate a new cover plate seal with clean engine oil, fit seal and cover plate.
10. Apply Loctite 577 to threads of Torx screws, fit and tighten screws.
11. Check that pump rotates freely.

Refit

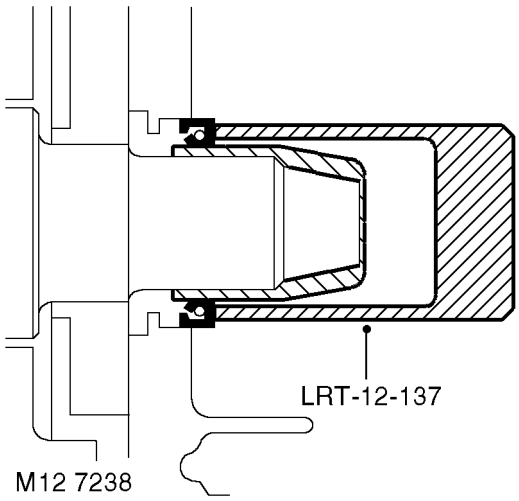
1. Clean oil seal running surface on crankshaft and oil pump mating face on cylinder block, ensure bolt holes are clean and dry.
2. Fit new oil pump gasket, align and fit oil pump.

   CAUTION: Gasket must be fitted dry.



M12 7902

3. Fit new Patchlok bolts ensuring M6 x 20 bolt is in position 'A'.
4. Using sequence shown, tighten bolts to 10 Nm (7.5 lbf.ft).
5. Fit bolt securing timing belt rear cover to 9 Nm (7 lbf.ft).
6. **If fitted:** Align engine harness to oil pump, fit bolts and tighten to 10 Nm (7.5 lbf.ft)



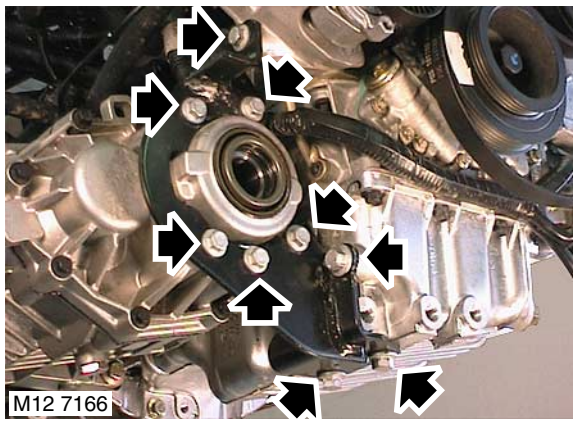
7. Fit seal guide from crankshaft front oil seal kit over front of crankshaft.
8. Fit new oil seal using tool **LRT-12-137**.
   CAUTION: Oil seal must be fitted dry.

9. Clean crankshaft gear.
10. Fit camshaft timing belt.
    ☞ **ENGINE - K SERIES 1.8, OVERHAUL, Camshaft timing belt.**

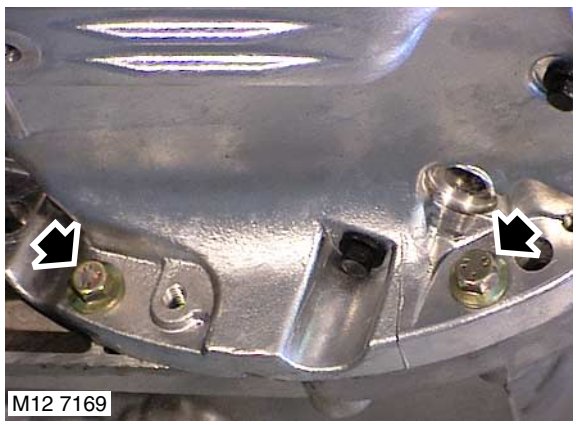
Sump

12.60.38.01

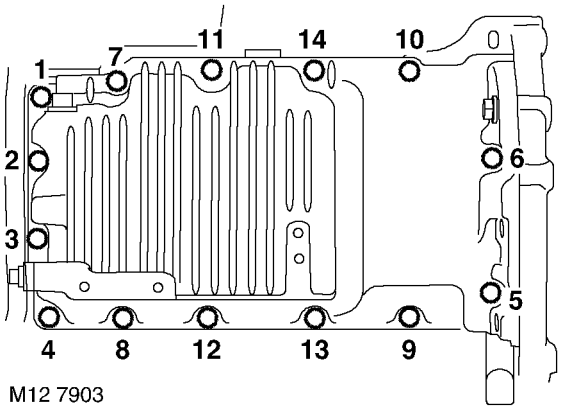
Remove



1. Remove upper bolt securing IRD support bracket to cylinder block.
2. Remove 5 bolts securing support bracket to IRD.
3. Remove 3 bolts securing IRD support bracket to sump and remove bracket.



4. Remove 2 bolts securing sump to gearbox.



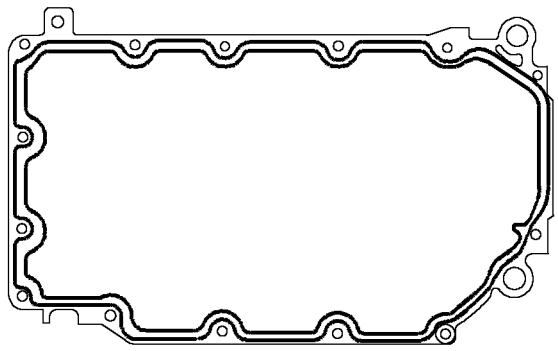
M12 7903

5. Noting the fitted position of 2 M8 x 60 mm bolts and using the sequence shown, remove 14 bolts securing sump to bearing ladder.
6. Using a mallet, gently tap sump sideways to release sealant bond, remove sump.

   CAUTION: Do not lever between sump and bearing ladder.

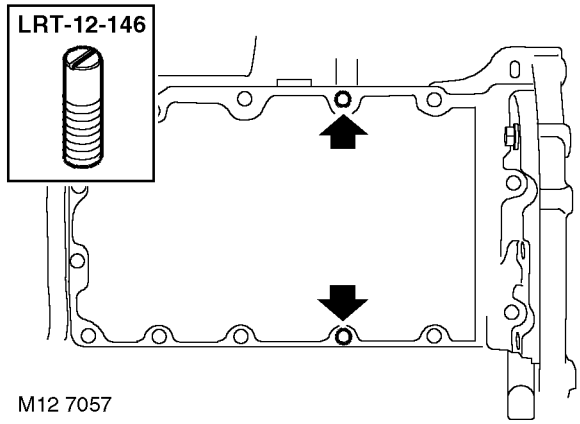
Refit

1. Clean inside of sump. Use a lint-free cloth and suitable solvent to clean mating faces of sump and bearing ladder.


M12 7030

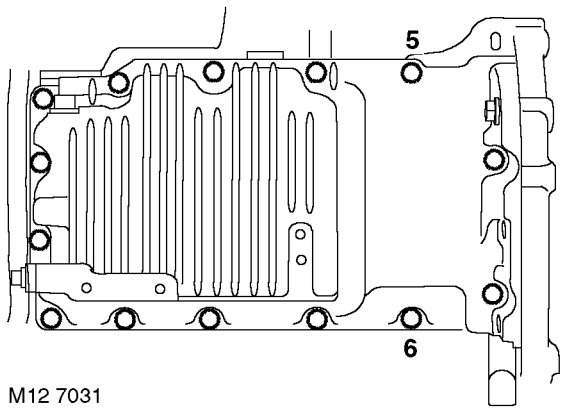
2. Apply a continuous bead of sealant, Part Number STC 4600, to sump face and spread to an even film using a roller.

   CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.



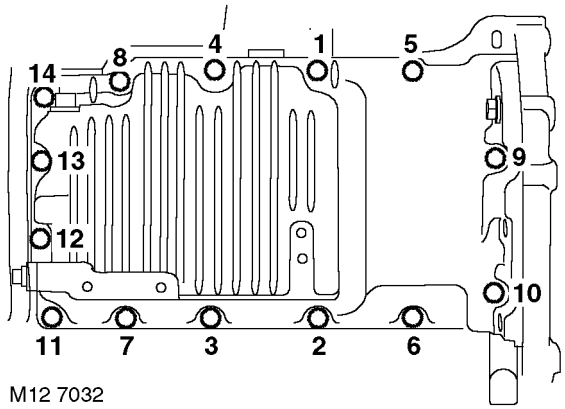
M12 7057

3. Fit alignment pins, **LRT-12-146,** to positions shown.



M12 7031

4. Position sump to bearing ladder, fit 2 bolts at positions 5 and 6 and tighten to 4 Nm (3 lbf.ft).
5. Fit 10 bolts into remaining holes, lightly tighten all bolts. Ensure that the two M8 x 60 longer bolts are fitted into rearmost holes in sump.
6. Fit bolts securing sump to gearbox housing, lightly tighten and then loosen bolts. This will correctly align the rear sump flange to gearbox.
7. Remove alignment pins, **LRT-12-146,** fit and lightly tighten 2 remaining bolts.



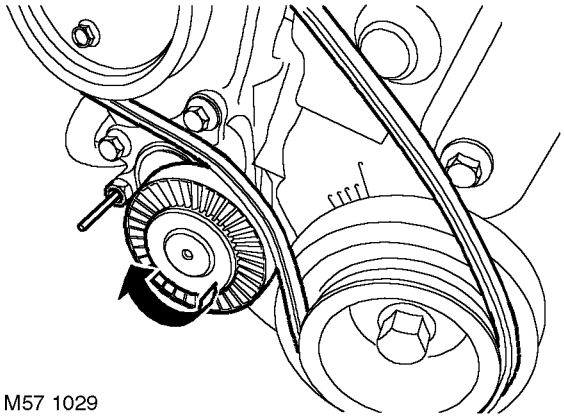
M12 7032

8. Ensure that the rear sump flange is aligned to gearbox housing and progressively tighten sump bolts in the sequence shown, M8 x 25 bolts to 25 Nm (18 lbf.ft) and M8 x 60 bolts to 30 Nm (22 lbf.ft).
9. Tighten bolts securing gearbox to sump to 45 Nm (33 lbf.ft).
10. Position support bracket to IRD unit and engine sump, fit and tighten bolts securing support bracket to IRD to 50 Nm (37 lbf.ft) and bolts securing support bracket to engine sump to 45 Nm (33 lbf.ft).
11. Fit and tighten upper bolt securing IRD support bracket to cylinder block to 45 Nm (33 lbf.ft).

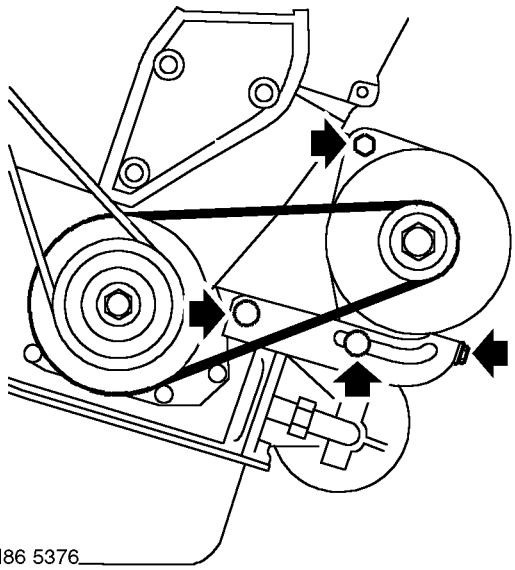
Camshaft timing belt

12.65.18.01

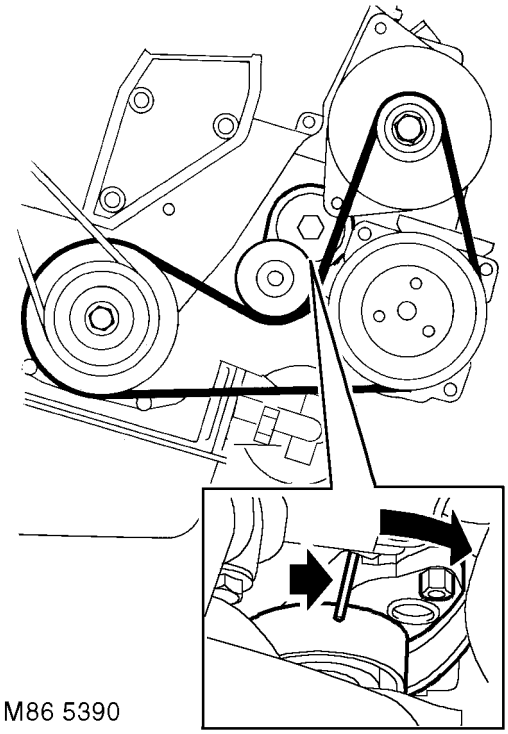
Remove


M57 1029

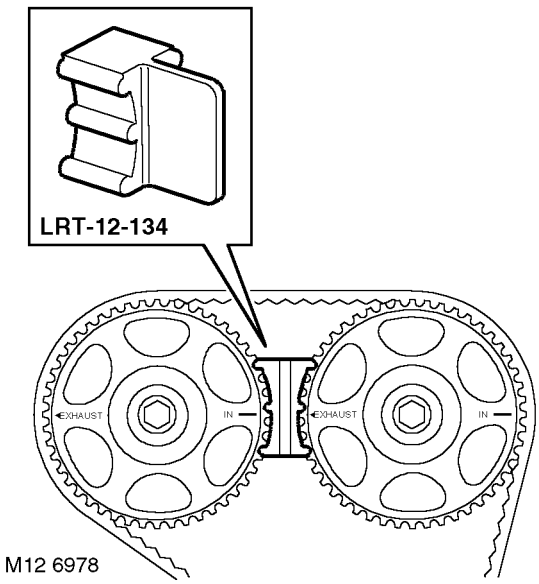
1. Using a 13 mm spanner, rotate PAS drive belt tensioner and insert a suitable 4 mm diameter pin through centre of hexagon into tensioner backplate. Remove PAS drive belt.


M86 5376

2. Loosen alternator pivot bolts and adjuster link bolts. Release belt tension using adjusting bolt and remove drive belt.


M86 5390

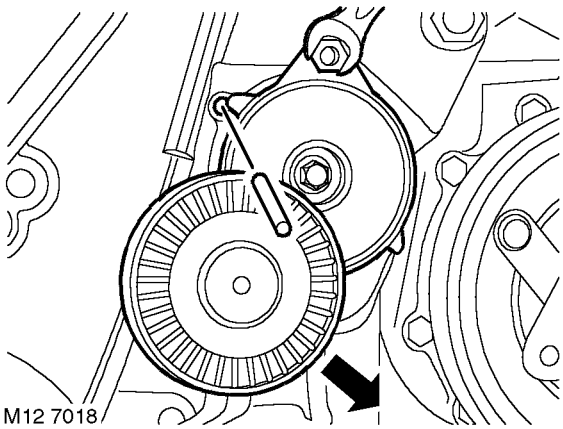
3. **Models with A/C:** Fit a 13 mm spanner to hexagon on ancillary drive belt tensioner and rotate fully clockwise to release tension on drive belt.
4. **Models with A/C:** To hold tensioner in this position, fit a suitable pin, not exceeding 3 mm in diameter, into hole in tensioner backplate. Remove ancillary drive belt.
5. Disconnect Lucar connector from starter solenoid.
6. Remove 2 bolts securing starter motor to gearbox and remove starter motor.
7. Remove camshaft timing belt upper cover.
   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**



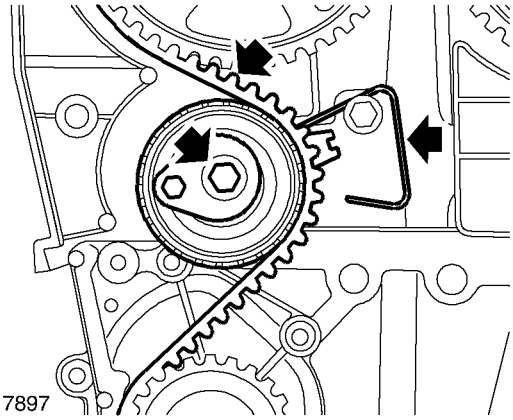
M12 6978

8. Rotate crankshaft clockwise to align camshaft gear timing marks.
   CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to turn the crankshaft.

9. Fit camshaft gear alignment tool **LRT-12-134.**


M12 7018

10. **Models with A/C:** Hold ancillary drive belt tensioner, remove pin and allow tensioner to move fully anti-clockwise.
11. Remove camshaft timing belt lower cover.
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - with A/C.**
    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - without A/C.**


M12 7897

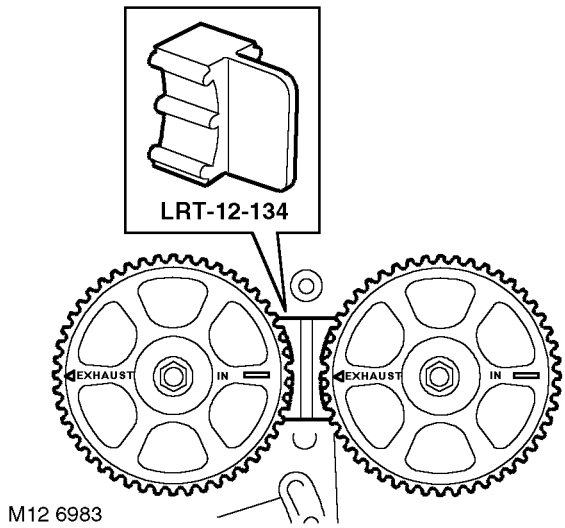
12. Remove and discard timing belt tensioner bolt.
13. Disengage index wire from its fitted position whilst at the same time removing timing belt tensioner.
14. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt.
15. Remove camshaft timing belt.

CAUTION: Ease the timing belt off the gears using the fingers only, metal levers may damage the belt and gears. Do not rotate the crankshaft or camshafts with the timing belt removed and cylinder head fitted. Timing belt must be replaced if cylinder head is to be removed or new drive gears, tensioner or coolant pump are to be fitted. Timing belts must be stored and handled with care. Always store a belt on its edge with a bend radius greater than 50 mm (2.0 in). Do not use a timing belt that has been twisted or bent double as this will damage the reinforcing fibres. Do not use a timing belt if debris other than belt dust is found in the timing belt covers. Do not use a timing belt if partial engine seizure has occurred. Do not use a timing belt if mileage exceeds 72,000 km (45,000 miles). Do not use an oil or coolant contaminated belt, cause of contamination must be rectified.

Refit

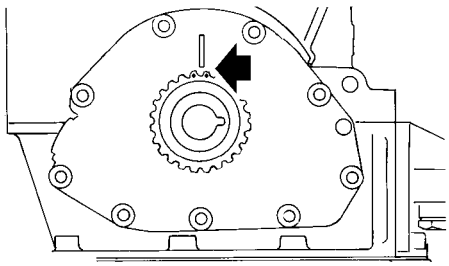
1. Clean crankshaft timing gear, camshaft timing gears, coolant pump drive gear and tensioner pulley.

CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gear will emerge and contaminate the belt.

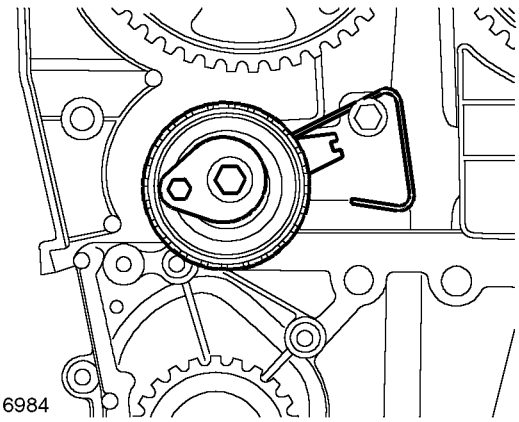


M12 6983

2. Check correct alignment of camshaft timing marks and that tool **LRT-12-134** is locking camshaft gears.


M12 7059

3. Check correct alignment of dots on crankshaft gear with flange on oil pump - 90° BTDC.


M12 6984

4. Fit timing belt tensioner ensuring that index wire is positioned over pillar bolt and tensioner lever is at 9 o'clock position.

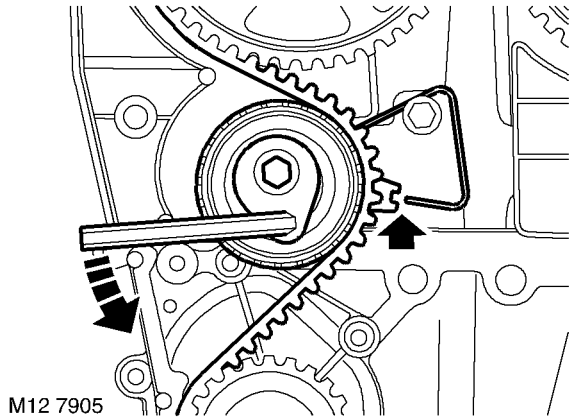
5. Fit a new Patchlok bolt and tighten until it is just possible to move tensioner lever.
6. Using fingers only, fit timing belt. Ensure belt run between the crankshaft gear and the exhaust camshaft gear is kept taut during the fitting procedure.

   CAUTION: If the original timing belt is being refitted, ensure the direction of rotation mark is facing the correct way.

7. Check that timing belt is positioned centrally around all gears and tensioner pulley.
8. Fit camshaft timing belt lower cover.

   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - with A/C.**

   ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing belt - front lower - without A/C.**
9. Remove camshaft gear alignment tool **LRT-12-134.**

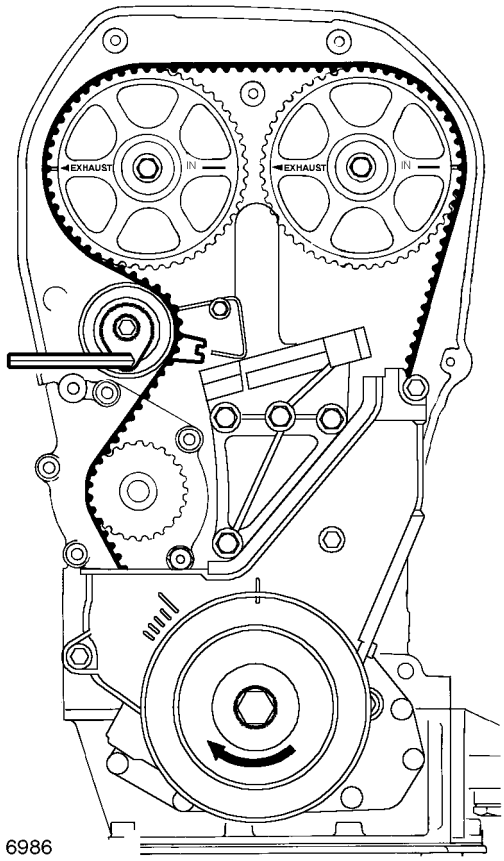

M12 7905

10. Using a 6 mm Allen key, rotate tensioner anti-clockwise and align the centre of the indent in the tensioner pointer to the index wire.

    NOTE: If original belt is being refitted, align index wire to lower land of pointer.

    CAUTION: Ensure that pointer approaches index wire from above. Should pointer go past index wire, release tension completely and repeat tensioning procedure.

11. Ensuring pointer maintains correct position, tighten tensioner bolt to 22 Nm (16 lbf.ft).



M12 6986

12. Rotate crankshaft 2 turns clockwise and align camshaft gear timing marks.

    CAUTION: Never use the camshaft gear, the camshaft gear retaining bolts or the timing belt to rotate the crankshaft.

13. Check that pointer is correctly aligned with index wire.
14. If pointer is not correctly aligned, loosen bolt until it is just possible to move tensioner lever. Rotate tensioner lever clockwise until tension is completely backed off, then rotate tensioner lever anti-clockwise until pointer is aligned correctly to index wire.
15. Ensuring pointer maintains correct position, tighten tensioner bolt to 22 Nm (16 lbf.ft).
16. Rotate crankshaft 2 turns clockwise and align camshaft gear timing marks.
17. Check alignment of pointer to index wire, if incorrect, repeat adjustment procedure.
18. Clean starter motor and mating face on gearbox.
19. Fit starter motor, fit and tighten bolts to 45 Nm (33 lbf.ft).
20. Connect Lucar to starter motor solenoid.
21. Fit camshaft timing belt upper cover

    ☞ **ENGINE - K SERIES 1.8, REPAIRS, Cover - timing gear - upper.**

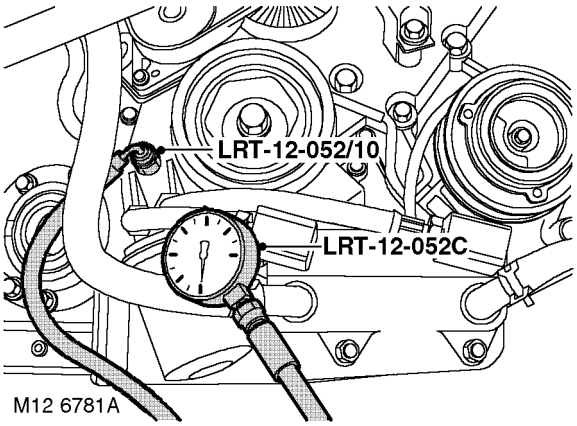
22. Fit alternator drive belt.
23. Tension drive belt, tighten adjusting link bolts and pivot bolts.
24. **Models with A/C:** Rotate ancillary drive belt tensioner fully clockwise. Whilst holding tensioner in this position, fit pin into hole in tensioner backplate.
25. **Models with A/C:** Fit ancillary drive belt, release tension, remove retaining pin and lower tensioner pulley onto drive belt.
26. Clean PAS drive belt pulleys.
27. Position PAS drive belt to pulleys, relieve tensioner pressure, remove retaining pin and release tensioner.

Engine oil pressure check

12.90.09.01

Check

1. Remove oil pressure switch.
   ENGINE - K SERIES KV6, REPAIRS, Switch - oil pressure.



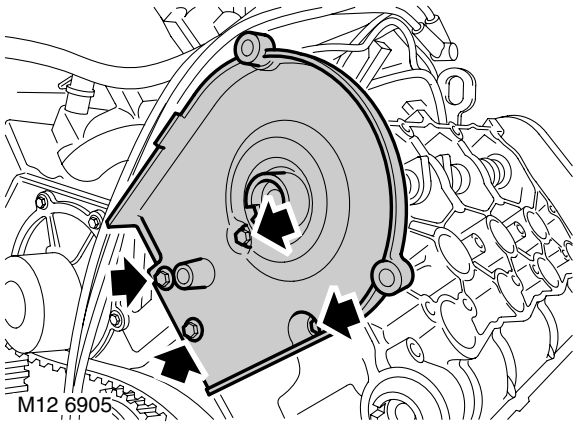
2. Fit sealing washer from oil pressure switch to **LRT-12-052/10** oil pressure gauge adaptor.
3. Fit and tighten oil pressure gauge adaptor **LRT-12-052/10** to oil pump housing.
4. Connect oil pressure gauge **LRT-12-052C** and tighten union.
5. Check and if necessary top up engine oil.
6. Start and run engine until normal operating temperature is reached.
7. Note oil pressure readings with the engine running at idle and at 3000 rev/min.
   GENERAL DATA, Engine – KV6 Petrol.
8. Switch off engine, unscrew gauge union and remove gauge.
9. Remove adaptor.
10. Wipe off oil spillage
11. Fit oil pressure switch.
    ENGINE - K SERIES KV6, REPAIRS, Switch - oil pressure.
12. Recheck engine oil and top up if necessary.

Camshafts - LH cylinder head

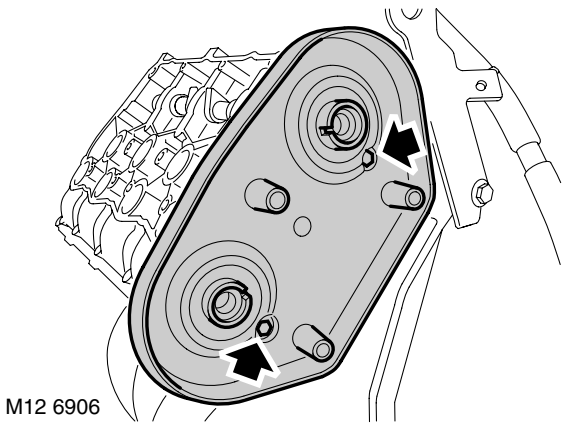
12.13.02

Remove

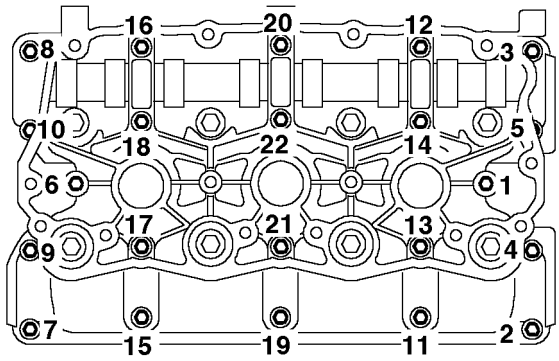
1. Disconnect battery earth lead.
2. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.
3. Remove LH camshaft rear timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - LH cylinder head.
4. Remove LH camshaft cover gasket.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - LH.


M12 6905

5. Remove 4 bolts and remove front camshaft drive belt cover backplate from cylinder head.

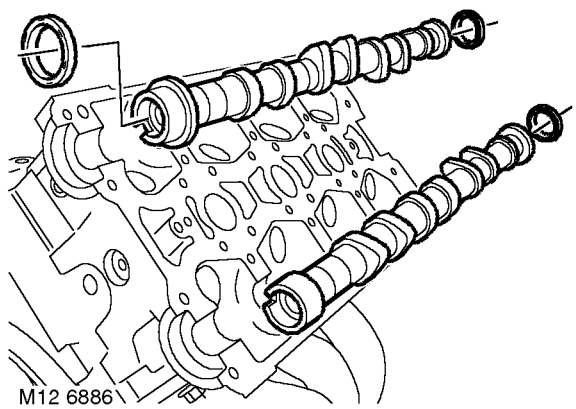

M12 6906

6. Remove 2 bolts securing LH rear camshaft drive belt cover backplate to cylinder head and remove backplate.



M12 6885

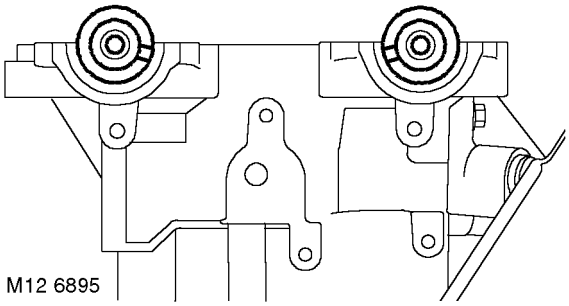
7. Using sequence shown, progressively loosen 22 bolts securing camshaft carrier to cylinder head until valve spring pressure is released, remove bolts.
8. Release camshaft carrier from dowels and remove carrier.


M12 6886

9. Remove camshafts and discard oil seals.
10. Using a stick magnet, remove 12 hydraulic tappets from cylinder head.
    CAUTION: Store hydraulic tappets in their fitted order and store upright. Maintain absolute cleanliness when handling hydraulic tappets. Failure to observe these precautions can result in engine failure.
11. Clean camshafts and bearing running surfaces in camshaft carrier and cylinder head.
12. Inspect camshafts and replace camshafts if scored, pitted or excessively worn.
    Note: Camshafts are colour coded - Inlet - ORANGE; Exhaust - BLUE.

Refit

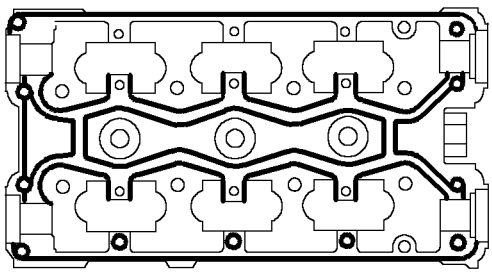
1. Thoroughly clean and lubricate hydraulic tappets with clean engine oil. Fit hydraulic tappets to original bores in cylinder head.
2. Ensure that mating faces of camshaft carrier and cylinder head are clean and dry.
3. Lubricate camshafts and bearing journals with clean engine oil.



M12 6895

4. Position camshafts in cylinder head with rear timing gear drive slots in each camshaft facing towards the centre as shown.

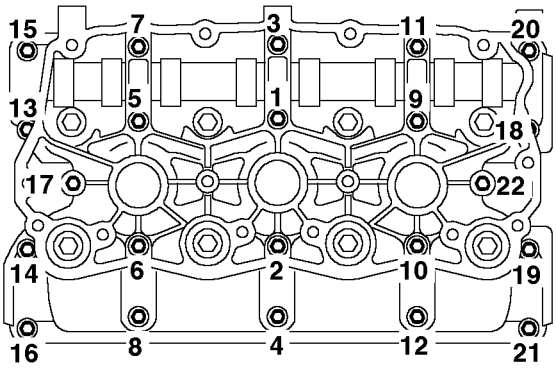
   CAUTION: Ensure camshafts are in their correct fitted locations, camshafts are colour coded - Inlet - ORANGE; Exhaust - BLUE.



M12 6894

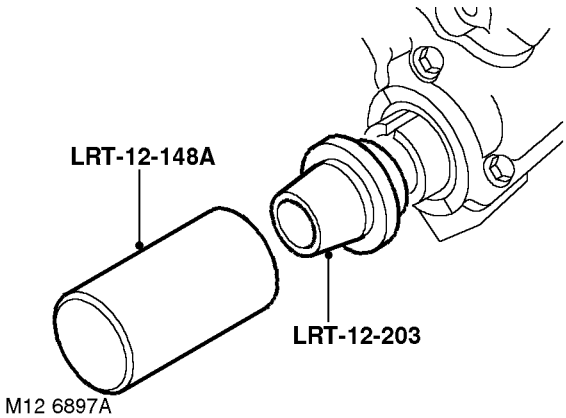
5. Apply continuous thin beads of sealant, Part No. STC 4600, to paths on camshaft carrier as shown. Spread sealant to an even film using a roller.

   CAUTION: Ensure sealant does not enter oil feed holes or grooves and that assembly is completed within 20 minutes.



M12 6896

6. Position camshaft carrier, fit and progressively tighten bolts in the sequence shown to 10 Nm (7.5 lbf.ft).



M12 6897A

7. Noting that the front camshaft oil seals are black in colour and the rear oil seals are red, fit new camshaft oil seals using **LRT-12-203** and **LRT-12-148A**

   CAUTION: Oil seals must be fitted dry. Do not use tool LRT-12-148 for fitting seals.

8. Clean camshaft timing belt cover backplate bolts and apply Loctite 242 to the first 3 threads.
9. Position camshaft timing belt rear cover backplates to cylinder head, fit and tighten bolts to 9 Nm (7 lbf.ft).
10. Fit LH camshaft cover gasket.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - LH.**
11. Fit camshaft timing belt.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**
12. Fit LH camshaft rear timing belt.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - LH cylinder head.**

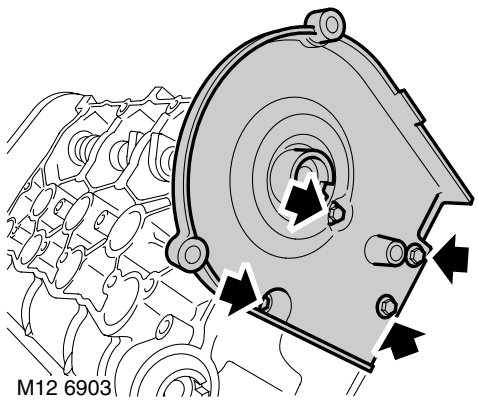
13. Top-up engine oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**
14. Connect battery earth lead.

Camshafts - RH cylinder head

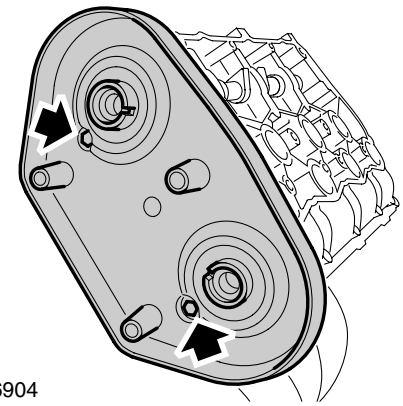
12.13.03

Remove

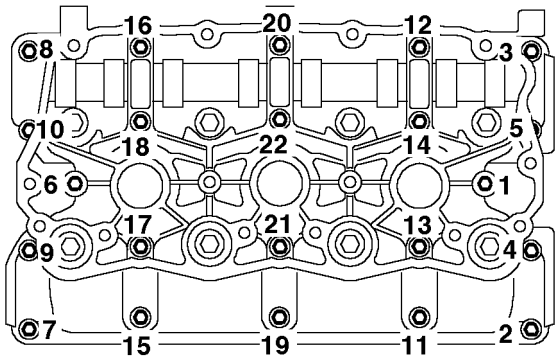
1. Disconnect battery earth lead.
2. Remove camshaft timing belt.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**
3. Remove RH rear camshaft timing belt.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - RH cylinder head.**
4. Remove RH camshaft cover gasket.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - RH.**


M12 6903

5. Remove 4 bolts securing RH front timing belt cover backplate to cylinder head and remove backplate.

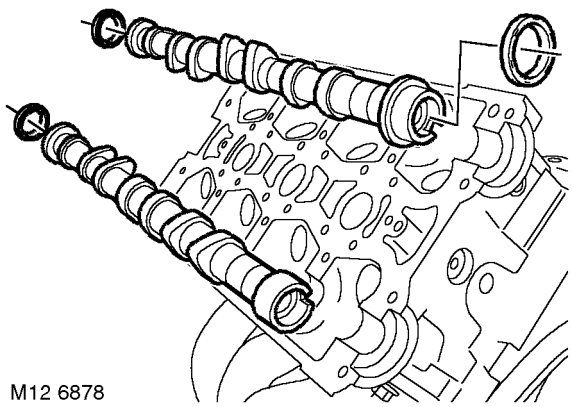

M12 6904

6. Remove 2 bolts securing RH rear timing belt cover backplate and remove backplate.



M12 6885

7. Using sequence shown, progressively loosen 22 bolts securing camshaft carrier to cylinder head until valve spring pressure is released and remove bolts.
8. Release camshaft carrier from dowels and remove carrier.


M12 6878

9. Remove both camshafts and discard oil seals.
10. Using a stick magnet, remove 12 hydraulic tappets from cylinder head.

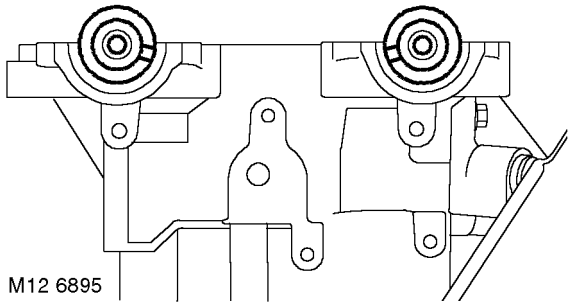
    CAUTION: Store hydraulic tappets in their fitted order and store upright. Maintain absolute cleanliness when handling hydraulic tappets. Failure to observe these precautions can result in engine failure.

11. Clean camshafts and bearing running surfaces in camshaft carrier and cylinder head.
12. Inspect camshafts and replace camshafts if scored, pitted or excessively worn.

    Note: Camshafts are colour coded - Inlet - ORANGE; Exhaust - BLUE.

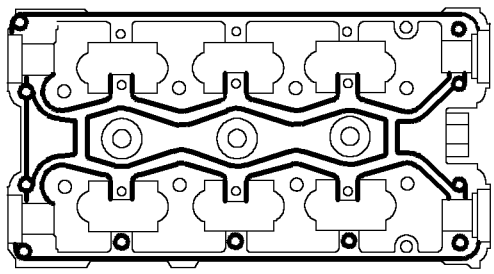
Refit

1. Thoroughly clean and lubricate hydraulic tappets with clean engine oil. Fit hydraulic tappets to original bores in cylinder head.
2. Ensure that mating faces of camshaft carrier and cylinder head are clean and dry.
3. Lubricate camshafts and bearing journals with clean engine oil.


M12 6895

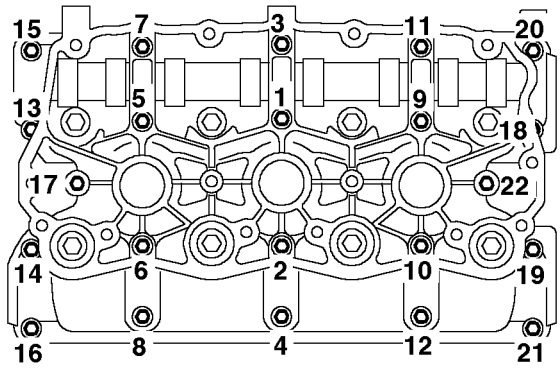
4. Position camshafts in cylinder head with rear timing gear drive slots in each camshaft facing towards the centre as shown.

   CAUTION: Ensure camshafts are in their correct fitted locations, camshafts are colour coded - Inlet - ORANGE, Exhaust - BLUE.


M12 6894

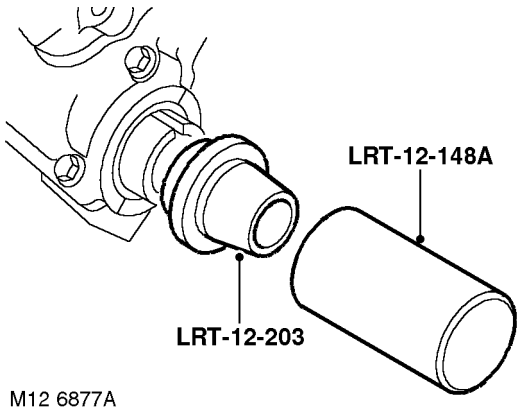
5. Apply continuous thin beads of sealant, Part No. STC 4600, to paths on camshaft carrier as shown. Spread sealant to an even film using a roller.

   Ensure sealant does not enter oil feed holes or grooves and that assembly is completed within 20 minutes.



M12 6896

6. Position camshaft carrier, fit and progressively tighten bolts in the sequence shown to 10 Nm (7.5 lbf.ft).



M12 6877A

7. Noting that the front camshaft oil seals are black in colour and the rear oil seals are red, fit new camshaft oil seals using **LRT-12-203** and **LRT-12-148A**

CAUTION: Oil seals must be fitted dry. Do not use tool LRT-12-148 for fitting seals.

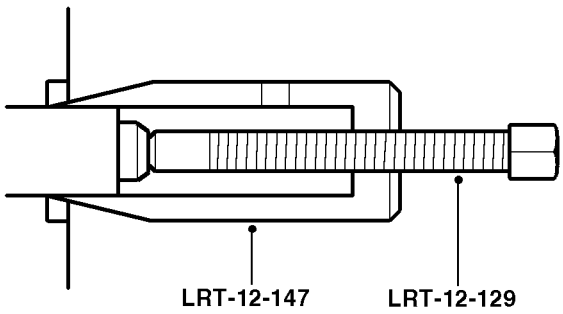
8. Clean camshaft timing cover backplate bolts and apply Loctite 242 to first 3 threads.
9. Fit camshaft cover backplates fit and tighten bolts to 9 Nm (7 lbf.ft).
10. Fit RH camshaft cover gasket.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - RH.**
11. Fit camshaft timing belt.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**
12. Fit RH rear camshaft timing belt.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - RH cylinder head.**
13. Top-up engine oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**
14. Connect battery earth lead.

Inlet camshaft front oil seal

12.13.40

Remove

1. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.

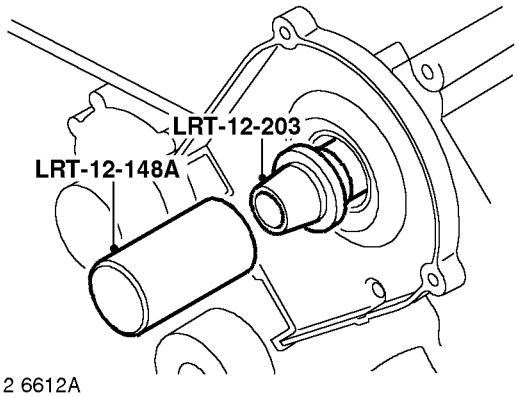


M12 6611

2. Remove camshaft oil seal using **LRT- 12-147** and centre bolt **LRT-12-129.**
3. Remove and discard oil seal from **LRT-12-147**.

Refit

1. Clean oil seal recess and camshaft.



M12 6612A

2. Ensure oil seal protector sleeve **LRT-12-203**, is clean. Fit sleeve to camshaft.
3. Position oil seal and using **LRT-12-148A**, drift seal into position.

   CAUTION: Oil seal must be fitted dry. Do not use tool LRT-12-148 for fitting seal.

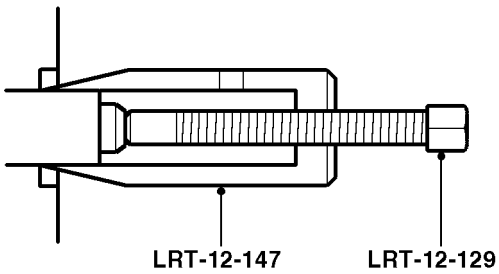
4. Remove seal protector, **LRT-12-203**, from end of camshaft.
5. Fit camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.
6. Top-up engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.

Camshaft rear oil seal

12.13.42

Remove

1. Disconnect battery earth lead.
2. **LH bank only:** Remove LH rear camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - LH cylinder head.
3. **RH bank only:**Remove RH rear camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - RH cylinder head.

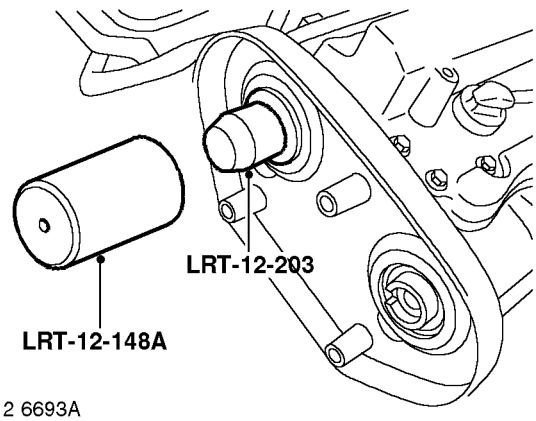


M12 6692

4. Remove camshaft rear oil seal using **LRT-12-147** and the centre bolt from **LRT-12-129.**
5. Remove and discard oil seal from **LRT-12-147**.

Refit

1. Clean oil seal recess and camshaft.



M12 6693A

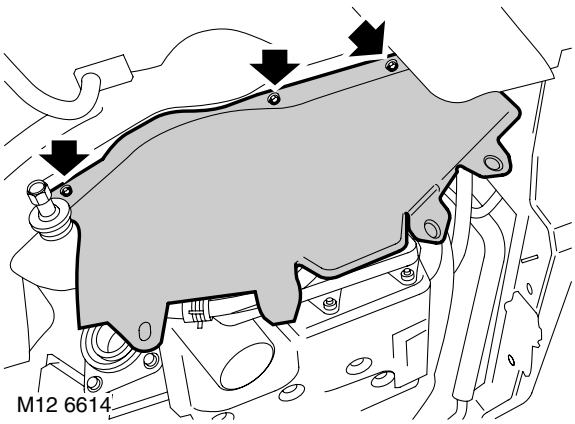
2. Ensure oil seal protector sleeve **LRT-12-203**, is clean. Fit sleeve to camshaft.
3. Position oil seal and using **LRT-12-148A**, drift seal into position.
   CAUTION: Do not use tool LRT-12-148 for fitting seal.
4. Remove seal protector, **LRT-12-203**, from end of camshaft.
5. **LH bank only:** Fit LH rear camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - LH cylinder head.
6. **RH bank only:** Fit RH rear camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft rear timing belt - RH cylinder head.
7. Connect battery earth lead.
8. Top-up engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.

Pulley - crankshaft

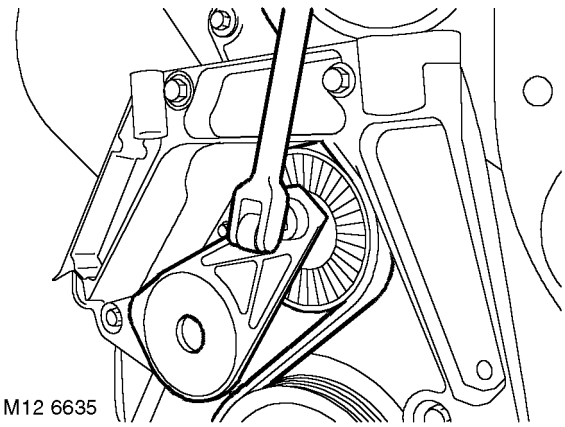
12.21.01

Remove

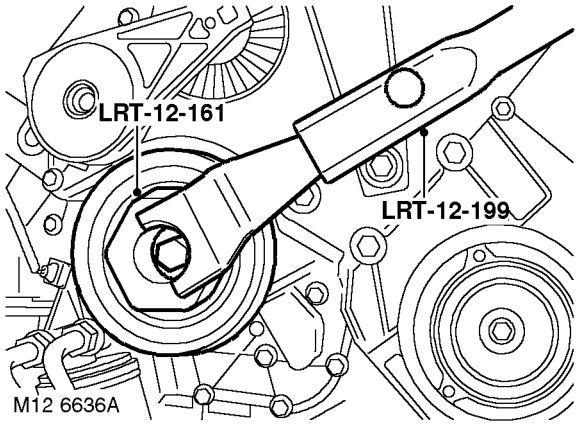
1. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
2. Remove RH front road wheel.



3. Remove 3 bolts securing RH splash shield to body and remove shield.



4. Using a 3/8 square drive socket bar, raise ancillary drive belt tensioner and release drive belt from crankshaft pulley.



5. Assemble **LRT-12-161** to **LRT-12-199** and secure with clamp bolt.
6. Insert **LRT-12-161** with **LRT-12-199** into crankshaft pulley, loosen and remove pulley bolt.
7. Remove tools from crankshaft pulley, remove crankshaft pulley.

Refit

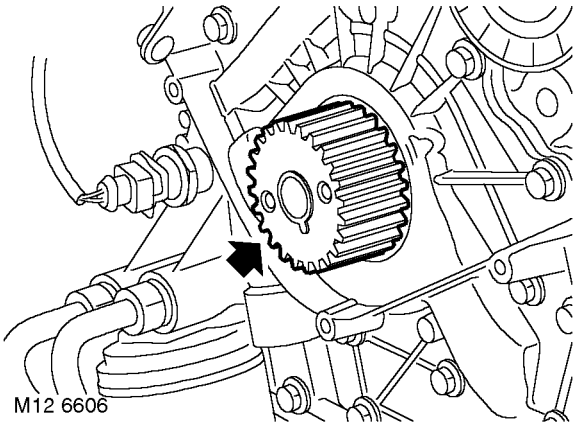
1. Clean crankshaft pulley and crankshaft gear mating faces.
2. Fit crankshaft pulley to crankshaft gear and ensure that the indent on pulley locates over the lug on crankshaft gear.
3. Fit crankshaft pulley bolt and washer, position **LRT-12-161** with **LRT-12-199** into crankshaft pulley. Tighten pulley bolt to 160 Nm (118 lbf.ft).
4. Remove tools from crankshaft pulley.
5. Ensure drive belt is located on ancillary pulleys, raise belt tensioner and fit drive belt to crankshaft pulley.
6. Fit splash shield and secure with bolts.
7. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft)
8. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.

Crankshaft front oil seal

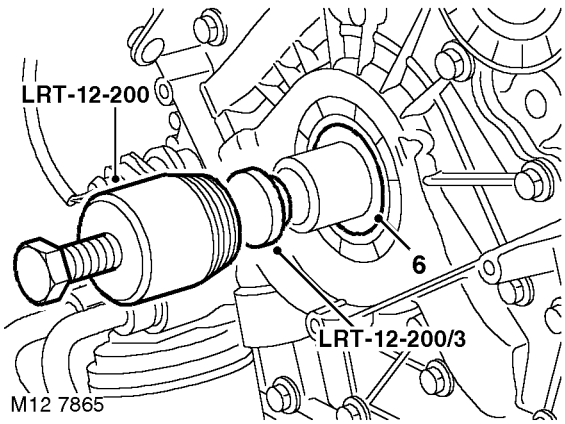
12.21.14

Remove

1. Disconnect battery earth lead.
2. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.



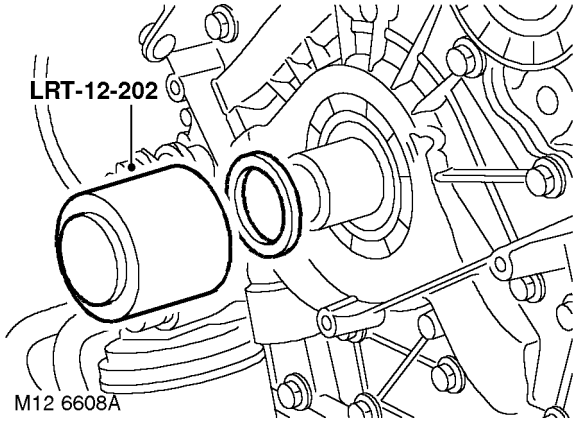
3. Remove crankshaft gear.



4. Fit thrust button, **LRT-12-200/3** to end of crankshaft.
5. Screw **LRT-12-200** into crankshaft front oil seal.
6. Tighten centre bolt of **LRT-12-200** to remove oil seal.
7. Remove and discard oil seal from special tool.
8. Remove thrust button from crankshaft.

Refit

1. Clean oil seal recess in oil pump and running surface on crankshaft, ensure bolt holes are clean and dry.
2. Fit oil seal guide, from seal kit, over end of crankshaft.



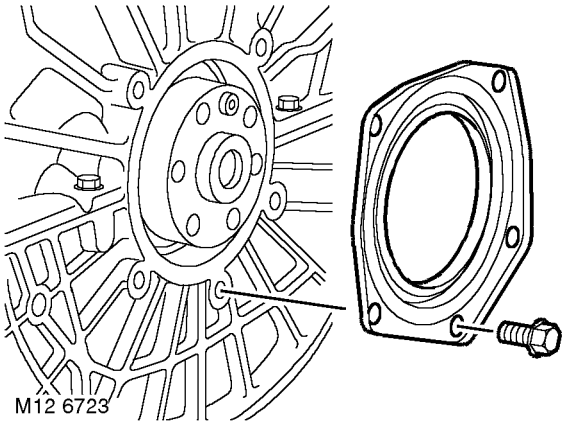
3. Position new seal on crankshaft up against oil pump housing. Drift seal into place using tool **LRT-12-202.**
4. Remove **LRT-12-202** and oil seal guide from crankshaft.
5. Fit gear to crankshaft.
6. Fit camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.
7. Connect battery earth lead.
8. Top-up engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.

Crankshaft rear oil seal

12.21.20

Remove

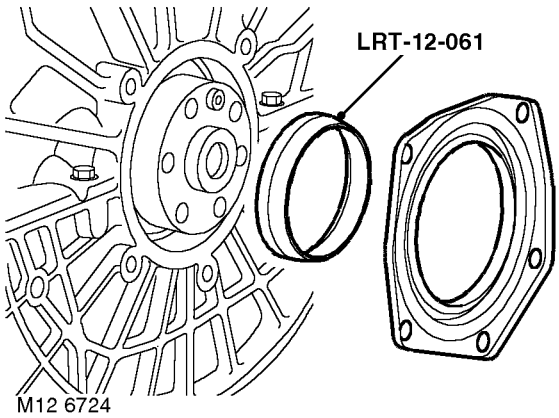
1. Remove torque converter drive plate.
   ENGINE - K SERIES KV6, REPAIRS, Torque converter drive plate.



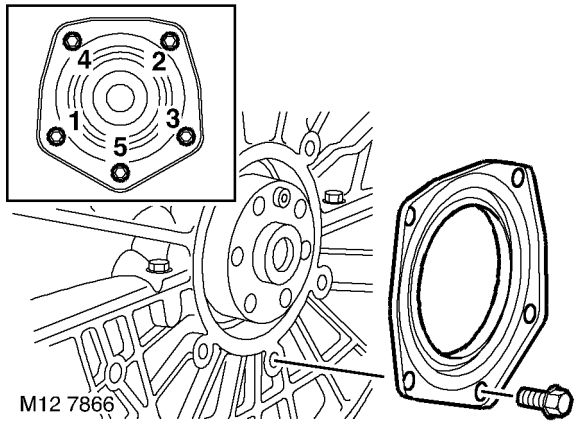
2. Remove and discard 5 bolts securing crankshaft rear oil seal to cylinder block.
3. Remove and discard crankshaft rear oil seal.

Refit

1. Clean cylinder block face and oil seal running surface on crankshaft; ensure bolt holes are clean and dry.



2. Position oil seal protector, **LRT-12-061** to crankshaft.
3. Position oil seal to crankshaft.
   CAUTION: Oil seal must be fitted dry.



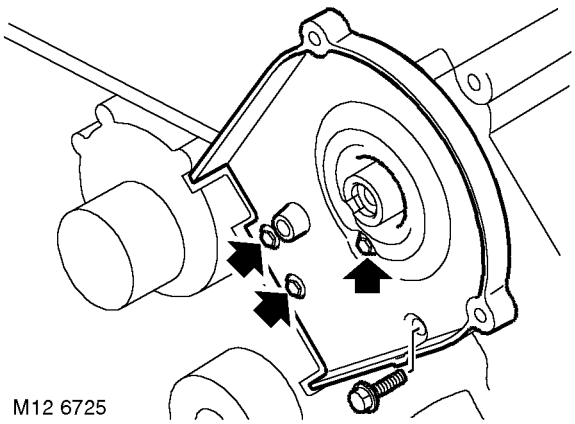
4. Fit new Patchlok bolts securing oil seal to cylinder block and using sequence shown, tighten to 8 Nm (6 lbf.ft).
5. Remove oil seal protector.
6. Fit torque converter drive plate.
   ENGINE - K SERIES KV6, REPAIRS, Torque converter drive plate.
7. Check engine oil level, top-up if necessary.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.

Cylinder head gasket - LH

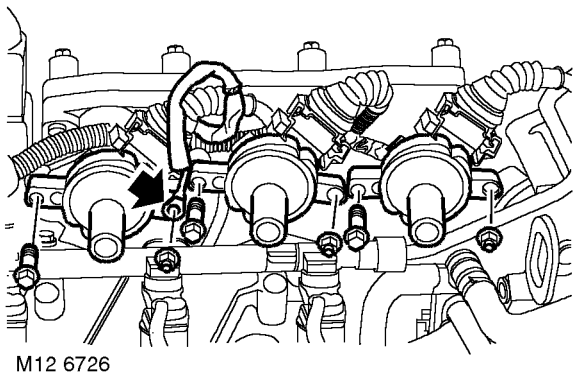
12.29.02

Remove

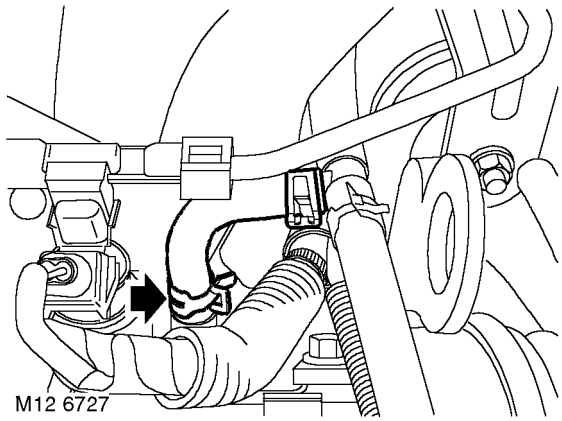
1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
3. Remove inlet manifold chamber.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.
4. Remove LH exhaust manifold gasket.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket - exhaust manifold - LH - Non NAS.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket(s) - exhaust manifold - LH - NAS.
5. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.


M12 6725

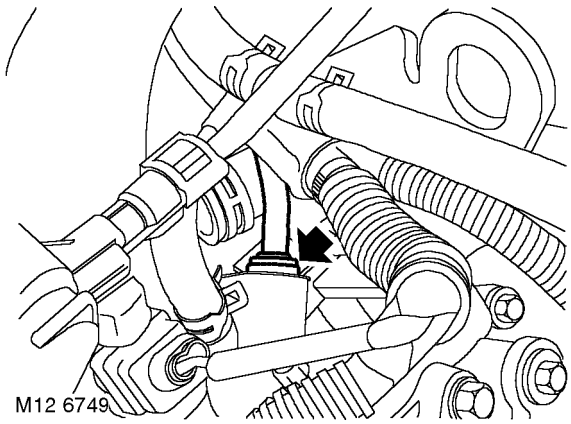
6. Remove 4 bolts securing LH front camshaft timing belt cover backplate to cylinder head; remove backplate.
7. Remove LH camshaft cover gasket.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - LH.


M12 6726

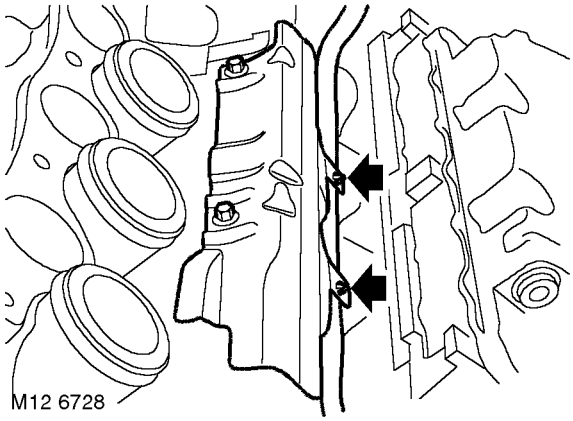
8. Remove 3 nuts and 3 bolts securing ignition coils to LH inlet manifold and release coil earth lead.
9. Remove ignition coils and position aside.


M12 6727

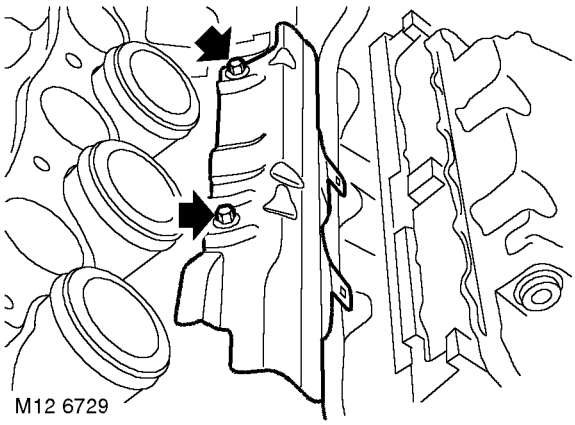
10. Release clip and disconnect coolant bleed hose from inlet manifold and move hose aside.


M12 6749

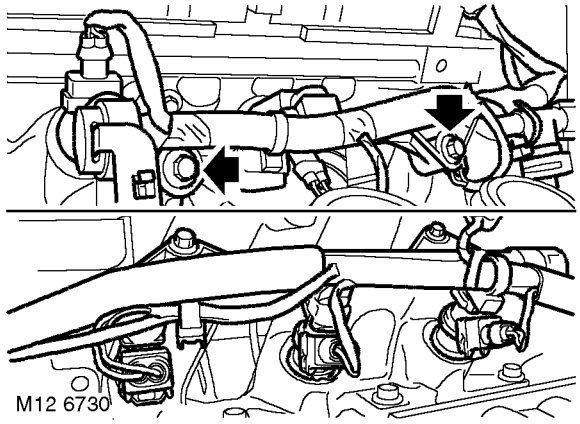
11. Depress locking collar and release breather hose from LH inlet manifold.


M12 6728

12. Disconnect clips securing RH injector harness to injector protection cover - if fitted or from bosses on fuel rail.


M12 6729

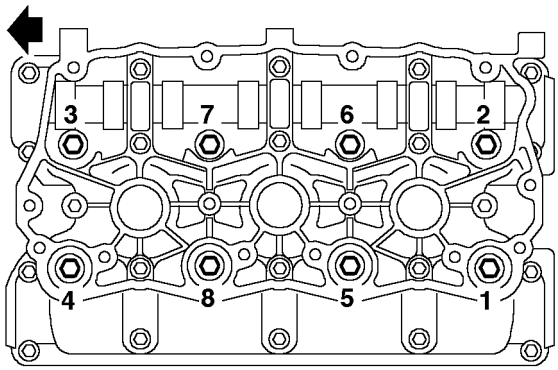
13. Remove 2 bolts securing protection cover - if fitted and fuel rail to RH inlet manifold, remove cover.


M12 6730

14. Remove 2 bolts securing fuel rail to LH inlet manifold.

15. Release injectors from manifolds and carefully lay fuel rail and injectors aside.

CAUTION: Always fit plugs to open connections to prevent contamination.



M12 7925

16. Using sequence shown, progressively loosen and remove 8 cylinder head bolts.

17. With assistance, remove cylinder head assembly.

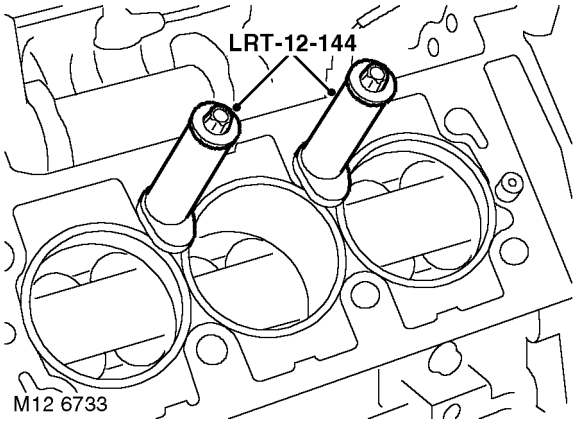
CAUTION: Support both ends of cylinder head on blocks of wood.

18. Remove and discard cylinder head gasket.

Do not rotate crankshaft whilst RH cylinder head is fitted.

19. Remove and discard 2 cylinder head locating dowels.

Note: Replacement dowels are supplied with new cylinder head gasket.



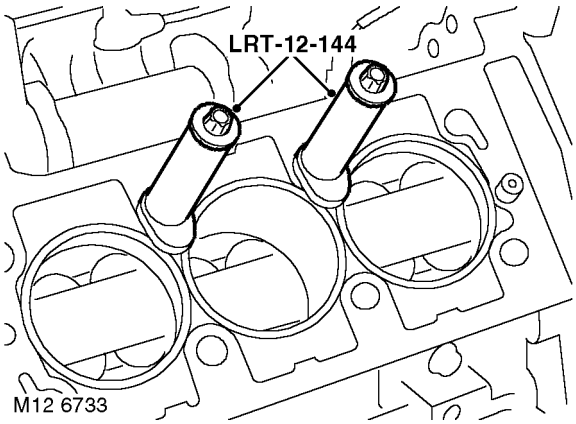
20. Fit cylinder liner clamps **LRT-12-144** and secure with cylinder head bolts.

CAUTION: Ensure that feet of clamps do not protrude over bores.

Refit

1. Clean cylinder head mating face.

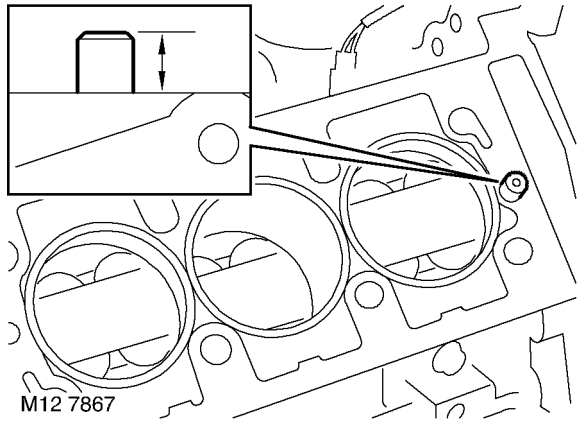
CAUTION: Use suitable gasket removal spray and a plastic scraper.



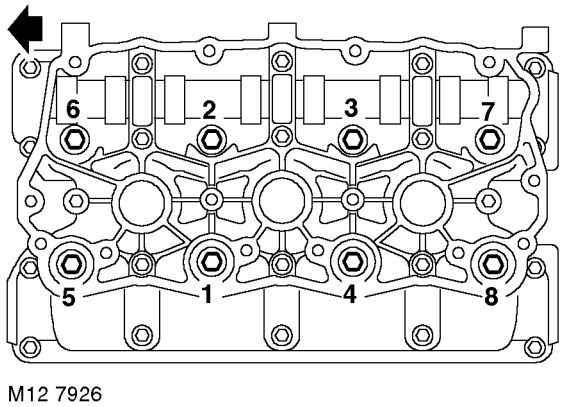
2. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.

CAUTION: Do not rotate crankshaft.

3. Clean cylinder block face and dowel holes.
4. Clean cylinder head bolts and wipe dry.
5. Lightly lubricate threads and beneath heads of cylinder head bolts with clean engine oil.
6. Fit 2 new metal locating dowels supplied with replacement cylinder head gasket.



7. Check that fitted height of dowels is between 10 to 11 mm (0.40 to 0.43 in) above cylinder block top face.
8. Fit new cylinder head gasket onto cylinder block with the word 'TOP' uppermost.
9. With assistance, fit cylinder head and carefully position LH inlet to RH inlet manifold.
10. Carefully enter cylinder head bolts, **DO NOT DROP.** Screw bolts into place by hand.



11. Tighten cylinder head bolts progressively in the sequence shown to :
- Stage 1 - 25 Nm (18 lbf.ft)
- Stage 2 - Tighten in the same sequence to 25 Nm (18 lbf.ft)
- Stage 3 -Tighten in the same sequence to 25 Nm (18 lbf.ft)
- Stage 4 - Using an angle torque gauge, tighten bolts in the same sequence a further 180°

12. Fit LH camshaft cover gasket.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - LH.**
13. Remove and discard 'O' rings from injectors.
14. Clean injectors and injector locations in fuel rail.
15. Lubricate new 'O' rings with castor oil and fit to injectors.

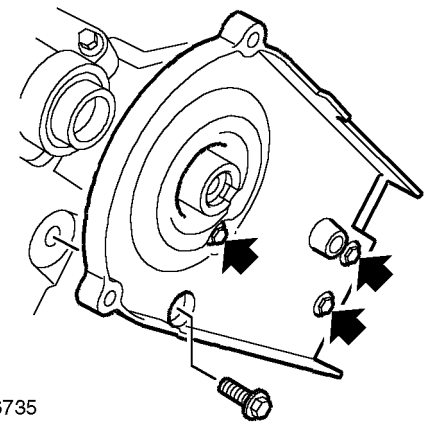
16. Position fuel rail assembly and secure injectors to inlet manifolds.
17. Position injector protection cover - if fitted to RH fuel rail and secure injector harness to protection cover or fuel rail with clips.
18. Fit bolts securing fuel rail to inlet manifolds and tighten to 9 Nm (7 lbf.ft).
19. Position CMP sensor bracket, fit and tighten bolt to 9 Nm (7 lbf.ft).
20. Connect CMP sensor multiplug and secure to bracket.
21. Connect breather hose to LH inlet manifold.
22. Connect coolant bleed hose to inlet manifold and secure with clip.
23. Position ignition coils to LH inlet manifold.
24. Position earth lead, fit nuts and bolts securing ignition coils to LH inlet manifold and tighten to 9 Nm (7 lbf.ft).
25. Position ht lead guide bracket, fit and tighten special bolt.
26. Connect ht leads to spark plugs and secure ht leads in guide clips.
27. Clean camshaft timing belt cover backplate bolts and apply Loctite 242 to the first 3 threads.
28. Position backplate, fit and tighten bolts to 9 Nm.
29. Fit camshaft timing belt.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**
30. Fit LH exhaust manifold gasket.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket - exhaust manifold - LH - Non NAS.**
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket(s) - exhaust manifold - LH - NAS.**
31. Fit inlet manifold chamber.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
32. Fill cooling system.
    ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
33. Check engine oil level and top-up if necessary.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**

Cylinder head gasket - RH

⊸ ***12.29.03***

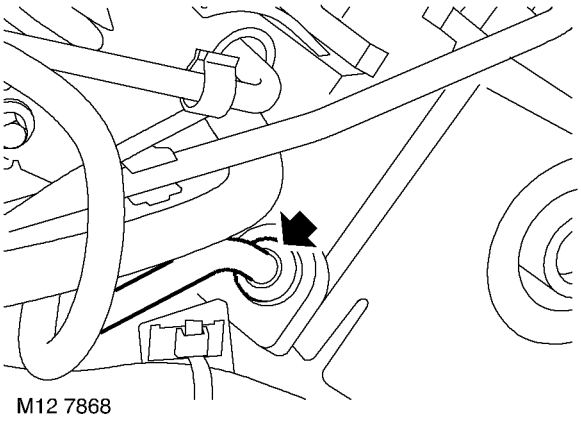
Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
3. Remove inlet manifold chamber.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
4. Remove RH exhaust manifold gasket.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket - exhaust manifold - RH - Non NAS.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket(s) - exhaust manifold - RH - KV6 - NAS.**
5. Remove camshaft timing belt.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**



M12 6735

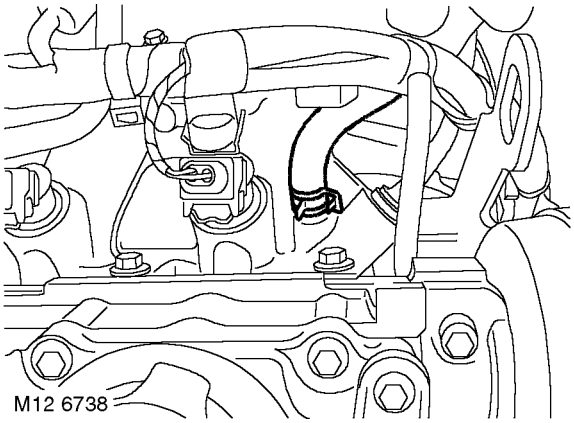
6. Remove 4 bolts securing RH front timing belt cover backplate to cylinder head and remove backplate.



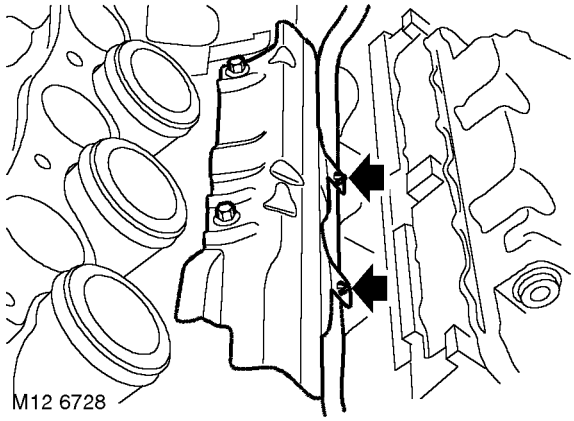
7. Depress locking collar and release breather hose from RH inlet manifold.

8. Remove RH camshaft cover gasket.

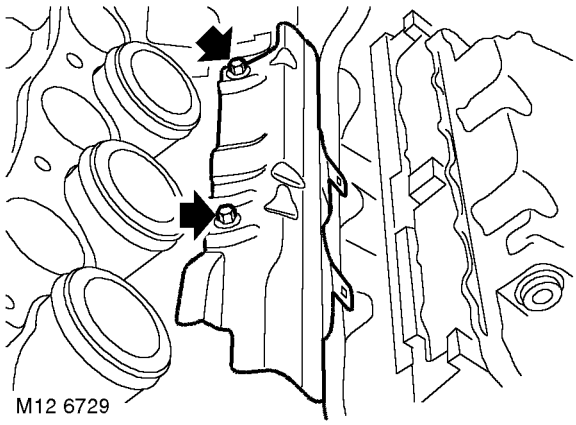
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - RH.**



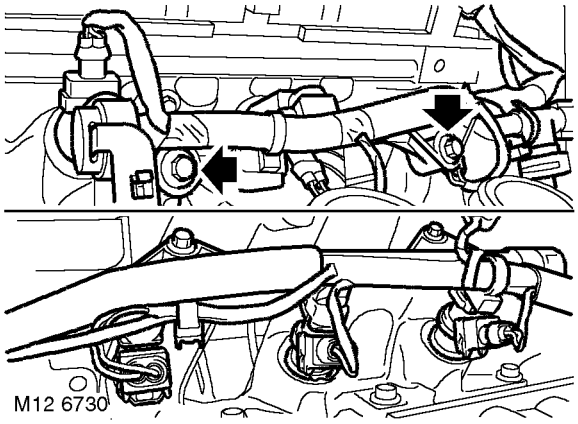
9. Release clip and disconnect coolant bleed hose from RH inlet manifold, position hose aside.



10. Release injector harness clips from injector protection cover - if fitted or from bosses on fuel rail.



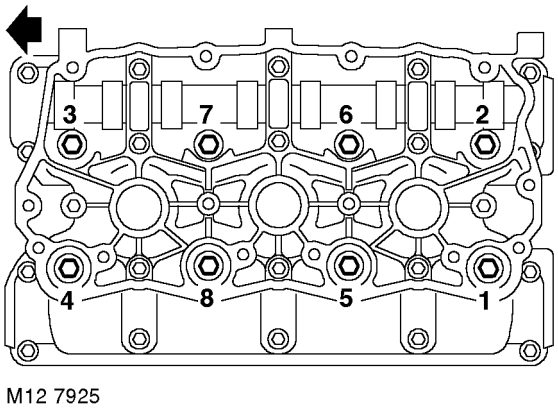
11. Remove 2 bolts securing protection cover - if fitted and RH fuel rail to RH inlet manifold, remove cover.



12. Remove 2 bolts securing fuel rail to LH inlet manifold.

13. Release injectors from manifolds and carefully lay fuel rail and injectors aside.

CAUTION: Always fit plugs to open connections to prevent contamination.



M12 7925

14. Using sequence shown, progressively loosen and remove 8 cylinder head bolts.

15. With assistance, remove cylinder head assembly.

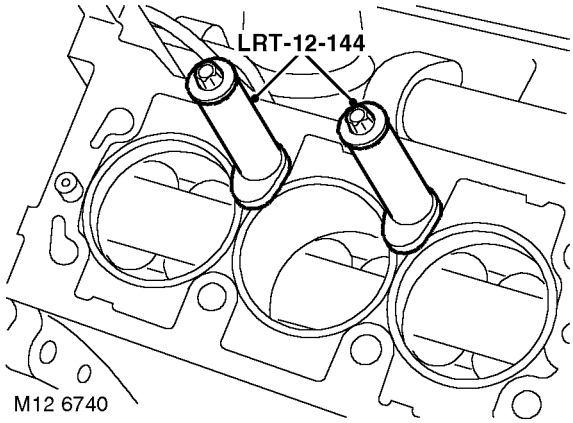
CAUTION: Support both ends of cylinder head on blocks of wood.

16. Remove and discard cylinder head gasket.

17. Remove and discard 2 cylinder head locating dowels.

Note: Replacement dowels are supplied with new cylinder head gasket.

CAUTION: Do not rotate crankshaft whilst LH cylinder head is fitted.



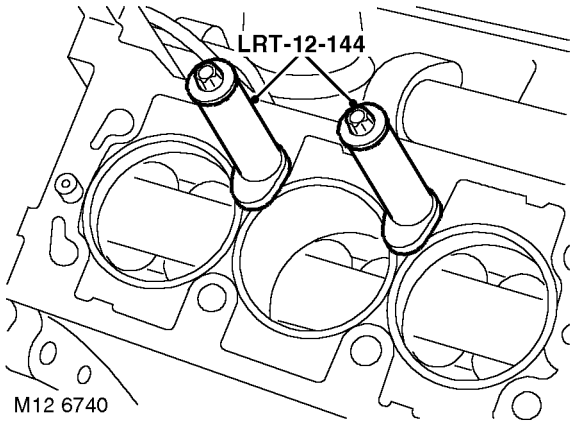
18. Fit cylinder liner clamps **LRT-12-144** and secure with cylinder head bolts.

CAUTION: Ensure that feet of clamps do not protrude over bores.

Refit

1. Clean cylinder head mating face.

CAUTION: Use suitable gasket removal spray and a plastic scraper.



2. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.

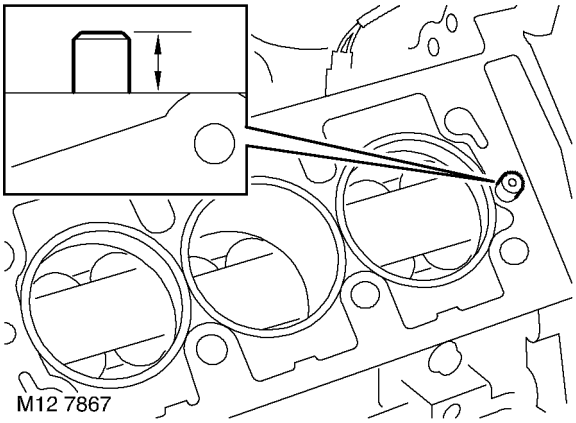
CAUTION: Do not rotate crankshaft.

3. Clean cylinder block mating face and dowel holes.

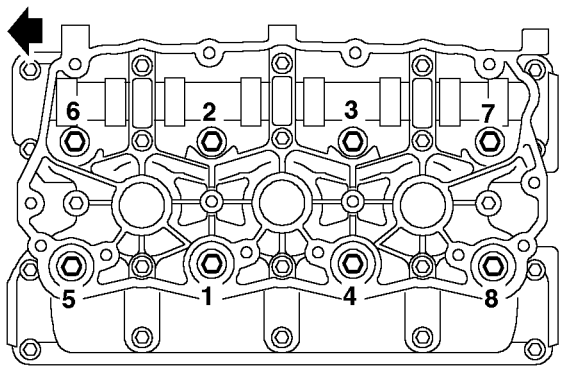
4. Clean cylinder head bolts and wipe dry.

5. Lightly lubricate threads and beneath heads of cylinder head bolts with clean engine oil.

6. Fit 2 new locating dowels supplied with replacement cylinder head gasket.



7. Check that fitted height of dowels is between 10 to 11 mm (0.40 to 0.43 in) above cylinder block top face.
8. Fit new cylinder head gasket onto cylinder block with the word 'TOP' uppermost.
9. With assistance, fit cylinder head and carefully position RH inlet to LH inlet manifold.
10. Carefully enter cylinder head bolts, **DO NOT DROP.** Screw bolts into place by hand.



M12 7926

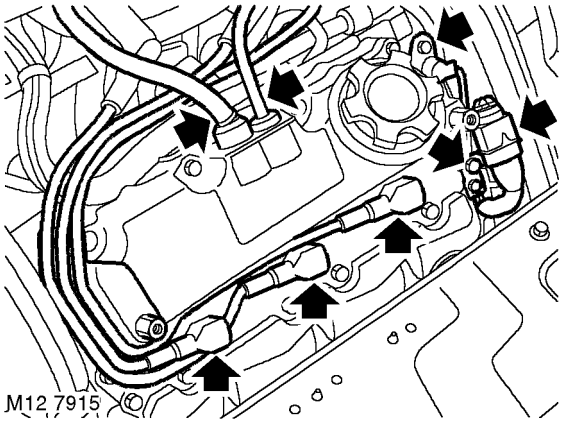
11. Tighten cylinder head bolts progressively in the sequence illustrated to:
    - Stage 1 - 25 Nm (18 lbf.ft)
    - Stage 2 - Tighten in the same sequence to 25 Nm (18 lbf.ft)
    - Stage 3 -Tighten in the same sequence to 25 Nm (18 lbf.ft)
    - Stage 4 - Using an angle torque gauge, tighten bolts in the same sequence a further 180°
12. Fit RH camshaft cover gasket.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - RH.**
13. Remove and discard lower 'O' rings from injectors.
14. Clean injectors and injector locations in fuel rail.
15. Lubricate new 'O' rings with castor oil and fit to injectors.
16. Position fuel rail assembly and secure injectors to inlet manifolds.
17. Position injector protection cover - if fitted to RH fuel rail; secure injector harness to protection cover or fuel rail with clips.
18. Fit bolts securing fuel rail to inlet manifolds and tighten to 9 Nm (7 lbf.ft).
19. Connect coolant bleed hose to inlet manifold and secure with clip.
20. Connect breather hoses to RH camshaft cover and inlet manifold.
21. Position ignition coils to LH inlet manifold.
22. Position earth lead, fit nuts and bolts securing ignition coils to LH inlet manifold and tighten to 9 Nm (7 lbf.ft).
23. Connect multiplugs to plug top coils and secure with locking clips.
24. Clean camshaft timing belt cover backplate bolts and apply Loctite 242 to the first 3 threads.
25. Position backplate, fit and tighten bolts to 9 Nm (7 lbf.ft).
26. Fit camshaft timing belt.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**
27. Fit RH exhaust manifold gasket.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket - exhaust manifold - RH - Non NAS.**
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket(s) - exhaust manifold - RH - KV6 - NAS.**
28. Fit inlet manifold chamber.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
29. Fill cooling system.
    ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
30. Check engine oil level and top-up if necessary.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**

Camshaft cover gasket - LH

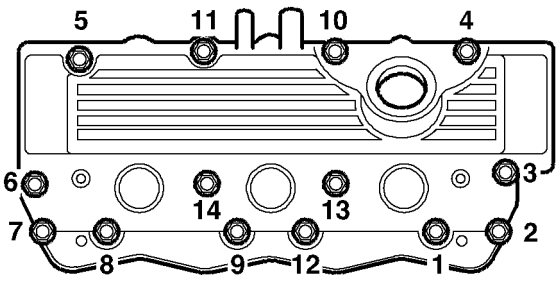
12.29.40

Remove

1. Remove engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**

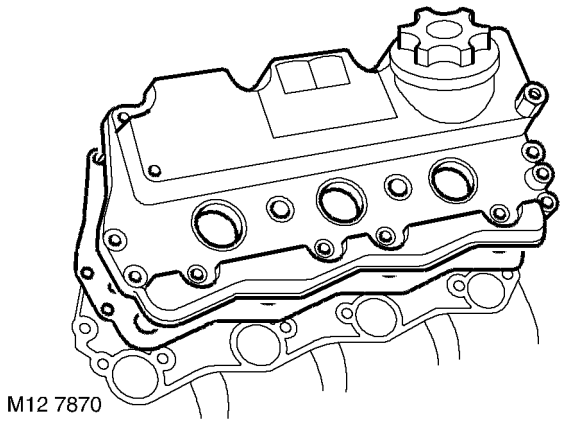


2. Depress locking collars and release 2 breather hoses from LH camshaft cover.
3. Disconnect 3 ht leads from spark plugs.
4. Remove special bolt securing ht lead guide bracket to LH cylinder head and position ht leads aside.
5. Disconnect CMP sensor multiplug and release male end of multiplug from bracket.
6. Remove bolt securing multiplug bracket which also retains front HO2S multiplug, move bracket and multiplug aside.



M12 7869

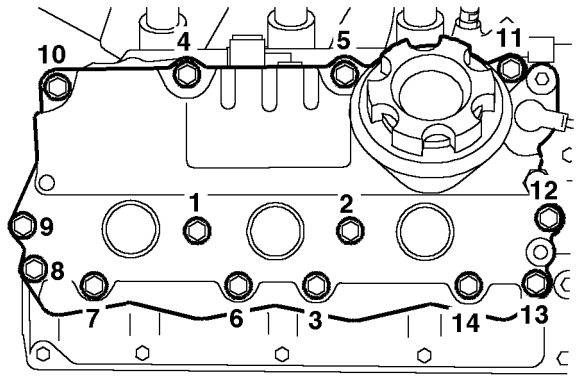
7. Using sequence shown, progressively loosen and remove 14 bolts securing camshaft cover.



8. Remove camshaft cover, remove and discard gasket.

Refit

1. Clean mating surfaces of camshaft cover and carrier.
2. Clean inside of camshaft cover. If necessary, wash oil separator elements in solvent and blow dry.
3. Position new gasket to camshaft carrier with arrows on gasket pointing towards inlet manifold.



M12 6659

4. Position camshaft cover, fit and tighten bolts progressively in the sequence shown to 9 Nm (7 lbf.ft).
5. Position multiplug bracket, fit and tighten bolt to 9 Nm (7 lbf.ft).
6. Secure male end of CMP sensor multiplug to bracket and connect multiplug.
7. Connect ht leads to spark plugs in their correct fitted order.

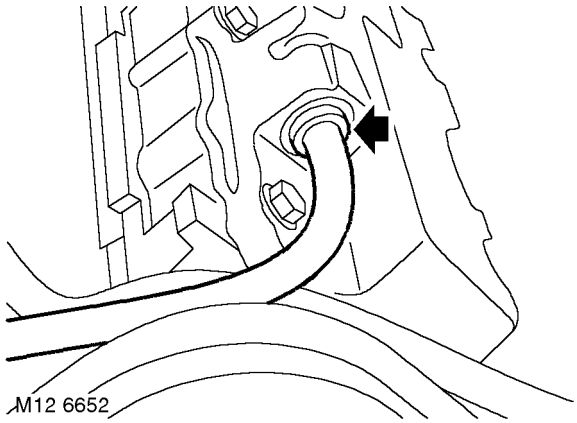
8. Position ht lead guide bracket, fit and tighten special bolt.
9. Connect breather hoses to LH camshaft cover.
10. Fit engine acoustic cover.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
11. Check engine oil, top-up if necessary.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**

Camshaft cover gasket - RH

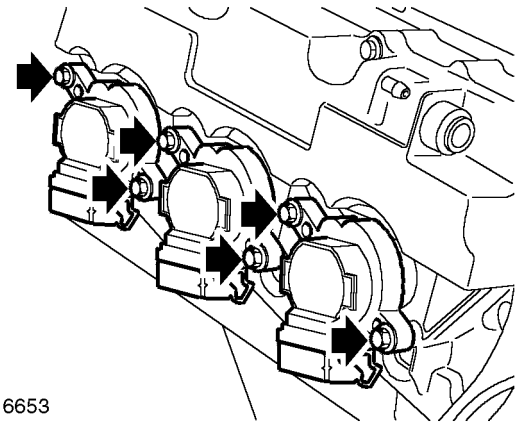
12.29.41

Remove

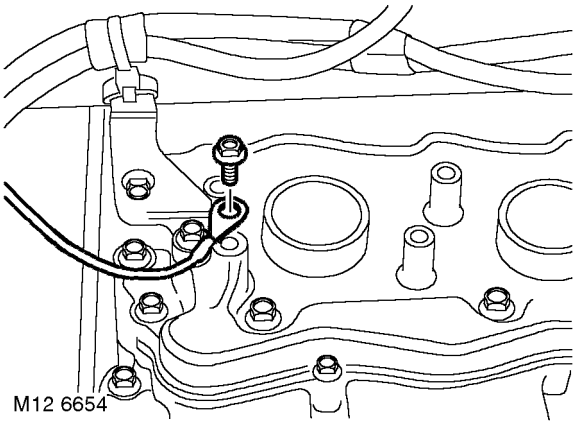
1. Remove inlet manifold chamber.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**


M12 6652

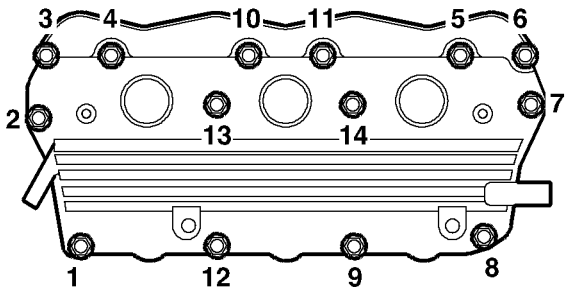
2. Depress locking collar and release breather hose from RH camshaft cover.


M12 6653

3. Remove 6 bolts securing plug top coils to RH camshaft cover and remove coils.

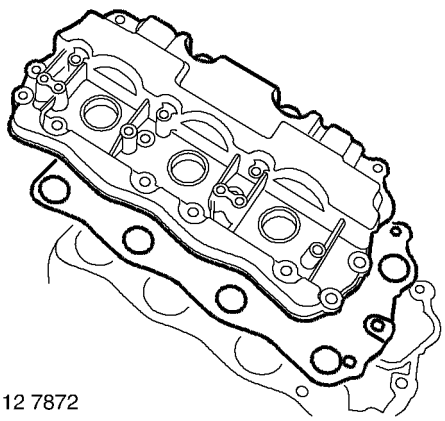


4. Remove bolt securing earth lead to RH camshaft cover and release earth lead.



M12 7871

5. Using sequence shown, progressively loosen and remove 14 bolts securing camshaft cover.



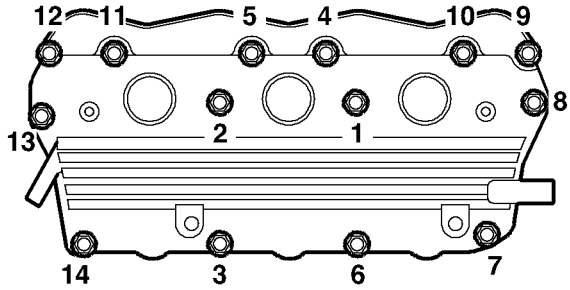
M12 7872

6. Remove camshaft cover, remove and discard gasket.

Refit

1. Clean mating surfaces of camshaft cover and carrier.

2. Position new gasket to camshaft carrier with arrows on gasket pointing towards inlet manifold.



M12 7873

3. Position camshaft cover, fit and tighten bolts progressively in the sequence shown to 9 Nm (7 lbf.ft).

4. Position plug top coils, fit bolts and tighten to 9 Nm (7 lbf.ft).

5. Position earth lead to RH camshaft cover, fit bolt and tighten to 9 Nm (7 lbf.ft).

6. Secure breather hose to camshaft cover.

7. Fit inlet manifold chamber.

☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**

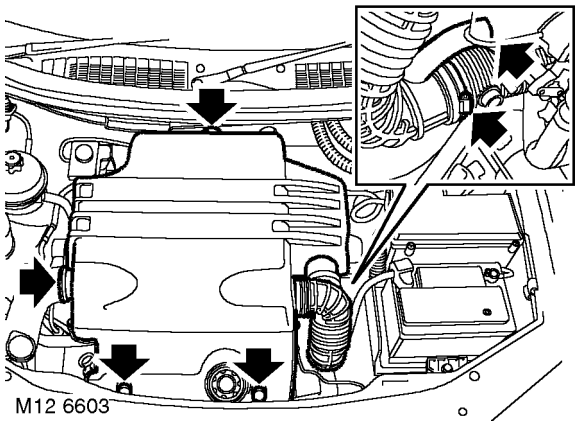
8. Check engine oil, top-up if necessary.

☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**

Cover - engine acoustic

12.30.50

Remove



1. Loosen clip and disconnect fresh air intake hose from acoustic cover.
2. Loosen clip and release air intake and air bypass hose from throttle body.
3. Release 2 turnbuckles securing acoustic cover to LH camshaft cover.
4. Release retaining strap and remove acoustic cover.

Refit

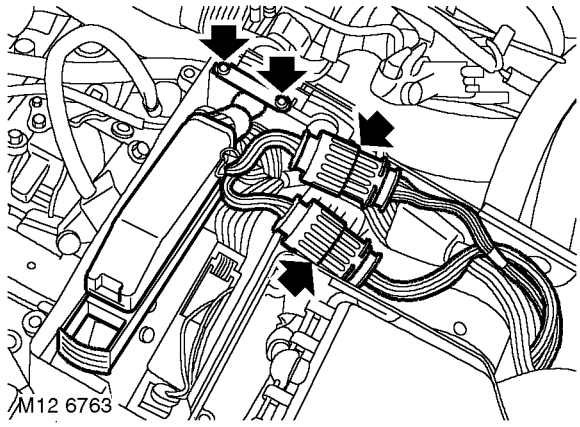
1. Fit and secure engine acoustic cover.
2. Connect air intake and air bypass hoses, secure clip.
3. Connect fresh air intake hose to acoustic cover and tighten clip screw.

Engine and automatic gearbox

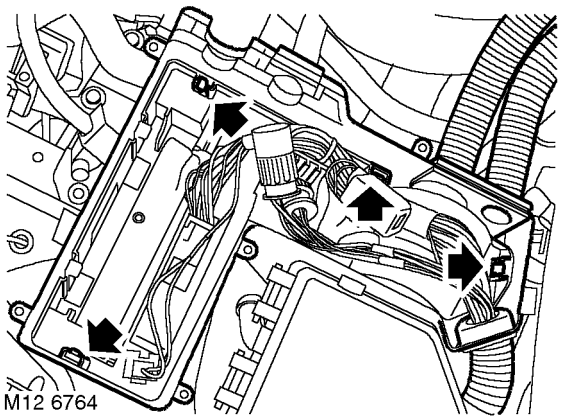
12.37.01.99

Remove

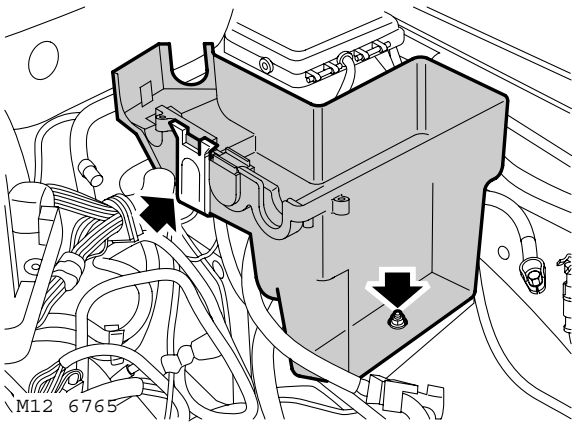
1. Disconnect battery earth lead.
2. Tie bonnet back in upright position.
3. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
4. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
5. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
6. Remove engine ECM.
   ENGINE MANAGEMENT SYSTEM - SIEMENS, REPAIRS, Engine control module (ECM) - Non NAS.



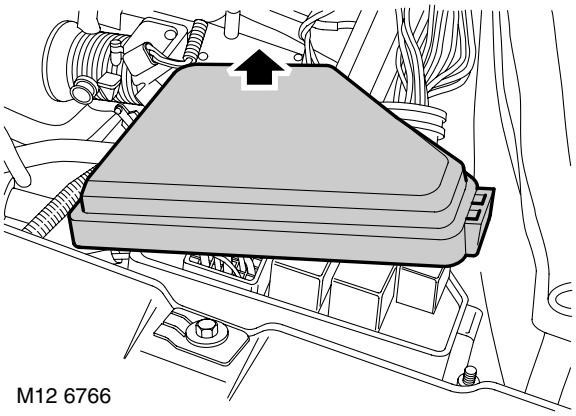
7. Remove 2 screws securing harness clamp and remove clamp.
8. Disconnect 2 engine harness to main harness multiplugs.



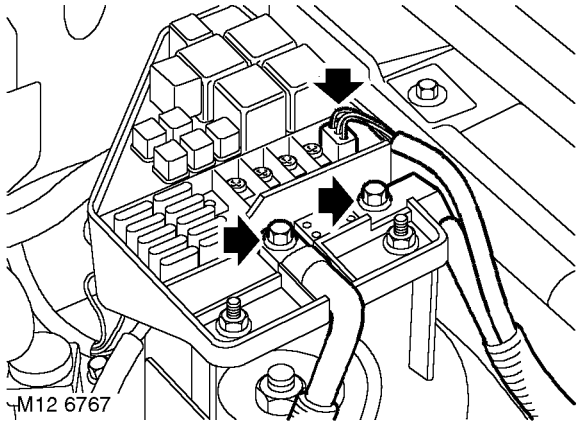
9. Release air duct and harness rubber sleeve from 'E' box.
10. Release 4 clips securing carrier in 'E' box, remove carrier from 'E' box and position aside.



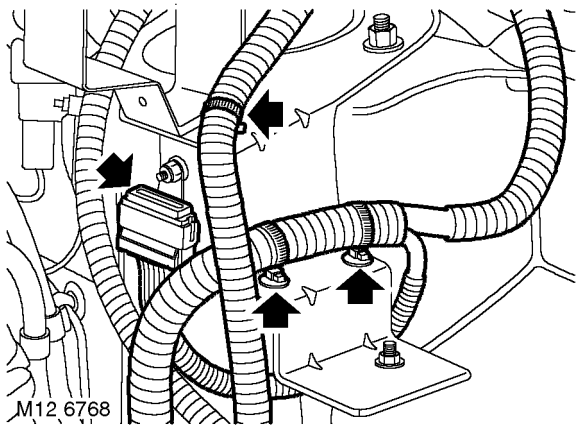
11. Remove nut, release retainer and remove 'E' box.



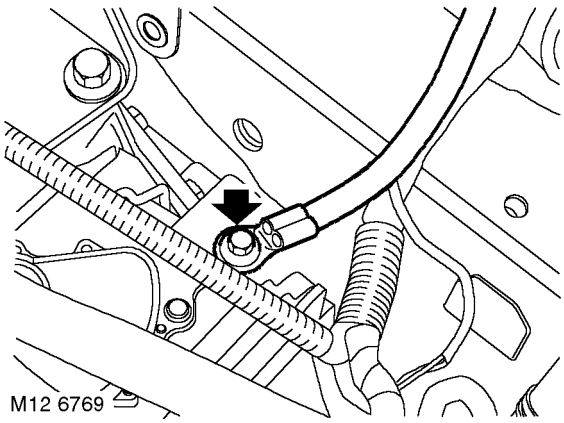
12. Remove engine compartment fuse box cover.



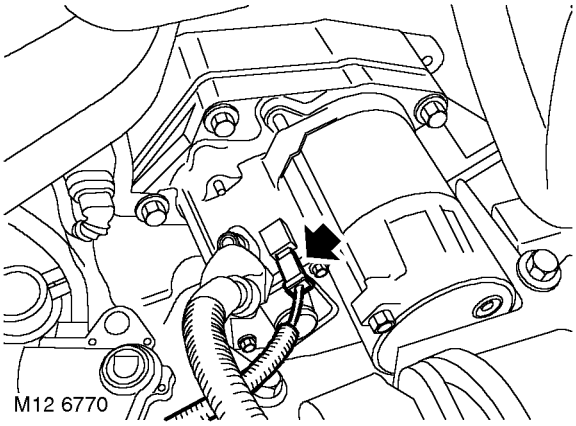
13. Remove 2 bolts securing battery and starter lead to fuse box.
14. Disconnect multiplug from fuse box.



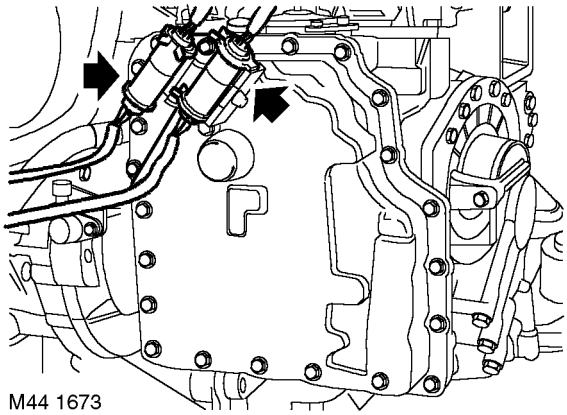
15. Disconnect earth header multiplug.
16. Release 3 clips securing engine harness to 'E' box mounting bracket, lay harness over engine.



17. Remove bolt securing engine earth lead.



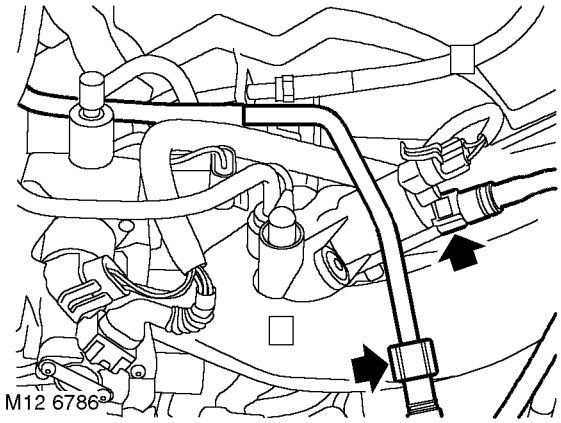
18. Disconnect Lucar from starter solenoid.



19. Release 2 gearbox harness multiplugs from mounting bracket clips and disconnect multiplugs.

20. Position absorbent cloth around fuel feed pipe connection to collect spillage.

WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.

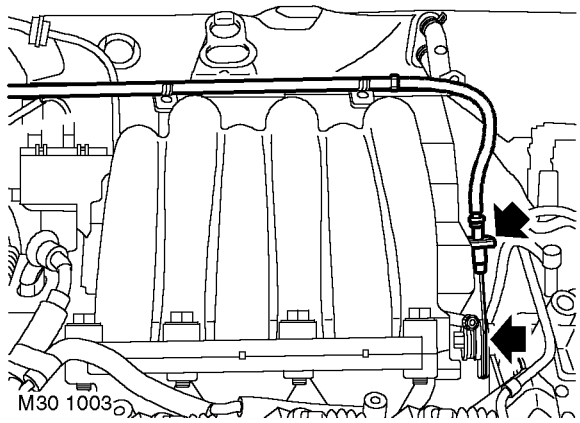


21. Pull back rubber sleeve on fuel pipe connector, release connector and disconnect fuel pipe from fuel rail pipe.

CAUTION: Always fit plugs to open connections to prevent contamination.

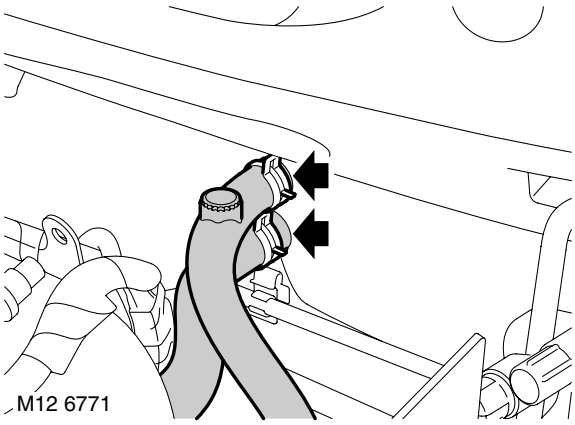
22. Release clip and disconnect hose from purge control valve.

CAUTION: Always fit plugs to open connections to prevent contamination.

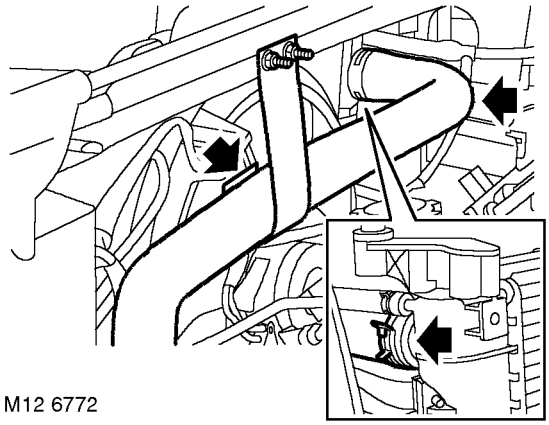


23. Release throttle cable from clips on harness brackets, if fitted, if fitted.

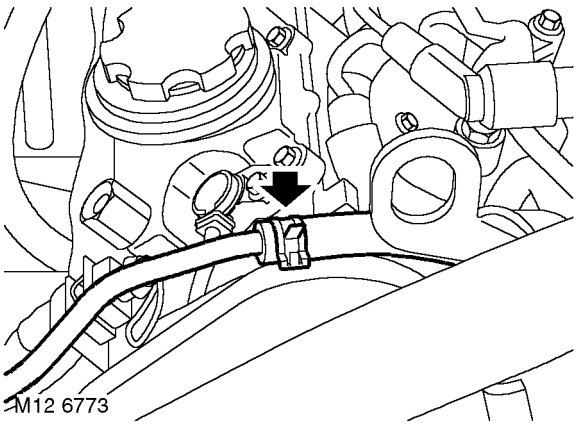
24. Release throttle cable from abutment bracket and disconnect cable from throttle body cam, if fitted.



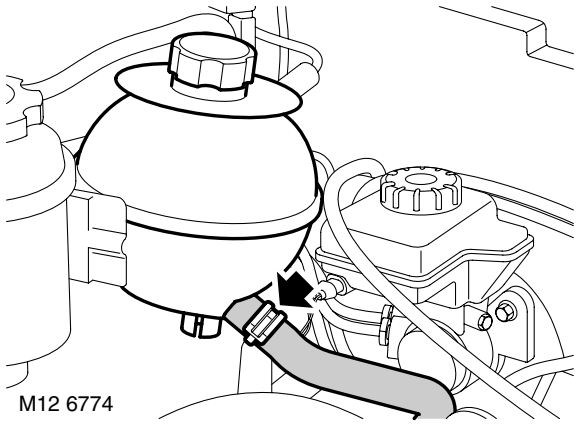
25. Release clips and disconnect heater feed and return hoses.



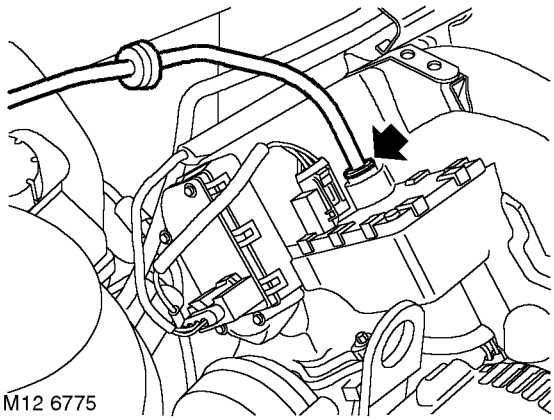
26. Release top hose from support bracket, release clip and disconnect top hose from radiator.



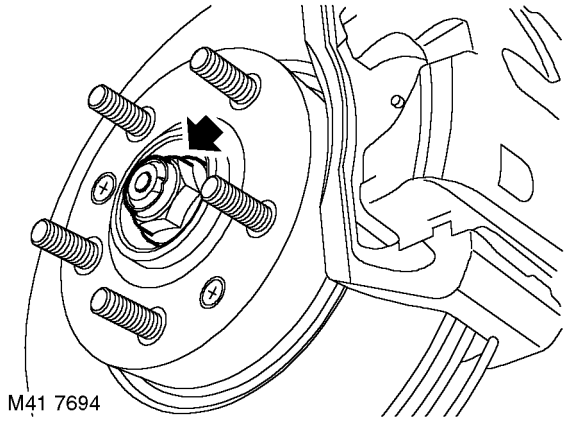
27. Release clip and disconnect expansion tank hose from inlet manifold.



28. Release clip and disconnect hose from underside of expansion tank.



29. Depress locking collar and disconnect brake servo hose from inlet manifold chamber.
30. Raise vehicle on ramp.
31. Remove front road wheels.
32. Release stake in drive shaft nuts.

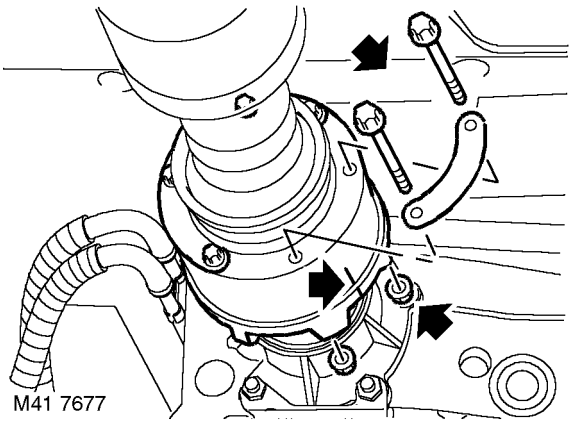

M41 7694

33. With an assistant depressing the brake pedal, remove and discard LH and RH drive shaft nuts.

34. Remove rear beam.
☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**

35. Remove exhaust front pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - Non NAS.**
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - NAS.**

36. Raise one rear wheel for rotation of propeller shaft to access bolts.


M41 7677

37. Reference mark position of viscous coupling flange to IRD unit flange to aid reassembly.

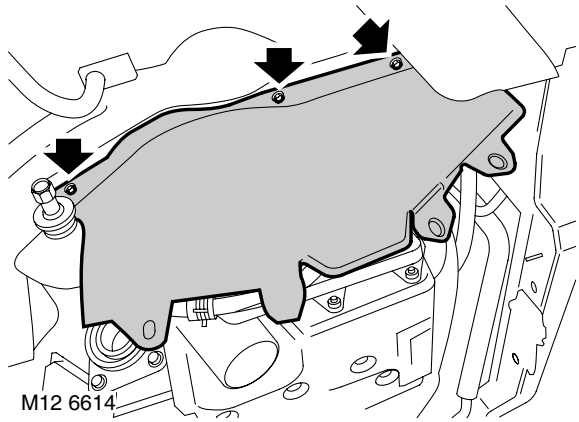
38. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.

39. Release propeller shaft from IRD drive flange and tie shaft aside.

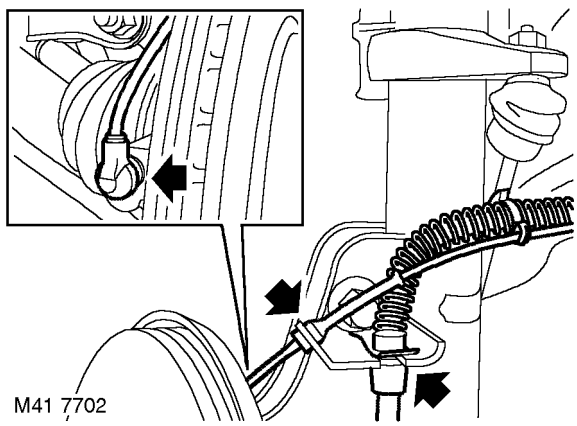
CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.

40. Drain gearbox fluid.
☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.**

41. Drain fluid from IRD.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.**


M12 6614

42. Remove 6 bolts securing RH and LH front splash shields and remove shields.


M41 7702

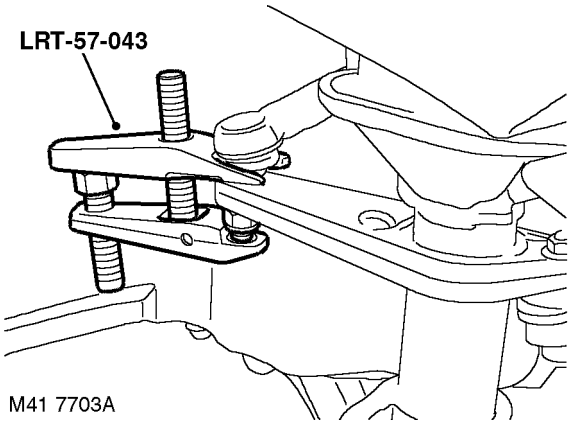
43. Remove clips securing brake hoses to RH and LH damper brackets.

44. Release ABS sensor leads from bracket.

45. Release ABS sensors from RH and LH front hubs.

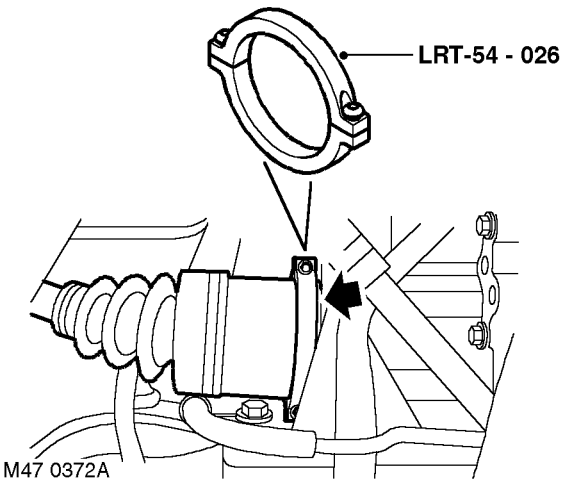
46. Remove nuts securing RH and LH track rod end ball joints.

47. Fit an M12 nut to each ball pin, flush with end of each pin.

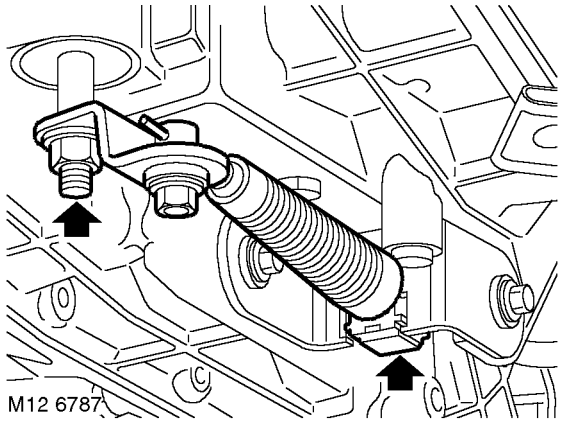


48. Using **LRT-57-043,** separate ball pins from RH and LH steering arms. Remove M12 nuts and release ball pins from steering arms.

49. Pull RH and LH hubs outwards and release driveshafts from hubs.

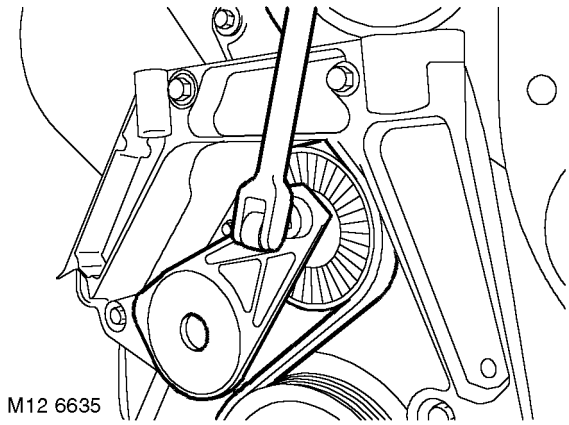


50. Using **LRT-54-026,** release drive shafts from IRD unit and gearbox.

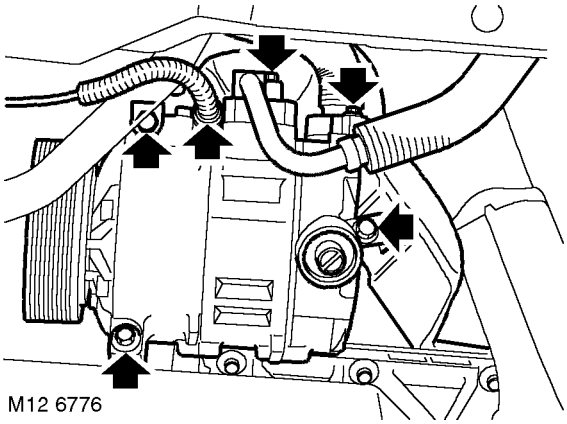


51. Remove nut securing selector lever to selector shaft on gearbox and release lever from selector shaft.

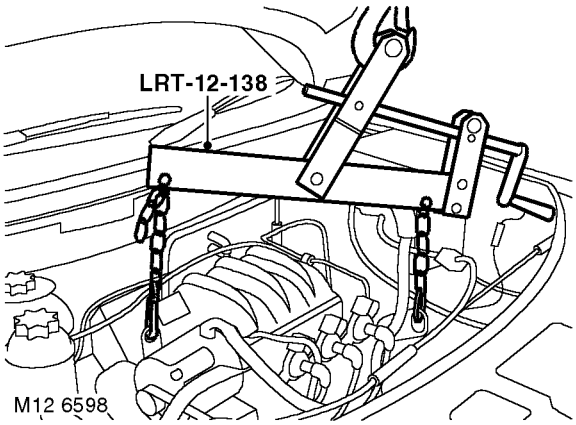
52. Release clip securing selector cable to gearbox bracket, remove cable and tie aside.



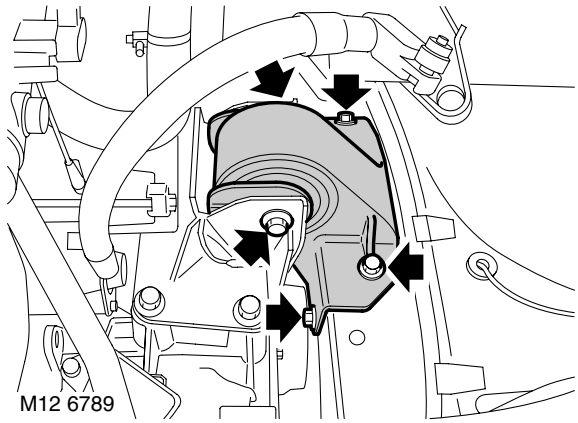
53. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and release drive belt from A/C compressor pulley.



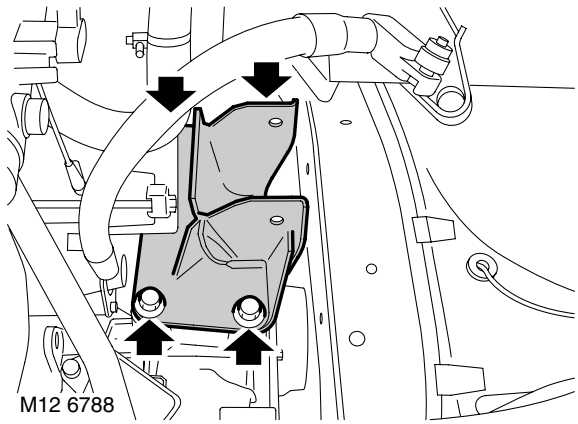
54. Disconnect multiplug from A/C compressor.
55. Note fitted position of heat shield on A/C compressor and remove 3 bolts securing A/C compressor to front mounting plate and cylinder block. Release A/C compressor and heat shield and position aside.
56. Lower vehicle on ramp.



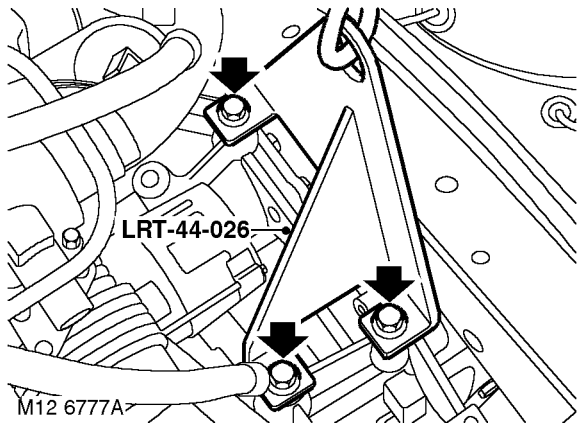
57. Using a hoist, connect adjustable lifting bracket, **LRT-12-138** to engine.
58. Raise hoist to take weight without exerting any load on the engine mountings.



59. Remove through bolt securing LH engine mounting to gearbox bracket.
60. Remove 4 bolts securing LH mounting to body and remove mounting.

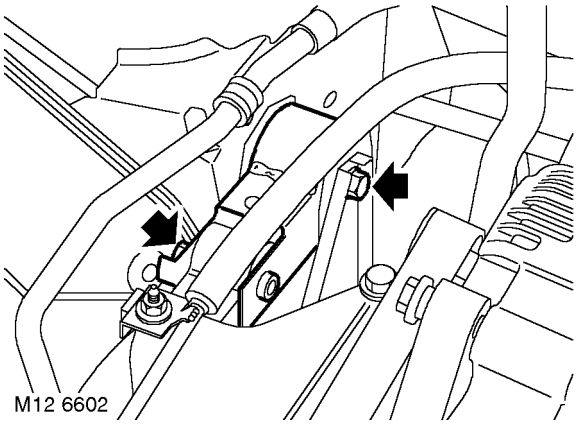


61. Remove 4 bolts securing LH mounting bracket to gearbox and remove bracket.

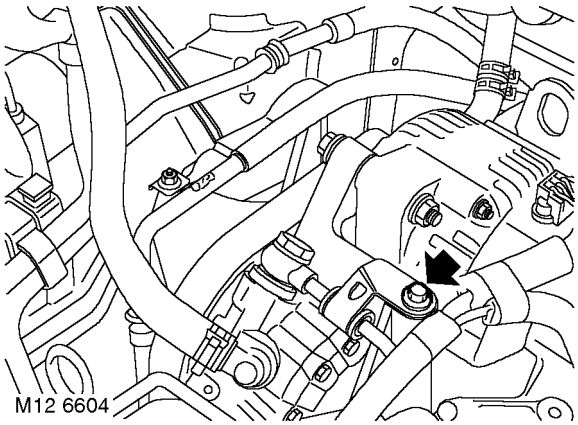


62. Using gearbox bracket bolts, secure **LRT-44-026** lifting bracket to gearbox.

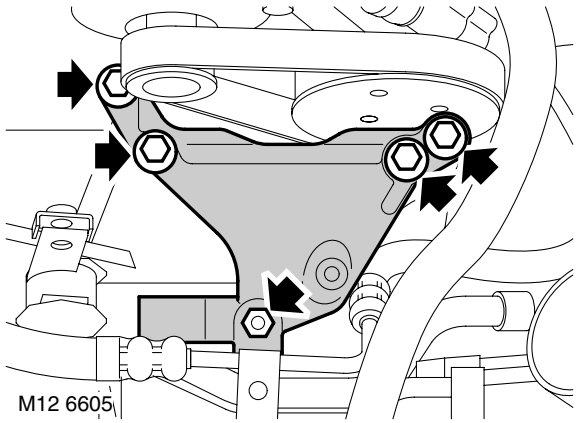
63. Place a wooden block on jack, position jack under gearbox and raise jack sufficient to support weight of gearbox. Release lifting hook from rear engine lifting bracket and connect to lifting bracket on gearbox.



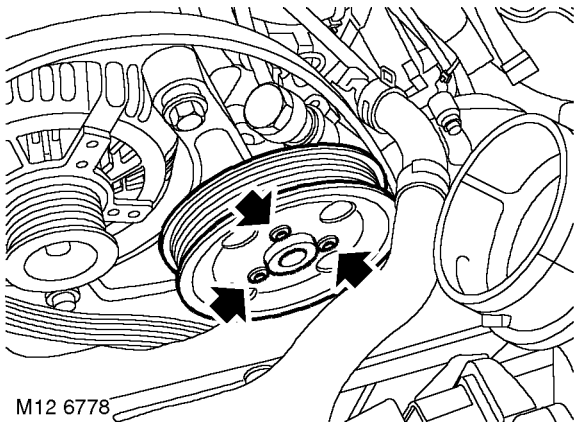
64. Remove bolt securing upper RH engine steady to top arm.
65. Loosen bolt securing upper RH engine steady to body, pivot engine steady away from top arm.



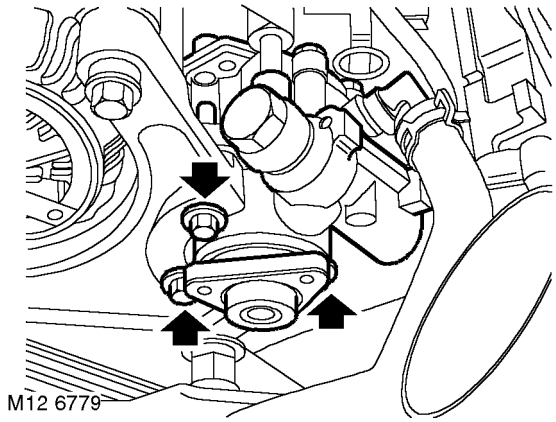
66. Remove bolt securing PAS pipe to engine front mounting plate.



67. Remove nut and 4 bolts securing engine top arm bracket to RH hydramount and to engine front mounting bracket.
68. Release PAS pipe support bracket from hydramount and position pipe aside.
69. Remove top arm.



70. Remove 3 Torx screws securing PAS pump pulley and remove pulley.



71. Remove 3 bolts securing PAS pump to front mounting plate and tie pump aside.
72. With assistance, manoeuvre and lower engine and gearbox to floor.

Refit

1. With assistance, raise engine and gearbox into engine compartment.
2. Position PAS pump to front mounting plate, fit and tighten bolts to 25 Nm (18 lbf.ft).
3. Position PAS pump pulley, fit and tighten Torx screws to 9 Nm (7 lbf.ft).
4. Position top arm to engine mounting bracket and RH hydramount, fit and tighten bolts to 100 Nm (74 lbf.ft).
5. Position PAS pipe support bracket to RH hydramount, fit and tighten nut to 85 Nm (63 lbf.ft).
6. Place a wooden block on jack, position jack under gearbox and raise jack sufficient to support weight of gearbox. Release lifting hook from lifting bracket on gearbox and connect to rear engine lifting bracket.
7. Lower and remove jack supporting gearbox.
8. Remove bolts securing **LRT-44-026** lifting bracket to gearbox and remove bracket.
9. Position LH mounting bracket to gearbox, fit and tighten bolts to 85 Nm (63 lbf.ft).
10. Position LH mounting to body, fit and tighten bolts to 48 Nm.
11. Align gearbox bracket to LH body mounting, fit and tighten through bolt to 100 Nm (74 lbf.ft).
12. Position upper RH engine steady to top arm, fit and tighten bolt to 100 Nm (74 lbf.ft).
13. Tighten bolt securing upper RH engine steady to body to 100 Nm (74 lbf.ft).
14. Position PAS pipe to engine front mounting plate, fit and tighten bolt to 25 Nm (18 lbf.ft).
15. Lower hoist, disconnect and remove lifting bracket, **LRT-12-138.**
16. Raise vehicle on ramp.
17. Position A/C compressor to front mounting plate and cylinder block, align heat shield, fit and tighten bolts to 25 Nm (18 lbf.ft).
18. Connect multiplug to A/C compressor.
19. Using a 3/8 square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
20. Position selector cable to gearbox bracket and secure with clip.
21. Position selector lever to selector shaft, fit and tighten nut to 25 Nm (18 lbf.ft).
22. Clean splines and seal areas on each driveshaft and mating faces in front hubs.
23. Fit new circlips to RH and LH driveshaft inner joint splines.
24. Fit driveshafts to IRD and gearbox, ensuring that the circlip on each driveshaft is fully engaged.
25. Engage LH and RH driveshafts into front hubs.
26. Fit new driveshaft flange nuts but do not tighten at this stage.
27. Clean ball joint tapers and taper seats.
28. Position LH and RH track rod ends to steering arms, fit new nuts and tighten to 55 Nm (40 lbf.ft).
29. Clean ABS sensors and mating faces.
30. Apply anti-seize grease to both ABS sensors and position sensors in front hubs.

Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

31. Position LH and RH brake hoses to front damper brackets and secure with clips.
32. Position LH and RH splash shields, fit and tighten bolts.
33. Ensure mating face of propeller shaft and IRD drive flange are clean.
34. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 42 Nm (31 lbf.ft).
35. Fit rear beam.
☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**
36. Fill IRD to correct level with fluid.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.**
37. Fit exhaust front pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - Non NAS.**
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - NAS.**

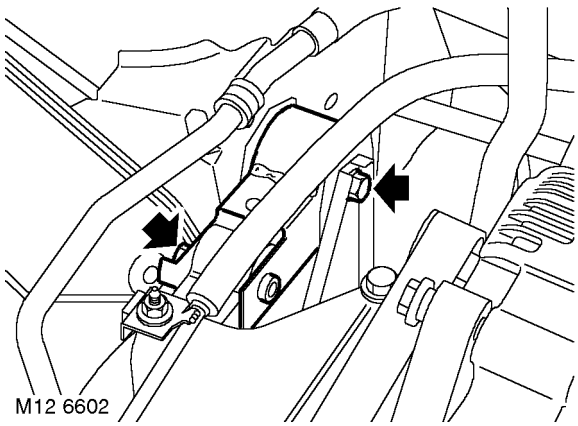
38. With assistant depressing the brake pedal, tighten front hub nuts to 400 Nm (295 lbf.ft).
39. Stake nut to shaft.
40. Fit front road wheels, fit and tighten nuts to 115 Nm (85 lbf.ft).
41. Lower vehicle on ramp.
42. Connect brake servo vacuum hose to inlet manifold chamber.
43. Connect coolant hose to underside of expansion tank and secure with clip.
44. Connect expansion tank hose to inlet manifold and secure clip.
45. Connect top hose to radiator and secure with clip. Position hose in bracket.
46. Connect heater feed and return hoses and secure with clips.
47. Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket, if fitted.
48. Secure throttle cable in clips on harness brackets, if fitted.
49. Adjust throttle cable, if fitted.
☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - KV6.**
50. Connect hose to purge control valve.
51. Connect fuel hose to fuel rail pipe, fit rubber sleeve over hose connector.
52. Connect gearbox harness multiplugs and secure multiplugs in mounting bracket clips.
53. Connect Lucar connector to starter solenoid.
54. Position earth lead to gearbox housing, fit and tighten bolt to 25 Nm (18 lbf.ft).
55. Position engine harness to 'E' box mounting bracket and secure with clips.
56. Connect earth header multiplug.
57. Connect multiplug to underbonnet fuse box.
58. Position battery and starter motor lead to underbonnet fuse box, fit and tighten bolts to 8 Nm (6 lbf.ft).
59. Fit underbonnet fuse box cover.
60. Position 'E' box, secure in retaining clip, fit and tighten nut to 9 Nm (7 lbf.ft).
61. Position carrier in 'E' box and secure with clips.
62. Position and secure air duct and harness rubber sleeve in 'E' box.
63. Connect multiplugs securing main harness to engine harness.
64. Position ECM harness and multiplug to 'E' box, align harness clamp and secure screws to 'E' box.
65. Fit engine ECM.
☞ **ENGINE MANAGEMENT SYSTEM - SIEMENS, REPAIRS, Engine control module (ECM) - Non NAS.**
66. Fit battery carrier.
☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
67. Fill cooling system.
☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
68. Connect battery earth lead.
69. Fill gearbox with fluid.
☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.**
70. Fit engine acoustic cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**

Arm assembly - engine mounting RH

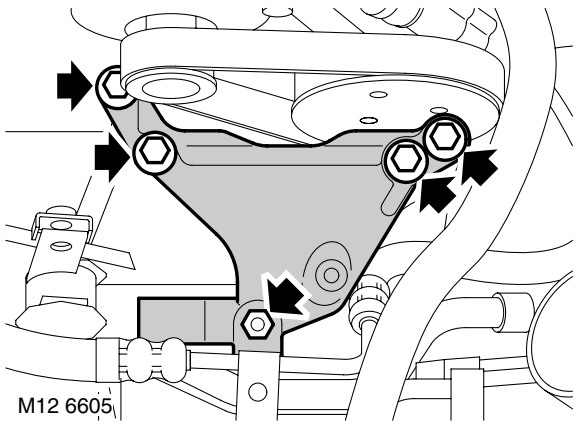
12.45.06

Remove

1. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Remove bolt securing upper RH engine steady to top arm.
4. Loosen bolt securing upper RH engine steady to body, pivot engine steady away from top arm.
5. Fit wooden block to jack, position jack under engine sump to support engine.



6. Remove nut and 4 bolts securing engine top arm bracket to RH hydramount and to engine front mounting bracket.
7. Release PAS pipe support bracket from hydramount and position pipe aside.
8. Remove top arm.

Refit

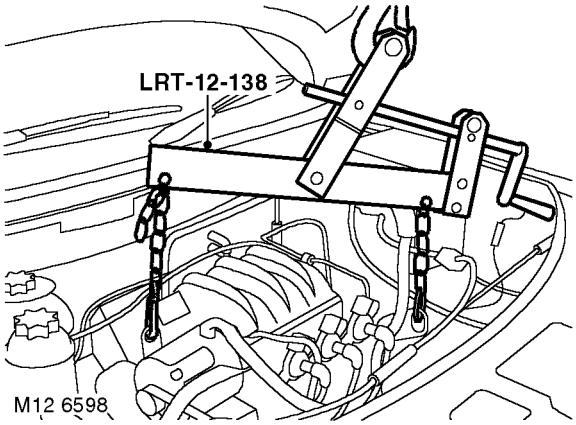
1. Position top arm to front engine mounting bracket, fit and tighten bolts to 100 Nm (74 lbf.ft).
2. Lower and remove jack supporting engine.
3. Position PAS pipe support bracket to hydramount.
4. Fit nut securing top arm to RH hydramount and tighten to 85 Nm (63 lbf.ft).
5. Position upper RH engine steady to top arm, fit and tighten bolt to 100 Nm (74 lbf.ft).
6. Tighten bolt securing upper RH engine steady to body to 100 Nm (74 lbf.ft).
7. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
8. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

Engine mounting - LH

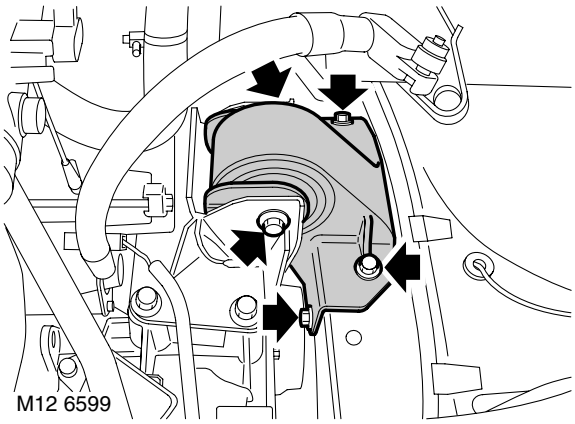
12.45.11

Remove

1. Remove engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
2. Remove battery carrier.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**



3. Using a hoist, connect adjustable lifting bracket, **LRT-12-138** to engine.
4. Raise hoist to take weight without exerting any load on the engine mountings.



5. Remove through bolt securing LH engine mounting to gearbox bracket.
6. Remove 4 bolts securing LH mounting to body and remove mounting.

Refit

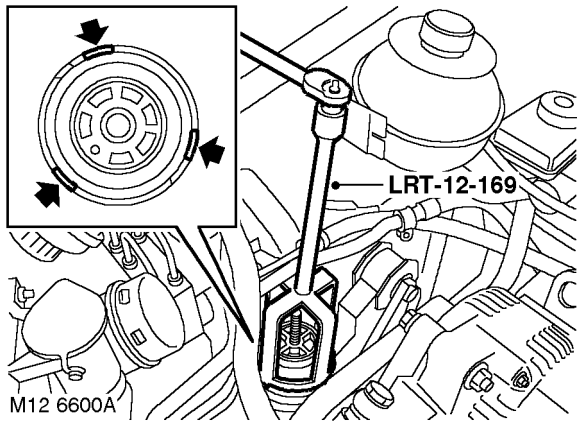
1. Position LH mounting to body, fit and tighten bolts to 48 Nm (35 lbf.ft).
2. Align gearbox bracket to LH body mounting, fit and tighten through bolt to 100 Nm (74 lbf.ft).
3. Lower hoist, disconnect and remove lifting bracket, **LRT-12-138.**
4. Fit battery carrier.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
5. Fit engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**

Hydramount - engine - RH

12.45.12

Remove

1. Remove top arm.
   ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.



2. Position 3 pegs on **LRT-12-169** into 3 slots in hydramount.
3. Connect a suitable socket bar to **LRT-12-169,** loosen and remove hydramount and **LRT-12-169.**

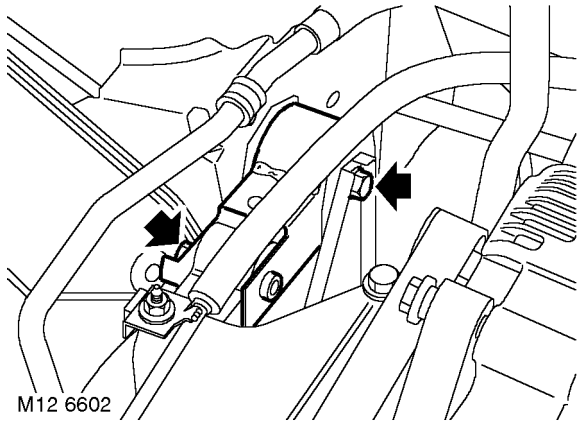
Refit

1. Clean hydramount and body mating faces.
2. Position hydramount to body.
3. Position 3 pegs on **LRT-12-169** into 3 slots in hydramount.
4. Tighten hydramount to 85 Nm (63 lbf.ft).
5. Fit top arm.
   ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.

Engine steady - upper RH

12.45.16

Remove



1. Remove 2 bolts securing RH engine steady to top arm and body.
2. Remove engine steady from mounting brackets.

Refit

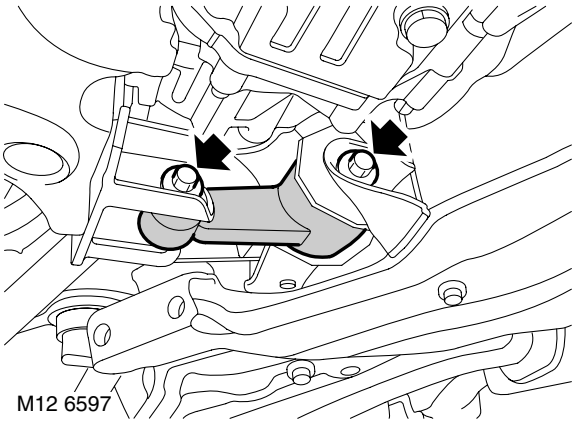
1. Position engine steady bar, fit bolts and tighten to 100 Nm (74 lbf.ft).

Engine steady - lower

12.45.17

Remove

1. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



2. Remove 2 bolts securing lower engine steady to sump bracket and subframe.
3. Remove lower engine steady noting that 'TOP' mark on engine steady faces uppermost.

Refit

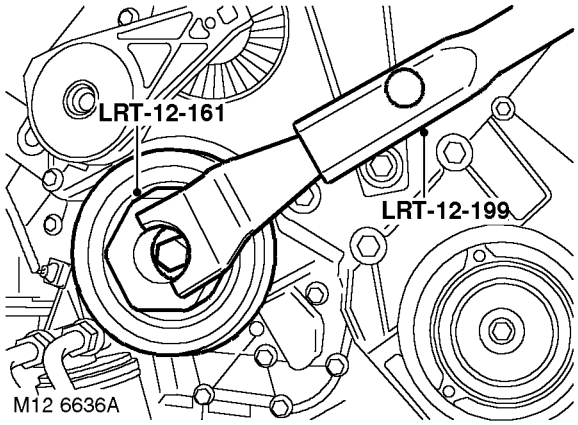
1. Position lower engine steady, 'TOP' mark uppermost. Fit and tighten bolts to 100 Nm (74 lbf.ft).
2. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.

Torque converter drive plate

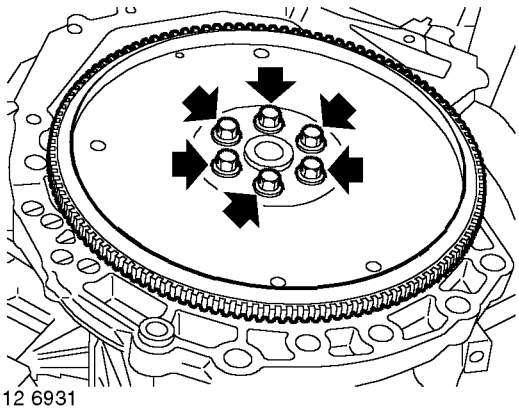
12.53.13

Remove

1. Remove automatic gearbox.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - KV6.
2. Assemble **LRT-12-161** to **LRT-12-199** and secure with clamp bolt.



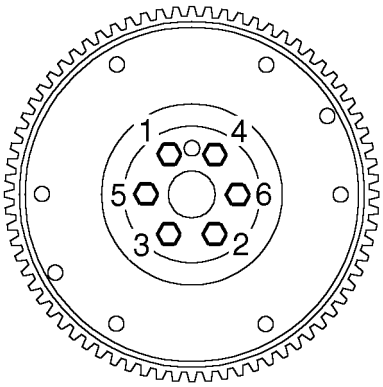
3. Position **LRT-12-161** and **LRT-12-199** to crankshaft pulley to restrain crankshaft.



4. Remove and discard 6 Patchlok bolts securing drive plate to crankshaft.
5. Remove drive plate from crankshaft.

Refit

1. Clean bolt holes in crankshaft using an old drive plate bolt with two saw cuts at an angle of 45° to the bolt shank.
2. Clean drive plate and mating face of crankshaft.
3. Position **LRT-12-161** and **LRT-12-199** to crankshaft pulley to restrain crankshaft.
4. Position drive plate to crankshaft.



M12 6932

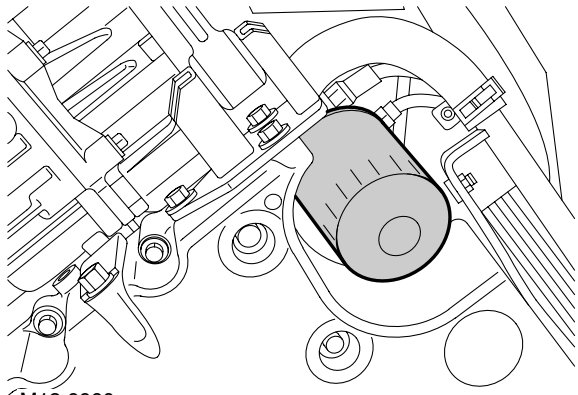
5. Fit new Patchlok bolts securing drive plate to crankshaft and tighten in sequence shown to:
   - Stage 1 - 25 Nm (18 lbf.ft)
   - Stage 2 - 100 Nm (74 lbf.ft)
6. Remove **LRT-12-161** and **LRT-12-199** from crankshaft pulley.
7. Fit automatic gearbox.
   ☞ **AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - KV6.**

Filter - engine oil

12.60.04

Remove

1. Raise vehicle on a 4 post ramp.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
3. Place suitable container under oil filter to collect spillage.



M12 6660

4. Using strap wrench, remove and discard oil filter.

   WARNING: Avoid excessive skin contact with used engine oil. Used engine oil contains potentially harmful contaminants which may cause skin cancer or other serious skin disorders.

Refit

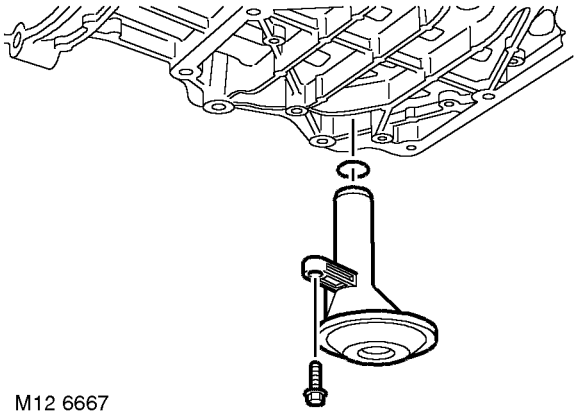
1. Clean oil filter mating face.
2. Fill canister of replacement oil filter with clean engine oil.
3. Lubricate new oil filter sealing ring with clean engine oil.
4. Fit new oil filter and tighten by hand until it seats, then tighten a further half turn.
5. Remove oil container from underneath of engine.
6. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
7. Lower vehicle on ramp.
8. Start and run engine and check for leaks.
9. Stop engine, wait a few minutes, then check oil level. Top up if necessary.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**

Oil pick-up strainer

12.60.20

Remove

1. Disconnect battery earth lead.
2. Remove engine sump.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Sump - reseal.**



M12 6667

3. Remove bolt and remove oil pick-up strainer. Remove and discard 'O' ring.

Refit

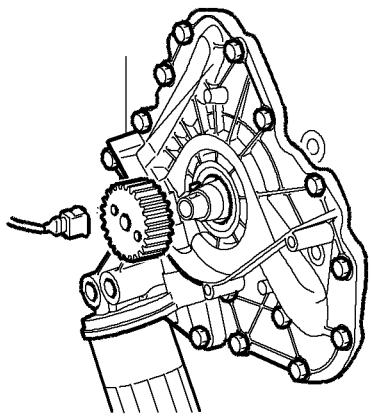
1. Clean oil pick-up strainer and mating face.
2. Remove all traces of thread locking material from oil strainer bolt hole.
   CAUTION: Do not use a tap.
3. Lubricate new 'O' ring with clean engine oil and fit to pick-up strainer.
   CAUTION: Ensure 'O' ring, Part No. LYX000210L is fitted.
4. Position oil pick-up strainer, fit and tighten bolt to 8 Nm (6 lbf.ft).
5. Fit engine sump.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Sump - reseal.**
6. Connect battery earth lead.

Gasket - oil pump

12.60.25

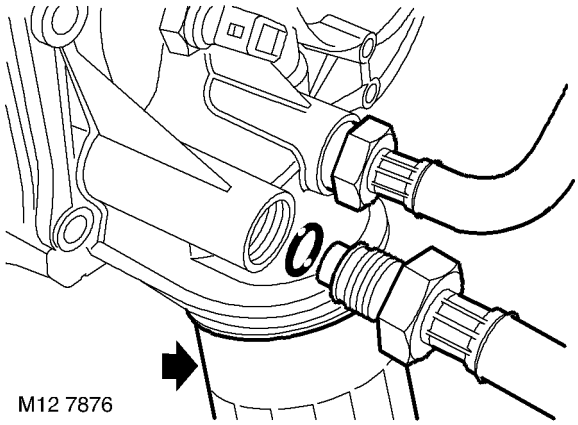
Remove

1. Disconnect battery earth lead.
2. Drain engine oil.
   ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**
3. Remove camshaft timing belt.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**



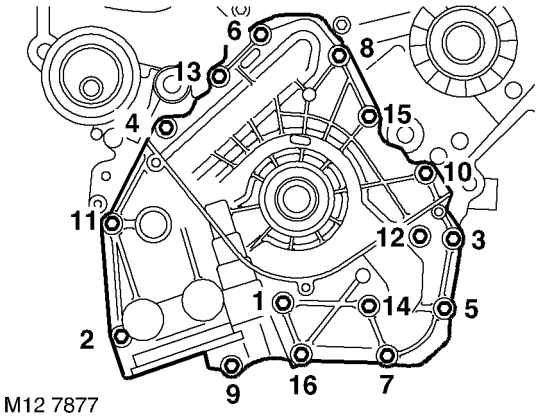
M12 7875

4. Remove crankshaft gear.
5. Disconnect multiplug from oil pressure switch.



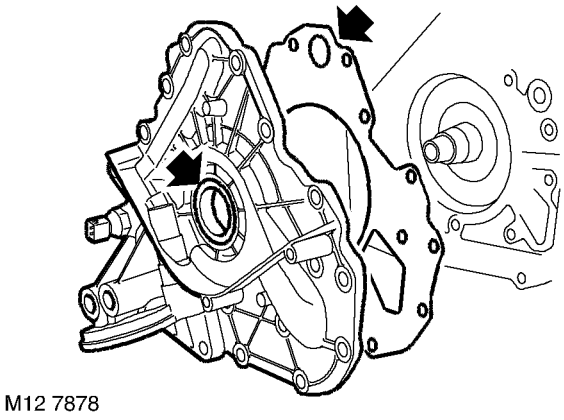
M12 7876

6. Loosen and remove oil cooler pipe unions from oil filter housing, remove and discard 2 'O' rings.
7. Using strap wrench, remove and discard oil filter.



M12 7877

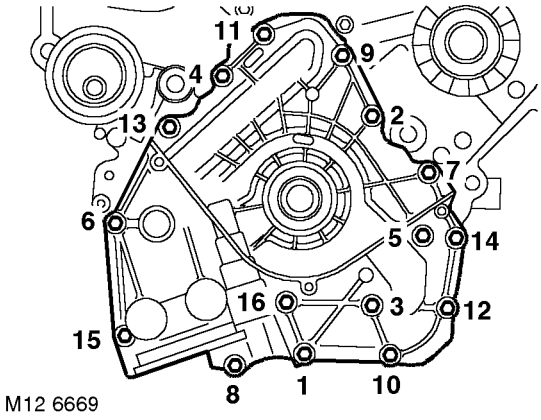
8. Using sequence shown, remove and discard 16 bolts securing oil pump to cylinder block.


M12 7878

9. Remove oil pump.
10. Remove and discard oil pump gasket.
11. Remove and discard crankshaft front oil seal from oil pump housing.

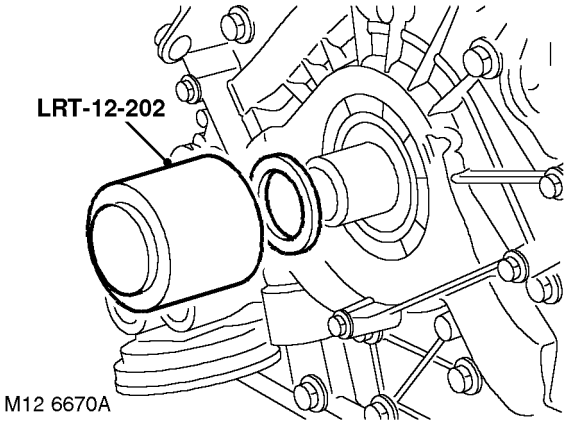
Refit

1. Clean oil pump and mating face on cylinder block ensure bolt holes are clean and dry.
2. Clean oil seal recess in oil pump and running surface on crankshaft.
3. Fit new oil pump gasket, dry, to cylinder block.
4. Fit oil seal guide, from seal kit, over end of crankshaft.



M12 6669

5. Position oil pump, aligning flats on oil pump drive to flats on crankshaft. Fit new Patchlok bolts and tighten progressively in sequence shown to:
   - Stage 1 - 5 Nm (4 lbf.ft)
   - Stage 2 - 9 Nm (7 lbf.ft)



M12 6670A

6. Position new seal on crankshaft up against oil pump housing. Drift seal into place using tool **LRT-12-202.**

   CAUTION: Oil seal must be fitted dry.

7. Remove oil seal guide from crankshaft.
8. Connect multiplug to oil pressure switch.
9. Fill canister of replacement oil filter with clean engine oil.
10. Lubricate oil filter sealing ring with clean engine oil.
11. Fit oil filter and tighten by hand until it seats then tighten a further half turn.
12. Lubricate new 'O' rings with clean engine oil and fit to oil cooler pipe unions.
13. Connect oil cooler pipes to oil filter housing and tighten unions to 26 Nm (19 lbf.ft).
14. Clean crankshaft gear and wipe end of crankshaft.
15. Fit crankshaft gear.

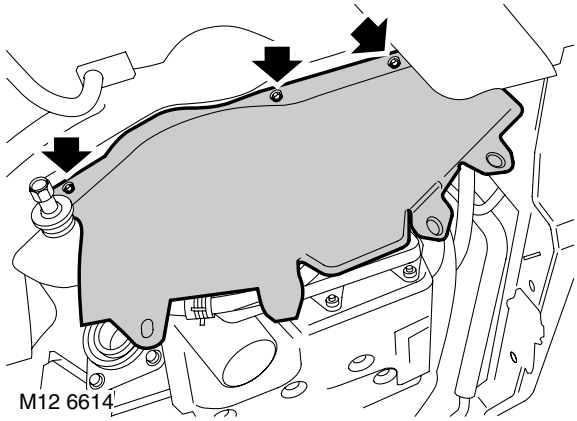
16. Fit camshaft timing belt.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.**
17. Fill engine with oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**
18. Connect battery earth lead.

Sump - reseal

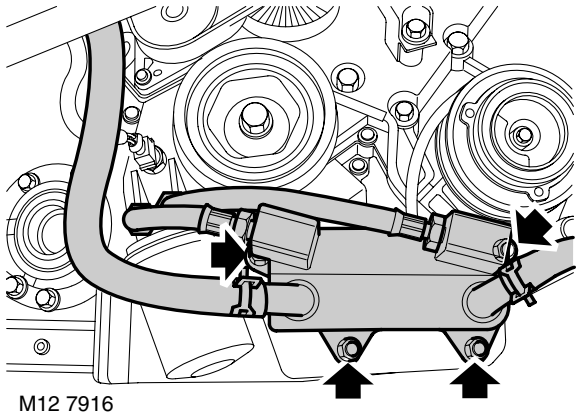
12.60.38

Remove

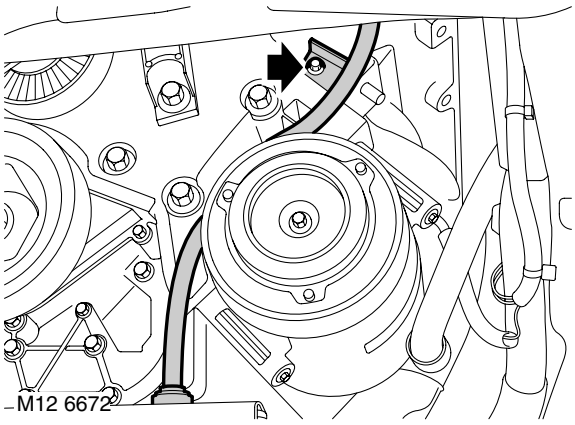
1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
3. Drain engine oil.
☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**


M12 6614

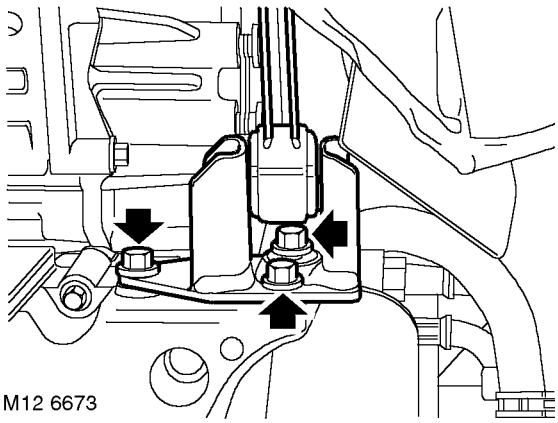
4. Remove 3 bolts securing RH splash shield to body and remove shield.


M12 7916

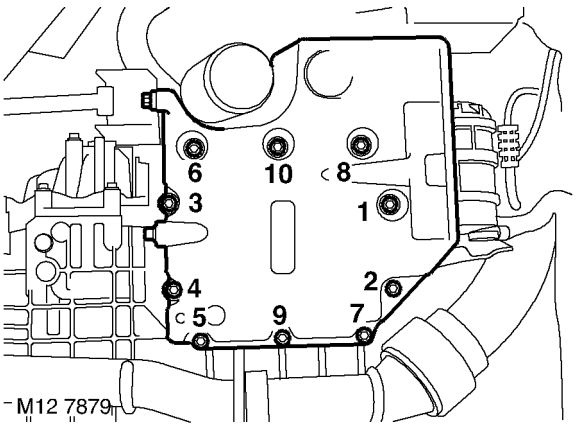
5. Remove 4 nuts securing engine oil cooler to mounting bracket and position oil cooler aside.



6. Remove bolt securing dipstick tube to cylinder block.
7. Depress and hold down dipstick collar, remove dipstick tube from sump.



8. Remove 3 bolts securing IRD support bracket to sump.



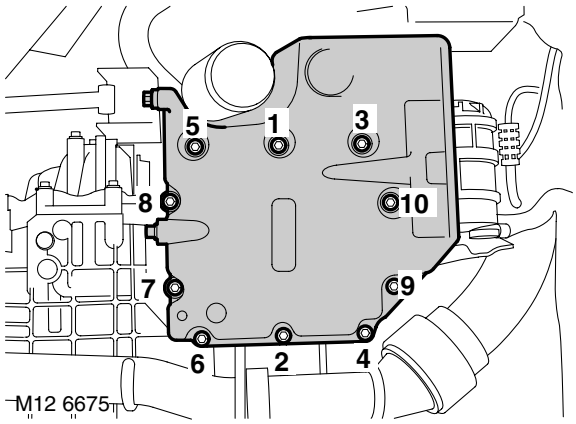
9. Using sequence shown and noting their fitted position, remove 10 bolts securing sump to lower crankcase.
10. Using a mallet, gently tap sump sideways to break sealant bond, remove sump.

CAUTION: Do not lever between sump and lower crankcase.

Refit

1. Using a suitable cleaning solvent, clean sump and mating face on lower crankcase. DO NOT use a metal scraper on sealing surfaces.
2. Apply a 2 mm (0.1 in) bead of sealant, Part No. STC 4600 along centre of sump flange, then spread to an even film using a roller.

CAUTION: To avoid contamination, assembly must be completed immediately after application of sealant.



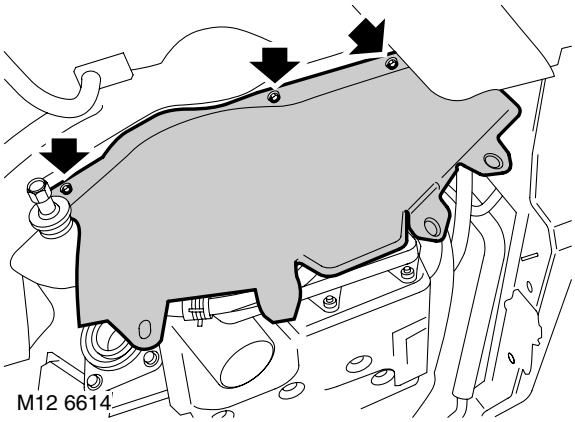
3. Position sump, fit bolts and tighten progressively in the sequence shown to 35 Nm (26 lbf.ft).
4. Fit bolts securing IRD support bracket to sump and tighten to 45 Nm (33 lbf.ft).
5. Position engine oil cooler to mounting bracket, fit and tighten nuts to 25 Nm (18 lbf.ft).
6. Position dipstick tube to sump and cylinder block, fit bolt and tighten to 9 Nm (7 lbf.ft).
7. Fit splash shield and secure with bolts.
8. Fill engine with correct quantity and grade of oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.
9. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
10. Connect battery earth lead.

Switch - oil pressure

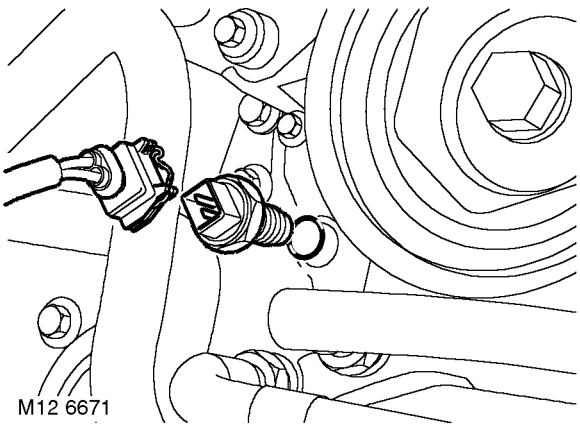
12.60.50

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove RH front road wheel.



4. Remove 3 bolts securing RH splash shield to body and remove shield.
5. Place container below oil pressure switch to collect spillage.



6. Disconnect multiplug from oil pressure switch.
7. Remove oil pressure switch and discard sealing washer.

Refit

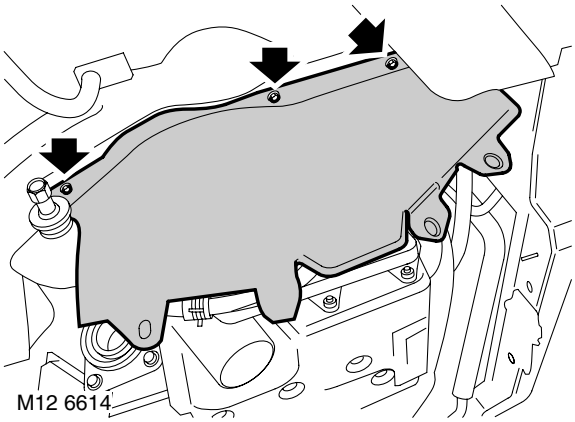
1. Ensure oil pressure switch and mating face is clean.
2. Fit oil pressure switch using a new sealing washer and tighten to 14 Nm (10 lbf.ft).
3. Connect multiplug to oil pressure switch.
4. Remove oil container from underneath of engine.
5. Fit splash shield and secure with bolts.
6. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
7. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
8. Check engine oil level, top-up if necessary.
9. Connect battery earth lead.

Oil pressure relief valve

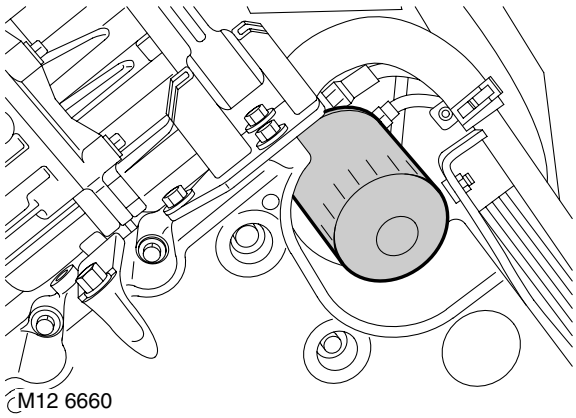
12.60.56

Remove

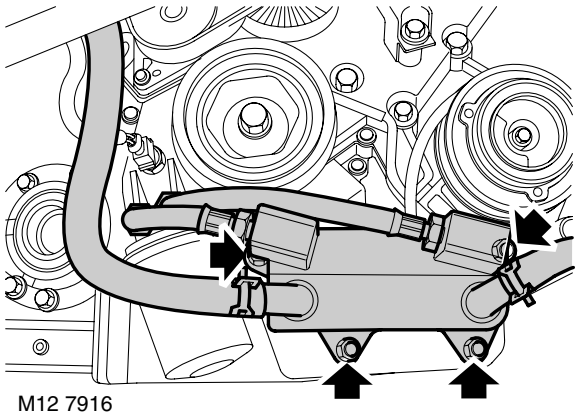
1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove RH front road wheel.


M12 6614

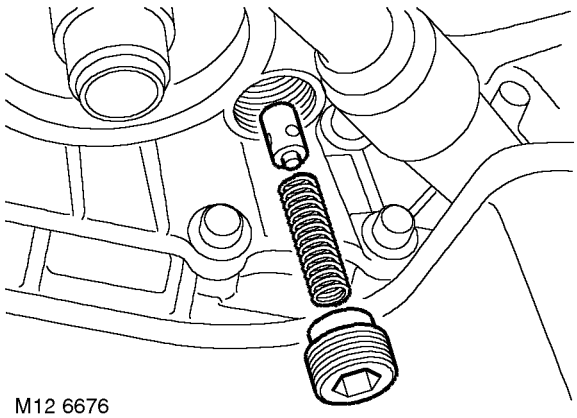
4. Remove 3 bolts securing RH splash shield to body and remove shield.
5. Place suitable container under oil filter to collect spillage.


M12 6660

6. Using strap wrench, remove and discard oil filter.


M12 7916

7. Remove 4 nuts securing engine oil cooler to mounting bracket and position oil cooler aside.


M12 6676

8. Remove oil pressure relief valve plug nut.
   Note: If a hexagonal head plug and sealing washer are fitted, discard sealing washer.
9. Remove spring and valve.

Refit

1. Clean valve, spring and plug.
2. Clean valve seating inside oil pump housing.
3. Check that valve slides freely in bore and that valve and bore are free from scoring and corrosion.
   Note: Light corrosion may be removed using grade 600 emery cloth soaked in oil.
4. Check free length of spring.
   GENERAL DATA, Engine – KV6 Petrol.
5. Apply Loctite 577 sealant to plug thread.
   Note: If a hexagonal head plug and sealing washer were fitted, fit new sealing washer to plug.

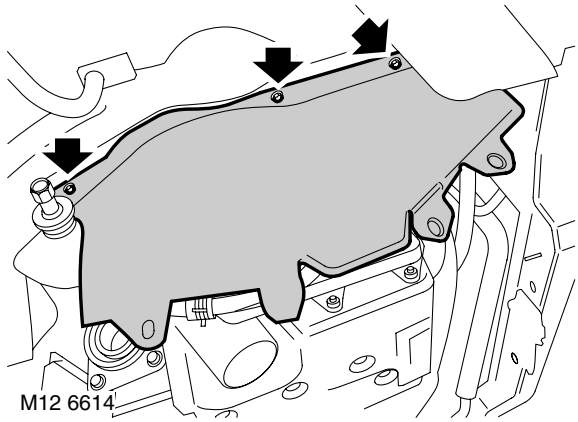
6. Fit valve, spring and plug to oil pump housing. Tighten plug to 25 Nm (18 lbf.ft).
7. Fill canister of replacement oil filter with clean engine oil.
8. Lubricate new oil filter seal with clean engine oil and fit filter.
9. Position engine oil cooler to mounting bracket, fit and tighten nuts to 25 Nm (18 lbf.ft).
10. Remove oil container from underneath of engine.
11. Fit splash shield and secure with bolts.
12. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
13. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
14. Connect battery earth lead.
15. Check engine oil level, top-up if necessary.

Oil cooler - engine

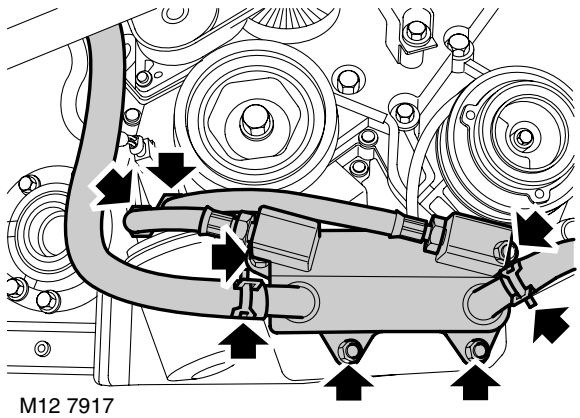
12.60.68

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
3. Remove RH front road wheel.


M12 6614

4. Remove 3 bolts securing RH splash shield to body and remove shield.
5. Position container to collect spillage under oil filter.


M12 7917

6. Loosen and remove oil cooler pipe unions from oil filter housing, remove and discard 2 'O' rings.
   CAUTION: Always fit plugs to open connections to prevent contamination.
7. Position container to collect coolant spillage.
8. Release clips and disconnect coolant hoses from engine oil cooler.
   CAUTION: Always fit plugs to open connections to prevent contamination.

9. Remove 4 nuts securing engine oil cooler to mounting bracket and remove oil cooler.
10. Restrain oil cooler pipe bosses on oil cooler housing, loosen and remove oil cooler pipes from oil cooler; remove and discard 2 'O' rings.

    CAUTION: Always fit plugs to open connections to prevent contamination.

Refit

1. Clean oil cooler pipe unions and mating faces.
2. Lubricate new 'O' rings with clean engine oil and fit to oil cooler pipes.
3. Fit pipes to engine oil cooler, restrain bosses on oil cooler body and tighten unions to 26 Nm (19 lbf.ft).

   CAUTION: To prevent damage to components, use two spanners when loosening or tightening unions.

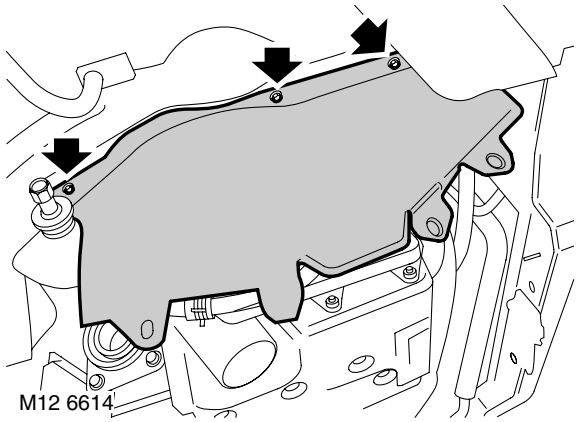
4. Position engine oil cooler to mounting bracket, fit and tighten nuts to 25 Nm (18 lbf.ft).
5. Position oil cooler pipes to oil filter housing and tighten unions to 26 Nm.
6. Connect coolant hoses to oil cooler and secure with clips.
7. Fit splash shield and secure with bolts.
8. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
9. Fill cooling system.
   ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
10. Connect battery earth lead.
11. Check engine oil level and top-up if necessary.
    ☞ **MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.**

Camshaft timing belt

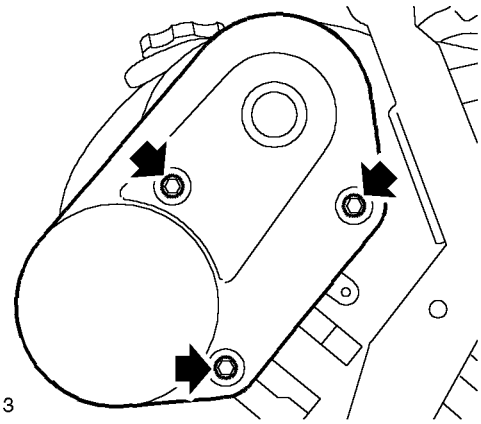
12.65.18

Remove

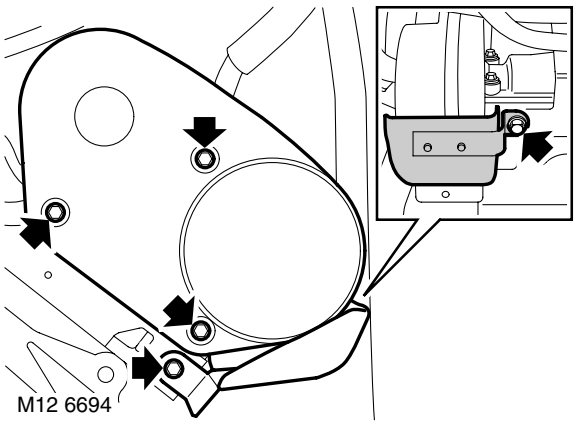
1. Disconnect battery earth lead.
2. Remove ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.**
3. Remove RH front road wheel.


M12 6614

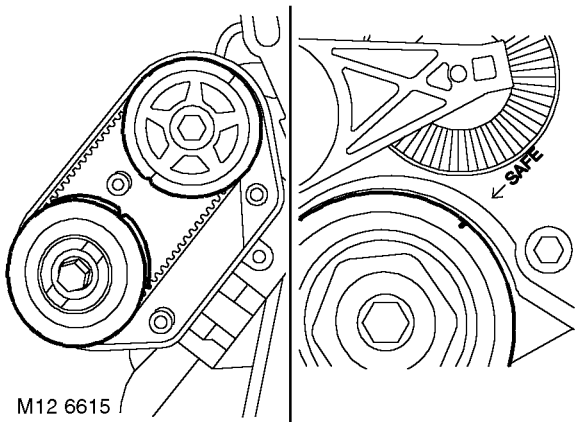
4. Remove 3 bolts securing RH splash shield to body and remove shield.


M12 6613

5. Remove 3 bolts securing camshaft timing belt LH rear cover and remove cover.
6. Remove inlet manifold chamber.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**

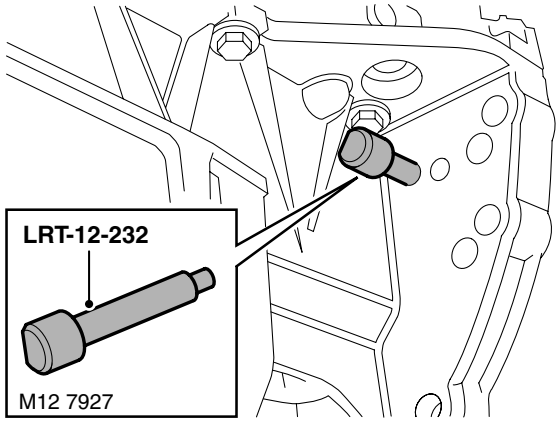


7. Remove 2 bolts securing RH rear timing belt cover heat shield; remove heat shield.
8. Remove 3 bolts securing RH rear timing belt cover; remove cover.



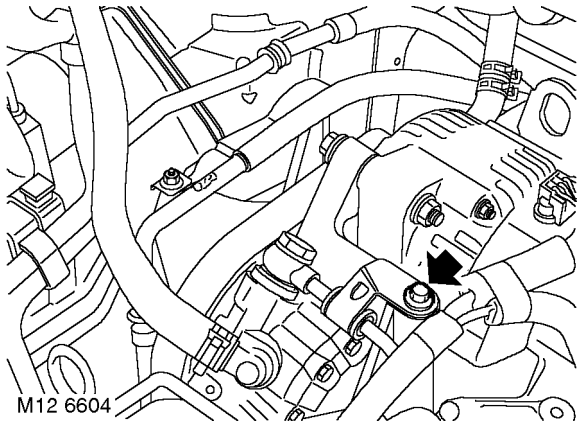
9. Using a socket on crankshaft pulley bolt, rotate crankshaft in a clockwise direction. Align the engine "SAFE" position, notch on crankshaft pulley with the "ARROW" on front mounting plate and the timing marks aligned on the rear camshaft gears as illustrated.

CAUTION: Do not use camshaft gear bolts or timing belt to rotate crankshaft.

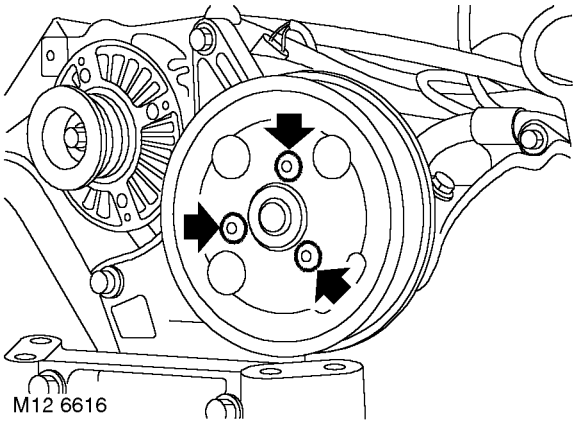


10. Insert timing pin **LRT-12-232** through hole in lower crankcase, ensuring pin is located in hole in drive plate.

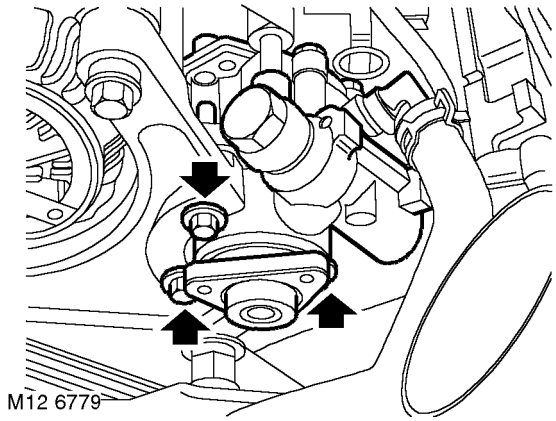
CAUTION: Hole immediately adjacent to side of lower crankcase must be used.



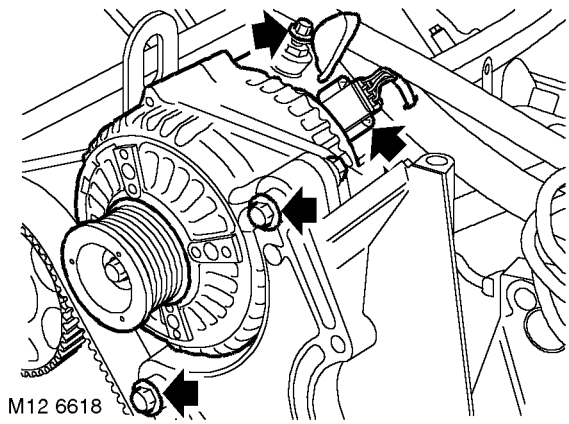
11. Remove bolt securing PAS pipe to engine front mounting plate.



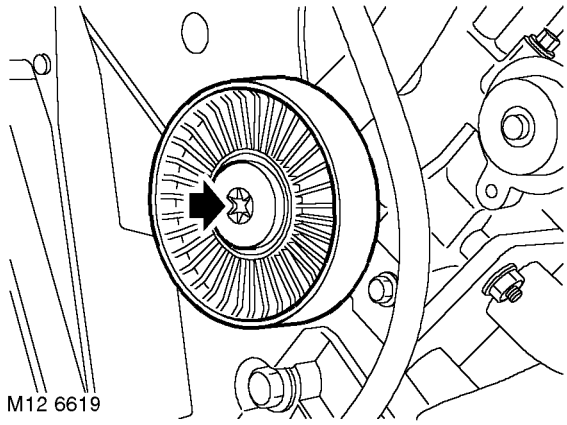
12. Remove 3 Torx screws securing PAS pump pulley and remove pulley.



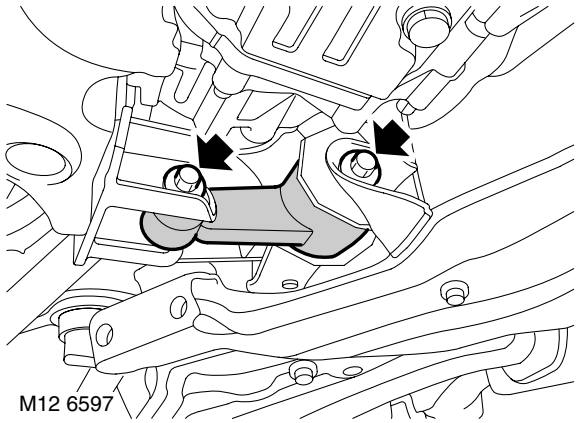
13. Remove 3 bolts securing PAS pump to front mounting plate and tie pump aside.



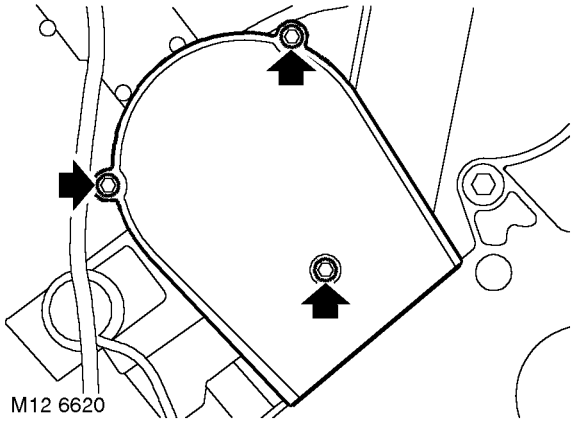
14. Release alternator battery lead terminal cover, loosen terminal nut and disconnect lead from terminal.
15. Disconnect multiplug from alternator.
16. Remove lower bolt and upper nut and bolt securing alternator to front mounting plate.
17. Remove alternator.



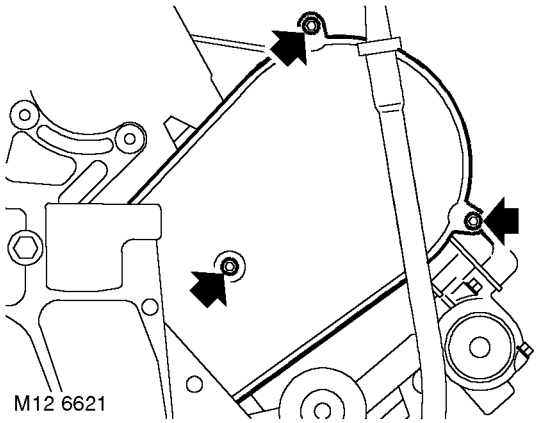
18. Remove Torx screw securing idler pulley to front mounting plate and remove pulley.



19. Loosen bolt securing lower engine steady to front subframe.
20. Remove bolt securing lower engine steady to sump mounting, release lower engine steady from sump mounting.

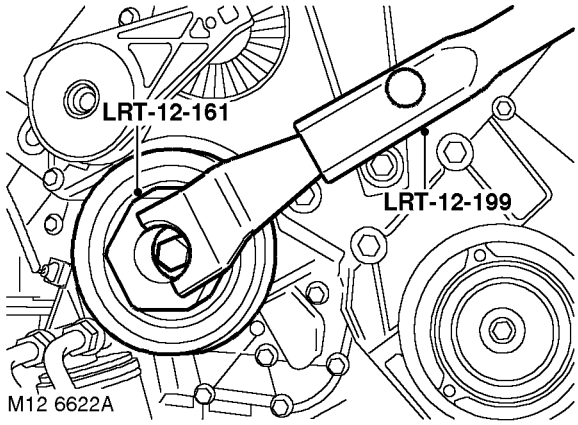


21. Remove 3 bolts securing camshaft timing belt RH front cover and remove cover.



22. Remove 3 bolts securing camshaft timing belt LH front cover and remove cover.

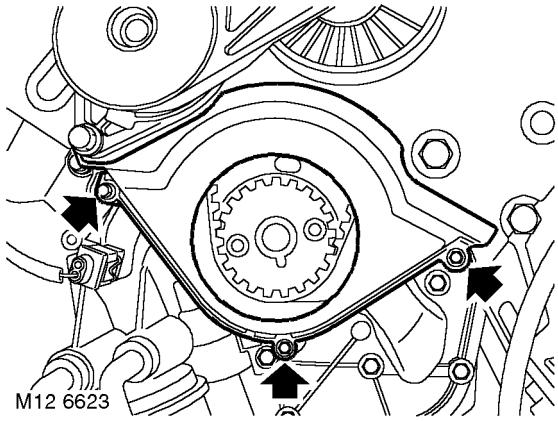
23. Assemble **LRT-12-161** to **LRT-12-199** and secure with clamp bolt.



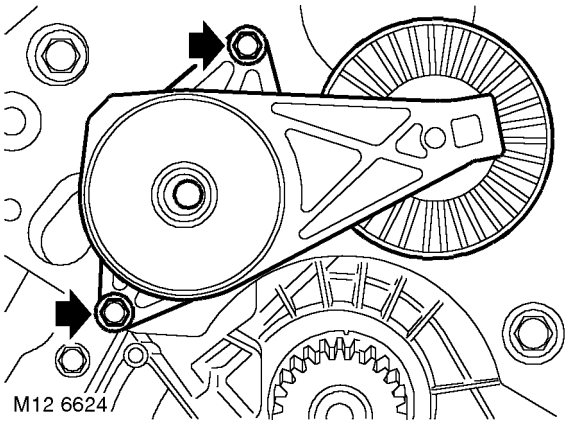
24. Insert **LRT-12-161** with **LRT-12-199** into crankshaft pulley, loosen and remove pulley bolt.

CAUTION: Ensure crankshaft does not rotate during above operation.

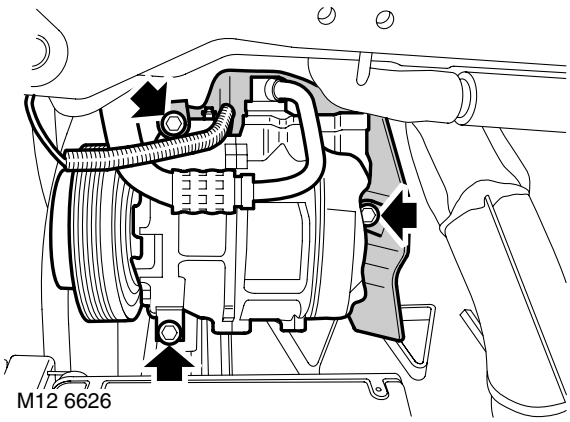
25. Remove tools **LRT-12-161** and **LRT-12-199** from crankshaft pulley, remove pulley.



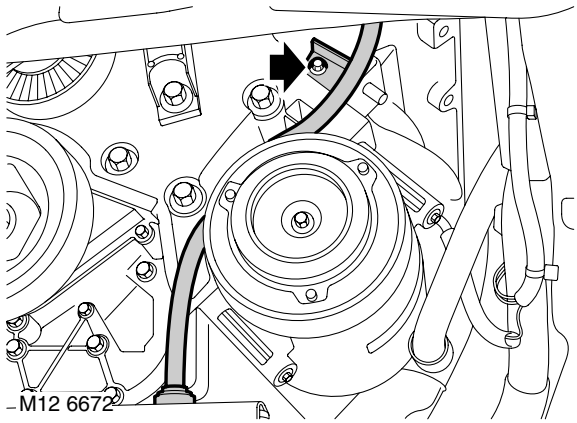
26. Remove 3 bolts securing camshaft timing belt lower cover to cylinder block and remove cover.



27. Remove 2 bolts securing ancillary drive belt tensioner and remove tensioner.

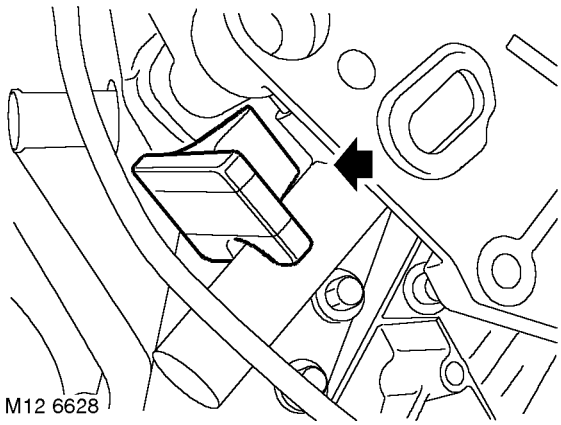


28. Note fitted position of heat shield on A/C compressor and remove 3 bolts securing A/C compressor to front mounting plate and cylinder block. Release A/C compressor and heat shield and position aside.

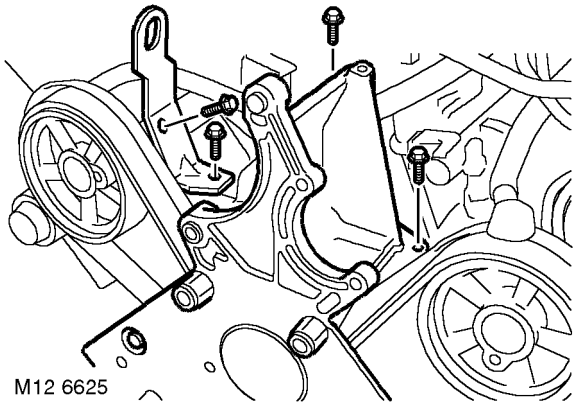


29. Remove bolt securing dipstick tube to cylinder block.

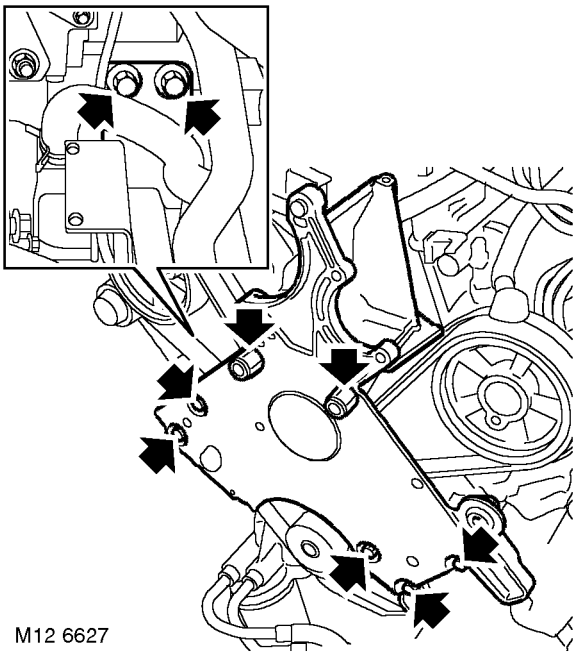
30. Depress and hold down dipstick tube locking collar, remove dipstick tube from engine sump.



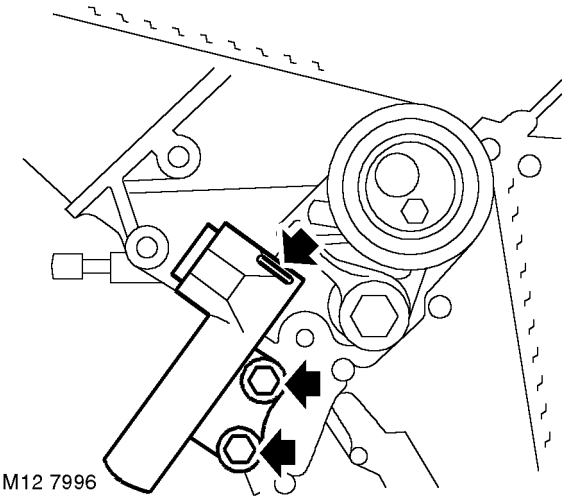
31. Remove rubber blanking plug from around camshaft timing belt tensioner.



32. Remove 3 bolts securing engine front mounting plate and lifting bracket to cylinder block.
33. Remove bolt securing lifting bracket to RH cylinder head and remove lifting bracket.



34. Remove 2 bolts securing IRD support bracket to engine front mounting plate.
35. Remove 5 bolts and 2 pillar bolts securing engine front mounting plate to cylinder block.
36. With care, release and remove front mounting plate from engine.



37. Insert a suitable 1.5 mm diameter pin through hole in tensioner body and into hole in plunger.
NOTE: If holes in body and plunger are not aligned, move tensioner backplate using a suitable broad bladed screwdriver; this will move plunger sufficiently to enable pin to be inserted.

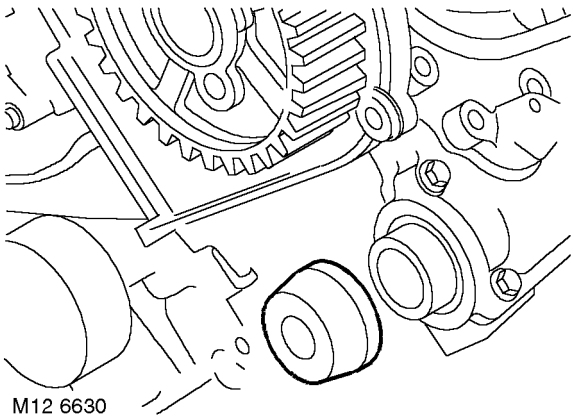
38. Remove and discard 2 Patchlok bolts securing tensioner to cylinder block and remove tensioner.
CAUTION: Exercise great care when removing bolts, do not apply excessive torque. If bolts appear to be seized, apply suitable anti-seize lubricant prior to removing bolts. DO NOT loosen Allen screw securing tensioner pulley.

39. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt before removal.

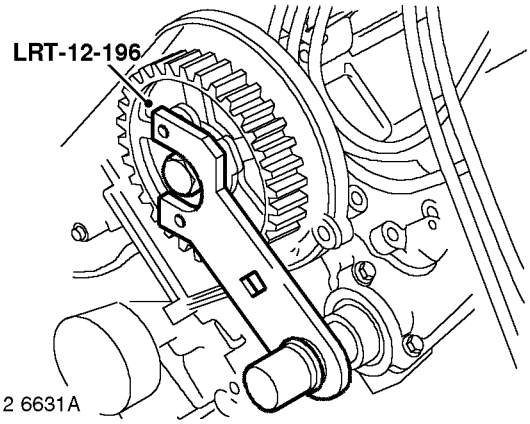
40. With care, ease camshaft timing belt from gears using fingers only and remove timing belt.

CAUTION: Do not rotate crankshaft or camshafts with timing belt removed and cylinder heads fitted.

CAUTION: Camshaft timing belt must be replaced if cylinder head is to be removed or new drive gears, tensioner or coolant pump are to be fitted. Camshaft timing belts must be stored and handled with care. Always store a camshaft timing belt on its edge with a bend radius greater than 50 mm (2.0 in). Do not use a camshaft timing belt that has been twisted or bent double as this will damage the reinforcing fibres. Do not use a camshaft timing belt if debris other than belt dust is found in timing belt covers. Do not use a camshaft timing belt if partial engine seizure has occurred. Do not use a camshaft timing belt if mileage exceeds 72,000 km (45,000 miles). Do not use an oil or coolant contaminated timing belt, cause of contamination must be rectified.


M12 6630

41. Remove and discard LH and RH exhaust camshaft cap seals.



M12 6631A

42. Position tools **LRT-12-196** to LH and RH front inlet camshaft gears and into the end of each exhaust camshaft.

CAUTION: Special tools must be fitted when tightening or loosening gear retaining bolts, otherwise damage to camshafts may occur.

43. Remove and discard bolts retaining front inlet camshaft gears to camshafts.

44. Remove tools **LRT-12-196** from both inlet camshaft gears and exhaust camshafts.

45. Remove camshaft drive gears and hub assemblies.

Refit

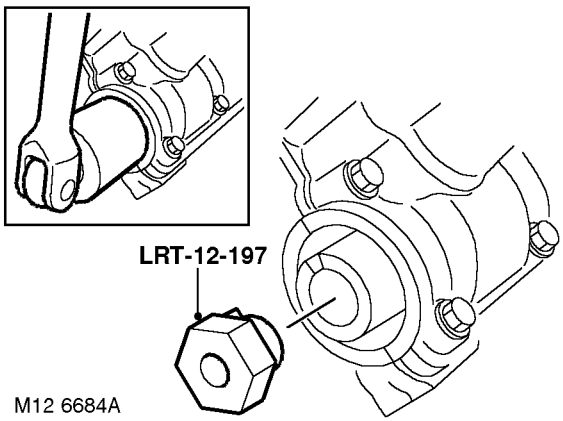
NOTE: Following front or rear timing belt refitment, it is possible that, after rotating the engine and positioning the crankshaft pulley to the 'SAFE' position, the timing marks on the rear timing gears may be misaligned. This misalignment is acceptable provided that the timing belt refitting procedure was carried out correctly.

1. Clean camshaft gears and hubs, crankshaft gear, tensioner and water pump pulleys.

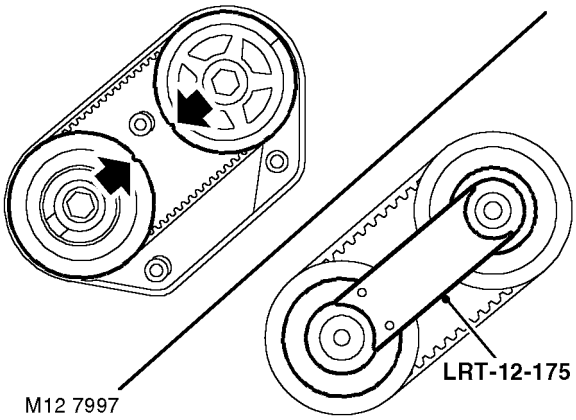
CAUTION: If the sintered gears have been subjected to prolonged oil contamination, they must be soaked in a solvent bath and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gears will emerge and contaminate the belt.

2. Fit hubs to camshaft gears and fit gears to camshafts. Fit new bolts and tighten sufficiently to allow gears to rotate without tipping.

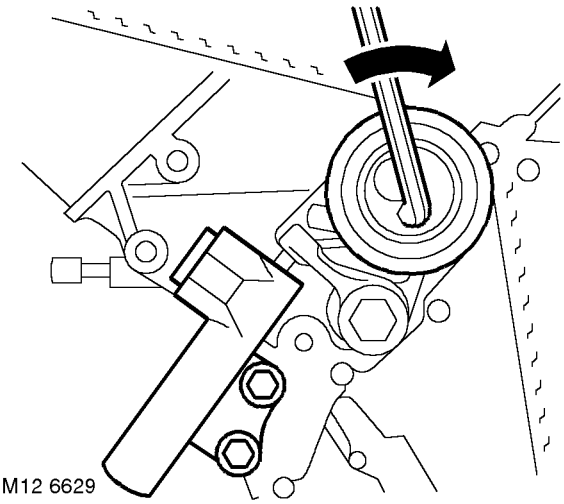
3. Position timing belt to crankshaft gear.
   NOTE: To prevent the timing belt from disengaging from the crankshaft gear when fitting, fit a suitable wedge between the belt and oil pump belt guard.



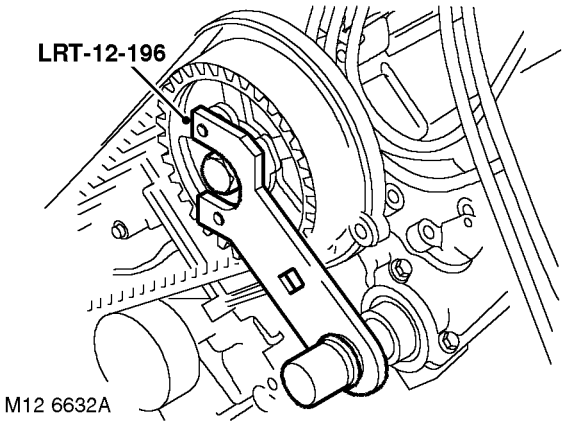
4. Fit tool **LRT-12-197** into each exhaust camshaft in turn.



5. Using assistance, rotate each exhaust camshaft slightly and align timing marks on LH and RH rear camshaft gears.
6. Remove tool **LRT-12-197** from exhaust camshaft.
7. Fit tools **LRT-12-175** to LH and RH rear camshaft gears.
8. Rotate both front inlet camshaft gears fully clockwise as viewed from front of engine.
9. Using fingers only, fit timing belt to gears, starting at the crankshaft gear and working in an anti-clockwise direction, keeping the belt run as taut as possible and turning the camshaft gears only a minimum amount anti-clockwise to fit timing belt.
   CAUTION: Gears must not be rotated anti-clockwise more than one tooth.



10. Position an Allen key in tensioner backplate and hold tensioner pulley against timing belt.
11. With assistance, position tensioner, fit new Patchlok bolts and tighten to 25 Nm (18 lbf.ft).
    CAUTION: Ensure tensioner plunger is contacting underside of tensioner backplate.
12. Remove tools **LRT-12-175** from rear timing belt gears.



13. Fit tools **LRT-12-196** to both front inlet camshaft gears and into the end of each exhaust camshaft.

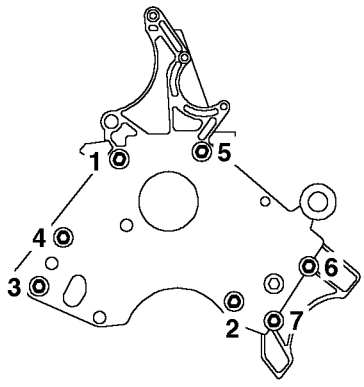
CAUTION: Special tools must be fitted when tightening or loosening gear retaining bolts, otherwise damage to camshafts may occur.

14. Tighten front inlet camshaft gear bolts to:
- Stage 1 - 27 Nm (20 lbf.ft)
- Stage 2 - Further 90°

15. Remove tools **LRT-12-196** from both inlet camshaft gears and exhaust camshafts.
16. Remove wedge from between drive belt and oil pump belt guard.
17. Remove 1.5 mm diameter pin from tensioner.
18. Fit rubber blanking plug around tensioner.
19. Remove timing pin **LRT-12-232**.
20. Clean exhaust camshaft front cap seal locations and fit new cap seals.

CAUTION: The sealing edge of the cap seal and mating face must be clean and dry.

21. Position engine front mounting plate and manoeuvre plate into position. Fit bolts but do not tighten at this stage.



22. Fit bolts securing IRD support bracket to front mounting plate but do not tighten at this stage.
23. Tighten bolts in the sequence shown:
- Bolt No. 1 - 25 Nm (18 lbf.ft)
- Bolt No. 5 - 45 Nm (33 lbf.ft)
- Bolts Nos. 2, 3, 4, 6 and 7 - 85 Nm (63 lbf.ft)

24. Position engine lifting bracket, fit bolts securing lifting bracket and front mounting plate to cylinder block and RH cylinder head. Tighten M10 bolts to 45 Nm (33 lbf.ft) and M8 bolt to 25 Nm (18 lbf.ft).
25. Clean end of dipstick tube.
26. Position dipstick tube to sump and cylinder block, fit bolt and tighten to 9 Nm (7 lbf.ft).
27. Position A/C compressor to front mounting plate and cylinder block, align heat shield, fit and tighten bolts to 25 Nm (18 lbf.ft).
28. Clean lower timing belt cover.
29. Position lower timing belt cover, fit and tighten bolts to 9 Nm (7 lbf.ft).
30. Clean crankshaft pulley.
31. Fit crankshaft pulley to crankshaft gear and ensure that the indent on pulley locates over the lug on crankshaft gear.
32. Fit crankshaft pulley bolt and washer, position **LRT-12-161** with **LRT-12-199** into crankshaft pulley. Tighten pulley bolt to 160 Nm (118 lbf.ft).
33. Remove tools **LRT-12-161** and **LRT-12-199**from crankshaft pulley.
34. Clean ancillary drive belt tensioner.
35. Position ancillary belt tensioner, fit bolts and tighten to 25 Nm (18 lbf.ft).
36. Clean LH and RH front timing belt covers.
37. Position LH and RH front timing belt covers, fit and tighten bolts to 4 Nm (3 lbf.ft).
38. Clean idler pulley, position pulley to engine front mounting plate and tighten Allen bolt to 45 Nm (33 lbf.ft).
39. Position alternator to front mounting plate.

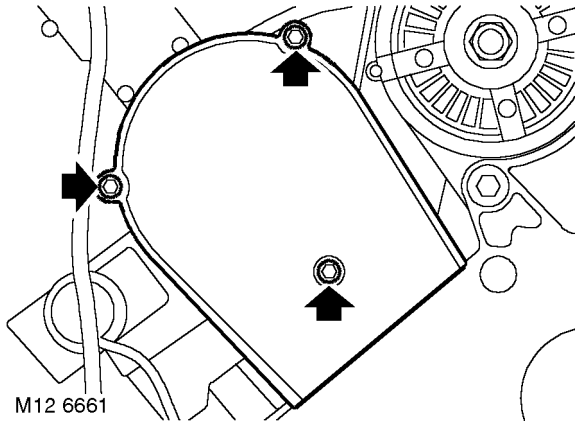
40. Fit bolt and nut and bolt securing alternator to front mounting plate and tighten to 45 Nm (33 lbf.ft).
41. Connect alternator multiplug.
42. Connect battery lead to alternator, fit and tighten nut to 8 Nm (6 lbf.ft), fit terminal cover.
43. Position PAS pump to front mounting plate, fit and tighten bolts to 25 Nm (18 lbf.ft).
44. Position PAS pipe to engine front mounting plate, fit and tighten bolt to 25 Nm (18 lbf.ft).
45. Clean PAS pump pulley mating faces.
46. Position PAS pump pulley, fit and tighten Torx screws to 9 Nm (7 lbf.ft).
47. Position lower engine steady to sump mounting, fit and tighten bolt to 100 Nm (74 lbf.ft).
48. Tighten bolt securing lower engine steady to subframe to 100 Nm (74 lbf.ft).
49. Clean LH rear timing belt cover.
50. Position LH rear timing belt cover, fit and tighten bolts to 4 Nm (3 lbf.ft).
51. Clean RH rear timing belt cover.
52. position RH rear timing belt cover, fit bolts and tighten to 4 Nm (3 lbf.ft).
53. Position heat shield, fit bolts and tighten M6 bolt to 9 Nm (7 lbf.ft) and M8 bolt to 25 Nm (18 lbf.ft).
54. Fit inlet manifold chamber.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
55. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
56. Fit ancillary drive belt.
☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.**

Camshaft timing belt cover - RH front

⊸ ***12.65.39***

Remove

1. Disconnect battery earth lead.
2. Remove ancillary drive belt.
☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.**



3. Remove 3 bolts securing camshaft timing belt RH front cover and remove cover.

Refit

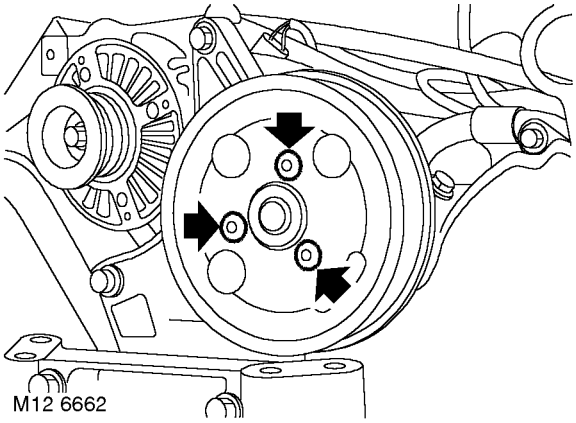
1. Clean RH front timing belt cover.
2. Position RH front timing belt cover, fit and tighten bolts to 4 Nm (3 lbf.ft).
3. Fit ancillary drive belt.
☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.**
4. Connect battery earth lead.

Camshaft timing belt cover - LH front

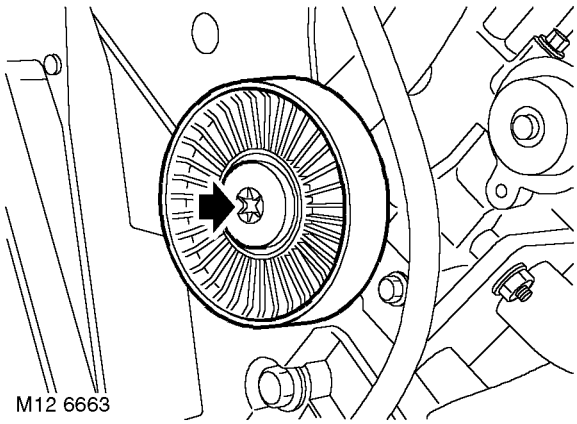
12.65.41

Remove

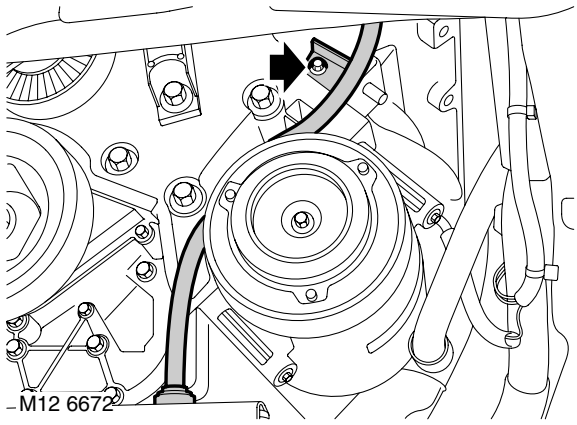
1. Disconnect battery earth lead.
2. Remove ancillary drive belt.
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.



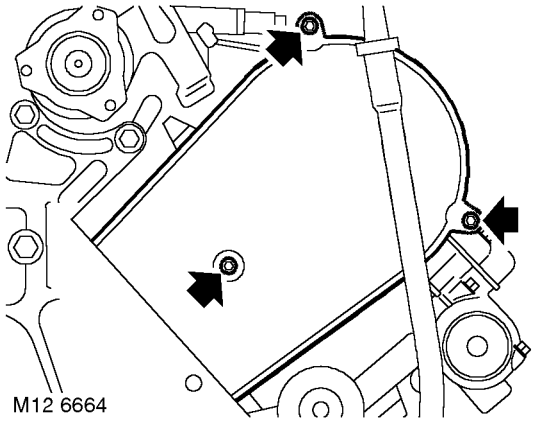
3. Remove 3 Torx screws securing PAS pump pulley, and remove pulley.



4. Remove Torx screw securing idler pulley to front mounting plate and remove pulley.



5. Remove bolt securing dipstick tube to cylinder block.



6. Remove 3 bolts securing camshaft timing belt LH front cover and remove cover.

Refit

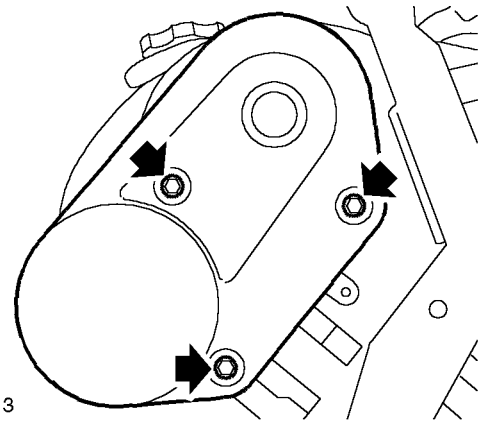
1. Clean LH front timing belt cover.
2. Position LH front timing belt cover, fit and tighten bolts to 4 Nm (3 lbf.ft).
3. Position dipstick tube bracket to cylinder block and tighten bolt to 9 Nm (7 lbf.ft).
4. Clean idler pulley, position pulley to engine front mounting plate and tighten Torx bolt to 45 Nm (33 lbf.ft).
5. Position PAS pump pulley, fit and tighten Torx screws to 9 Nm (7 lbf.ft).
6. Fit ancillary drive belt
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - KV6.
7. Connect battery earth lead.

Camshaft timing belt cover - LH rear

12.65.46

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ☞ ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Remove 3 bolts securing LH rear timing belt cover and remove cover.

Refit

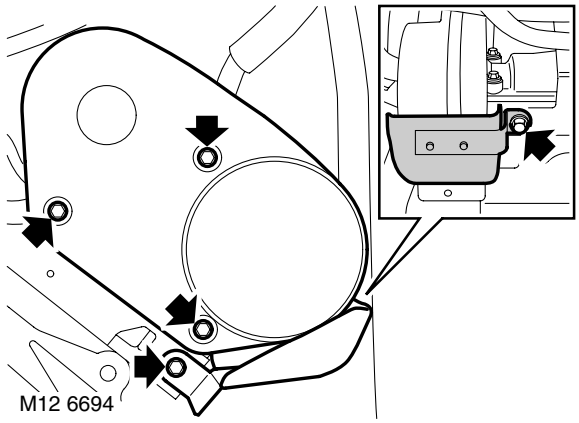
1. Clean LH rear timing belt cover.
2. Position LH rear timing belt cover, fit bolts and tighten to 4 Nm (3 lbf.ft).
3. Fit engine acoustic cover.
   ☞ ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
4. Connect battery earth lead.

Camshaft timing belt cover - RH rear

12.65.47

Remove

1. Disconnect battery earth lead.
2. Remove inlet manifold chamber.
   ☞ MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.



3. Remove 2 bolts securing RH rear timing belt cover heat shield to cylinder head and remove heat shield.
4. Remove 3 bolts securing RH rear timing belt cover and remove cover.

Refit

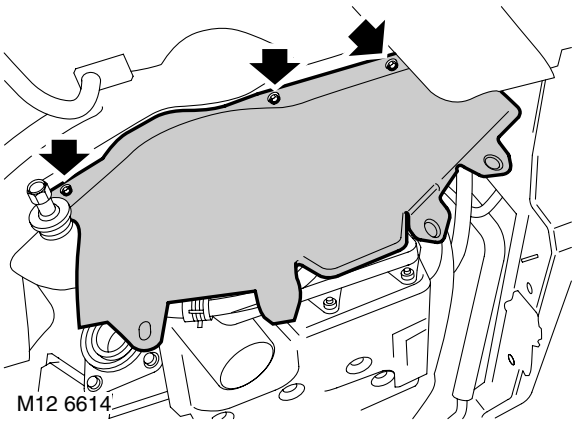
1. Clean RH rear timing belt cover.
2. Position RH rear timing belt cover, fit bolts and tighten to 4 Nm (3 lbf.ft).
3. Position heat shield, fit bolts and tighten M6 bolt to 9 Nm (7 lbf.ft) and M8 bolt to 25 Nm (18 lbf.ft).
4. Fit inlet manifold chamber.
   ☞ MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.
5. Connect battery earth lead.

Camshaft rear timing belt - LH cylinder head

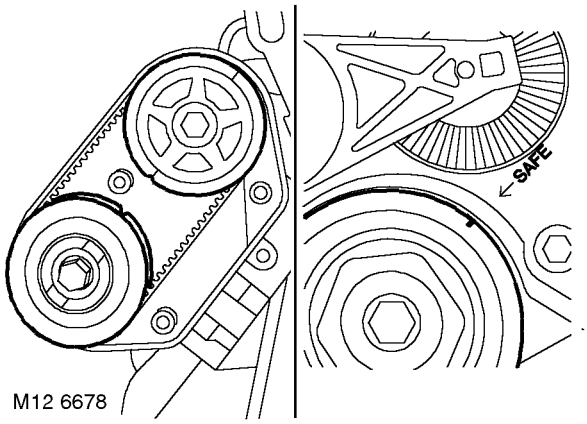
12.65.56

Remove

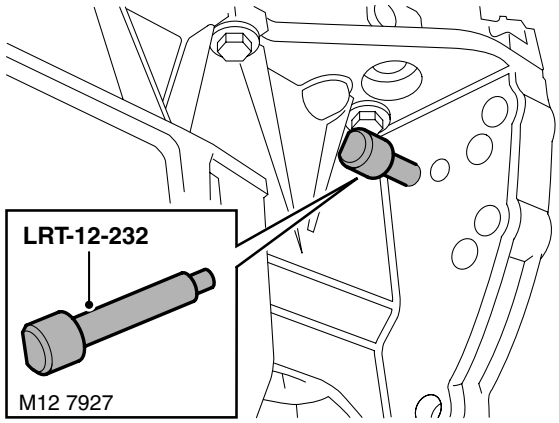
1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove LH rear timing belt cover.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt cover - LH rear.
4. Remove RH front road wheel.



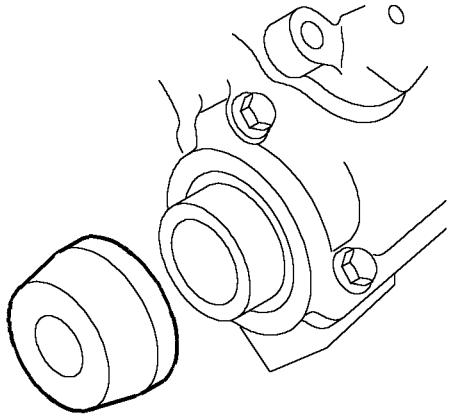
5. Remove 3 bolts securing RH splash shield to body and remove shield.



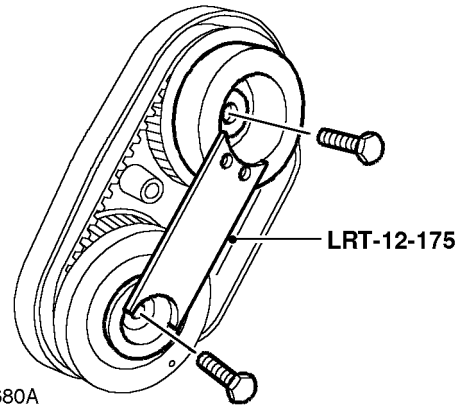
6. Using a socket on crankshaft pulley bolt, rotate crankshaft in a clockwise direction. Align the engine "SAFE" position, notch on crankshaft pulley aligned to the "ARROW" on front mounting plate and the timing marks aligned on the rear camshaft gears as illustrated.
   CAUTION: Do not use camshaft gear bolts or timing belt to rotate crankshaft. Never use the arrow on the oil pump body as a timing reference.



7. Insert timing pin **LRT-12-232** through hole in lower crankcase, ensuring pin is located in hole in drive plate.
   CAUTION: Hole immediately adjacent to side of lower crankcase must be used.


M12 6679

8. Remove and discard LH front exhaust camshaft cap seal from cylinder head.



M12 6680A

9. Position **LRT-12-175** to rear camshaft gears as illustrated, remove and discard bolts securing gears to camshafts.
10. Remove rear camshaft gears, timing belt and special tool as an assembly.
    CAUTION: Do not turn the crankshaft or the camshafts while the timing belt is removed.

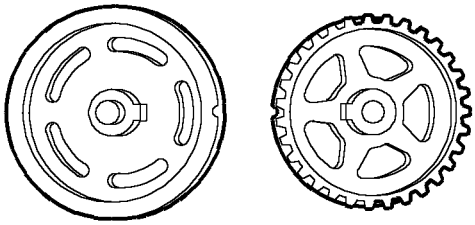
11. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt.
12. Remove **LRT-12-175** from camshaft gears and remove timing belt from gears.
    CAUTION: Do not rotate crankshaft or camshafts with timing belt removed and cylinder heads fitted.

    CAUTION: Camshaft timing belts must be stored and handled with care. Always store a camshaft timing belt on its edge with a bend radius greater than 50 mm (2.0 in). Do not use a camshaft timing belt that has been twisted or bent double as this will damage the reinforcing fibres. Do not use a camshaft timing belt if debris other than belt dust is found in timing belt covers. Do not use a camshaft timing belt if partial engine seizure has occurred. Do not use a camshaft timing belt if mileage exceeds 72,000 km (45,000 miles). Do not use an oil or coolant contaminated timing belt, cause of contamination must be rectified.

Refit

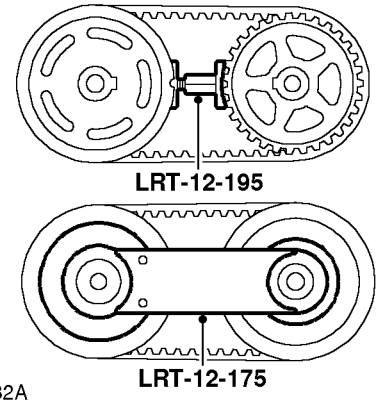
NOTE: Following front or rear timing belt refitment, it is possible that after rotating the engine and positioning the crankshaft pulley to the 'SAFE' position, the timing marks on the rear timing gears may be misaligned. This misalignment is acceptable provided that the timing belt refitting procedure was carried out correctly.

1. Clean camshaft gears and mating faces on camshafts.
   CAUTION: If the sintered gears have been subjected to prolonged oil contamination, they must be soaked in a solvent bath and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gears will emerge and contaminate the belt.



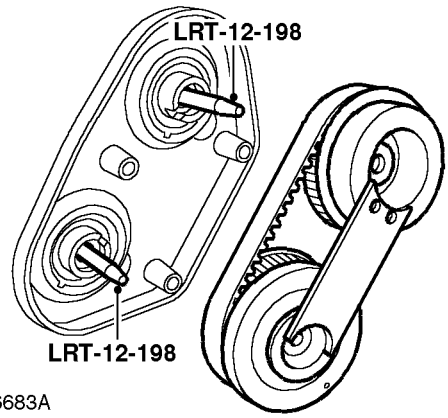
M12 6681

2. Place gears inverted on a flat surface, with the locating lugs on the gears positioned as illustrated.



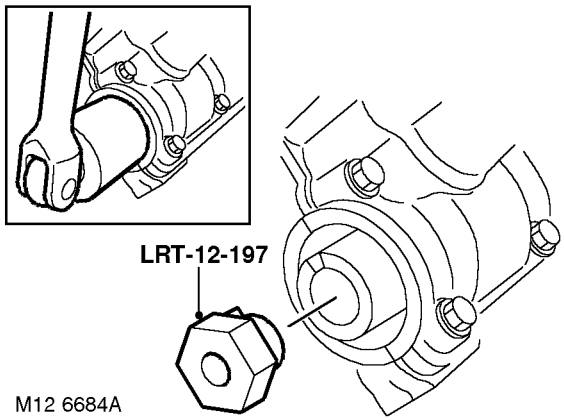
M12 6682A

3. Keeping the timing marks aligned, position timing belt onto gears.
4. Position **LRT-12-195** between the gears, turn centre nut sufficiently to spread drive belt.
5. Invert gears and timing belt and position **LRT-12-175** to camshaft gears.
6. Check that the locating lugs are still aligned and remove **LRT-12-195** from between camshaft gears.



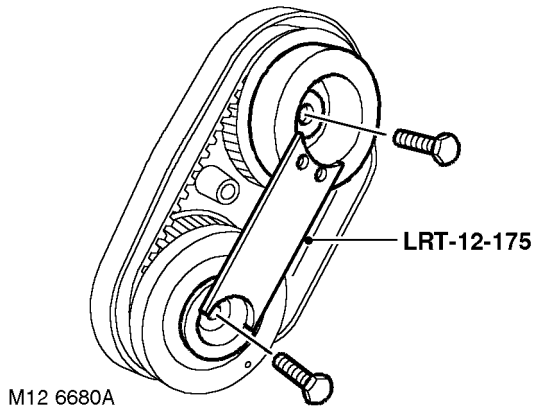
M12 6683A

7. Fit **LRT-12-198** alignment pins into the end of each camshaft.
8. Position timing belt and gears over **LRT-12-198** and locate gears onto camshafts.



M12 6684A

9. Position **LRT-12-197** into the front end of the LH exhaust camshaft.
10. With assistance, using a 30 mm socket on **LRT-12-197**, turn the LH exhaust camshaft sufficiently to align camshaft gears to the drive slots in each camshaft.



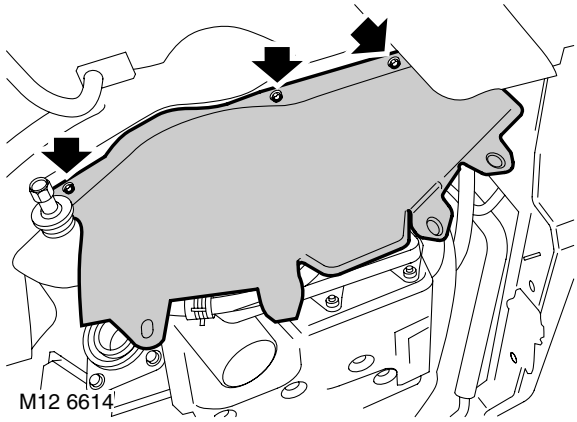
11. Remove **LRT-12-198** alignment pins and fit new camshaft gear retaining bolts.
12. Tighten camshaft gear bolts to:
    - Stage 1 - 27 Nm (20 lbf.ft)
    - Stage 2 - Further 90°
13. Remove **LRT-12-175** from camshaft gears.
14. Remove **LRT-12-197** from front end of exhaust camshaft.
15. Clean LH exhaust camshaft cap seal recess and fit new cap seal.
16. Remove timing pin **LRT-12-232** from lower crankcase.
17. Fit splash shield and secure with bolts.
18. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
19. Fit LH rear timing belt cover.
    ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt cover - LH rear.
20. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
21. Connect battery earth lead.

Camshaft rear timing belt - RH cylinder head

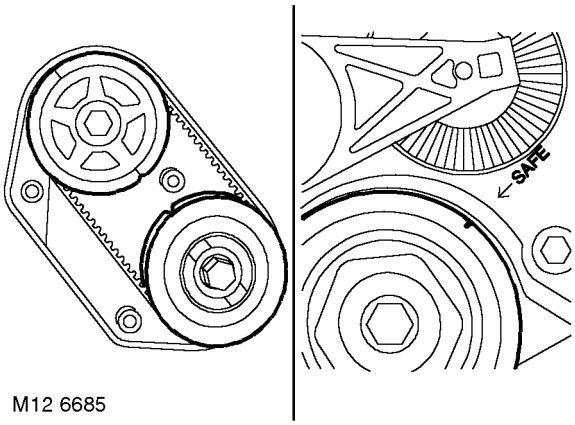
12.65.57

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove RH front road wheel.



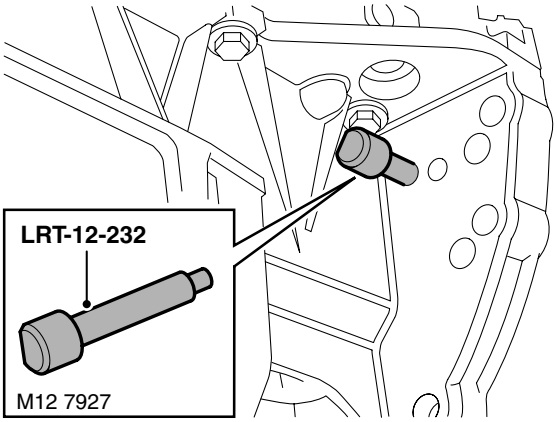
4. Remove 3 bolts securing RH splash shield to body and remove shield.
5. Remove RH rear timing belt cover.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt cover - RH rear.



M12 6685

6. Using a socket on crankshaft pulley bolt, rotate crankshaft in a clockwise direction. Align the engine "SAFE" position, notch on crankshaft pulley aligned to the "ARROW" on front mounting plate and the timing marks aligned on the rear camshaft gears as illustrated.

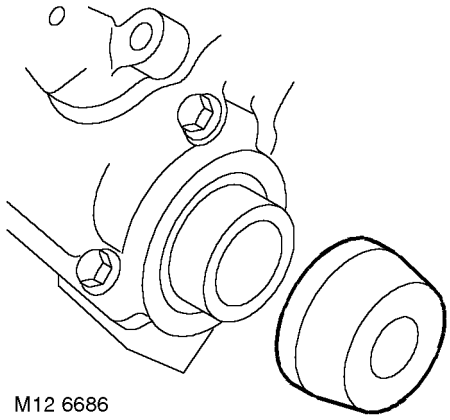
   CAUTION: Do not use camshaft gear bolts or timing belt to rotate crankshaft. Never use the arrow on the oil pump body as a timing reference.



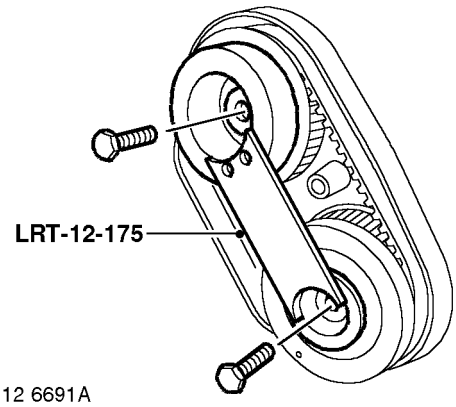
M12 7927

7. Insert timing pin **LRT-12-232** through hole in lower crankcase, ensuring pin is located in hole in drive plate.

   CAUTION: Hole immediately adjacent to side of lower crankcase must be used.


M12 6686

8. Remove and discard RH front exhaust camshaft cap seal from cylinder head.



M12 6691A

9. Position **LRT-12-175** to rear camshaft gears as illustrated, remove and discard bolts securing gears to camshafts.
10. Remove rear camshaft gears, timing belt and special tool as an assembly.

    CAUTION: Do not turn the crankshaft or the camshafts while the timing belt is removed.

11. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt.

12. Remove **LRT-12-175** from camshaft gears and remove timing belt from gears.

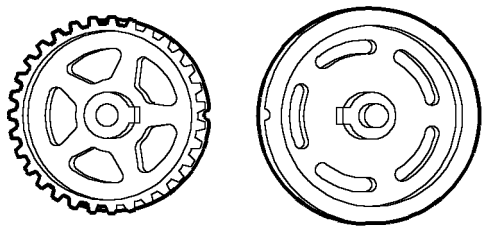
CAUTION: Camshaft timing belts must be stored and handled with care. Always store a camshaft timing belt on its edge with a bend radius greater than 50 mm (2.0 in). Do not use a camshaft timing belt that has been twisted or bent double as this will damage the reinforcing fibres. Do not use a camshaft timing belt if debris other than belt dust is found in timing belt covers. Do not use a camshaft timing belt if partial engine seizure has occurred. Do not use a camshaft timing belt if mileage exceeds 72,000 km (45,000 miles). Do not use an oil or coolant contaminated timing belt, cause of contamination must be rectified.

Refit

NOTE: Following front or rear timing belt refitment, it is possible that after rotating the engine and positioning the crankshaft pulley to the 'SAFE' position, the timing marks on the rear timing gears may be misaligned. This misalignment is acceptable provided that the timing belt refitting procedure was carried out correctly.

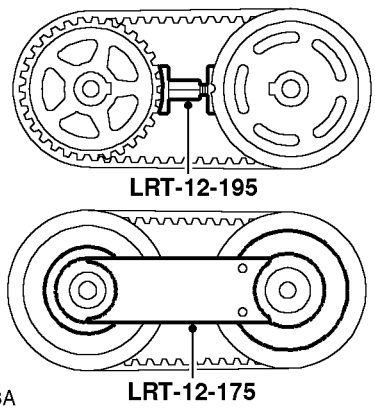
1. Clean camshaft gears and mating faces on camshafts.

CAUTION: If the sintered gears have been subjected to prolonged oil contamination, they must be soaked in a solvent bath and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gears will emerge and contaminate the belt.



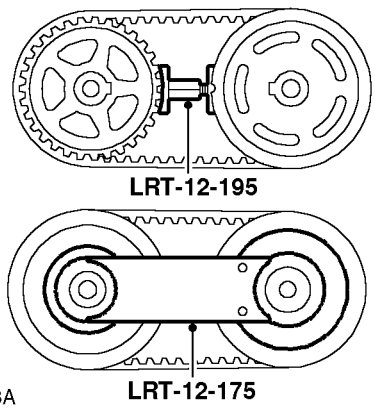
M12 6687

2. Place gears inverted on a flat surface, with the locating lugs on the gears positioned as illustrated.



M12 6688A

3. Keeping the timing marks aligned, position timing belt onto gears.

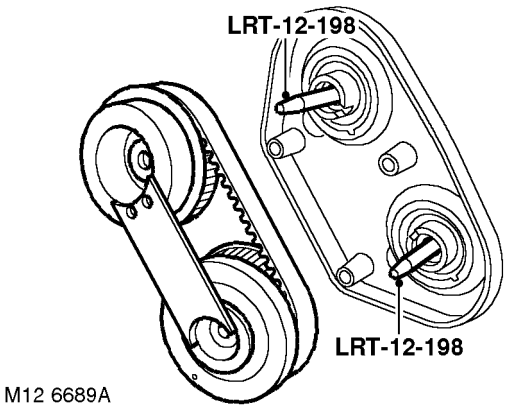


M12 6688A

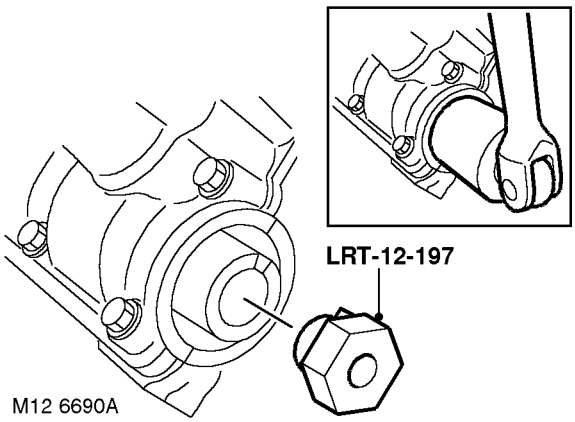
4. Position **LRT-12-195** between the gears, turn centre nut sufficiently to spread drive belt.

5. Invert gears and timing belt and position **LRT-12-175** to camshaft gears.

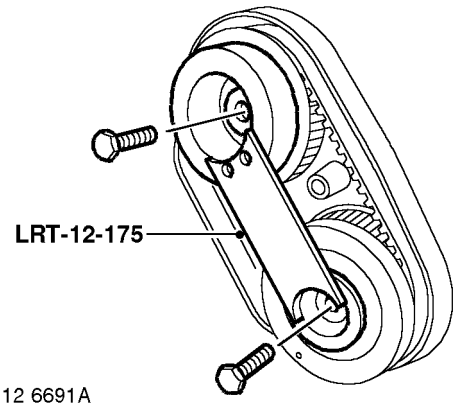
6. Check that the locating lugs are correctly aligned and remove **LRT-12-195** from between camshaft gears.



7. Fit **LRT-12-198** alignment pins into the end of each camshaft.
8. Position timing belt and gears over **LRT-12-198** and locate gears onto camshafts.



9. Position **LRT-12-197** into the front end of the RH exhaust camshaft.
10. With assistance, using a 30 mm socket on **LRT-12-197**, turn the RH exhaust camshaft sufficiently to align camshaft gears to the drive slots in each camshaft.



11. Remove **LRT-12-198** alignment pins and fit new camshaft gear retaining bolts.
12. Tighten camshaft gear bolts to:
- Stage 1 - 27 Nm (20 lbf.ft)
- Stage 2 - Further 90°

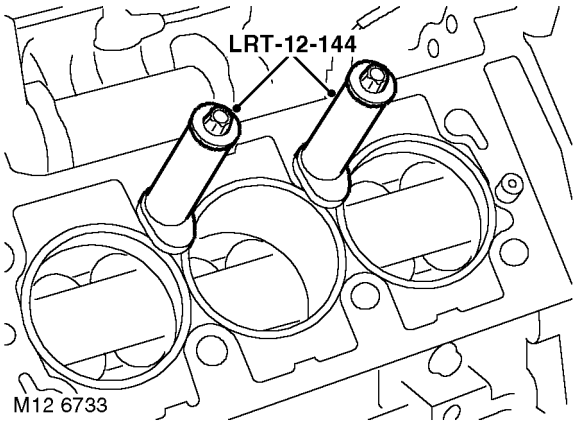
13. Remove **LRT-12-175** from camshaft gears.
14. Remove **LRT-12-197** from front end of exhaust camshaft.
15. Clean RH exhaust camshaft cap seal recess and fit new cap seal.
16. Remove timing pin **LRT-12-232** from lower crankcase.
17. Fit splash shield and secure with bolts.
18. Fit RH road wheel and tighten nuts to 115 Nm (85 lbf.ft).
19. Fit RH rear timing belt cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt cover - RH rear.**
20. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
21. Connect battery earth lead.

Piston assemblies - engine set

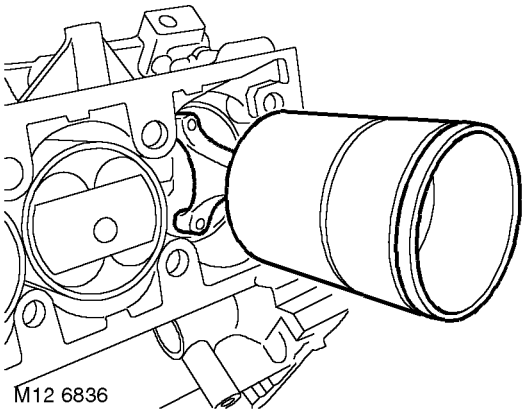
12.17.03.01

Disassembly

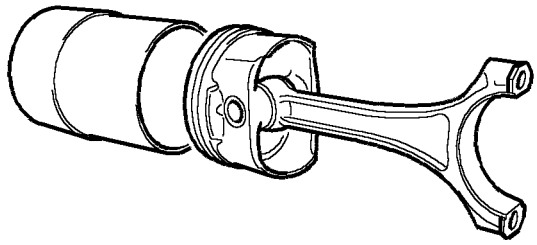
1. Remove crankshaft.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Crankshaft.**



2. Remove **LRT-12-144** cylinder liner clamps from cylinder block.
3. Suitably identify each cylinder liner to its fitted position in cylinder block.
4. With assistance, position cylinder block to enable each piston and cylinder liner to be removed.

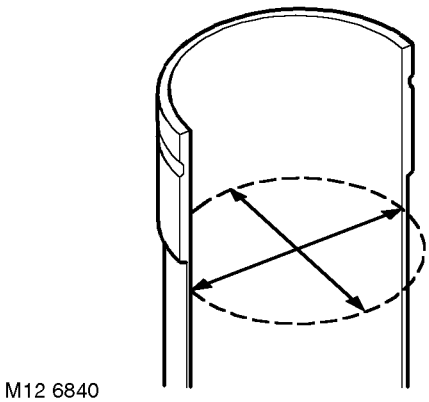


5. Carefully push each piston assembly and cylinder liner from cylinder block.
   CAUTION: Suitably identify each piston with its respective cylinder liner.

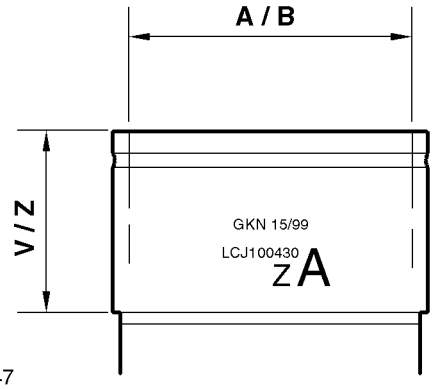


6. Remove piston assemblies from liners, keep liners in their fitted order.
7. Refit caps onto connecting rods, lightly tighten dowel bolts.
8. Using a suitable expander, remove and discard piston rings from each piston.
9. Using a squared off end of an old piston ring, remove carbon from piston ring grooves.

Inspect



1. **Cylinder liner bores:** Measure wear and taper in two axis 65 mm (2.5 in) from top of cylinder liner bore The cylinder liner grade is marked on outside diameter of liner.
   CAUTION: Cylinder liners with excessively glazed, worn, scratched or scored bores must be replaced. DO NOT attempt to hone or remove glazing from bore. Ensure that if original liners are to be refitted, reference marks made during dismantling are not erased.



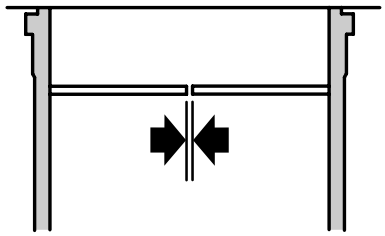
M12 7047

2. Cylinder liners have their bore/grade and step height determined at manufacture. The bore/grade, red, blue (A) or (B), and step heights V or Z together with the cylinder liner part number and colour code are marked on the external diameter of the cylinder liners. If cylinder(s) are to be replaced, the replacement liner(s) must have the same step height as the original liner(s). Both step heights are available in red (A) and blue (B) grades of cylinder liners.
   ☞ **GENERAL DATA, Engine – KV6 Petrol.**
3. Check pistons for distortion and cracks.
   NOTE: Piston grades A or B are stamped on the crown of the piston.

4. **Piston diameter check:** Measure piston diameter at right angles to gudgeon pin and 8 mm (0.3 in) from bottom of skirt.
   ☞ **GENERAL DATA, Engine – KV6 Petrol.**
   NOTE: Piston and connecting rods are only supplied as an assembly.

   CAUTION: Ensure pistons are retained with their respective cylinder liners.

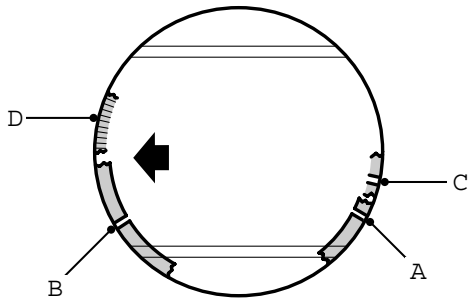
5. Position piston in cylinder liner and measure clearance 20 mm (0.75 in) from bottom of cylinder liner.
   ☞ **GENERAL DATA, Engine – KV6 Petrol.**



M12 6838

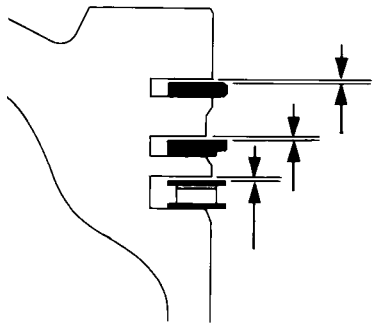
6. **Piston ring gap:** Position new top and second compression piston rings 20 mm (0.75 in) from top of cylinder bore and measure ring gaps.
   ☞ **GENERAL DATA, Engine – KV6 Petrol.**
   CAUTION: Ensure piston rings are kept square to liner bore. Retain rings with the piston fitted to the liner in which they were checked.

7. **Piston rings - refit:**Using a suitable expander, fit oil control spring.
8. With 'TOP' or identification markings to top of piston, use an expander to fit piston rings in sequence; oil control, 2nd and top compression.
   NOTE: The second compression ring is stepped.



M12 6839

9. Ensure rings are free to rotate, position compression ring gaps A and B at 120° to each other and away from thrust side. Position oil control ring gap C and spring gap D at 30° on opposite side of gudgeon pin axis.

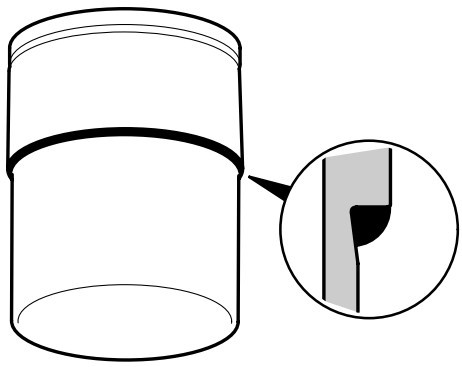


M12 7880

10. Check clearance of each piston ring to its respective groove.
    ☞ **GENERAL DATA, Engine – KV6 Petrol.**

Reassembly

1. Clean cylinder liners and liner recess in cylinder block.
2. Lubricate cylinder liner bores, pistons and rings with clean engine oil, ensure ring gaps are correctly spaced.
3. Clean bearing shell recesses in connecting rods and bearing caps.
4. Fit piston ring clamp, **LRT-12-204** to each piston in turn and fit piston to its respective cylinder liner ensuring that when fitted, arrow on piston crown will be towards front of engine.
   CAUTION: Do not push pistons fully down bores at this stage.
5. Remove piston ring clamp.



M12 6842

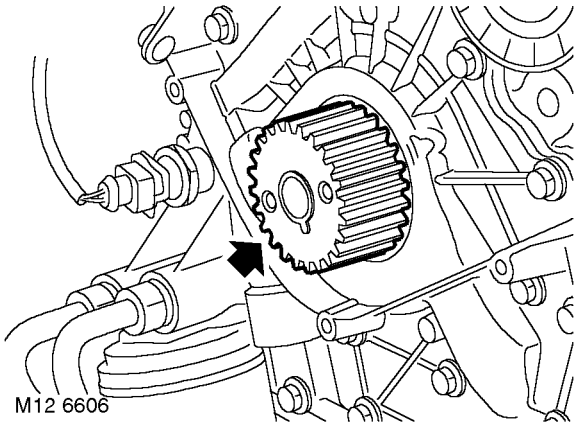
6. Apply a 2.00 mm (0.1 in) thick continuous bead of sealant, Part No. RTC 3347, around shoulder of each cylinder liner as shown.
7. Keeping cylinder liner 'square' to cylinder block, push each liner fully down until shoulder of liner seats against cylinder block ensuring that the arrow on the piston is towards front of engine.
8. To prevent cylinder liners from being displaced, position **LRT-12-144** cylinder liner clamps and secure to cylinder block with cylinder head bolts. Ensure that feet of clamps do not protrude over liner bores.
9. Fit crankshaft.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Crankshaft.**

Crankshaft front oil seal

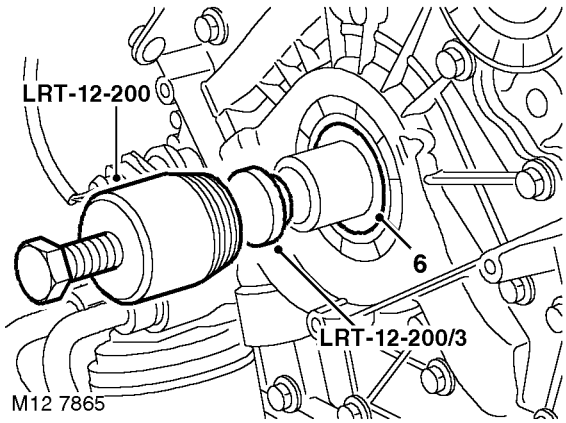
12.21.14.01

Remove

1. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.



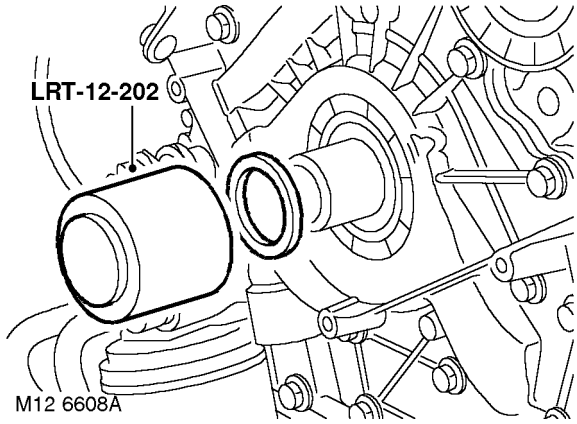
2. Remove crankshaft drive gear.



3. Fit thrust button, **LRT-12-200/3** to end of crankshaft.
4. Screw **LRT-12-200** into crankshaft front oil seal.
5. Tighten centre bolt of **LRT-12-200** to remove oil seal.
6. Remove and discard oil seal from **LRT-12-200**.
7. Remove thrust button from crankshaft.

Refit

1. Clean oil seal recess in oil pump and running surface on crankshaft, ensure bolt holes are clean and dry.
2. Fit oil seal guide from seal kit, over end of crankshaft.



3. Position new seal on crankshaft up against oil pump housing. Drift seal into place using tool **LRT-12-202.**
   CAUTION: Oil seal must be fitted dry.

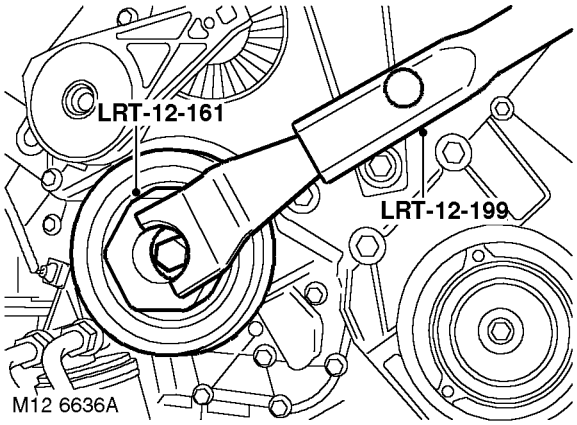
4. Remove **LRT-12-202** and oil seal guide from crankshaft.
5. Clean crankshaft gear and wipe end of crankshaft.
6. Fit drive gear to crankshaft.
7. Fit camshaft timing belt.
   ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.

Crankshaft rear oil seal

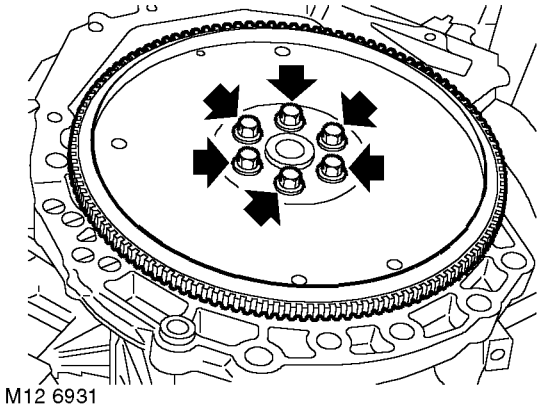
12.21.20.01

Remove

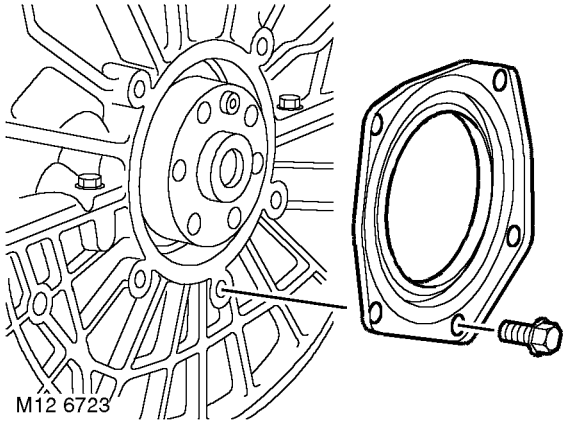
1. Remove automatic gearbox.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - KV6 - with engine and gearbox removed.
2. Assemble **LRT-12-161** to **LRT-12-199** and secure with clamp bolt.



3. Position **LRT-12-161** and **LRT-12-199** to crankshaft pulley to restrain crankshaft.



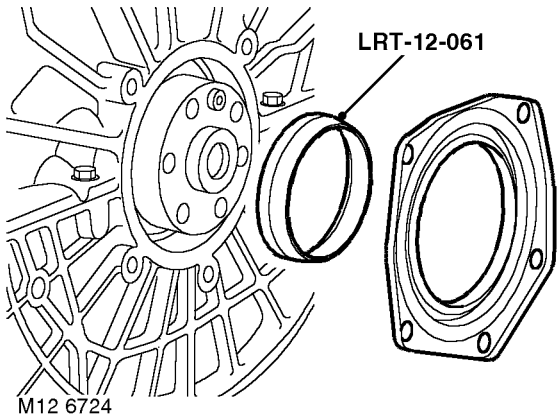
4. With assistance, remove and discard 6 bolts securing drive plate to crankshaft.
5. Remove drive plate from crankshaft.



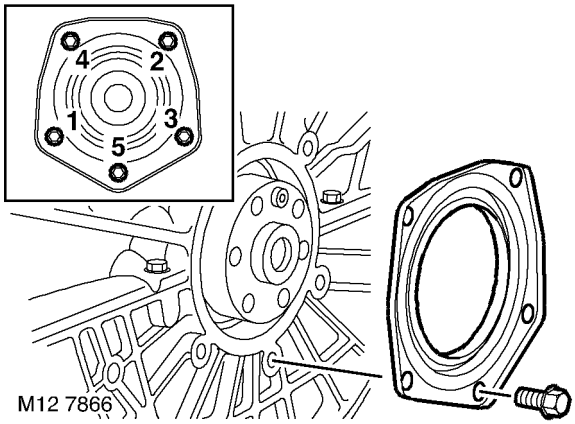
6. Remove and discard 5 bolts securing crankshaft rear oil seal housing to cylinder block.
7. Remove crankshaft rear oil seal.

Refit

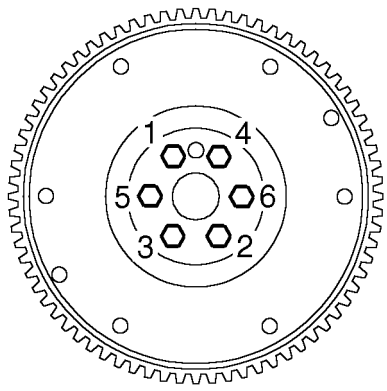
1. Clean cylinder block face and oil seal running surface on crankshaft, ensure bolt holes are clean and dry.



2. Position oil seal protector, **LRT-12-061** to crankshaft.
3. Position oil seal to crankshaft.
   CAUTION: Oil seal must be fitted dry.



4. Fit new Patchlok bolts securing oil seal to cylinder block and using sequence shown, tighten to 8 Nm (6 lbf.ft).
5. Remove oil seal protector **LRT-12-061**.
6. Clean bolt holes in crankshaft using an old drive plate bolt with two saw cuts at an angle of 45° to the bolt shank.
7. Clean drive plate and mating face of crankshaft.
8. Position drive plate to crankshaft and fit but do not tighten new Patchlok bolts.
9. Position **LRT-12-161** and **LRT-12-199** to crankshaft pulley to restrain crankshaft.



10. Using sequence shown, tighten to bolts to:
    - Stage 1 - 25 Nm (18 lbf.ft)
    - Stage 2 - 100 Nm (74 lbf.ft)
11. Remove special tool from crankshaft pulley, loosen bolt and remove **LRT-12-161** from **LRT-12-199.**
12. Fit automatic gearbox.
    AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - KV6 - with engine and gearbox removed.

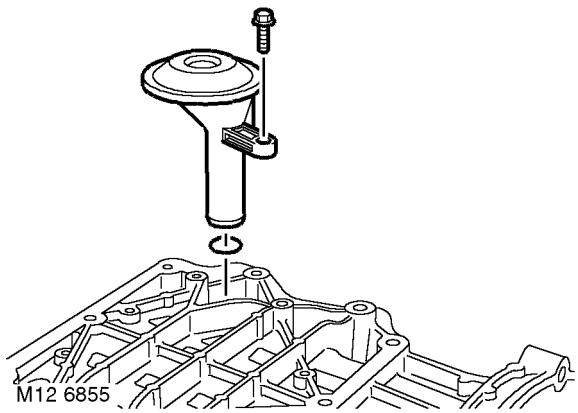
Crankshaft

12.21.33.01

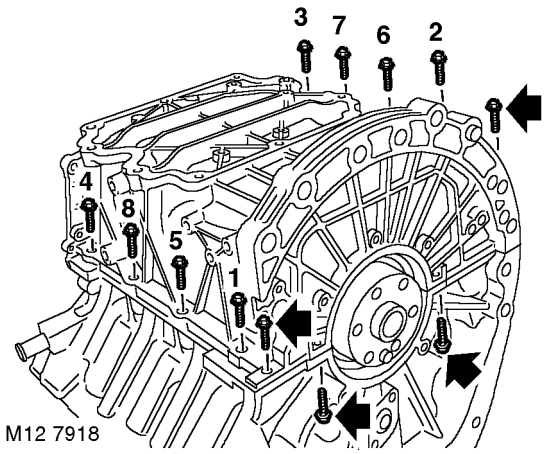
Remove

1. Remove cylinder head gaskets.
   ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - LH.
   ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - RH.
2. Remove oil pump gasket.
   ENGINE - K SERIES KV6, OVERHAUL, Oil pump.
3. Remove crankshaft rear oil seal.
   ENGINE - K SERIES KV6, OVERHAUL, Crankshaft rear oil seal.
4. Remove engine sump.
   ENGINE - K SERIES KV6, OVERHAUL, Sump - engine oil.

Disassembly

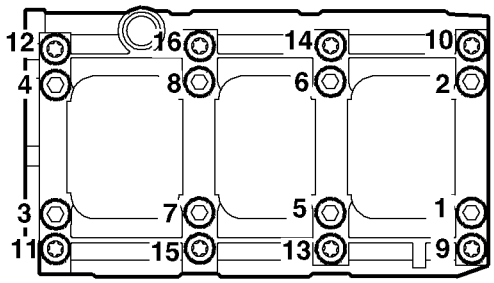


1. Remove bolt securing oil pick up strainer, remove strainer and discard 'O' ring.



M12 7918

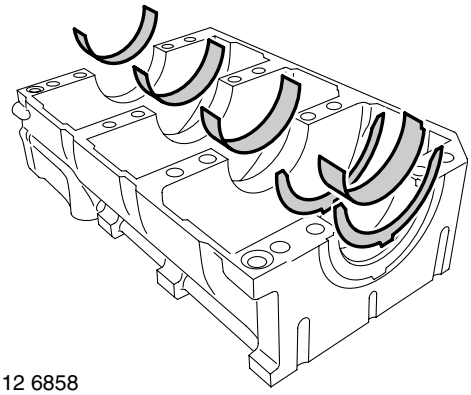
2. Using sequence shown, remove 8 M8 bolts securing lower crankcase to cylinder block.
3. Remove remaining M8 bolt and 2 M6 bolts securing lower crankcase to cylinder block.
4. Remove lower crankcase.



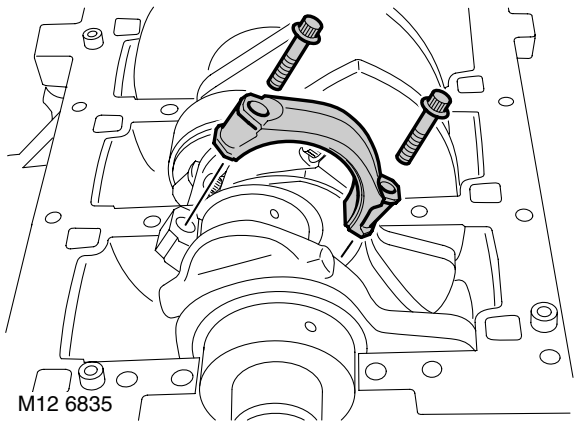
M12 7882

5. Using sequence shown, remove and discard 16 bolts securing bearing ladder to cylinder block.
   NOTE: Short length bolts are fitted to the outer edge of the bearing ladder.

6. Release bearing ladder from dowels and remove from cylinder block.


M12 6858

7. Remove main bearing shells and 2 thrust washer halves from bearing ladder, keep main bearing shells in fitted order; discard thrust washers.

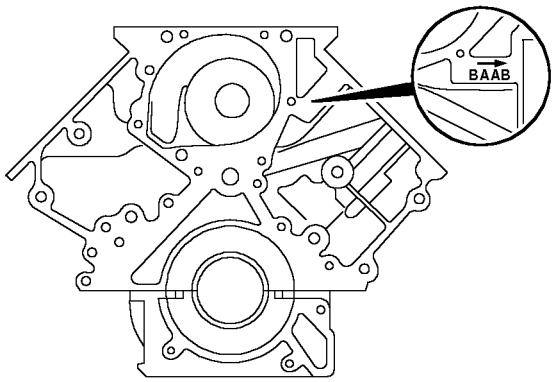

M12 6835

8. Temporarily fit crankshaft pulley bolt.
9. Remove 4 dowel bolts and remove big end bearing caps from No 1 and No 2 connecting rods. Keep bearing caps in order.
   NOTE: Number stamped below bearing cap bolt is bearing bore size code. Number stamped on connecting rod is cylinder number and letter is weight code.

   CAUTION: Do not remove cylinder clamps LRT-12-144 unless pistons and connecting rods are to be removed.

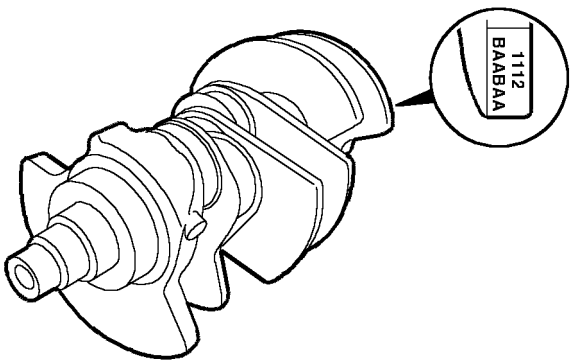
10. Release connecting rods from crankshaft.
11. Remove bearing shells from connecting rod and cap.
12. Rotate crankshaft using pulley bolt, remove bolts securing remaining connecting rod bearing caps. Remove bearing caps and bearing shells from caps. Keep bearing caps in their fitted order.

13. Remove crankshaft, remove main bearing shells and thrust washers from cylinder block. Discard thrust washers.



M12 6876

14. Main bearings - selection: record main bearing code letters from front face of cylinder block. Reading from left to right, the first letter relates to No.1, (front) main bearing journal.



M12 6859

15. Record main bearing code numbers, located on the crankshaft rear web. The first number, reading left to right, relates to number one main bearing journal.

Inspect

1. Check crankshaft main journal diameters.

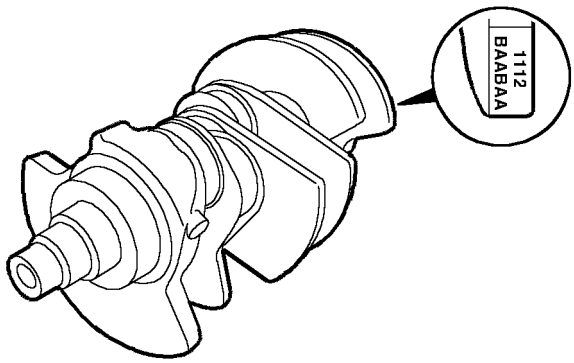
2. Diameters should be within tolerances. Replace crankshaft if outside tolerance.
☞ **GENERAL DATA, Engine – KV6 Petrol.**

3. Determine appropriate main bearing shells to be fitted from size selection and type tables in general data.
☞ **GENERAL DATA, Engine – KV6 Petrol.**

4. Determine main bearing thickness by colour code on edge of bearing.
☞ **GENERAL DATA, Engine – KV6 Petrol.**

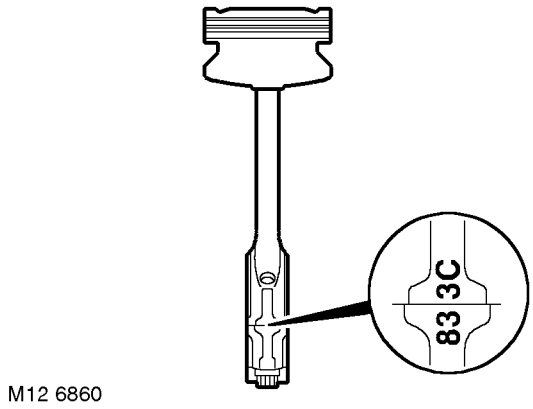
5. Crankshaft big-end journal diameters: Check crankshaft big-end journal diameters; replace crankshaft if outside tolerance.
☞ **GENERAL DATA, Engine – KV6 Petrol.**

6. Determine big-end bearing thickness by colour code on edge of bearing.
☞ **GENERAL DATA, Engine – KV6 Petrol.**

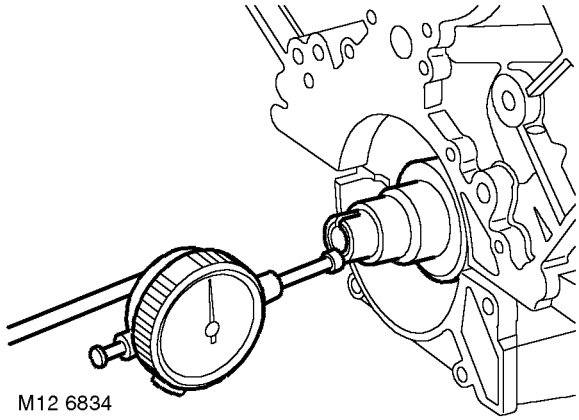


M12 6859

7. Big-end bearings - selection: Record big-end journal code letters, located on the rear crankshaft web. The first letter, reading from left to right, relates to the number one big-end journal.



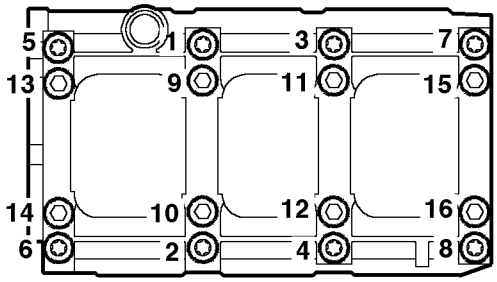
M12 6860


M12 6834

8. Record big-end bearing bore numbers, this will be 7, 8 or 9 located on the connecting rod bearing cap.
9. **Big-end bearings selection:** Select the required bearing shells from general data.
   ☞ **GENERAL DATA, Engine – KV6 Petrol.**
10. Ensure all bolt holes are clean and dry. Remove all traces of thread locking material from oil pick-up strainer bolt hole.
    CAUTION: Do not use a tap.
11. Ensure bearing ladder locating dowels are fitted and dowel holes in bearing ladder are clean and dry.
12. Check coolant stub pipe in cylinder block for signs of leakage and corrosion, replace as necessary. Seal replacement pipe with Loctite 638.
13. Clean main bearing shell recesses in cylinder block.
14. Clean crankshaft main bearing and big end bearing journals. Clean bearing shell locations in connecting rods and caps.
15. Fit selected main bearing shells, grooved into cylinder block and plain into bearing ladder.
16. Fit new thrust washers to cylinder block.
17. Position DTI gauge stylus on end of crankshaft as illustrated, push crankshaft away from DTI, zero DTI gauge, push crankshaft in the opposite direction and note reading on gauge.
    ☞ **GENERAL DATA, Engine – KV6 Petrol.**
    CAUTION: If end-float exceeds limits given, crankshaft must be replaced.

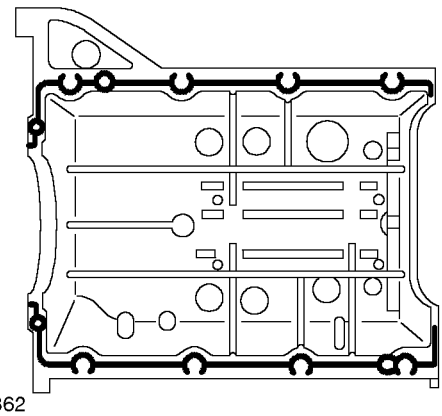
Reassembly

1. Fit selected big-end bearing shells to connecting rods and caps.
2. Lubricate crankshaft journals with clean engine oil. Hold crankshaft with big end journals horizontal, lower crankshaft into main bearings.
3. Carefully pull connecting rods into place, fit connecting rod caps noting that featherways are on opposite sides; fit and lightly tighten dowel bolts.
4. Tighten dowel bolts to:
   - Stage 1 - 20 Nm (15 lbf.ft)
   - Stage 2 - Further 45°
5. Using a lint free cloth and a suitable cleaning solvent, clean bearing ladder and mating face on cylinder block.
6. Apply clean engine oil to crankshaft thrust washers and fit to bearing ladder with oil grooves facing outwards.
7. Fit bearing ladder and ensure that all bearing shells are seated correctly.



M12 6861

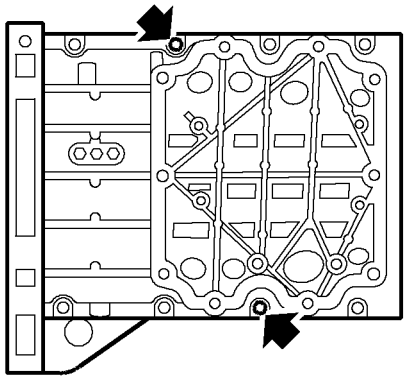
8. Noting that longest bolts must be fitted in inner holes in bearing ladder, fit new bolts and tighten to:
   - Stage 1 - 20 Nm (15 lbf.ft)
   - Stage 2 - Further 90°
9. Using a lint free cloth and a suitable cleaning solvent, clean mating surfaces on cylinder block and lower crankcase.



M12 6862

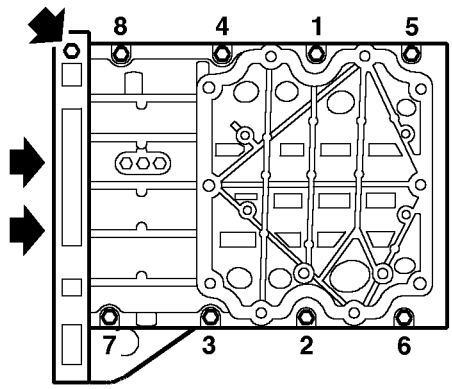
10. Apply a continuous bead of sealant, Part No. STC 50550, to paths on lower crankcase as shown then spread to an even film using a roller.

    CAUTION: To avoid contamination, assembly must be completed immediately after application of sealant.



M12 7884

11. Fit 2 M8 slave guide studs into cylinder block at positions shown.
12. Position lower crankcase to cylinder block.



M12 7919

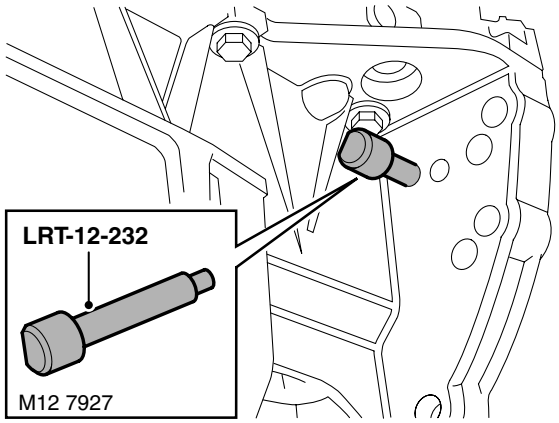
13. Fit and lightly tighten 6 M8 bolts, remove guide studs, fit and lightly tighten 2 remaining M8 bolts.
14. Using sequence shown, tighten bolts to 25 Nm (18 lbf.ft).
15. Fit and tighten remaining M8 bolt to 25 Nm (18 lbf.ft).
16. Fit 2 rear M6 bolts and tighten to 9 Nm (7 lbf.ft).
17. Clean oil pick-up strainer and mating face.
18. Lubricate new 'O' ring with clean engine oil and fit to pick-up strainer.

    CAUTION: Ensure 'O' ring, Part No. LYX 000210L is used.

19. Position oil pick-up strainer, fit and tighten bolt to 25 Nm (18 lbf.ft).
20. Clean oil pump, oil seal recess in oil pump body and mating face on cylinder block, ensure bolt holes are clean and dry.
21. Clean oil seal running surface on crankshaft.

Refit

1. Fit oil pump gasket.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Oil pump.**
2. Fit engine sump.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Sump - engine oil.**
3. Fit crankshaft rear oil seal.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Crankshaft rear oil seal.**



4. Rotate crankshaft until timing pin **LRT-12-232** can be inserted through hole immediately adjacent to side of lower crankcase and into elongated hole in drive plate.

   CAUTION: Ensure that pin is in elongated hole. Do not use cast arrow on oil pump body as a timing mark. Do not remove timing pin until timing belts are fitted.

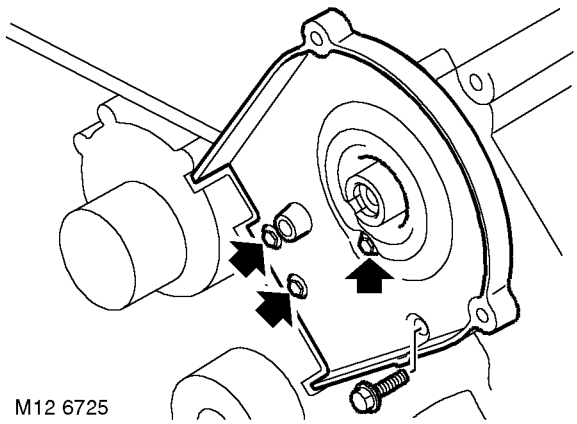
5. Fit cylinder head gaskets.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - LH.**
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - RH.**

Cylinder head gasket - LH

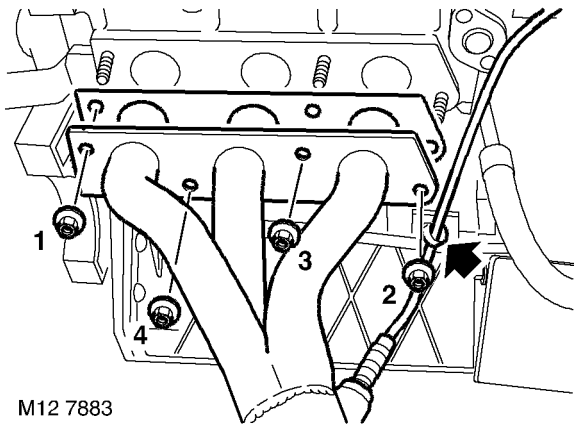
12.29.02.01

Remove

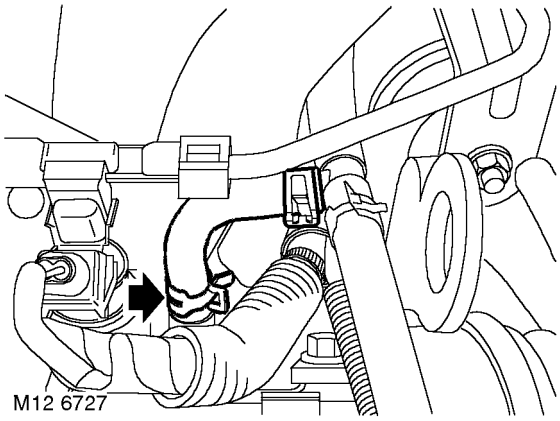
1. Remove and discard camshaft timing belt.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.**
2. Remove inlet manifold chamber.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, OVERHAUL, Gasket(s) - manifold chamber.**



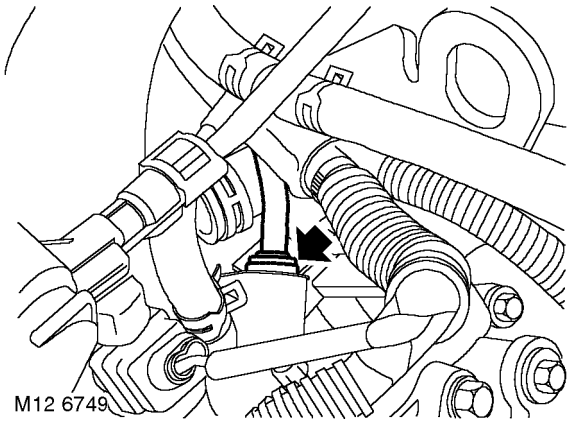
3. Remove 4 bolts securing LH front camshaft timing belt cover backplate to cylinder head and remove backplate.



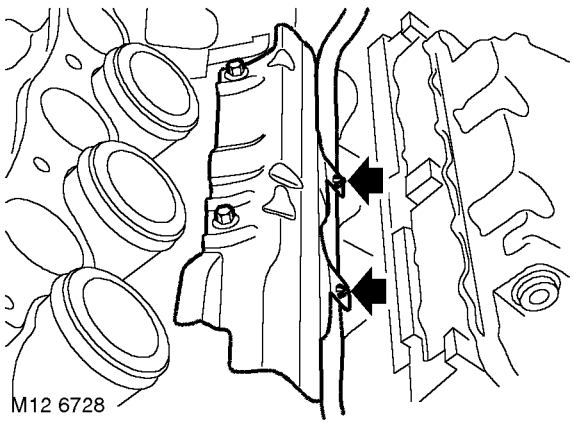
4. Release HO2S lead from clip on cylinder block.
5. Using sequence shown, loosen then remove 4 nuts securing exhaust manifold to cylinder head. Remove manifold, remove and discard gasket.
6. Remove LH camshaft cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - LH.**



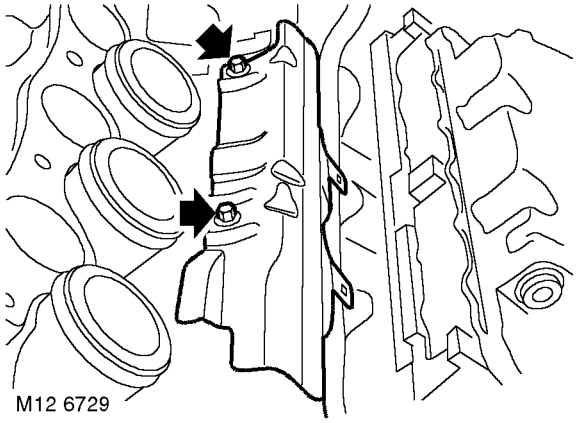
7. Release clip and disconnect coolant bleed hose from LH inlet manifold, position hose aside.



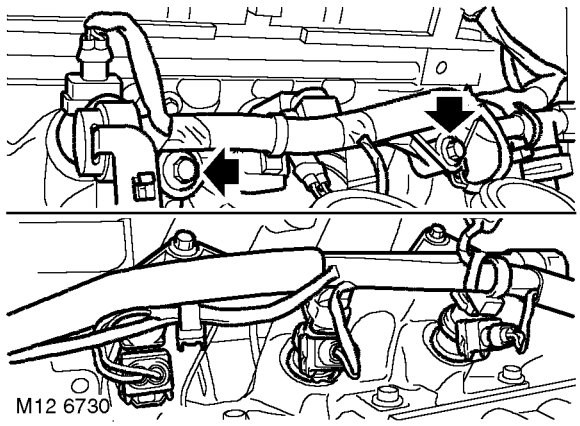
8. Depress locking collar and release breather hose from LH inlet manifold.



9. Release clips securing RH injector harness to injector protection cover - if fitted, or from bosses on fuel rail.



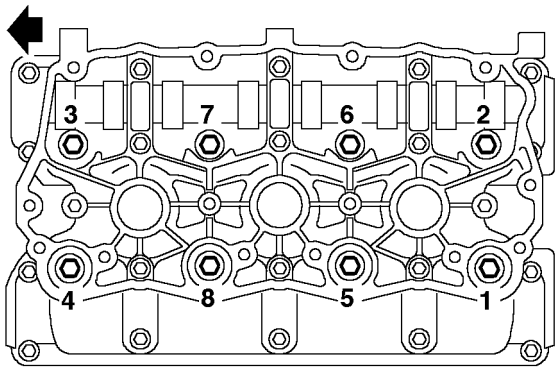
10. Remove 2 bolts securing protection cover - if fitted and RH fuel rail to RH inlet manifold, remove cover.



11. Remove 2 bolts securing fuel rail to LH inlet manifold.

12. Release injectors from manifolds and carefully lay fuel rail and injectors aside.

CAUTION: Always fit plugs to open connections to prevent contamination.

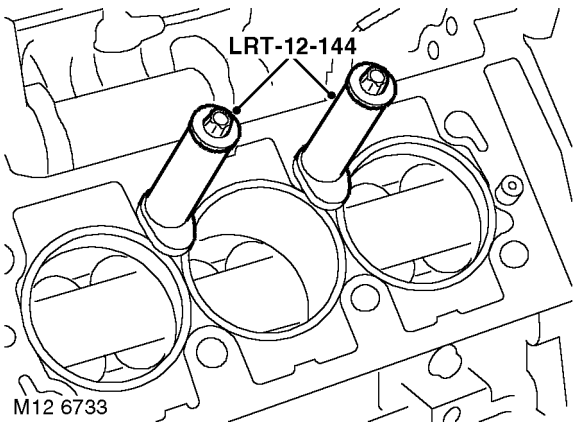


M12 7925

13. Using sequence shown, progressively loosen and remove 8 cylinder head bolts.
14. Remove cylinder head.
    CAUTION: Support both ends of cylinder head on blocks of wood.

15. Remove and discard cylinder head gasket.
    CAUTION: Do not rotate crankshaft with RH cylinder head fitted.

16. Remove and discard 2 cylinder head locating dowels.
    NOTE: Replacement dowels are supplied with new cylinder head gasket.

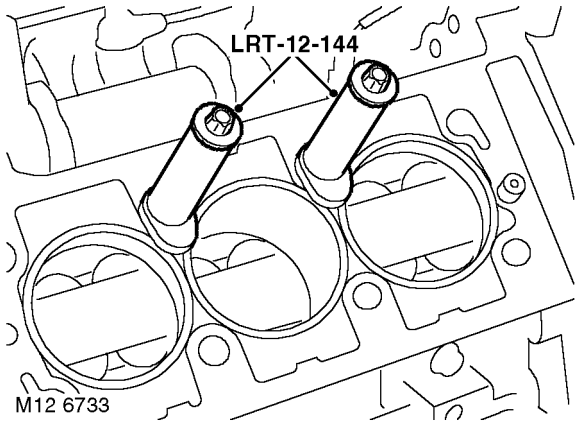


M12 6733

17. Fit cylinder liner clamps **LRT-12-144** and secure with cylinder head bolts.
    CAUTION: Ensure that feet of clamps do not protrude over bores.

Refit

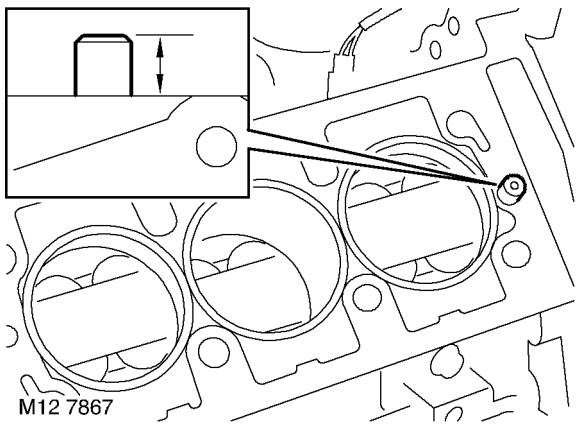
1. Clean cylinder head face.
   CAUTION: Use suitable gasket removal spray and a plastic scraper.



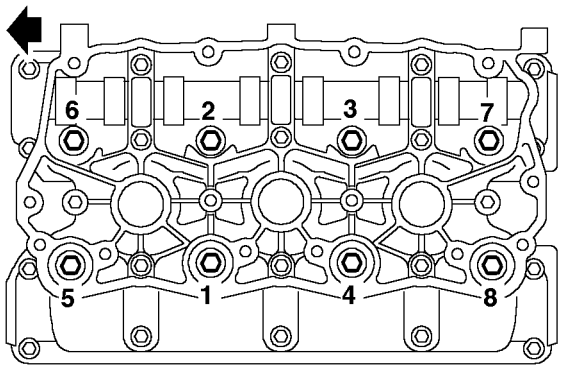
M12 6733

2. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.
   CAUTION: Do not rotate crankshaft.

3. Clean cylinder block face and dowel holes.
4. Clean cylinder head bolts and wipe dry.
5. Lightly lubricate threads and beneath heads of cylinder head bolts with clean engine oil.
6. Fit 2 new locating dowels supplied with replacement cylinder head gasket.

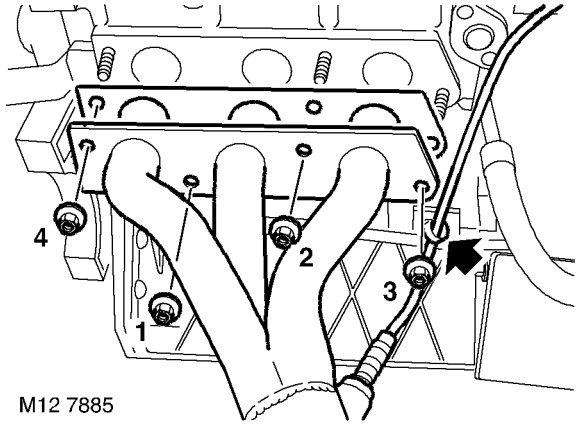

M12 7867

7. Check that fitted height of dowels is between 10 to 11 mm (0.40 to 0.43 in) above cylinder block top face.
8. Fit new cylinder head gasket onto cylinder block with the word 'TOP' uppermost.
9. With assistance, fit cylinder head and carefully position LH inlet to RH inlet manifold.
10. Carefully enter cylinder head bolts, **DO NOT DROP.** Screw bolts into place by hand.



M12 7926

11. Tighten cylinder head bolts progressively in the sequence shown to:
    - Stage 1 - 25 Nm (18 lbf.ft)
    - Stage 2 - 25 Nm (18 lbf.ft)
    - Stage 3 - 25 Nm (18 lbf.ft)
    - Stage 4 - Using an angle torque gauge, tighten a bolts in same sequence a further 180°
12. Fit LH camshaft cover gasket.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - LH.**
13. Remove and discard 'O' rings from injectors.
14. Clean injectors and injector locations in fuel rail.
15. Lubricate new 'O' rings with castor oil and fit to injectors.
16. Position fuel rail assembly and secure injectors to inlet manifolds.
17. Position injector protection cover - if fitted to RH fuel rail and secure injector harness to protection cover or fuel rail with clips.
18. Fit bolts securing fuel rail to inlet manifolds and tighten to 9 Nm (7 lbf.ft).
19. Connect coolant bleed hose to inlet manifold and secure with clip.
20. Connect breather hose to LH inlet manifold.
21. Position ignition coils to LH inlet manifold.
22. Position earth lead, fit nuts and bolts securing ignition coils to LH inlet manifold and tighten to 9 Nm (7 lbf.ft).
23. Clean camshaft drive belt cover backplate bolts and apply Loctite 242 to first 3 threads.
24. Position backplate, fit and tighten bolts to 9 Nm (7 lbf.ft).
25. Clean exhaust manifold and cylinder head mating face.



M12 7885

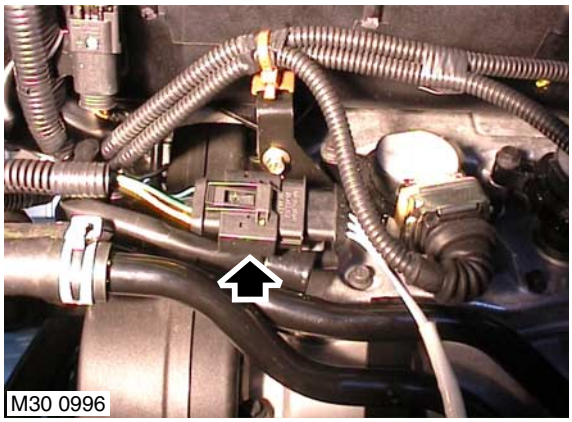
26. Fit new exhaust manifold gasket. Position exhaust manifold, fit nuts and using sequence shown, tighten to 45 Nm (33 lbf.ft).
27. Secure HO2S lead in clip on cylinder block.
28. Connect HO2S multiplug and secure to support bracket.
29. Fit new camshaft timing belt.
    ☞ **ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.**

Cylinder head gasket - RH

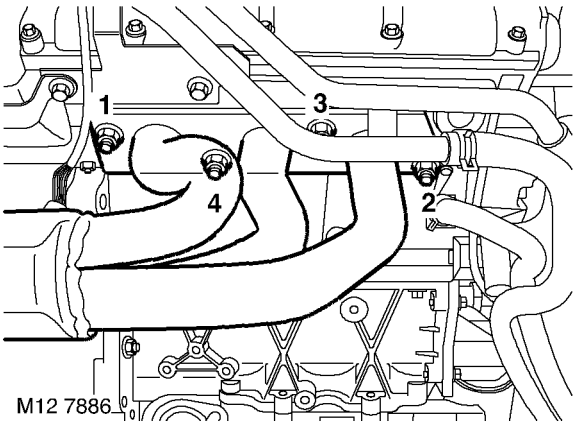
12.29.03.01

Remove

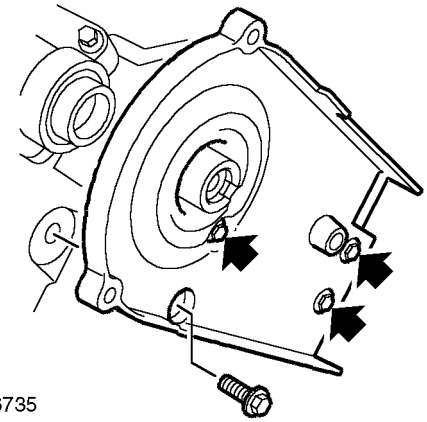
1. Remove inlet manifold chamber.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, OVERHAUL, Gasket(s) - manifold chamber.
2. Remove and discard camshaft timing belt.
   ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.



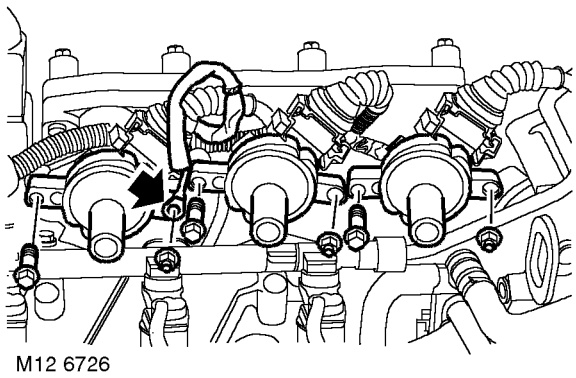
3. Release RH HO2S multiplug from coolant rail bracket and disconnect multiplug.



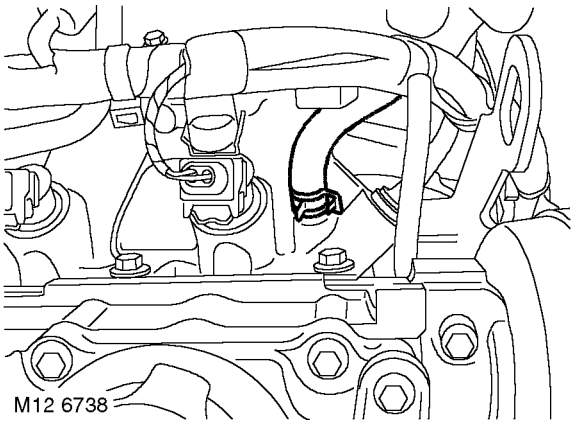
4. Using sequence shown, loosen then remove 4 nuts securing RH exhaust manifold to cylinder head.
5. Remove exhaust manifold, remove and discard gasket.



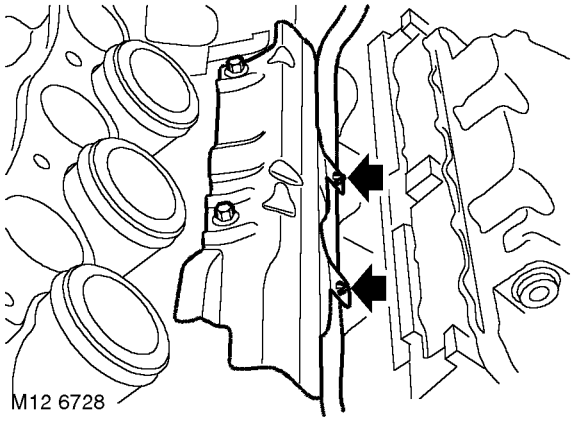
6. Remove 4 bolts securing RH front timing belt cover backplate to cylinder head and remove backplate.
7. Remove RH camshaft cover gasket.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - RH.



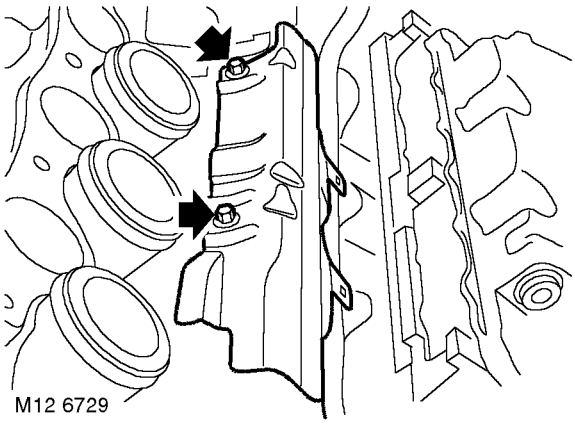
8. Remove 3 nuts and 3 bolts securing ignition coils to LH inlet manifold and release coil earth lead.
9. Remove ignition coils and position aside.


M12 6738

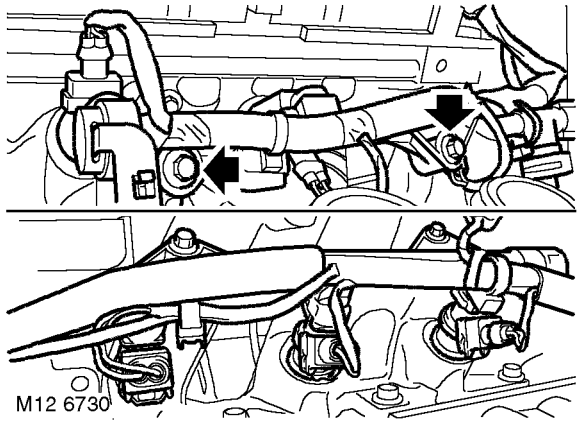
10. Release clip and disconnect coolant bleed hose from RH inlet manifold, position hose aside.


M12 6728

11. Release injector harness clips from injector protection cover - if fitted, or from bosses on fuel rail.


M12 6729

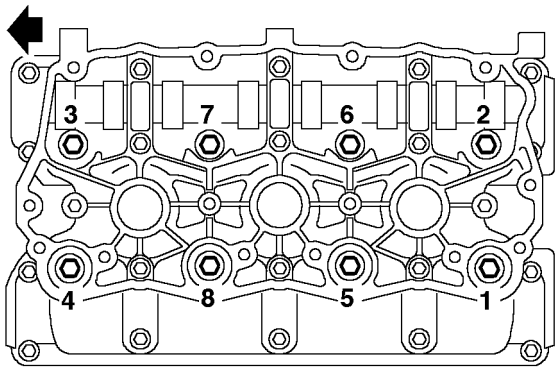
12. Remove 2 bolts securing protection cover - if fitted and RH fuel rail to RH inlet manifold, remove cover.


M12 6730

13. Remove 2 bolts securing fuel rail to LH inlet manifold.

14. Release injectors from manifolds and carefully lay fuel rail and injectors aside.

CAUTION: Always fit plugs to open connections to prevent contamination.



M12 7925

15. Using sequence shown, progressively loosen and remove 8 cylinder head bolts.

16. Remove cylinder head.

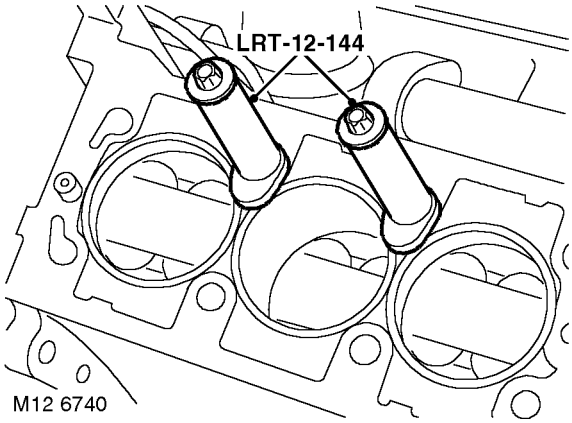
CAUTION: Support both ends of cylinder head on blocks of wood.

17. Remove and discard cylinder head gasket.

CAUTION: Do not rotate crankshaft with LH cylinder head fitted.

18. Remove and discard 2 cylinder head locating dowels.

NOTE: Replacement dowels are supplied with new cylinder head gasket.



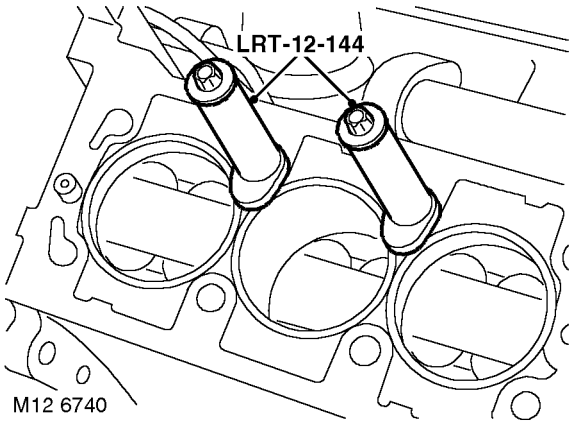
19. Fit cylinder liner clamps **LRT-12-144** and secure with cylinder head bolts.

CAUTION: Ensure that feet of clamps do not protrude over bores.

Refit

1. Clean cylinder head face.

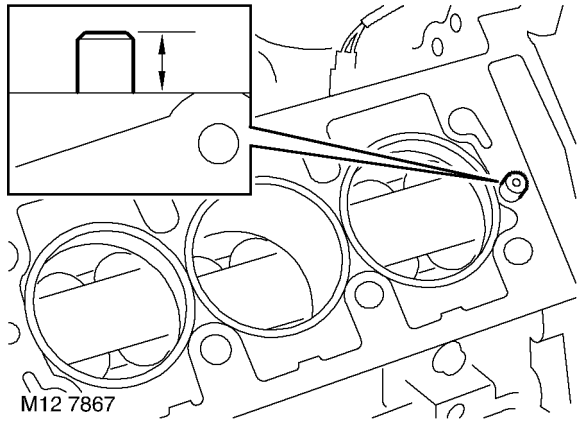
CAUTION: Use suitable gasket removal spray and a plastic scraper.



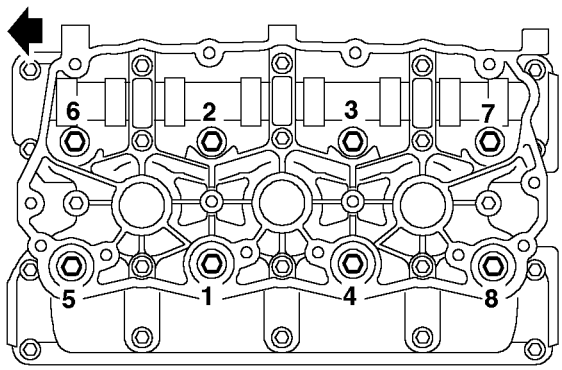
2. Remove bolts securing cylinder liner clamps **LRT-12-144** to cylinder block and remove clamps.

CAUTION: Do not rotate crankshaft.

3. Clean cylinder block face, dowels and dowel holes.
4. Clean cylinder head bolts and wipe dry.
5. Lightly lubricate threads and beneath heads of cylinder head bolts with clean engine oil.
6. Fit 2 new metal locating dowels supplied with replacement cylinder head gasket.



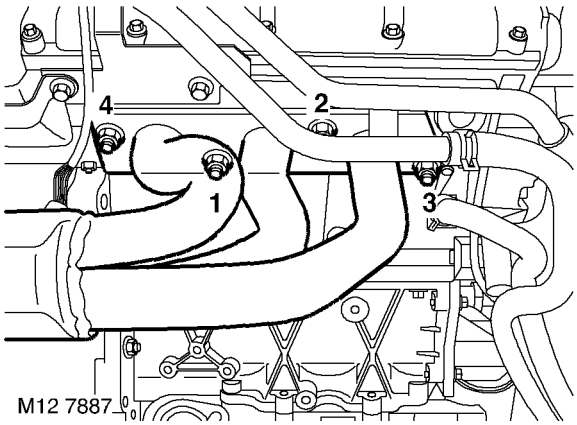
7. Check that fitted height of dowels is between 10 to 11 mm (0.40 to 0.43 in) above cylinder block top face.
8. Fit new cylinder head gasket onto cylinder block with the word 'TOP' uppermost.
9. With assistance, fit cylinder head and carefully position RH inlet to LH inlet manifold.
10. Carefully enter cylinder head bolts, **DO NOT DROP.** Screw bolts into place by hand.



11. Using sequence shown, tighten cylinder head bolts progressively to:
- Stage 1 - 25 Nm (18 lbf.ft)
- Stage 2 - 25 Nm (18 lbf.ft)
- Stage 3 - 25 Nm (18 lbf.ft)
- Stage 4 - Further 180°

12. Fit RH camshaft cover gasket.
☞ **ENGINE - K SERIES KV6, REPAIRS, Camshaft cover gasket - RH.**
13. Remove and discard lower 'O' rings from injectors.
14. Clean injectors and injector locations in fuel rail.
15. Lubricate new 'O' rings with castor oil and fit to injectors.
16. Position fuel rail assembly and secure injectors to inlet manifolds.

17. Position injector protection cover - if fitted to RH fuel rail and secure injector harness to protection cover or fuel rail with clips.
18. Fit bolts securing fuel rail to inlet manifolds and tighten to 9 Nm (7 lbf.ft).
19. Connect coolant bleed hose to inlet manifold and secure with clip.
20. Position ignition coils to LH inlet manifold.
21. Position earth lead, fit nuts and bolts securing ignition coils to LH inlet manifold and tighten to 9 Nm (7 lbf.ft).
22. Connect multiplugs to plug top coils and secure with locking clips.
23. Clean camshaft timing belt cover backplate bolts and apply Loctite 242 to the first 3 threads.
24. Position backplate, fit and tighten bolts to 9 Nm (7 lbf.ft).
25. Fit new camshaft timing belt.
    ☞ **ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.**
26. Clean exhaust manifold and mating face on cylinder head.



27. Fit new exhaust manifold gasket. Position exhaust manifold, fit nuts and using sequence shown, tighten to 45 Nm (33 lbf.ft).
28. Connect RH HO2S multiplug, secure multiplug in coolant rail bracket.

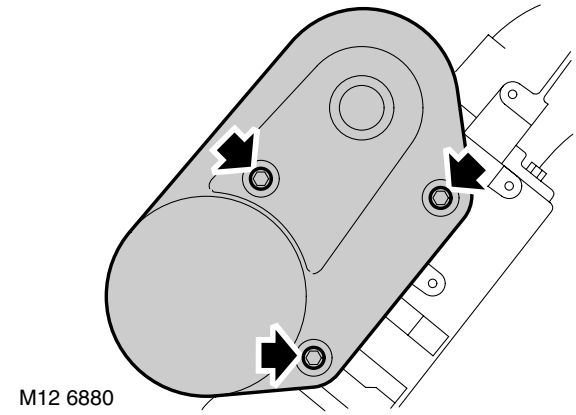
Cylinder head - decarbonise

⊸ ***12.29.19***

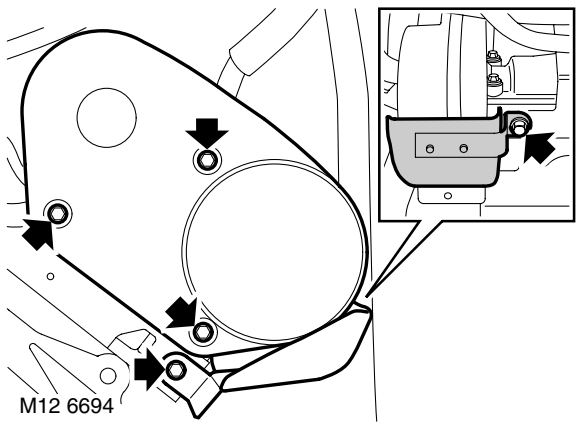
Remove

1. Remove cylinder head gaskets.
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - LH.**
   ☞ **ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - RH.**

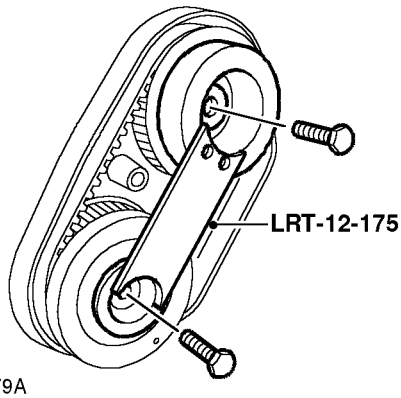
Disassembly



1. **LH Cylinder head:** Remove 3 bolts securing LH rear timing belt cover and remove cover.

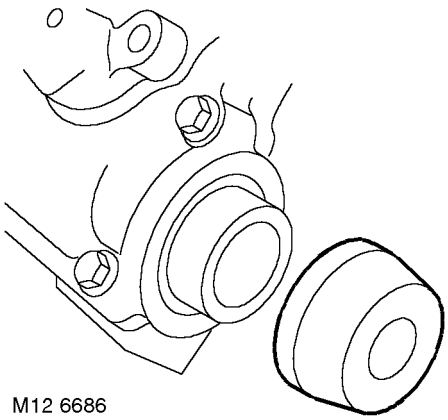


2. **RH Cylinder head:** Remove 2 bolts securing RH rear timing belt cover heat shield to cylinder head.
3. **RH Cylinder head:**Remove 3 bolts securing RH rear timing belt cover; remove cover.

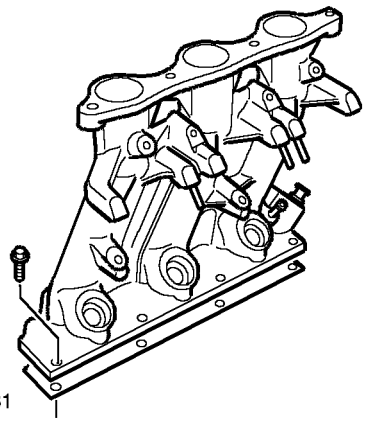


M12 6879A

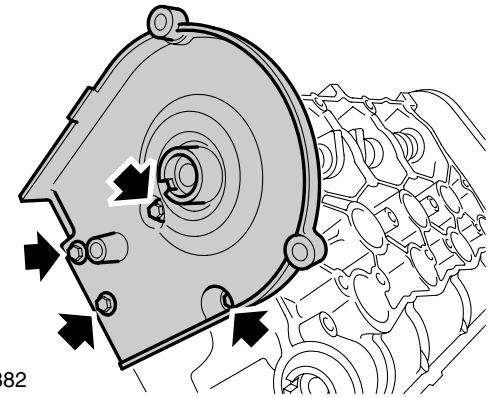
4. Position **LRT-12-175** to rear camshaft gears as illustrated, remove and discard bolts securing gears to camshafts.
5. Remove rear camshaft gears, timing belt and **LRT-12-175** as an assembly.
6. Remove **LRT-12-175** from camshaft gears and remove timing belt from gears. Discard timing belt.
7. Remove spark plugs.


M12 6686

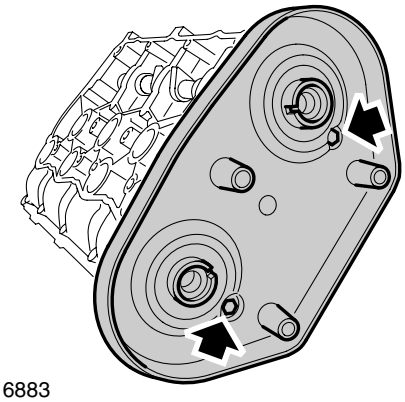
8. Remove and discard exhaust camshaft cap seal from cylinder head.
   Note: RH cylinder head illustrated.


M12 6881

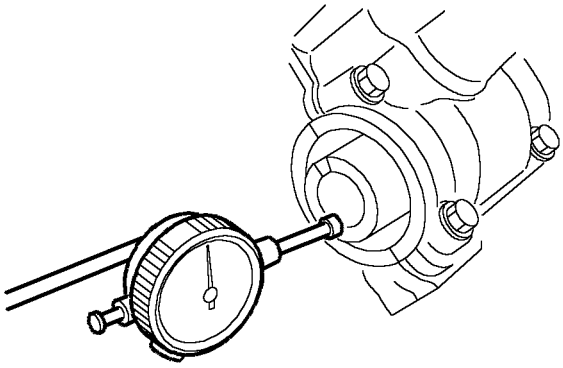
9. Progressively loosen then remove 7 bolts securing inlet manifold to cylinder head, remove inlet manifold and discard gasket.


M12 6882

10. Remove 4 bolts securing camshaft front timing belt cover backplate to cylinder head and remove backplate.
    Note: LH backplate illustrated.

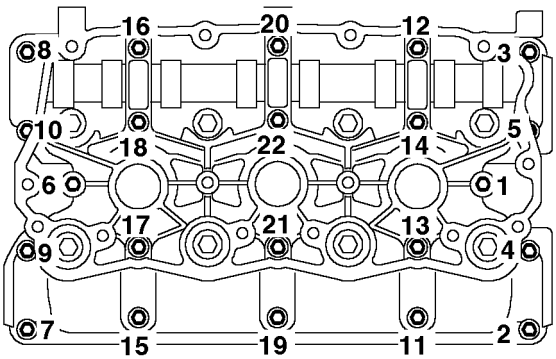

M12 6883

11. Remove 2 bolts securing camshaft rear timing belt cover backplate to cylinder head and remove backplate.
    Note: LH backplate illustrated.



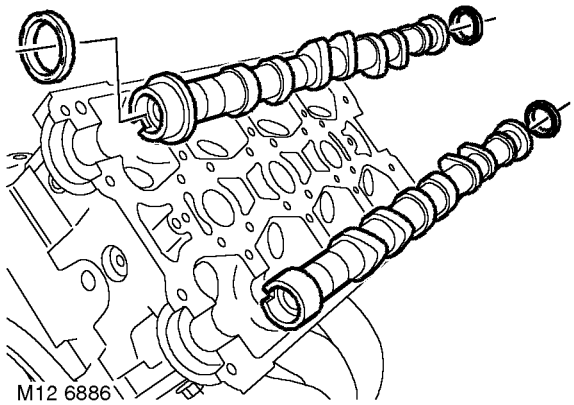
M12 6884

12. Check end-float of camshafts using a DTI.
☞ **GENERAL DATA, Engine – KV6 Petrol.**
CAUTION: If camshaft end-float exceeds limits given, repeat check with new camshaft(s). If end-float is still excessive, replace cylinder head and camshaft carrier as an assembly.



M12 6885

13. Using sequence shown, progressively loosen 22 bolts securing camshaft carrier to cylinder head until valve spring pressure is released and remove bolts.
14. Remove camshaft carrier.

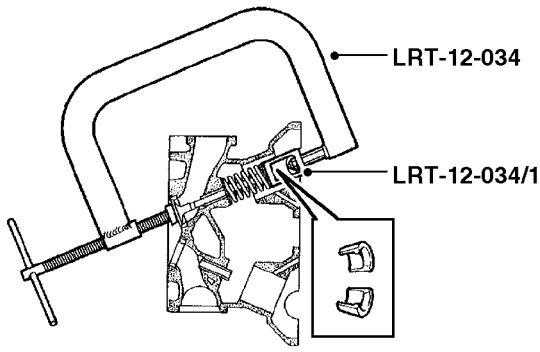


M12 6886

15. Remove camshafts and discard oil seals.
Note: Inlet camshafts are colour coded orange, exhaust camshafts

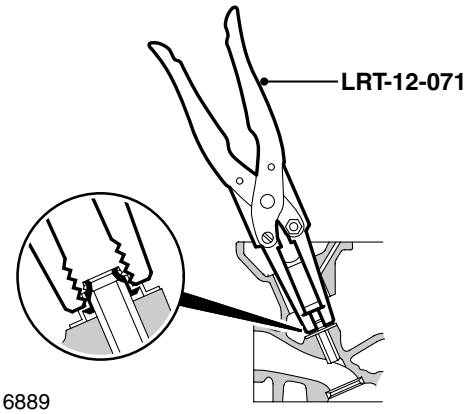
16. Using a stick magnet, remove 12 hydraulic tappets from cylinder head.
CAUTION: Store hydraulic tappets in their fitted order and store upright. Maintain absolute cleanliness when handling hydraulic tappets. Failure to observe these precautions can result in engine failure.

17. Measure the outside diameter of hydraulic tappets.
☞ **GENERAL DATA, Engine – KV6 Petrol.**
Note: Measurement must be taken half-way along tappet body.



M12 7106

18. Using **LRT-12-034,** and adapter **LRT-12-034/1**, compress valve spring, remove 2 collets, release valve spring and remove **LRT-12-034.**
19. Remove valve spring cap and valve spring.
20. Remove valve from cylinder head.



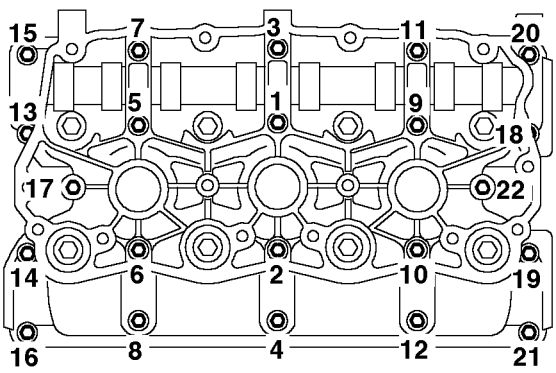
M12 6889

21. Remove valve stem oil seal using **LRT-12-071.** Discard stem seal.
22. Repeat procedure for remaining valves, keeping components in their fitted order.

Inspect

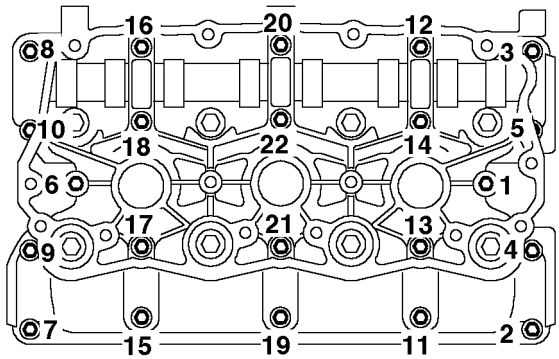
1. Clean camshafts, bearing running surfaces in carrier and cylinder head, carrier and cylinder head mating faces.
2. Inspect camshafts and replace camshafts if scored, pitted or excessively worn.
3. Position camshafts in cylinder head and place Plastigauge across each journal.

   CAUTION: Ensure camshafts are in their correct fitted locations. Camshafts are colour coded - Inlet - Orange; Exhaust - Blue.



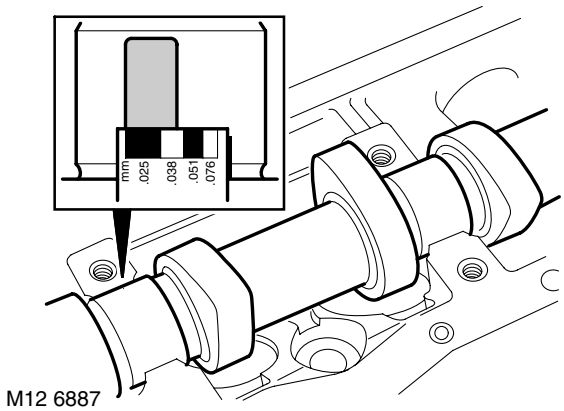
M12 6896

4. Refit camshaft carrier, fit bolts and using sequence shown, tighten to 10 Nm (7.5 lbf.ft). Do not rotate camshafts.



M12 6885

5. Using the sequence shown, progressively loosen and remove camshaft carrier bolts. Release and remove camshaft carrier from cylinder head.

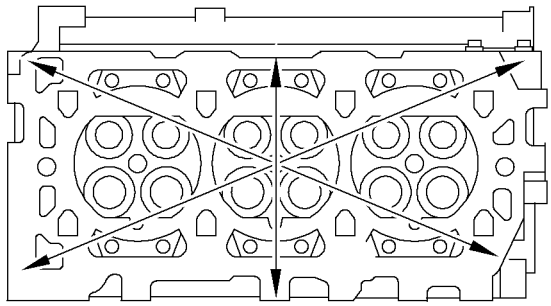


M12 6887

6. Measure widest part of Plastigauge on each journal.

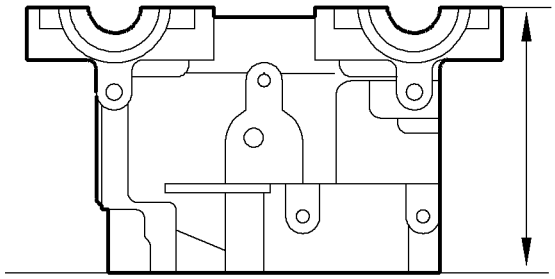
   GENERAL DATA, Engine – KV6 Petrol.
7. If clearance is excessive, fit new camshafts and repeat check. If clearance is still excessive renew cylinder head.
8. Remove all traces of Plastigauge using an oily rag.
9. Clean sealing surfaces of cylinder heads. Clean inlet and exhaust manifold mating faces.

   CAUTION: Do not use a metal scraper.
10. Decarbonise combustion areas of cylinder heads
11. Blow out all oilways and coolant passages.
12. Check cylinder head for damage, pay particular attention to sealing faces.



M12 7888

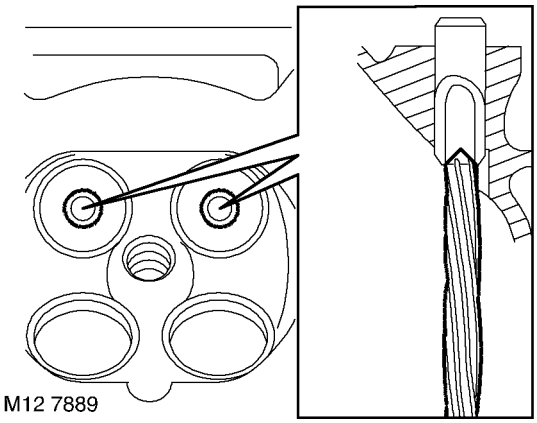
13. Check cylinder head face for warping, across centre and from corner to corner.
    ☞ **GENERAL DATA, Engine – KV6 Petrol.**



M12 7890

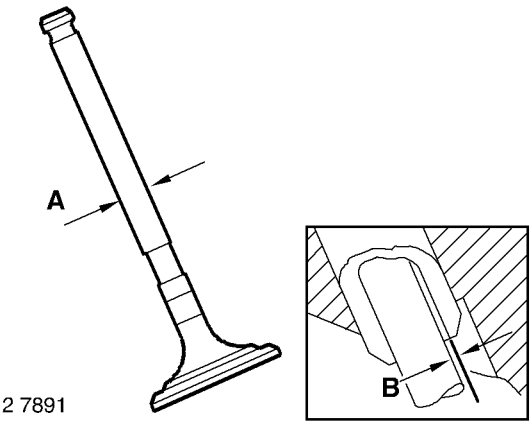
14. Check cylinder head height.
    ☞ **GENERAL DATA, Engine – KV6 Petrol.**
    Note: Provided that cylinder head height is kept within limits, cylinder heads may be refaced.

15. Check condition of valve springs and measure free length of springs.
    ☞ **GENERAL DATA, Engine – KV6 Petrol.**



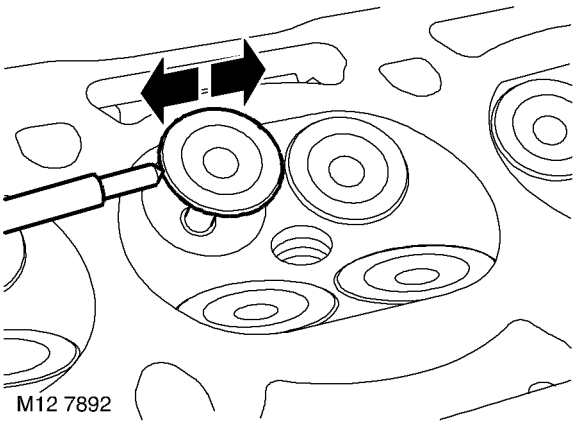
M12 7889

16. Remove carbon deposits from exhaust valve guides using a 6 mm diameter reamer inserted from combustion side of cylinder head.
17. Remove carbon from inlet valve guides, inlet and exhaust valves and valve seat inserts. Remove all loose carbon on completion.

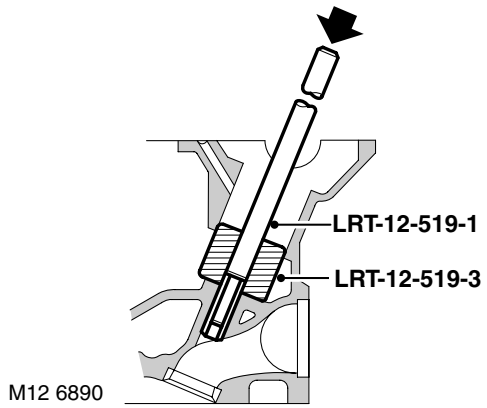


M12 7891

18. Check and record existing valve stem diameters 'A', replace any valve with stem diameter less than specified.
    ☞ **GENERAL DATA, Engine – KV6 Petrol.**
19. Check inlet and exhaust valve to guide clearances 'B' using the following procedures.

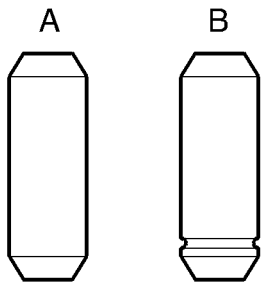

M12 7892

20. Insert each valve into its respective guide.
21. Extend valve head 15 mm (0.6 in) out of guide and position DTI gauge to rear of valve head.
22. Move valve towards front of cylinder head and zero gauge ensuring that stylus of gauge remains in contact with valve head.
23. Move valve towards rear of cylinder head, record gauge reading obtained to give valve stem to guide clearance 'B'.
☞ **GENERAL DATA, Engine – KV6 Petrol.**
24. Remove valves ensuring they are retained in their fitted order.
25. Renew valves and/or guides as necessary.
26. To replace valve guides support cylinder head face down on wooden blocks.



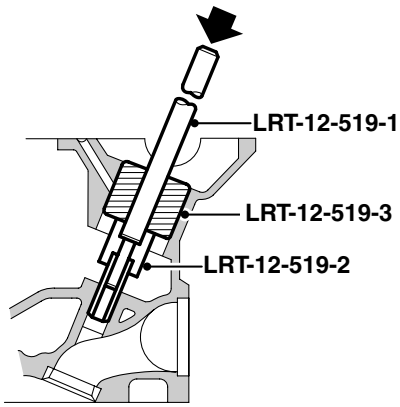
M12 6890

27. Position **LRT-12-519-3** in tappet bore and drift out valve guide using **LRT-12-519-1.**
CAUTION: Retain guides in their fitted order.



M12 7893

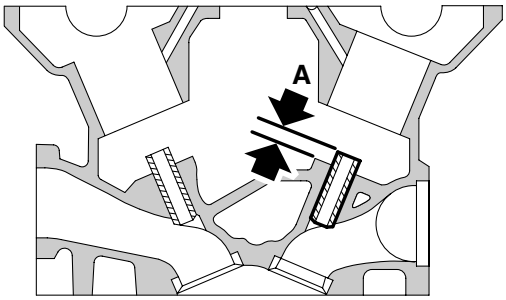
28. Identify type of valve guide fitted: **'A'** - Standard production **'B'** - Service replacement.
CAUTION: Standard production valve guides A must be replaced with service replacement guides B.



M12 6892

29. Locate valve guide in valve guide bore with identification groove towards valve seat and position depth gauge **LRT-12-519-2** onto valve guide.
CAUTION: Cylinder head and valve guides must be at room temperature when fitting guides.

30. Position nylon guide **LRT-12-519-3** in cylinder head, press guide into bore using driver **LRT-12-519-1** until depth gauge contacts cylinder head.

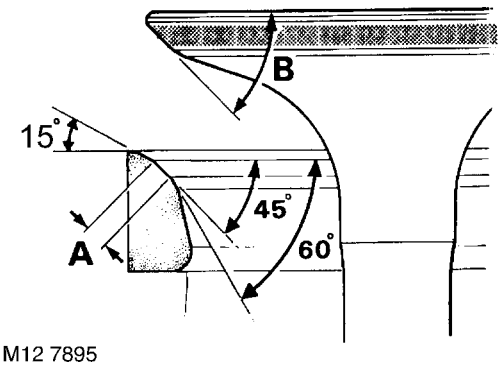


M12 7894

31. Check that fitted height of valve guide, 'A', is 6.00 mm (0.24 in).
32. Check condition of valve seats and existing valves that are to be re-used.
33. Renew valve seat inserts as necessary.
CAUTION: Do not damage counterbore when removing insert.

34. Cool replacement valve seat inserts using liquid nitrogen and press into cylinder head in one continuous operation.
CAUTION: Do not heat cylinder head. Inserts must not stand proud of combustion face on completion of cutting operation.

35. Cut valve seats using a suitable pilot and the following cutters:
- 15° - To cut first angle
- 45° - Make final cut and remove any burrs
- 60° - To narrow seat and obtain correct valve seat width

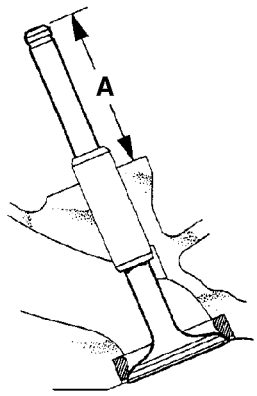


M12 7895

36. Check valve seat width and face angle:
- Seat width - 'A' - Inlet = 1.2 mm (0.05 in); Exhaust = 1.6 mm (0.06 in)
- Valve face angle - 'B' - Inlet and exhaust = 45°

37. Lap each valve to its seat using grinding paste.

38. Apply Prussian Blue to valve seat, insert valve and press it into position several times without rotating. Remove and check valve for even and central seating: seating position shown by Prussian Blue should be in the centre of valve face: *a:* High towards stem, increase 60° cut and restore seat width. *b:* Low towards edge, increase 45° cut and restore seat width. Lap and recheck valve seating.

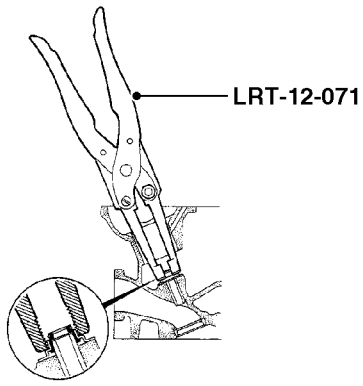


M12 7115

39. Check valve stem fitted height - **'A'**.
☞ **GENERAL DATA, Engine – KV6 Petrol.**
CAUTION: If valve stem fitted height is above service limit, fit new valve and re-check. If still over limit, renew valve seat insert.

40. Clean valve springs and lubricate valves.

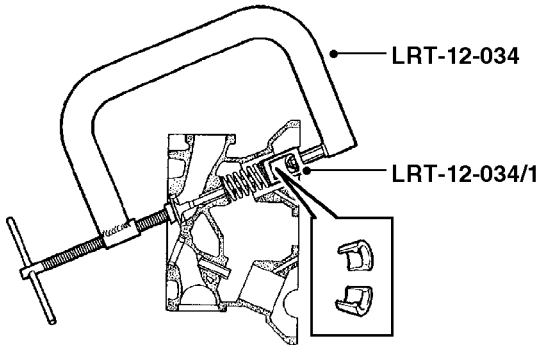
Reassembly
1. Lubricate new valve stem oil seals with clean engine oil.



M12 7117

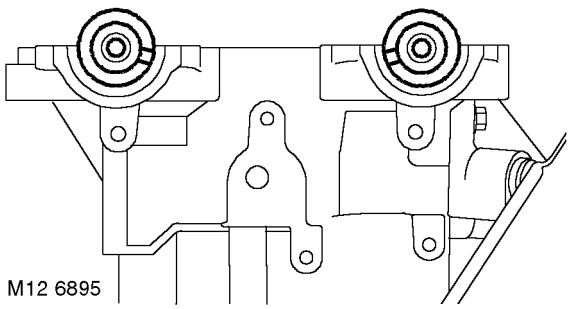
2. Using tool **LRT-12-071** fit new valve stem oil seals.
3. Fit valves.

4. Fit spring and spring cap.



M12 7106

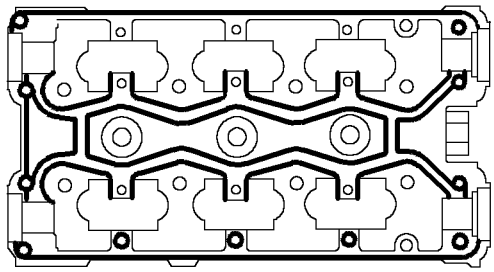
5. Position **LRT-12-034** and adapter **LRT-12-034/1**to spring cap and compress valve spring.
6. Fit collets.
7. Release valve spring and remove tool **LRT-12-034**.
8. Using a wooden dowel and mallet, lightly tap top of each valve two or three times to seat valves and collets.
9. Thoroughly clean and lubricate hydraulic tappets with clean engine oil. Fit hydraulic tappets to original bores in cylinder head.
10. Ensure that mating faces of camshaft carrier and cylinder head are clean and dry.
11. Lubricate camshafts and bearing journals with clean engine oil.



M12 6895

12. Position camshafts in cylinder head with rear timing gear drive slots in each camshaft facing towards the centre as shown.

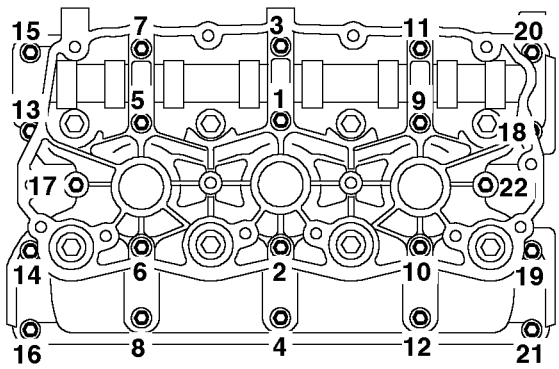
CAUTION: Ensure camshafts are in their correct fitted locations. Camshafts are colour coded - Inlet - Orange; Exhaust - Blue.



M12 6894

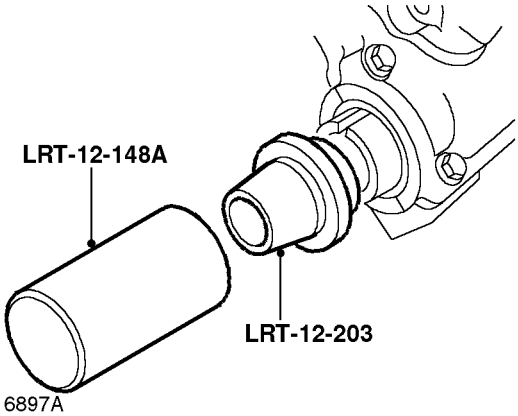
13. Apply continuous thin beads of sealant, Part No. STC 4600, to paths on camshaft carrier as shown. Spread sealant to an even film using a roller.

CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.



M12 6896

14. Position camshaft carrier, fit and progressively tighten bolts in the sequence shown to 10 Nm (7.5 lbf.ft).



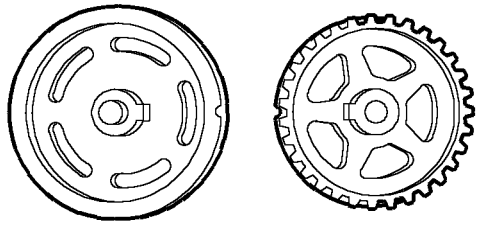
M12 6897A

15. Noting that the front camshaft oil seals are black in colour and the rear oil seals are red, fit new camshaft oil seals using **LRT-12-203** and **LRT 12-148A**

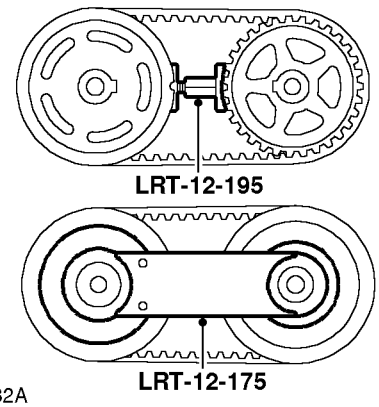
CAUTION: Oil seals must be fitted dry. Do not use tool LRT-12-148 for fitting seals.

16. Clean camshaft timing belt cover backplate bolts and apply Loctite 242 to the first 3 threads.
17. Position camshaft timing belt rear cover backplates to cylinder head, fit and tighten bolts to 9 Nm (7.5 lbf.ft).
18. Fit spark plugs.
19. Clean rear camshaft gears and mating faces on camshafts.

CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gears will emerge and contaminate the timing belts.

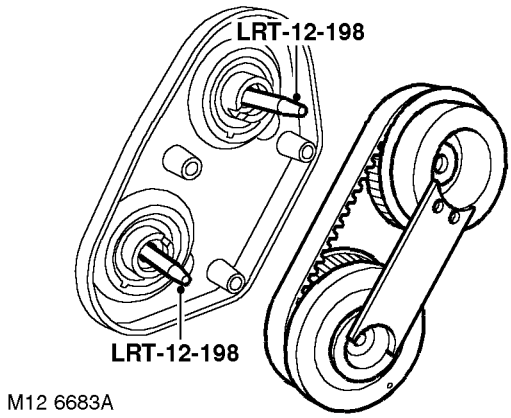

M12 6681

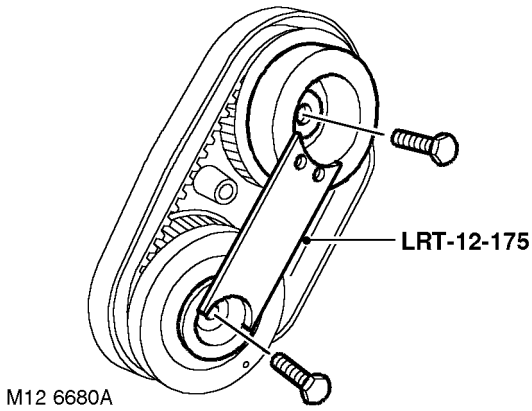
20. Place gears inverted on a flat surface, with the locating lugs on the gears positioned as illustrated.



M12 6682A

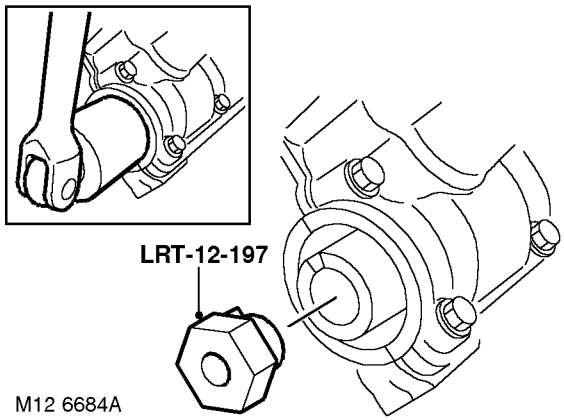
21. Keeping the timing marks aligned, position timing belt onto gears.
22. Position **LRT-12-195** between the gears, turn centre nut sufficiently to spread drive belt.
23. Invert gears and timing belt and position **LRT-12-175** to camshaft gears.
24. Check that locating lugs are still aligned and remove **LRT-12-195** from between camshaft gears.





25. Fit **LRT-12-198** alignment pins into the end of each camshaft.

26. Position timing belt and gears over **LRT-12-198** and locate gears onto camshafts.



27. Position **LRT-12-197** into the front end of the exhaust camshaft.

28. With assistance, using a 30 mm socket on **LRT-12-197**, turn the exhaust camshaft sufficiently to align camshaft gears to the drive slots in each camshaft.

29. Remove **LRT-12-198** alignment pins and fit new camshaft gear retaining bolts.

30. Tighten camshaft gear bolts to:

- Stage 1 - 27 Nm (20 lbf.ft)
- Stage 2 - Further 90°

31. Remove **LRT-12-175** from camshaft gears.

32. Remove **LRT-12-197** from front end of exhaust camshaft.

NOTE: Following front or rear timing belt refitment, it is possible that after rotating the engine and positioning the crankshaft pulley to the 'SAFE' position, the timing marks on the rear timing gears may be misaligned. This misalignment is acceptable provided that the timing belt refitting procedure was carried out correctly.

33. Fit timing belt rear cover and tighten bolts to 9 Nm (7 lbf.ft).

Refit

1. Fit cylinder head gaskets.

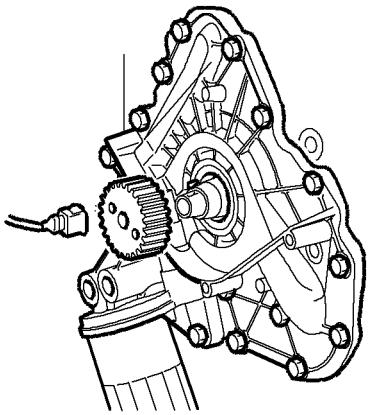
☞ **ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - LH.**
☞ **ENGINE - K SERIES KV6, OVERHAUL, Cylinder head gasket - RH.**

Oil pump

12.60.26.02

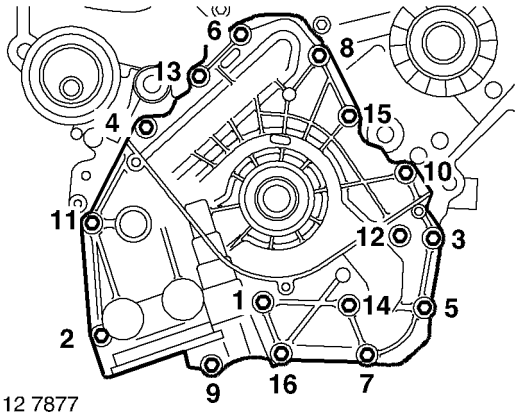
Remove

1. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.



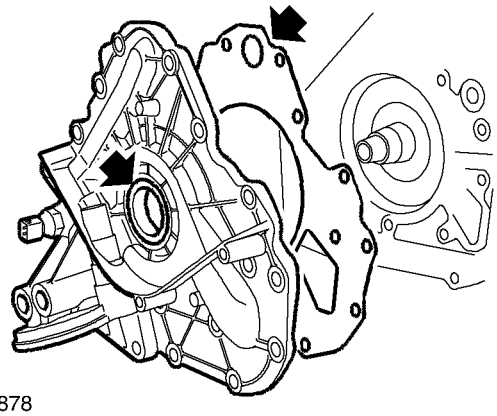
M12 7875

2. Remove crankshaft gear.
3. **If fitted:** Disconnect multiplug from oil pressure switch.
4. Using a strap wrench, remove and discard oil filter.



M12 7877

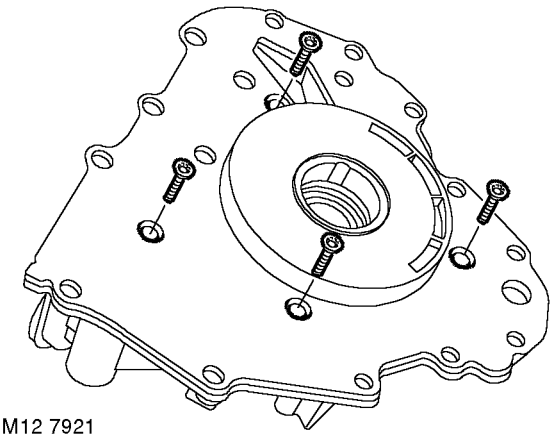
5. Using sequence shown, remove and discard 16 bolts securing oil pump to cylinder block.



M12 7878

6. Remove oil pump, remove and discard gasket.
7. Remove and discard crankshaft front oil seal from oil pump body.

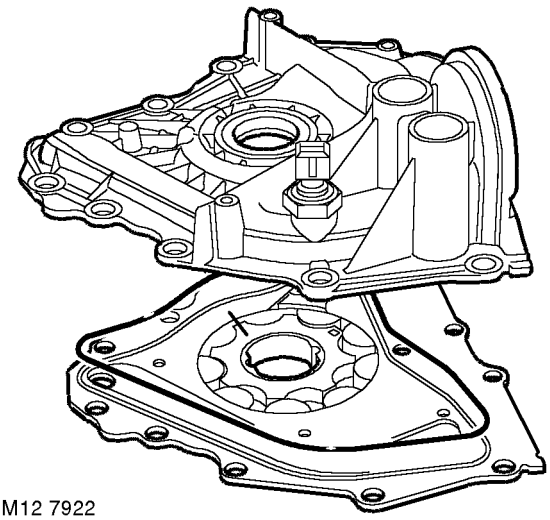
Disassembly



M12 7921

1. Remove 4 Torx screws securing cover plate to oil pump body.
   CAUTION: Do not allow cover to separate from pump body.

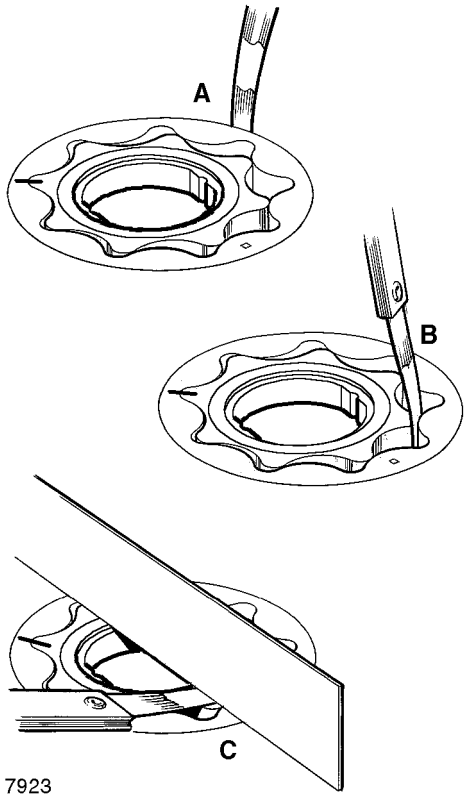
2. Invert oil pump.



M12 7922

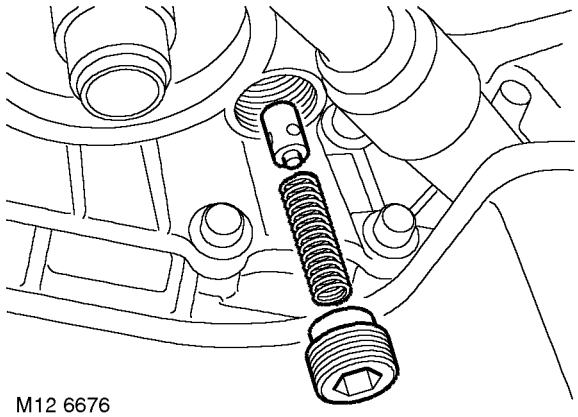
3. Carefully remove cover plate from oil pump body taking care to ensure that rotors are retained in pump body.
   Note: Cover plate is dowel located.
4. Remove and discard cover plate sealing ring.
5. Make suitable alignment marks between inner and outer rotors and pump body.
6. Remove inner and outer rotors.
7. Clean inner and outer rotors and rotor housing.
8. Fit inner and outer rotors ensuring that reference marks are aligned.

Inspect



M12 7923

1. Check rotor clearances:
   - Outer rotor to body = 0.13 - 0.23 mm (0.0051 - 0.0091 in)
   - Inner rotor tip = 0.05 - 0.13 mm (0.002 - 0.005 in)
   - Inner and outer rotor end-float = 0.04 - 0.09 mm (0.0016 - 0.0035 in)
2. Renew oil pump as an assembly if clearances are excessive.



M12 6676

3. Remove oil pressure relief valve plug.
   Note: If a hexagonal plug and sealing washer are fitted, discard washer.

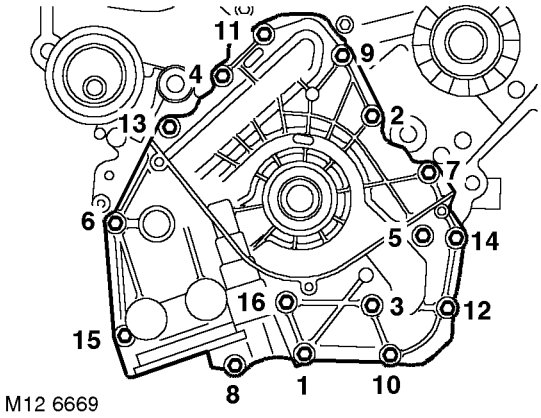
4. Remove spring and valve.
5. Check that valve and bore are free from scoring and corrosion.
   Note: Light corrosion may be removed using grade 600 emery cloth soaked in engine oil.
6. Check free length of spring.
   ☞ **GENERAL DATA, Engine – KV6 Petrol.**
7. Check that valve slides freely in bore.
   CAUTION: If valve is scored, renew relief valve as an assembly. If valve bore is scored, renew oil pump as an assembly.

Reassembly

1. Clean cover plate and mating face of cylinder block; ensure bolt holes are clean and dry.
2. Clean running surface on crankshaft.
3. Remove all traces of Loctite from relief valve plug, Torx screws and tapped holes in pump body.
   CAUTION: Do not use a tap.
4. Lubricate relief valve, spring and bore with clean engine oil.
5. Fit relief valve and spring.
6. If a hexagonal plug and sealing washer were fitted, fit new sealing washer to plug.
7. Apply Loctite 577 to plug threads; fit plug and tighten to 25 Nm (18 lbf.ft).
8. Lubricate pump rotors and recess with clean engine oil.
9. Fit inner and outer rotors ensuring that identification mark on outer rotor is facing outwards and that reference marks are aligned.
10. Lubricate new cover plate sealing ring with clean engine oil.
11. Fit cover plate seal and cover plate.
12. Apply Loctite 577 to threads of Torx screws, fit and tighten screws.
13. Check that pump rotates freely.

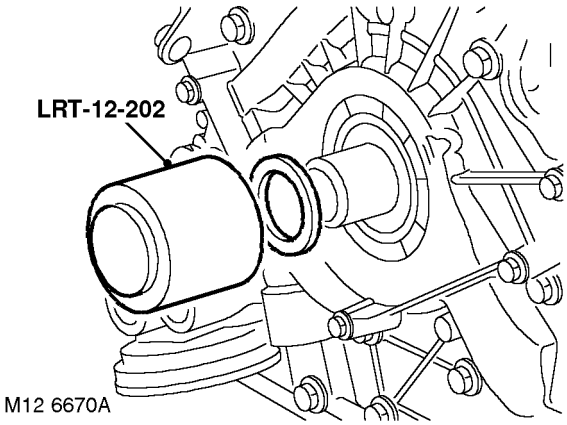
Refit

1. Fit new oil pump gasket to cylinder block.
   CAUTION: Gasket must be fitted dry.
2. Fit oil seal guide from crankshaft front oil seal kit over end of crankshaft.
3. Position oil pump, aligning flats on pump drive to flats on crankshaft.



M12 6669

4. Fit new Patchlok bolts and using sequence shown, tighten to :
   - Stage 1 - 5 Nm (4 lbf.ft)
   - Stage 2 - 9 Nm (7 lbf.ft)



M12 6670A

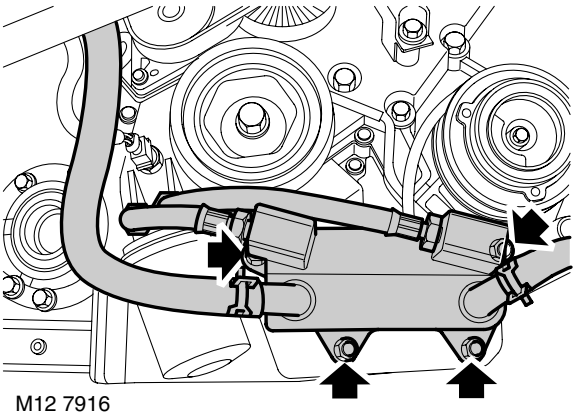
5. Position new crankshaft front seal against oil pump housing, fit seal using tool **LRT-12-202**.
   CAUTION: Oil seal must be fitted dry.
6. Remove oil seal guide.
7. **If fitted:** Connect multiplug to oil pressure switch.
8. Fill canister of replacement oil filter with clean engine oil.
9. Lubricate sealing ring on new oil filter with clean engine oil.
10. Fit oil filter and tighten by hand until it seats then tighten a further half turn.
11. Fit crankshaft gear.
12. Fit camshaft timing belt.
    ☞ **ENGINE - K SERIES KV6, OVERHAUL, Camshaft timing belt.**

Sump - engine oil

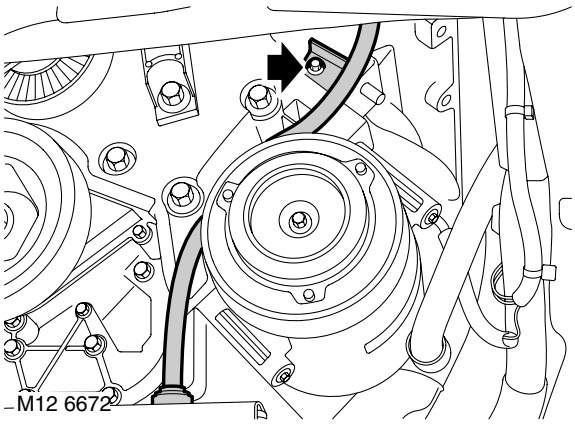
12.60.38.01

Remove

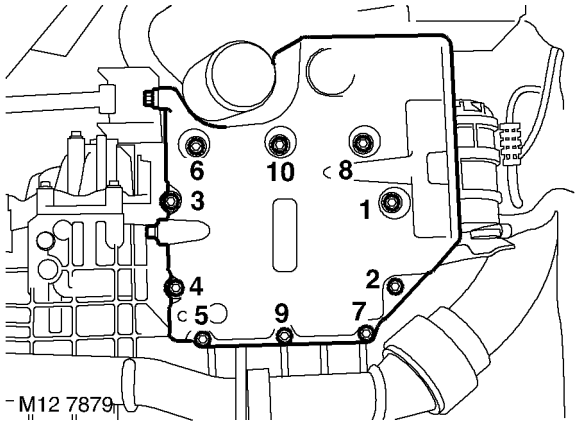
1. Drain engine oil.
   MAINTENANCE, MAINTENANCE, Engine Oil and Filter – KV6.


M12 7916

2. **If fitted:**Remove 4 nuts securing engine oil cooler to mounting bracket and position oil cooler aside.


M12 6672

3. Remove bolt securing dipstick tube to cylinder block.
4. Depress and hold down dipstick tube collar; remove dipstick tube from sump.

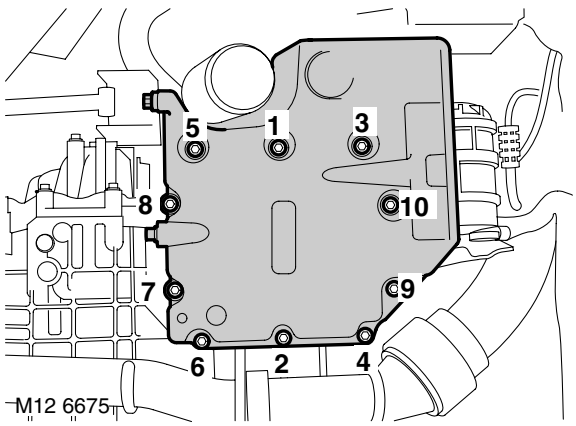


M12 7879

5. Using sequence shown and noting their fitted positions, remove 10 bolts securing sump to lower crankcase.
6. Using a mallet, gently tap sump sideways to break sealant bond, remove sump.
   CAUTION: Do not lever between crankcase and sump.

Refit

1. Using a suitable cleaning solvent, clean sump and mating face on lower crankcase. DO NOT use a metal scraper on sealing surfaces.
2. Apply a 2 mm (0.1 in) bead of sealant, Part No. STC 4600 along centre of sump flange, then spread to an even film using a roller.
   CAUTION: To avoid contamination, assembly should be completed immediately after application of sealant.



M12 6675

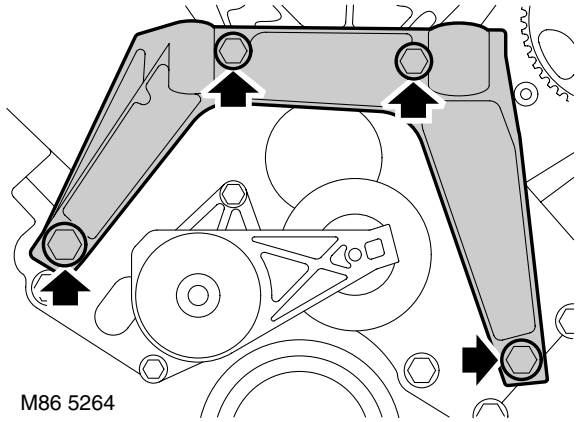
3. Position sump, fit bolts and tighten progressively in the sequence shown to 35 Nm (26 lbf.ft).
4. **If fitted:**Position engine oil cooler to sump mounting bracket, fit and tighten nuts to 25 Nm (18 lbf.ft).

5. Position dipstick tube to sump and cylinder block, fit bolt and tighten to 9 Nm (7 lbf.ft).
6. Fill engine with oil.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**

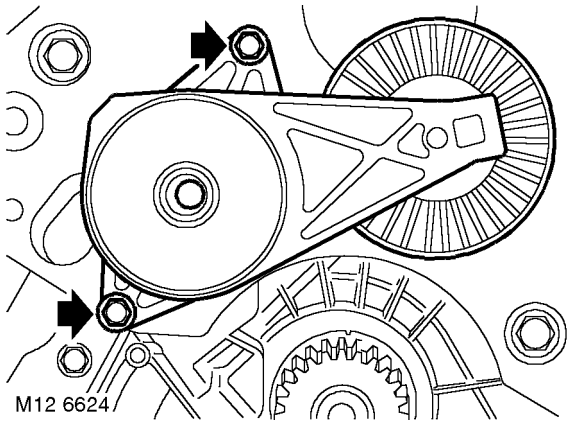
Camshaft timing belt

⊸ ***12.65.18.01***

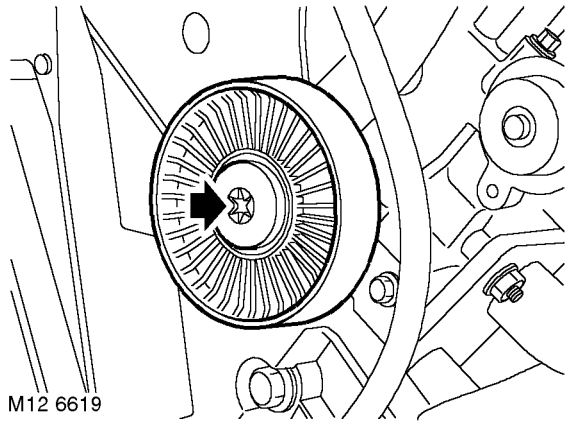
Remove



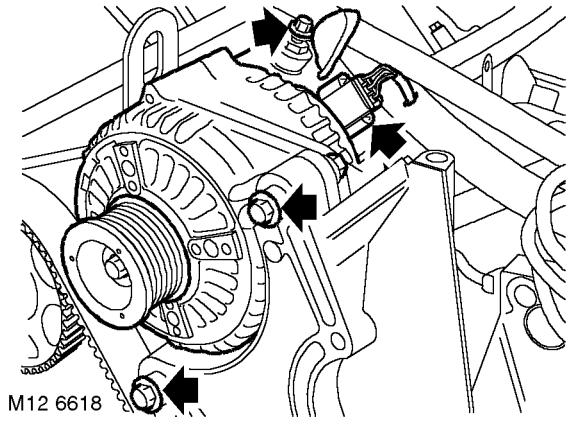
1. Remove 4 bolts securing engine mounting bracket to engine front plate and remove bracket.
2. Release and remove ancillary drive belt from remaining pulleys.



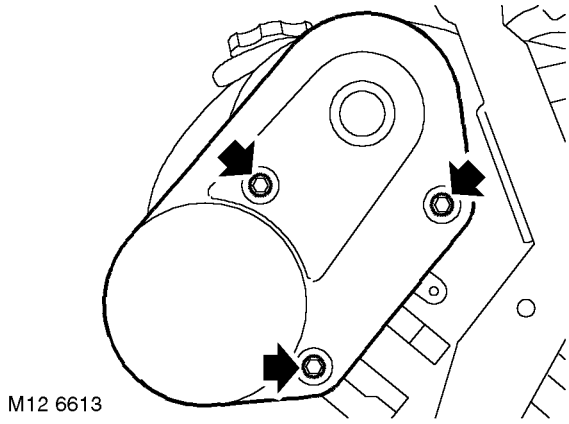
3. Remove 2 bolts securing ancillary drive belt tensioner and remove tensioner.



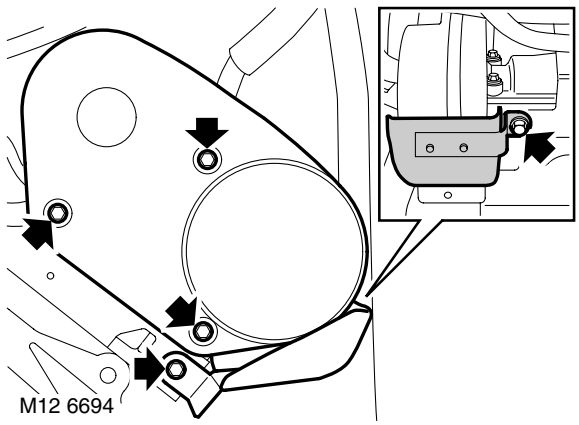
4. Remove Torx screw securing idler pulley to front mounting plate and remove pulley.



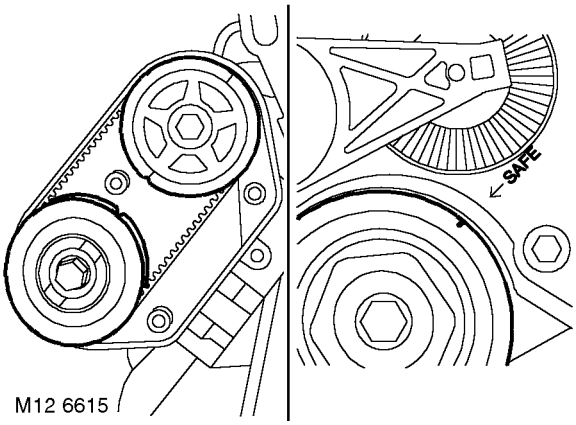
5. Release alternator battery lead terminal cover, loosen terminal nut and disconnect lead from terminal
6. Disconnect multiplug from alternator.
7. Remove lower bolt and upper nut and bolt securing alternator to front mounting plate.
8. Release alternator and remove.



9. Remove 3 bolts securing camshaft timing belt LH rear cover and remove cover.
10. Remove inlet manifold chamber - if fitted.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**

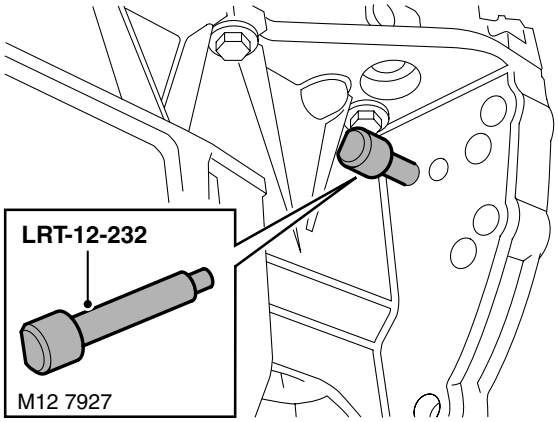


11. Remove 2 bolts securing RH rear timing belt cover heat shield to cylinder head; remove heat shield.
12. Remove 3 bolts securing RH rear timing belt cover; remove cover.

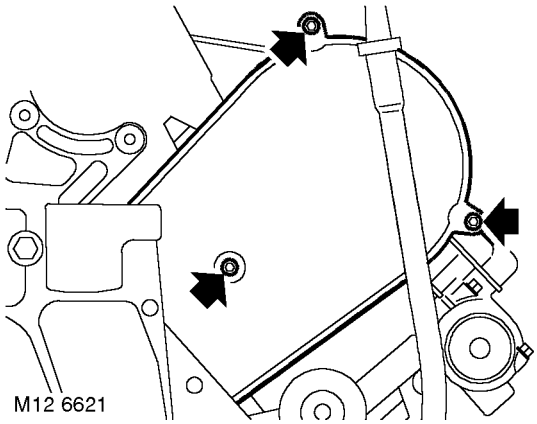


13. Using a socket on crankshaft pulley bolt, rotate crankshaft in a clockwise direction and align the engine "SAFE" position - notch on crankshaft pulley aligned to the "ARROW" on front mounting plate. Check that the timing marks on the rear camshaft gears are aligned as illustrated.

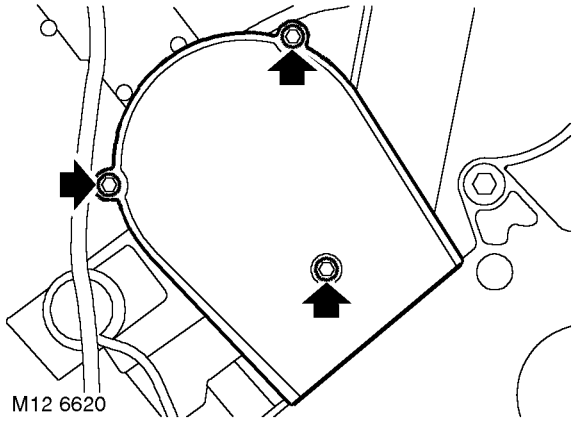
CAUTION: Do not use the camshaft gear bolts or timing belts to rotate the crankshaft. Do not use the arrow on the oil pump body as a timing reference.



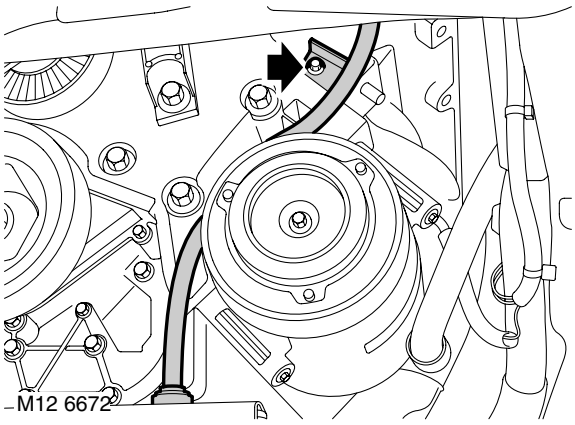
14. Insert timing pin **LRT-12-232** through hole immediately adjacent to side of lower crankcase ensuring that pin is located in hole in drive plate.



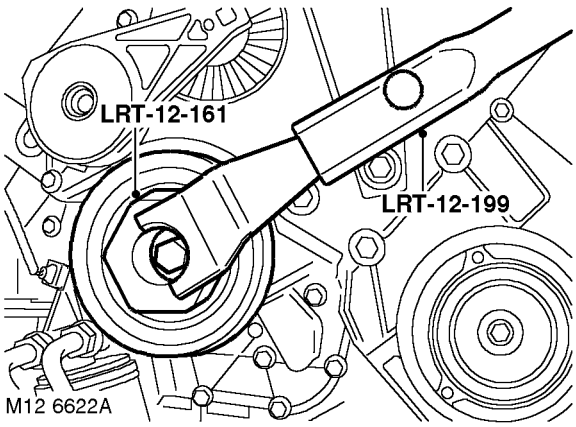
15. Remove 3 bolts securing camshaft timing belt LH front cover and remove cover.



16. Remove 3 bolts securing camshaft timing belt RH front cover and remove cover.



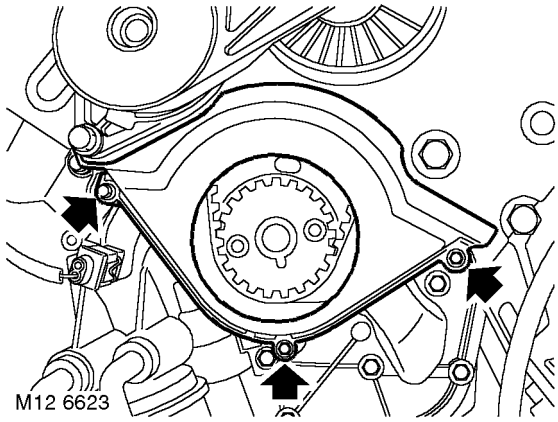
17. Remove bolt securing dipstick tube to cylinder block.
18. Depress locking collar, release and remove dipstick tube from engine sump.
19. Assemble **LRT-12-161** to **LRT-12-199** and secure with clamp bolt.



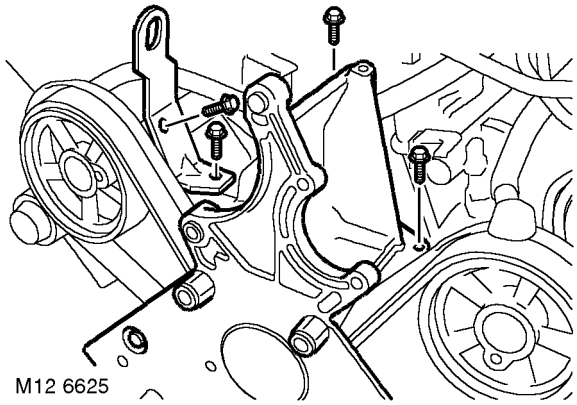
20. Insert **LRT-12-161** with **LRT-12-199** into crankshaft pulley, loosen and remove pulley bolt.

CAUTION: Ensure crankshaft does not rotate during above operation.

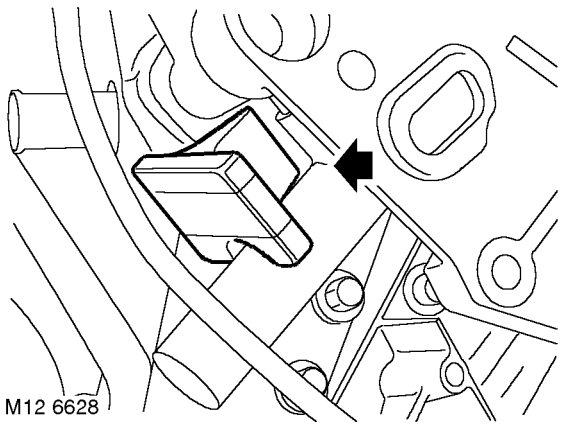
21. Remove **LRT-12-161** and **LRT-12-199** from crankshaft pulley.
22. Remove crankshaft pulley.



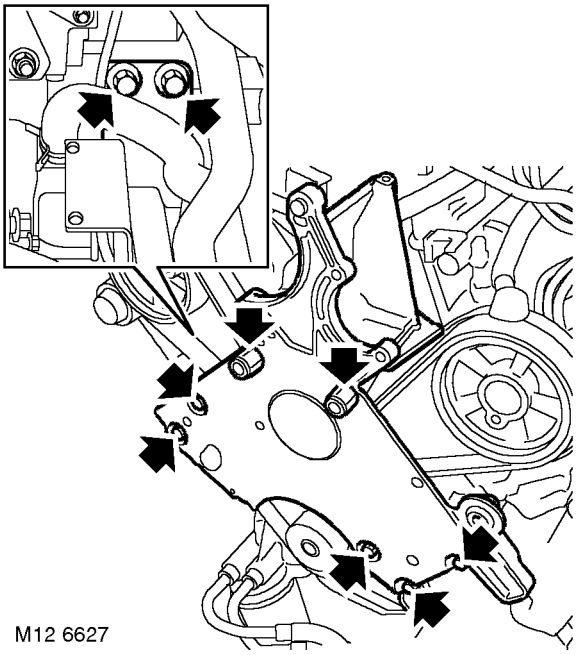
23. Remove 3 bolts securing camshaft timing belt lower cover to cylinder block and remove cover.



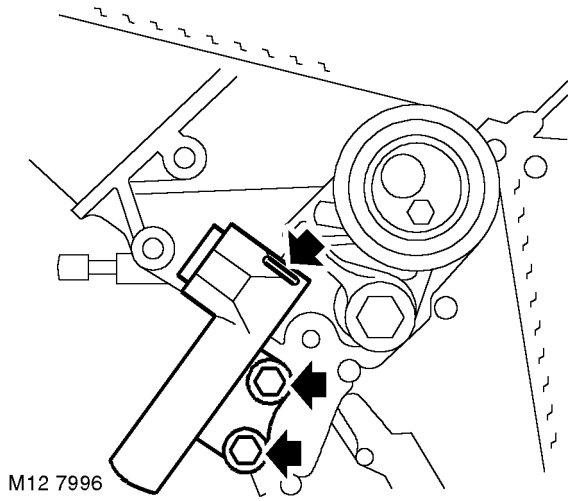
24. Remove 3 bolts securing engine front mounting plate and lifting bracket to cylinder block.
25. Remove bolt securing lifting bracket to RH cylinder head and remove lifting bracket.



26. Remove rubber blanking plug from around camshaft timing belt tensioner.


M12 6627

27. Remove 5 bolts and 2 pillar bolts securing engine front mounting plate to cylinder block.
28. Remove 2 bolts securing IRD support bracket to engine front mounting plate.
29. With care, release and remove front mounting plate from engine.

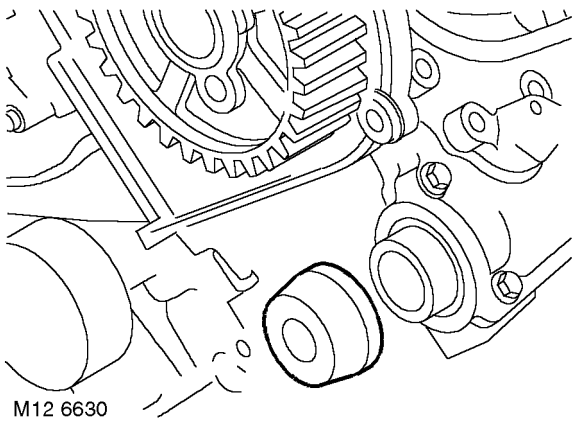

M12 7996

30. Fit a suitable 1.5 mm diameter pin through hole in tensioner body and into hole in plunger.
NOTE: If holes in body and plunger are not aligned, move tensioner backplate using a broad bladed screwdriver; this will move the plunger sufficiently to align the holes and allow the pin to be inserted.

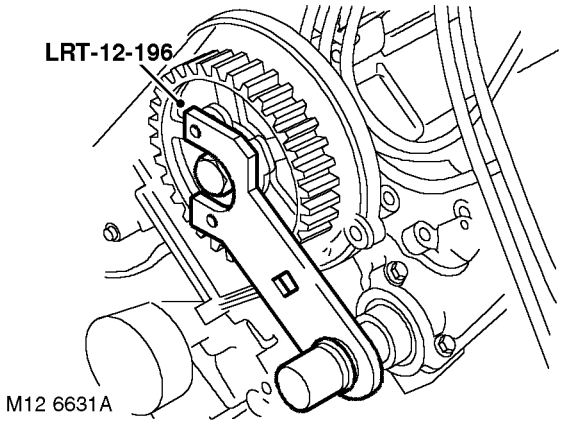
31. Remove and discard 2 Patchlok bolts securing tensioner to cylinder block and remove tensioner.
CAUTION: Exercise great care when removing bolts, do not apply excessive torque. If bolts appear to be seized, apply suitable anti-seize lubricant prior to removing bolts. DO NOT loosen Allen screw securing tensioner pulley.

32. If camshaft timing belt is to be refitted, mark direction of rotation on timing belt before removal.
33. With care, ease camshaft timing belt from gears using fingers only and remove timing belt.
CAUTION: Do not rotate crankshaft or camshafts with timing belt removed.

CAUTION: Camshaft timing belt must be replaced if cylinder head is to be removed or new drive gears, tensioner or coolant pump are to be fitted. Camshaft timing belts must be stored and handled with care. Always store a camshaft timing belt on its edge with a bend radius greater than 50 mm (2.0 in). Do not use a camshaft timing belt that has been twisted or bent double as this will damage the reinforcing fibres. Do not use a camshaft timing belt if debris other than belt dust is found in timing belt covers. Do not use a camshaft timing belt if partial engine seizure has occurred. Do not use a camshaft timing belt if mileage exceeds 72,000 km (45,000 miles). Do not use an oil or coolant contaminated timing belt, cause of contamination must be rectified.


M12 6630

34. Remove and discard LH and RH exhaust camshaft cap seals.



35. Position tools **LRT-12-196** to LH and RH front inlet camshaft gears and into the end of each exhaust camshaft.

CAUTION: Special tools must be fitted when tightening or loosening gear retaining bolts, otherwise damage to camshafts may occur.

36. Remove and discard bolts retaining front inlet camshaft gears to camshafts.
37. Remove tools **LRT-12-196** from both inlet camshaft gears and exhaust camshafts.
38. Remove camshaft drive gears and hub assemblies.

Refit

NOTE: Following front or rear timing belt refitment, it is possible that, after rotating the engine and positioning the crankshaft pulley to the 'SAFE' position, the timing marks on the rear timing gears may be misaligned. This misalignment is acceptable provided that the timing belt refitting procedure was carried out correctly.

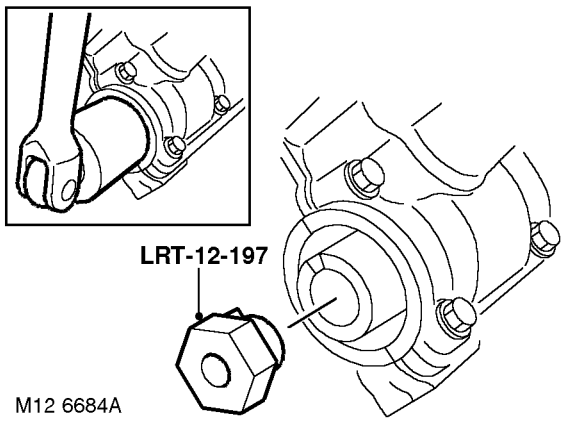
1. Clean camshaft gears and hubs, crankshaft gear, tensioner and water pump pulleys.

CAUTION: If sintered gears have been subjected to prolonged oil contamination, they must be soaked in solvent and then thoroughly washed in clean solvent before refitting. Because of the porous construction of sintered material, oil impregnated in the gears will emerge and contaminate the timing belts.

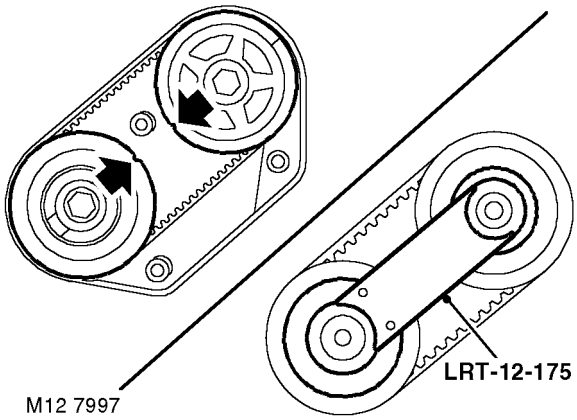
2. Fit hubs to camshaft gears and fit gears to camshafts.
3. Fit new camshaft gear bolts; tighten bolts sufficiently to allow gears to rotate without tipping.

4. Position timing belt to crankshaft gear.

NOTE: To prevent the timing belt from disengaging from the crankshaft gear when fitting, fit a suitable wedge between the belt and oil pump belt guard.

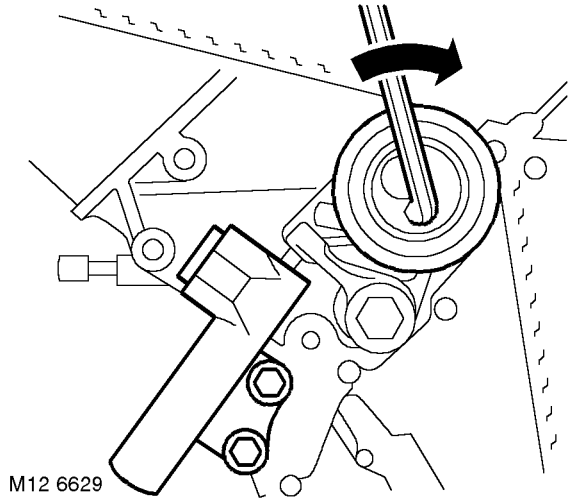


5. Fit tool **LRT-12-197** into each exhaust camshaft in turn.



6. Using assistance, rotate each exhaust camshaft slightly and align timing marks on LH and RH rear camshaft gears.
7. Remove tool **LRT-12-197**.
8. Fit tools **LRT-12-175** to LH and RH rear camshaft gears.
9. Rotate both front camshaft gears fully clockwise as viewed from front of engine.
10. Using fingers only, fit timing belt to gears, starting at the crankshaft gear and working in an anti-clockwise direction, keeping the belt run as taut as possible and turning the camshaft gears only a minimum amount anti-clockwise to fit timing belt.

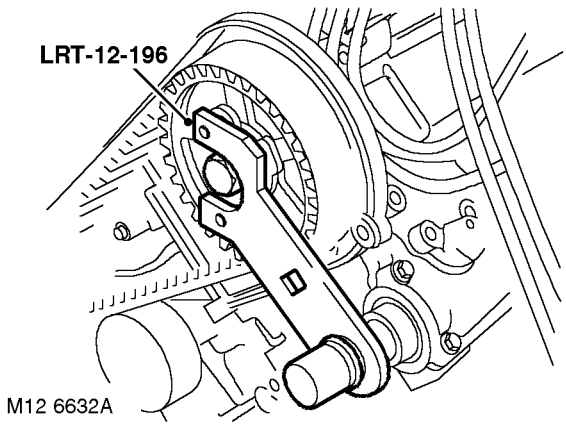
CAUTION: Gears must not be rotated anti-clockwise more than one tooth.


M12 6629

11. Position an Allen key in tensioner backplate and hold tensioner pulley against timing belt.
12. With assistance, position timing belt tensioner, fit new Patchlok bolts and tighten to 25 Nm (18 lbf.ft).

CAUTION: Ensure tensioner plunger is contacting underside of tensioner backplate.

13. Remove tools **LRT-12-175** from rear timing belt gears.



M12 6632A

14. Fit tools **LRT-12-196** to both front inlet camshaft gears and into the end of each exhaust camshaft.

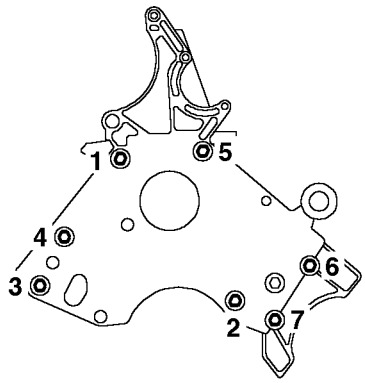
CAUTION: Special tools must be fitted when tightening or loosening gear retaining bolts, otherwise damage to camshafts may occur.

15. Tighten front inlet camshaft gear bolts to:
- Stage 1 - 27 Nm (20 lbf.ft)
- Stage 2 - Further 90°

16. Remove tools **LRT-12-196** from both inlet camshaft gears and exhaust camshafts.
17. Remove wedge from between drive belt and oil pump belt guard.
18. Remove 1.5 mm diameter pin from tensioner.
19. Clean exhaust camshaft front cap seal locations and fit new cap seals.

CAUTION: The sealing edge of the cap seal and mating face must be clean and dry.

20. Position engine front mounting plate and manoeuvre plate into position; fit bolts but do not tighten at this stage.
21. Fit bolts securing IRD support bracket to front mounting plate; do not tighten bolts at this stage.



M12 6634

22. Tighten bolts in the sequence shown:
- M10 bolt - No.1 - 25 Nm (18 lbf.ft)
- M10 bolt - No. 5 - 45 Nm (33 lbf.ft)
- Bolts Nos. 2, 3, 4, 6 and 7 - 85 Nm (63 lbf.ft)

23. Position engine lifting bracket, fit bolts securing lifting bracket and front mounting plate to cylinder block and RH cylinder head and tighten to:
- M8 bolt - 25 Nm (18 lbf.ft)
- M10 bolts - 45 Nm (33 lbf.ft)

24. Fit rubber blanking plug around tensioner.
25. Clean end of dipstick tube.
26. Position dipstick tube to sump and cylinder block, fit bolt and tighten to 9 Nm (7 lbf.ft).
27. Clean lower timing belt cover.
28. Position lower timing belt cover, fit and tighten bolts to 9 Nm (7 lbf.ft).
29. Remove timing pin **LRT-12-232**.
30. Clean crankshaft pulley.
31. Fit crankshaft pulley to crankshaft gear and ensure that the indent on pulley locates over the lug on crankshaft gear.
32. Fit crankshaft pulley bolt and washer, position **LRT-12-161** with **LRT-12-199** into crankshaft pulley. Tighten pulley bolt to 160 Nm (118 lbf.ft).
33. Remove tools **LRT-12-161** and **LRT-12-199.**
34. Clean ancillary drive belt tensioner.

35. Position ancillary belt tensioner, fit bolts and tighten to 25 Nm (18 lbf.ft).
36. Clean LH and RH front timing belt covers.
37. Position LH and RH front timing belt covers, fit and tighten bolts to 4 Nm (3 lbf.ft).
38. Clean idler pulley, position pulley to engine front mounting plate and tighten Torx bolt to 45 Nm (33 lbf.ft).
39. Position alternator to front mounting plate.
40. Fit bolt and nut and bolt securing alternator to front mounting plate and tighten to 45 Nm (33 lbf.ft).
41. Connect alternator multiplug.
42. Connect battery lead to alternator, fit and tighten nut to 8 Nm (6 lbf.ft), fit terminal cover.
43. Clean LH rear timing belt cover.
44. Position LH rear timing belt cover, fit and tighten bolts to 4 Nm (3 lbf.ft).
45. Clean RH rear timing belt cover.
46. Position RH rear timing belt cover, fit bolts and tighten to4 Nm (3 lbf.ft).
47. Position heat shield, fit bolts and tighten M6 bolt to 9 Nm (7 lbf.ft) and M8 bolt to 25 Nm (18 lbf.ft).
48. Fit inlet manifold chamber - if fitted.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
49. Position ancillary drive belt to crankshaft and alternator pulleys.
50. Position engine mounting front bracket to engine front plate and tighten bolts to 45 Nm (33 lbf.ft).

Evaporative loss control system (EVAPS) - leak test - NAS

17.90.02.01

The following procedure allows a fuel leak, indicated by the Malfunction Indicator Lamp (MIL), to be accurately located. It must only be carried out once it has been established that there are no obvious faults with any of the system components.

Check

1. Check components in fuel and EVAP system for obvious damage. Ensure all connections are properly secured.
2. The system must be checked using a EVAPS Diagnostic Testing Station **LRA-19-004**.
3. Disconnect vent pipe from purge valve and connect adapter **LRA-19-004/1**.
   NOTE: The reason for inserting the adapter into the purge valve is that there is currently no service port fitted to Freelander.
4. Remove RH rear wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
5. Release clip and disconnect hose from charcoal canister.
   CAUTION: Before disconnecting any part of the fuel system, it is imperative that all dust, dirt and debris is removed from around components to prevent ingress of foreign matter into fuel system.
6. Block charcoal canister port with bung, included in **LRA-19-004**.
7. Connect **LRA-19-004** to service port fitted on purge valve.
8. Carry out procedures given in the operating instructions, these are supplied with **LRA-19-004**.

Adjust

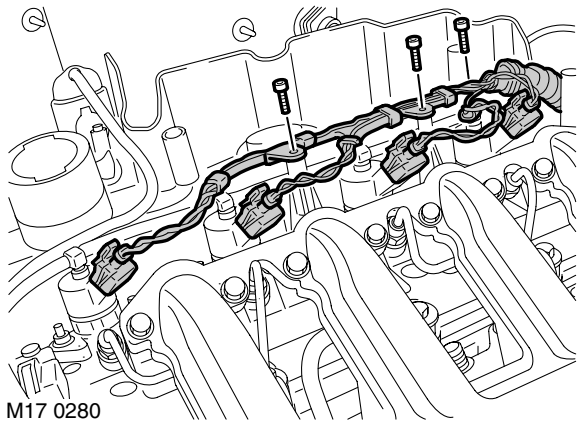
1. If a leak has been detected, replace component as necessary and repeat leak test to validate repair.
2. Remove bung from charcoal canister.
3. Connect hose to charcoal canister and secure with clip.
4. Fit rear wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
5. Disconnect adaptor **LRA-19-004/1** from purge valve.
6. Connect hose to purge valve.

Valve - depression limiter - Td4

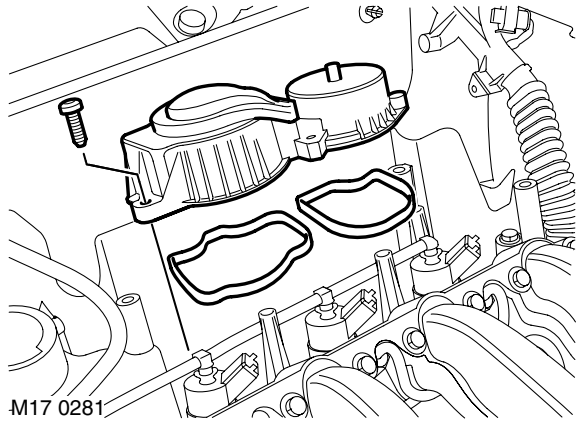
17.10.25

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner element
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.


M17 0280

3. Disconnect multiplugs from injectors.
4. Remove 3 screws and move injector harness aside.


M17 0281

5. Remove 4 Allen screws and remove valve with filter assembly. Discard seals.

Refit

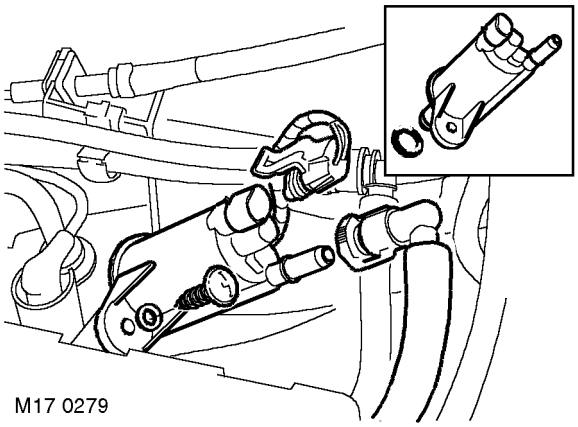
1. Clean filter with valve housing and mating faces.
2. Use new seals, fit filter and valve assembly, tighten Allen screws to 8 Nm (6 lbf.ft).
3. Position injector harness and secure with screws.
4. Connect multiplugs to injectors.
5. Fit air cleaner element.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.
6. Connect battery earth lead.

Solenoid - canister purge - KV6

17.15.06

Remove

1. Disconnect battery earth lead.



2. Disconnect multiplug from purge control valve.
3. Disconnect hose from purge control valve.
4. Remove screw and plain washer securing purge control valve to manifold chamber.
5. Remove purge control valve, remove and discard seal.

Refit

1. Clean purge control valve and mating face on manifold chamber.
2. Fit new seal to purge control valve.
3. Position purge control valve to manifold chamber, secure with plain washer and screw.
4. Connect multiplug and secure hose to purge control valve.
5. Connect battery earth lead.

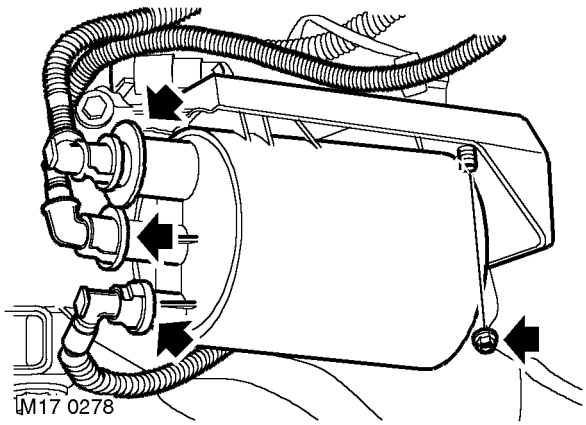
Charcoal canister - petrol - Non NAS

17.15.13

Remove

1. Raise rear of vehicle, one side.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



2. Remove nut securing charcoal canister to bracket.
3. Remove charcoal canister from bracket.
4. Disconnect tank, air and purge pipes from charcoal canister.

   CAUTION: Always fit plugs to open connections to prevent contamination.

5. Remove charcoal canister.

Refit

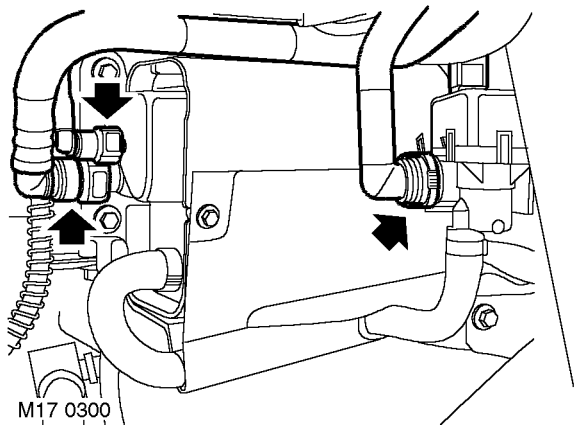
1. Connect tank, air and purge pipes to charcoal canister.
2. Fit charcoal canister to bracket and secure with nut.
3. Lower vehicle.

Charcoal canister - NAS

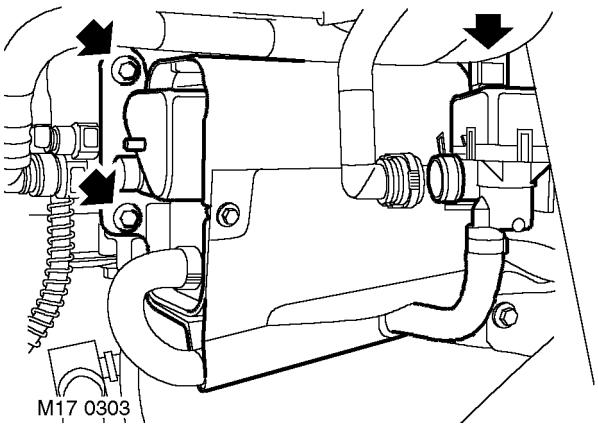
17.15.13

Remove

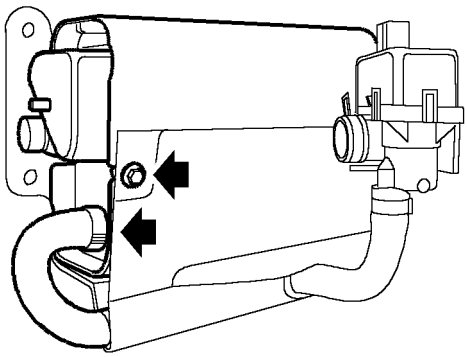
1. Disconnect battery earth lead.
2. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.


M17 0300

3. Release and disconnect pipes from charcoal canister and DMTL.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.


M17 0303

4. Remove 2 bolts securing canister support bracket and release assembly from mounting.
5. Disconnect multiplug from DMTL and remove canister and valve assembly.


M17 0304

6. Release clip and disconnect hose from charcoal canister.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.
7. Remove nut and bolt securing charcoal canister and remove canister from bracket.

Refit

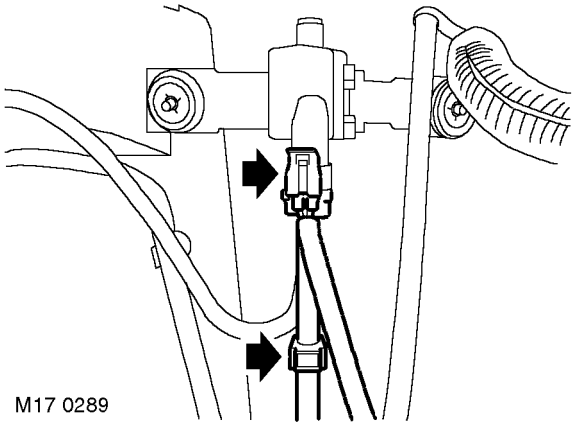
1. Fit charcoal canister to bracket and tighten nut and bolt to 4 Nm (3 lbf.ft).
2. Connect hose and secure with clip.
3. Position canister assembly and connect multiplug.
4. Fit canister assembly to mounting and tighten bolts to 4 Nm (3 lbf.ft).
5. Connect pipes to DMTL and canister.
6. Fit wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.
7. Connect battery earth lead.

Valve - canister purge - K1.8

17.15.39

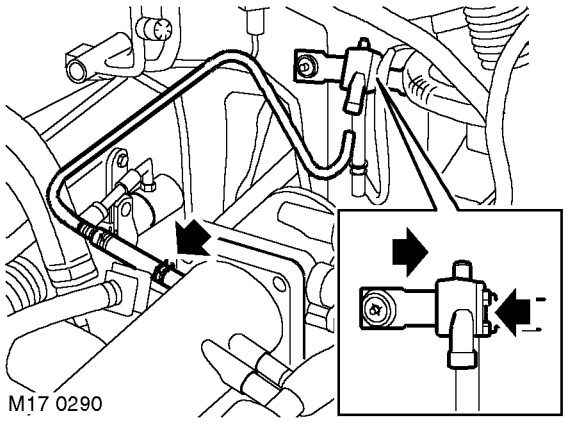
Remove

1. Disconnect battery earth lead.



2. Disconnect multiplug from purge control valve.
3. Disconnect quick release hose connector on purge control valve.

   CAUTION: Always fit plugs to open connections to prevent contamination.



4. Release clip and disconnect purge hose from inlet manifold.
5. Release clip and slide purge control valve off from bracket.

Refit

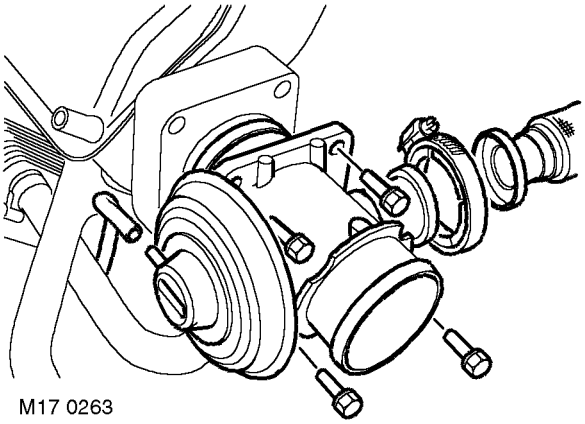
1. Position purge control valve onto bracket.
2. Connect purge hose to inlet manifold and secure with clip.
3. Connect quick release hose connector to purge control valve.
4. Connect multiplug to purge control valve .
5. Connect battery earth lead.

Valve - EGR - Td4

17.45.01

Remove

1. Disconnect battery earth lead.
2. Remove intake ducting assembly.
   ☞ FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.


M17 0263

3. Disconnect vacuum hose from EGR valve.
4. Loosen screw and remove clamp EGR pipe to valve.
5. Remove 4 bolts and EGR valve. Discard seal.

Refit

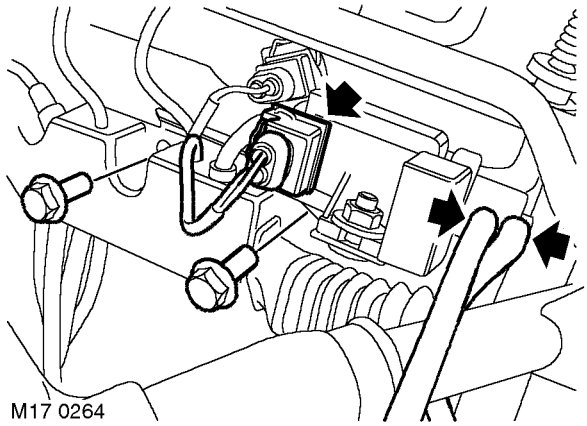
1. Clean EGR valve and mating face on inlet manifold.
2. Clean EGR pipe flange and EGR valve mating face.
3. Fit new seal to inlet manifold.
4. Fit EGR valve and tighten bolts evenly to 10 Nm (7.5 lbf.ft).
5. Fit EGR pipe clamp and tighten screw.
6. Connect vacuum hose to EGR valve.
7. Fit intake ducting assembly.
   ☞ FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
8. Connect battery earth lead.

Solenoid/modulator valve - EGR - Td4

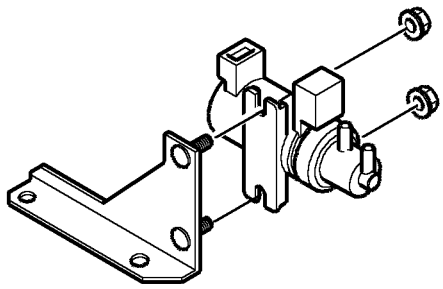
17.45.04

Remove

1. Disconnect battery earth lead.
2. Remove inlet manifold gaskets.
   ☞ MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.


M17 0264

3. Disconnect multiplug from EGR solenoid valve.
4. Remove 2 bolts securing EGR solenoid bracket to cylinder block.
5. Identify and disconnect vacuum hoses.


M17 0265

6. Remove 2 nuts and remove EGR solenoid valve from bracket.

Refit

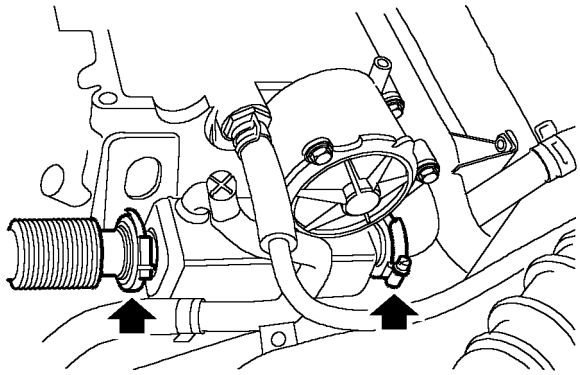
1. Fit EGR solenoid valve to bracket and secure with nuts.
2. Position EGR solenoid valve, identify and connect vacuum hoses and tighten bolts to 10 Nm (7.5 lbf.ft).
3. Connect multiplug to EGR solenoid valve.
4. Fit inlet manifold gaskets.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.**
5. Connect battery earth lead.

Cooler - EGR - Td4

⊸ ***17.45.40***

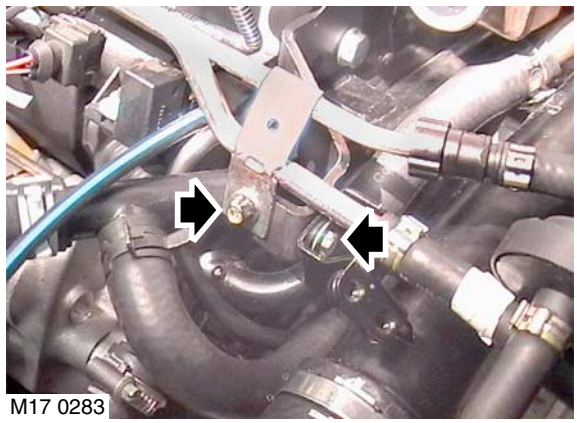
Remove

1. Disconnect battery earth lead.
2. Remove camshaft cover.
   ☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
3. Mark EGR pipe and cooler to aid refit.



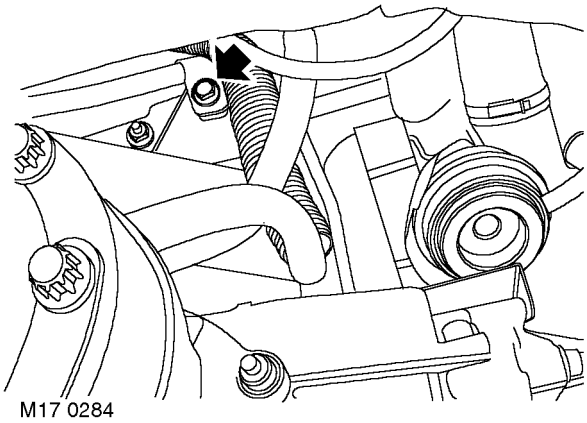
M17 0282

4. Loosen clamps EGR pipes to cooler and move clamps aside.
5. Remove pipe, EGR cooler to EGR valve.

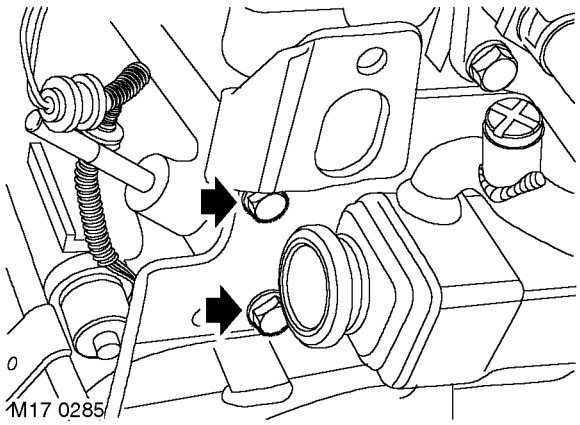


M17 0283

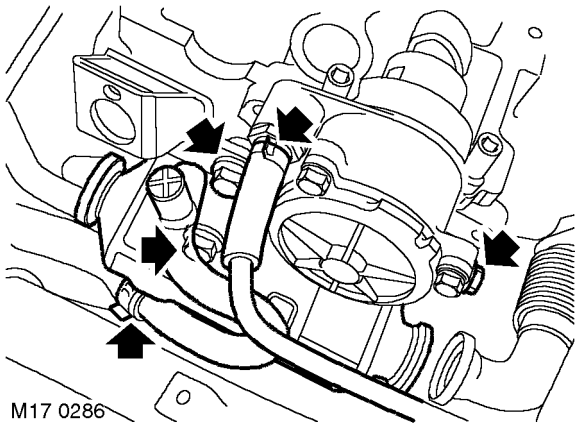
6. Remove bolt securing fuel rails to support bracket.
7. Remove bolt securing turbocharger outlet pipe to support bracket.
8. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M17 0284

9. Remove bolt securing turbo outlet pipe to upper coolant rail.


M17 0285

10. Remove 2 bolts securing pipe support bracket to engine lifting bracket, remove support bracket.


M17 0286

11. Release clip and remove vacuum hose.
12. Remove 3 bolts securing EGR cooler to cylinder head and lifting bracket.
13. Lift EGR cooler from mounting and position a container beneath coolant hoses.
14. Release clips and remove hoses from EGR cooler allow coolant to drain.
15. Remove EGR cooler.

Refit

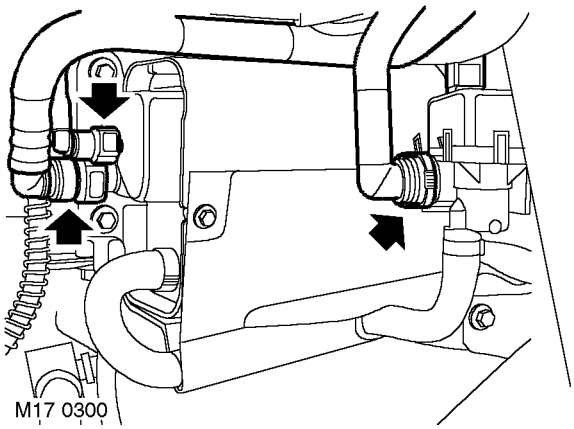
1. Position EGR cooler, connect coolant hoses and fit clips.
2. Position EGR cooler to mounting, fit bolts and tighten to 25 Nm (18 lbf.ft).
3. Position pipe support bracket to engine lifting bracket, fit and tighten bolts to 25 Nm (18 lbf.ft).
4. Fit vacuum hose and tighten clip.
5. Fit bolt securing turbocharger pipe to coolant rail and tighten to 25 Nm (18 lbf.ft).
6. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
7. Fit bolt securing turbocharger outlet pipe to support bracket and tighten to 10 Nm (7.5 lbf.ft).
8. Fit bolt securing fuel rails to support bracket and tighten to 10 Nm (7.5 lbf.ft).
9. Align EGR pipe to cooler fit clamp, but do not fully tighten until camshaft cover is refitted.
10. Fit EGR pipe clamp and tighten screw.
11. Fit camshaft cover.
☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
12. Connect battery earth lead.
13. Top up cooling system.
☞ **MAINTENANCE, MAINTENANCE, Cooling System and Intercooler.**

Module - tank leakage diagnostic (DMTL)

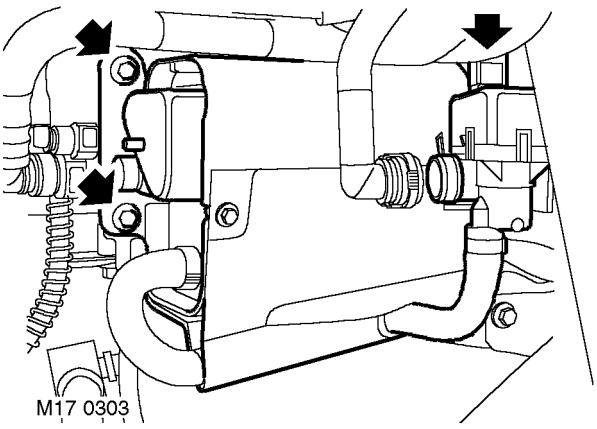
17.45.41

Remove

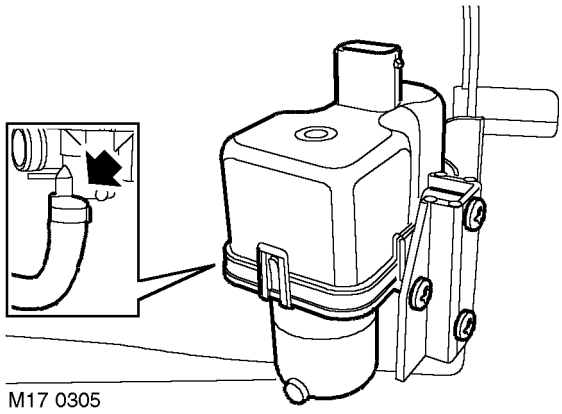
1. Disconnect battery earth lead.
2. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.


M17 0300

3. Release and disconnect pipes from charcoal canister and DMTL.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.


M17 0303

4. Remove 2 bolts securing canister support bracket and release assembly from mounting.
5. Disconnect multiplug from DMTL and remove canister and valve assembly.


M17 0305

6. Release clip and disconnect hose from DMTL.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.
7. Remove 3 screws and remove DMTL.

Refit

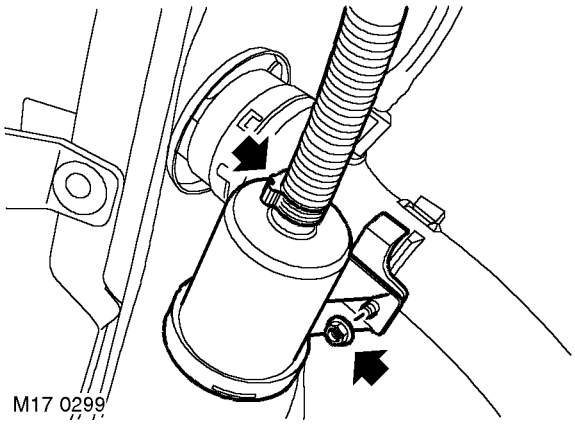
1. Fit DMTL and secure with screws.
2. Connect hose and secure with clip.
3. Position canister assembly and connect multiplug.
4. Fit canister assembly to mounting and tighten bolts to 4 Nm (3 lbf.ft).
5. Connect pipes to DMTL and canister.
6. Fit wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.
7. Connect battery earth lead.

Filter - fuel leak detection pump - KV6 - NAS

17.45.42

Remove

1. Disconnect battery earth lead.
2. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.



3. Remove nut and release filter from bracket.
4. Release clip and remove filter from pipe.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

Refit

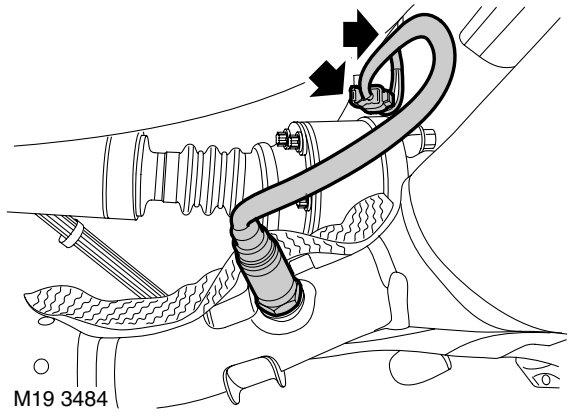
1. Fit filter to pipe and secure with clip.
2. Fit filter to bracket and tighten nut to 3 Nm (2.2 lbf.ft).
3. Fit wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.
4. Connect battery earth lead.

Catalytic converter - RH - KV6 - NAS

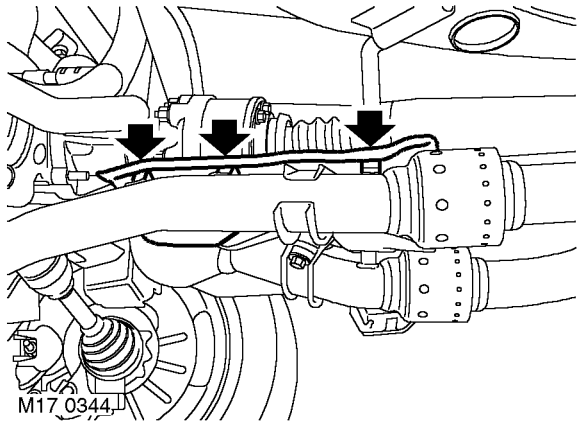
17.50.01

Remove

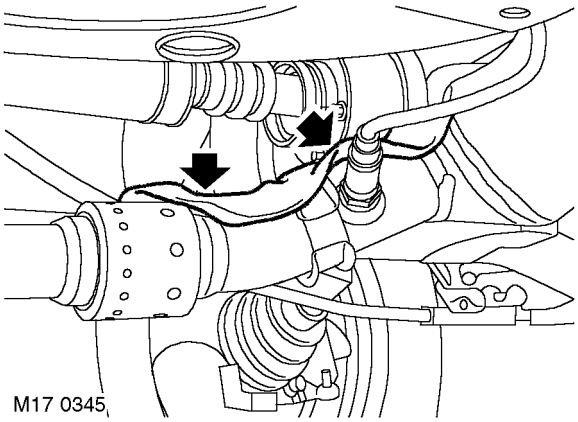
1. Position vehicle on 4 post ramp.
2. Disconnect battery earth lead.
3. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



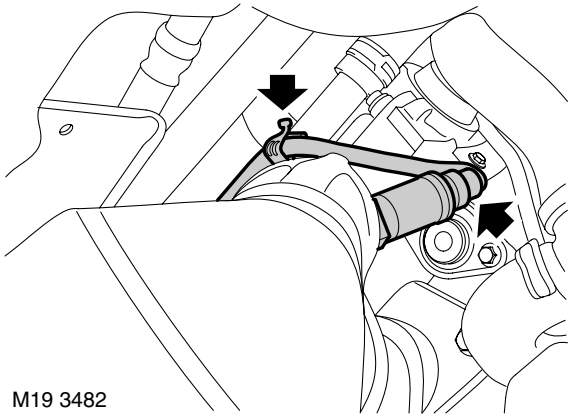
4. Release pre catalyst H02S harness from clips.
5. Release and disconnect HO2S multiplug.
6. Remove intermediate pipe and silencer.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - NAS.



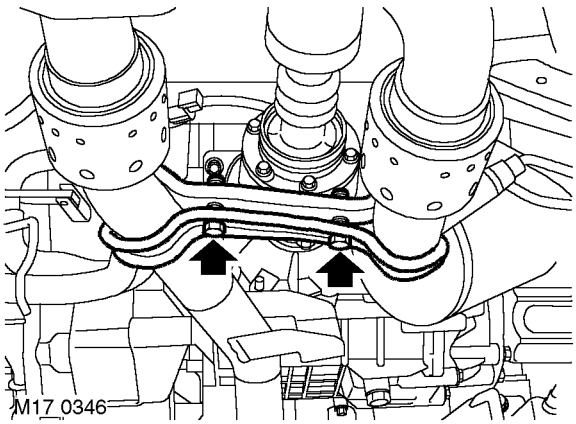
7. Remove 3 bolts and remove LH heat shield.



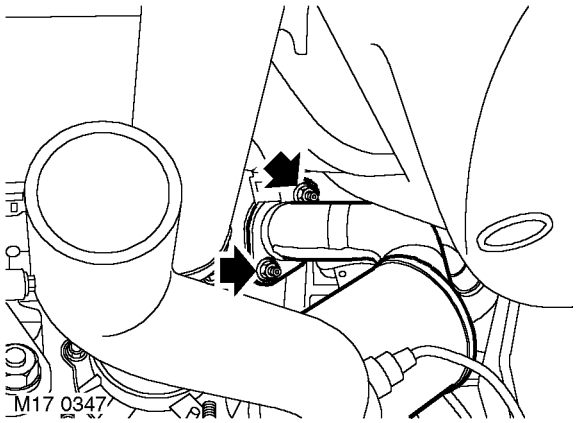
8. Remove 2 bolts and remove RH heat shield.



9. Release post catalyst HO2S harness from clips.
10. Release and disconnect post catalyst HO2S multiplug.



11. Remove 2 bolts securing pipe clamp and remove clamp.



12. Remove 2 nuts securing catalyst, remove catalyst and discard gasket.
NOTE: Do not carry out further dismantling if component is removed for access only.

13. Identify and remove both H02S from catalyst.

Refit

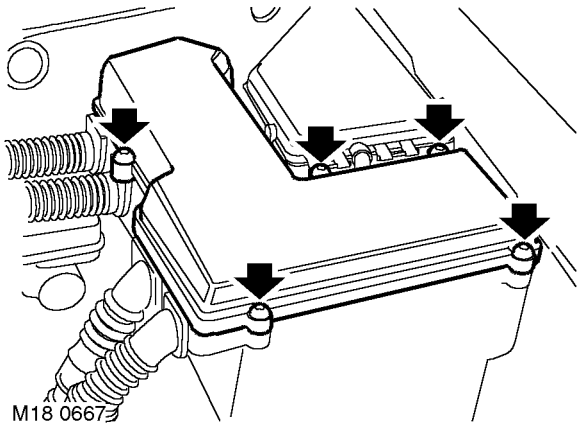
1. Clean H02S and mating faces.
2. Fit both H02S and tighten to 55 Nm (40 lbf.ft).
3. Clean catalyst and mating face.
4. Using a new gasket, fit catalyst and fit nuts but do not tighten at this stage.
5. Fit clamp, fit bolts but do not tighten at this stage.
6. Connect post catalyst H02S multiplug and fit to bracket.
7. Fit harness into clips.
8. Fit heat shields and tighten bolts to 10 Nm (7 lbf.ft).
9. Fit intermediate pipe and silencer.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - NAS.**
10. Tighten nuts securing catalyst to manifold to 50 Nm (37 lbf.ft).
11. Tighten bolts securing clamp to 10 Nm (7 lbf.ft).
12. Connect pre catalyst H02S multiplug and fit to bracket.
13. Fit harness into clips.
14. Fit acoustic cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
15. Connect battery earth lead.

Engine control module (ECM)

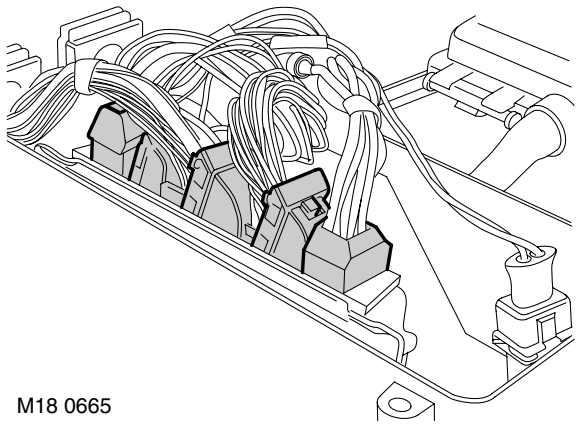
18.30.03

Remove

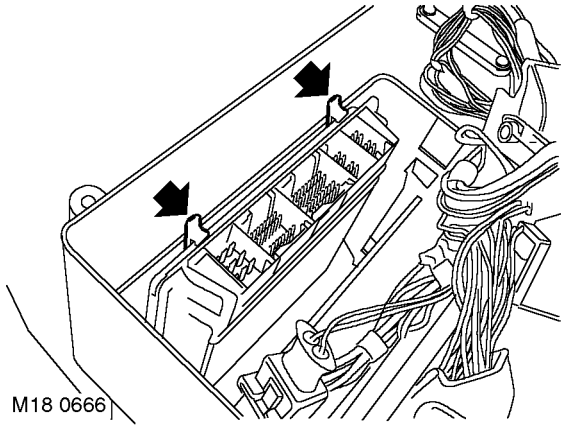
1. Disconnect battery earth lead.



2. Remove 5 Allen screws and 'E' box cover.



3. Disconnect 5 multiplugs from ECM.



4. Release 2 clips and remove ECM.

Refit

1. Fit ECM and connect multiplugs.
2. Fit 'E' box cover and tighten Allen screws to 2 Nm.
3. Connect battery earth lead.
4. Initiate ECM using TestBook.

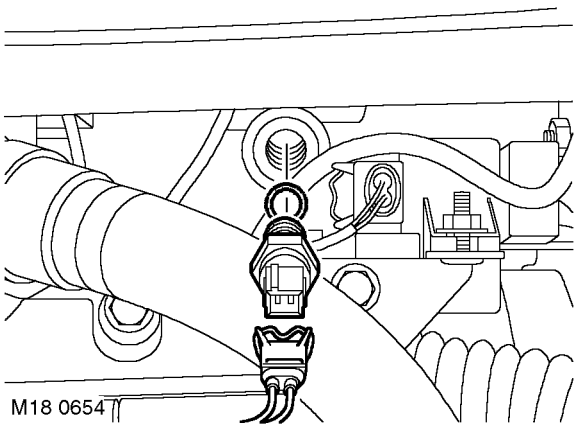
   CAUTION: ECM may only be programmed a maximum of 4 times.

Sensor - engine coolant temperature (ECT)

18.30.10

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
3. Remove inlet manifold gaskets.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.



4. Disconnect multiplug from ECT sensor.
5. Using a deep socket, carefully remove ECT sensor and discard seal.

Refit

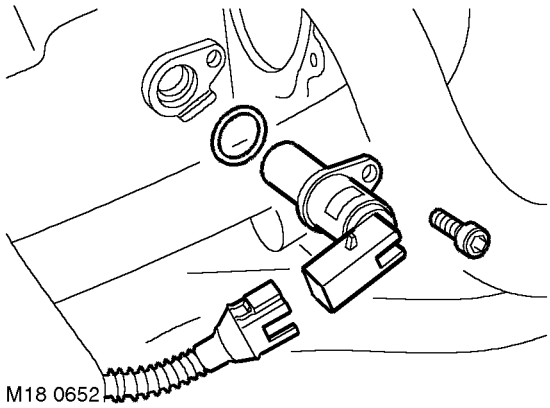
1. Ensure mating faces of ECT sensor and cylinder head are clean.
2. Fit new seal and tighten ECT sensor to 15 Nm.
3. Connect multiplug to ECT sensor.
4. Fit inlet manifold gaskets.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.
5. Connect battery earth lead.
6. Fill cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.

Sensor - crankshaft position (CKP)

18.30.12

Remove

1. Disconnect battery earth lead.
2. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.



3. Disconnect multiplug from CKP sensor.
4. Remove Allen screw and remove CKP sensor.
5. Remove and discard seal.

Refit

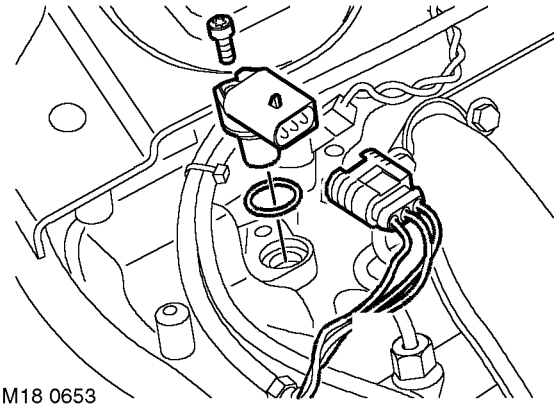
1. Clean CKP sensor and mating face.
2. Fit new seal to CKP sensor.
3. Fit CKP sensor, and tighten Allen screw to 8 Nm.
4. Connect multiplug to CKP sensor.
5. Fit starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.
6. Connect battery earth lead.

Sensor - camshaft position (CMP)

18.30.24

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
3. Disconnect multiplug from CMP sensor.


M18 0653

4. Remove Torx screw securing CMP sensor to camshaft cover.
5. Remove CMP sensor and discard seal.

Refit

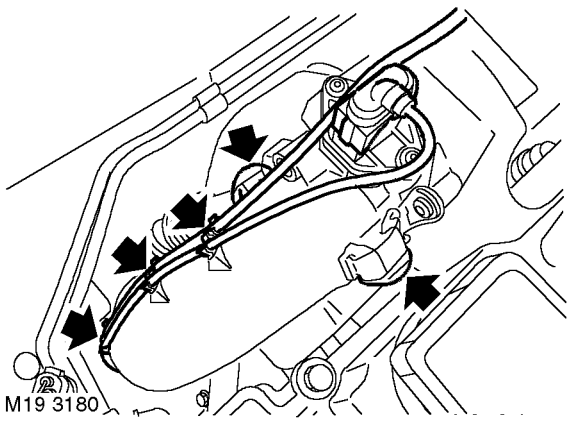
1. Clean CMP sensor and mating face.
2. Fit new seal to CMP sensor, fit sensor to camshaft cover and tighten Torx screw to 8 Nm.
3. Connect multiplug to CMP sensor.
4. Fit engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
5. Connect battery earth lead.

Sensor - combined - mass air flow (MAF) & intake air temperature (IAT)

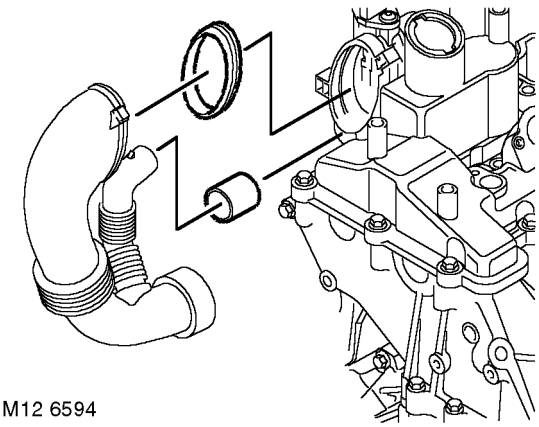
19.22.38

Remove

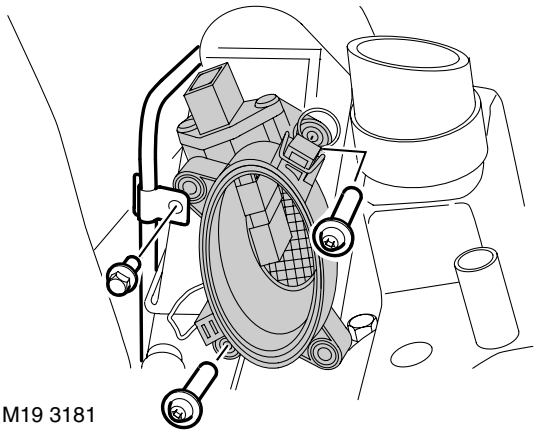
1. Disconnect battery earth lead.
2. Remove air cleaner element.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.


M19 3180

3. Disconnect multiplug from MAF/IAT sensor.
4. Release vacuum hose and harness from turbocharger duct.
5. Release 2 clips securing turbocharger duct to MAF/IAT sensor and remove duct.


M12 6594

6. Remove seal, duct to MAF/IAT sensor.
7. Remove connector, engine breather pipe to air cleaner housing.


M19 3181

8. Remove bolt and move breather pipe aside.
9. Remove 2 Torx screws and MAF/IAT sensor.

Refit

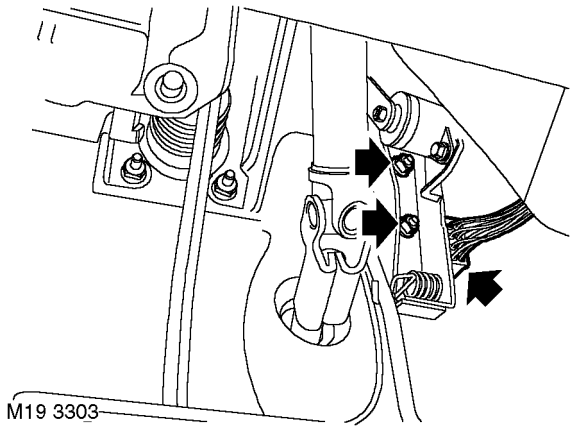
1. Clean sensor housing and mating face.
2. Fit new sensor and housing to air cleaner housing and tighten screws to 6 Nm.
3. Connect multiplug to MAF/IAT sensor.
4. Fit breather pipe and tighten bolt to 6 Nm.
5. Fit engine breather pipe connector to air cleaner housing.
6. Fit upper seal to turbocharger duct and ensure lower seal to turbocharger is in good condition.
7. Fit duct to turbocharger, connect to engine breather and MAF/IATsensor.
8. Secure duct with clips.
9. Fit vacuum hose and harness to clips.
10. Fit air cleaner element.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**
11. Connect battery earth lead.

Sensor - throttle position (TP)

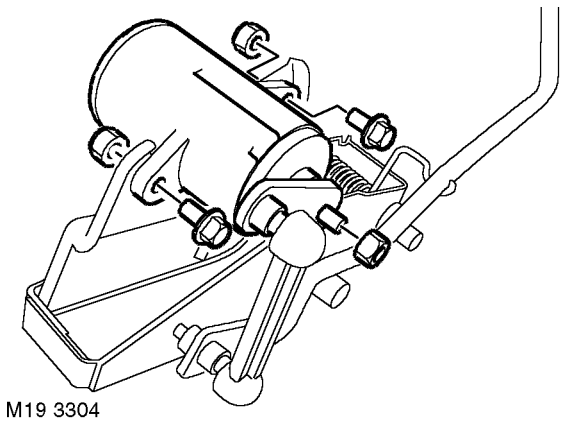
⊸ ***19.22.49***

Remove

1. Disconnect battery earth lead.


M19 3303

2. Remove 2 nuts and throttle pedal from studs.
3. Release TP sensor multiplug from bracket and disconnect from main harness.


M19 3304

4. Remove nut and release lever from sensor.
5. Remove 2 nuts and bolts and remove sensor.

Refit

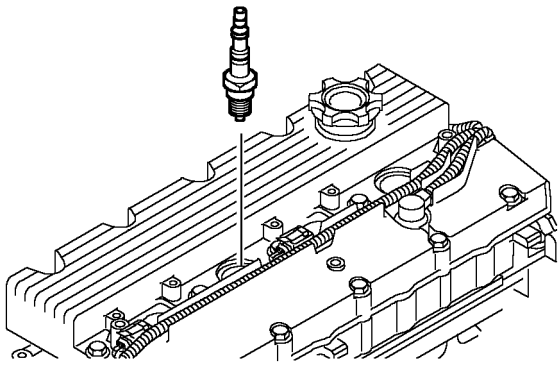
1. Fit TP sensor and tighten nuts and bolts to 10 Nm.
2. With throttle pedal held closed, fit lever to sensor and tighten nut to 10 Nm.
3. Position throttle pedal, connect multiplug and secure to pedal bracket.
4. Fit pedal to studs and tighten nuts to 25 Nm.
5. Connect battery earth lead.
6. Use TestBook to confirm correct operation.

Spark plugs

18.20.02

Remove

1. Remove ignition coils.
   ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Ignition coil.
2. Clean area around spark plugs.



M18 0684

3. Using a 16 mm spark plug socket remove 4 spark plugs.

Refit

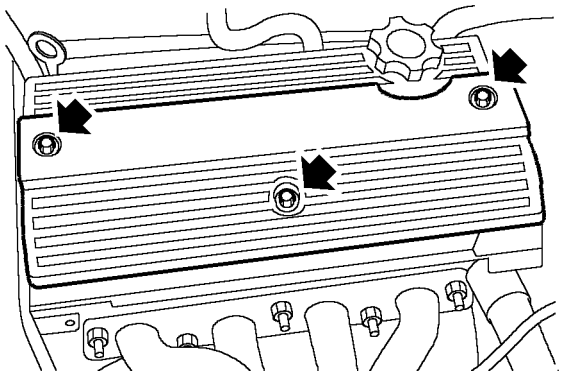
1. Set gap of each new spark plug to 1.00 mm.
2. Fit spark plugs and tighten to 27 Nm (20 lbf.ft).
3. Fit ignition coils.
   ENGINE MANAGEMENT SYSTEM - MEMS, REPAIRS, Ignition coil.

Ignition coil

18.20.44

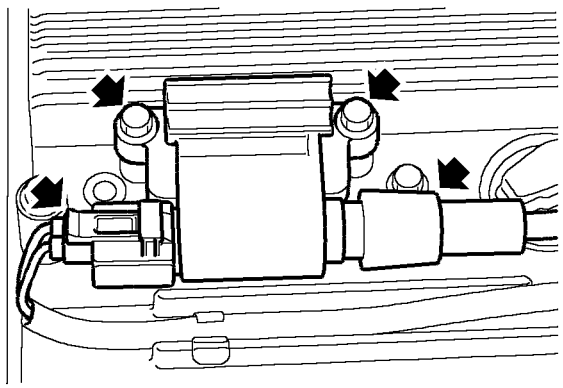
Remove

1. Disconnect battery earth lead.



M18 0681

2. Remove 3 bolts securing coil lead cover.
3. Remove cover.
4. Release ht lead from spark plug.



M18 0682

5. Remove 2 bolts securing coil and release coil from spark plug.
6. Disconnect multiplug from coil and remove coil.
7. Remove ht lead from coil.

Refit

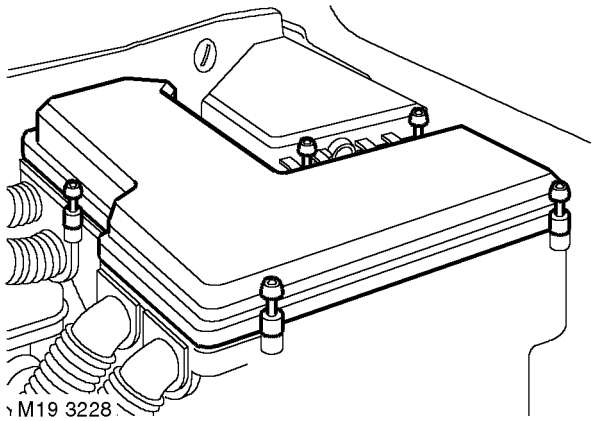
1. Fit ht lead to coil.
2. Position coil, connect mutliplug and secure coil to spark plug.
3. Fit and tighten 2 bolts securing coil to 8 Nm (6 lbf.ft).
4. Connect ht lead to spark plug and secure lead in clip.
5. Position coil cover, fit bolts and tighten to 10 Nm (7 lbf.ft).
6. Connect battery earth lead.

Engine control module (ECM) - combined ignition & fuel

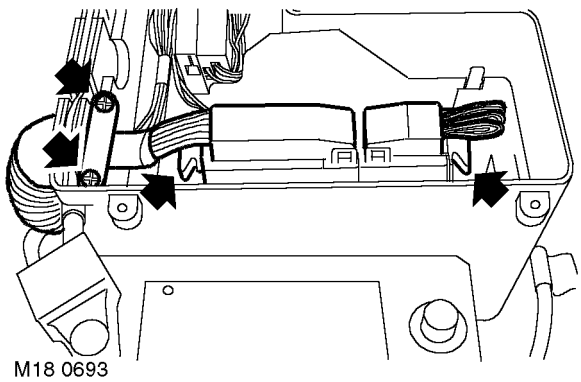
18.30.01

Remove

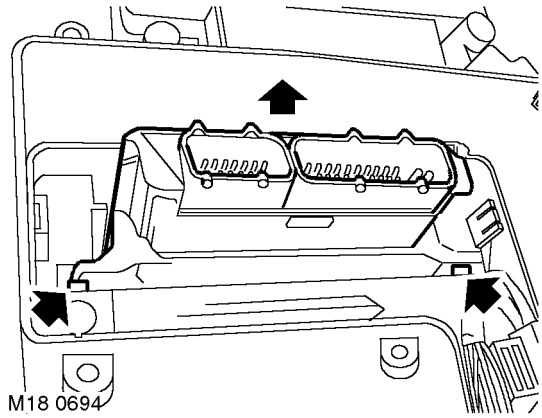
1. Disconnect battery earth lead.



2. Release 5 Allen bolts securing 'E' box cover to 'E' box.



3. Remove 2 screws securing ECM harness clamp and remove clamp.
4. Release latches and disconnect multiplugs from ECM.



5. Release 2 clips and remove ECM.

Refit

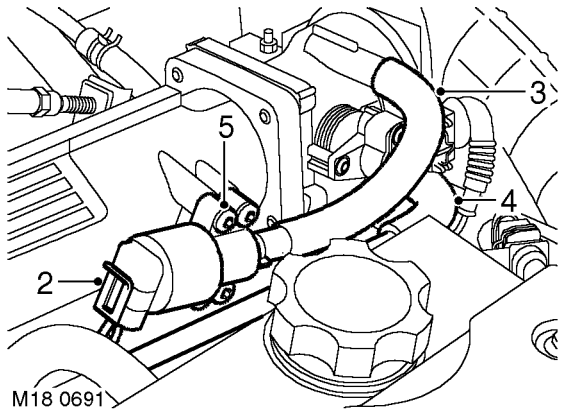
1. Fit ECM into 'E' box.
2. Connect ECM multiplugs.
3. Fit ECM harness clamp and secure with screws.
4. Fit 'E' box cover and secure with Allen bolts.
5. Connect battery earth lead.
6. Initiate ECM using TestBook.

Idle air control (IAC) valve

18.30.05

Remove

1. Disconnect battery earth lead.



2. Disconnect multiplug from IAC valve.
3. Release air bypass hose from IAC and remove from throttle body.
4. Release breather hose from throttle body and position aside.
5. Remove 4 Torx screws securing IAC valve to inlet manifold.
6. Remove IAC valve.
7. Remove and discard 'O' ring.

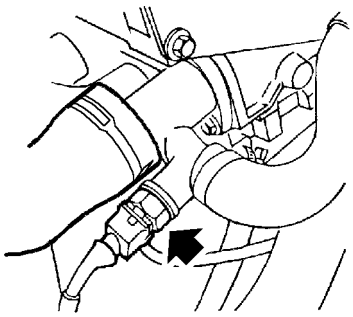
Refit

1. Clean mating faces of IAC valve and inlet manifold.
2. Lubricate new 'O' ring with silicone grease and fit to IAC valve.
3. Fit IAC valve to inlet manifold.
4. Fit Torx screws securing IAC valve and tighten to 1.5 Nm (1.0 lbf.ft).
5. Connect breather hose to throttle body.
6. Fit air bypass hose to IAC valve and connect to throttle body.
7. Connect multiplug to IAC valve.
8. Connect battery earth lead.

Sensor - engine coolant temperature (ECT)

18.30.10

Remove



M18 0687

1. Disconnect multiplug from ECT sensor.
2. Position container to collect coolant spillage.
3. Remove ECT sensor.

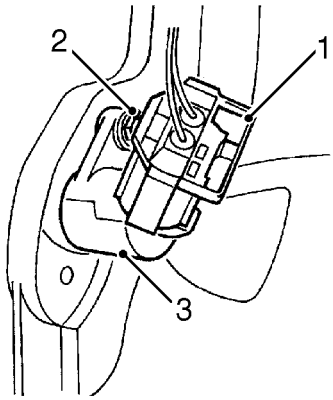
Refit

1. Clean ECT sensor and mating face on cylinder block.
2. Apply Loctite 577 to sensor threads.
3. Fit ECT sensor and tighten to 15 Nm (11 lbf.ft).
4. Connect ECT sensor multiplug.
5. Check for leaks and top-up coolant to 'MAX' mark on expansion tank.

Sensor - crankshaft position (CKP)

18.30.12

Remove



M18 0686

1. Disconnect multiplug from CKP sensor.
2. Remove bolt securing CKP sensor.
3. Remove CKP sensor.

Refit

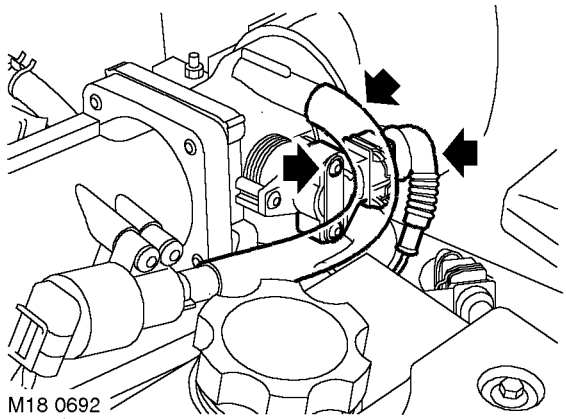
1. Clean CKP sensor and mating face.
2. Position CKP sensor fit bolt and tighten to 6 Nm (4.4 lbf.ft).
3. Connect multiplug to CKP sensor.

Sensor - throttle position (TP)

18.30.17

Remove

1. Disconnect battery earth lead.



2. Release air bypass hose from IACV and remove from throttle body.
3. Disconnect multiplug from TP sensor.
4. Remove and discard 2 Torx screws and wave washers securing TP sensor to throttle housing.
5. Remove TP sensor specification plate.
6. Remove TP sensor.

   CAUTION: Do not twist or apply leverage to throttle position sensor.

Refit

1. Clean mating faces of throttle housing and TP sensor.
2. Fit TP sensor to throttle spindle. Ensure that during fitting the machined flat on the throttle spindle is aligned with the mating portion of the TP sensor

   CAUTION: The throttle position sensor can be easily damaged during fitting. When pressing the sensor onto the throttle spindle, use fingers only, and only apply pressure to the area shown shaded in the illustration.

3. Rotate TP sensor in an anti-clockwise direction to align fixing holes.

   CAUTION: Do not rotate throttle position sensor in a clockwise direction and ensure that it is not rotated beyond its internal stops.

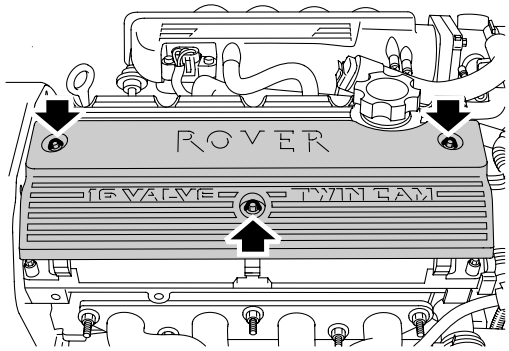
4. Fit TP sensor specification plate.
5. Fit new Torx screws and wave washers, tighten Torx screws to 1.5 Nm (1.0 LBF.FT).
6. Connect multiplug to TP sensor.
7. Fit air bypass hose to IACV and connect to throttle body.
8. Operate throttle cable cam 2 or 3 times and ensure that full travel to the throttle open and the throttle closed positions is available.
9. Connect battery earth lead.

Sensor - camshaft position (CMP)

18.30.24

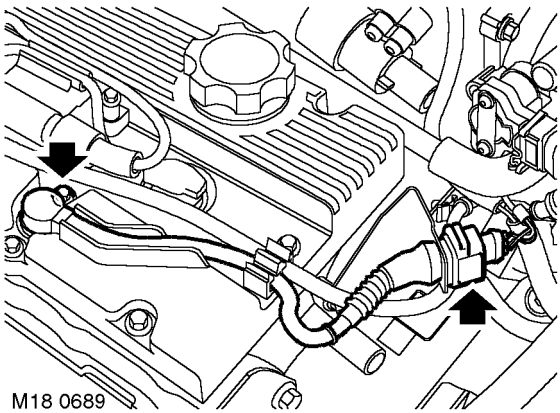
Remove

1. Disconnect battery earth lead.



M18 0688

2. Remove three bolts securing coil cover to engine and remove coil cover.



M18 0689

3. Release CMP sensor multiplug from bracket and disconnect multiplug.
4. Release sensor cable from clip.
5. Remove bolt securing CMP sensor and remove sensor.

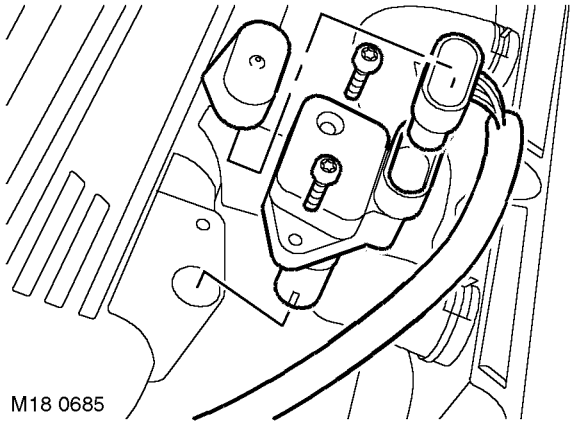
Refit

1. Clean CMP sensor and mating face.
2. Fit CMP sensor, fit bolt and tighten to 10 Nm (8 LBF.FT).
3. Connect CMP sensor multiplug and secure to bracket.
4. Position coil cover, fit bolts and tighten to 10 Nm (8 LBF.FT).
5. Connect battery earth lead.

Sensor - manifold absolute pressure (MAP)

18.30.56

Remove



M18 0685

1. Remove cover and disconnect MAP sensor multiplug.
2. Remove 2 Torx screws securing MAP sensor to inlet manifold.
3. Remove MAP sensor from manifold.

Refit

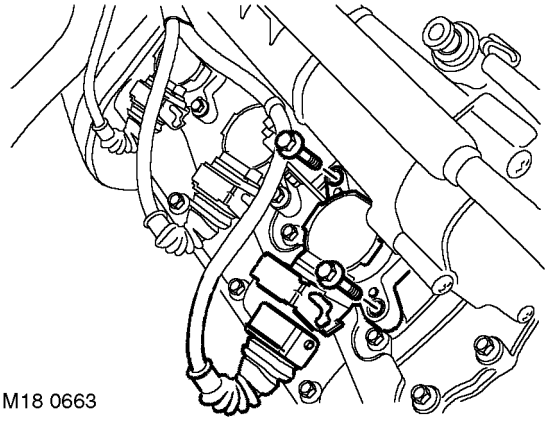
1. Clean MAP sensor and manifold mating faces.
2. Fit MAP sensor to inlet manifold and tighten Torx screws.
3. Connect MAP sensor multiplug.
4. Fit MAP sensor multiplug cover.

Spark plugs

18.20.02

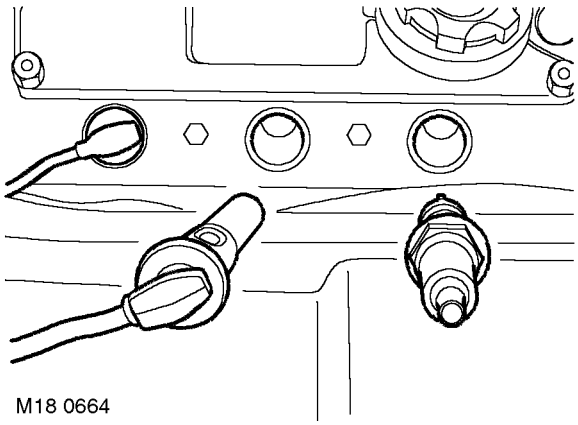
Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



M18 0663

3. **RH bank only:** Release locking clips and disconnect multiplugs from plug top coils.
4. **RH bank only:** Remove 6 bolts securing plug top coils to RH camshaft cover and remove coils.



M18 0664

5. **LH bank only:** Noting their fitted positions, disconnect ht leads.
6. Using a 16 mm plug socket, remove spark plugs from both cylinder heads.

Refit

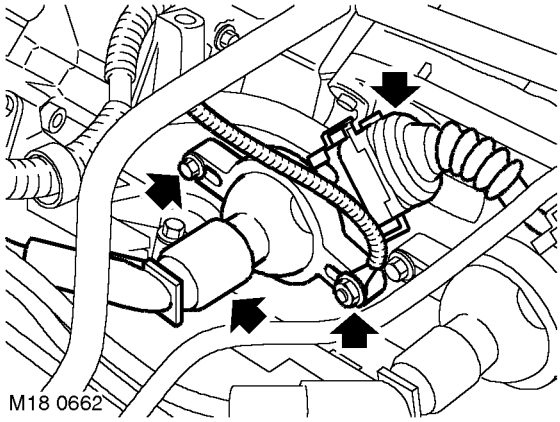
1. Set gap of each new spark plug to 1.00 mm.
2. Fit spark plugs and tighten to 25 Nm (18 lbf.ft).
3. **LH bank only:** Connect ht leads.
4. **RH bank only:** Fit plug top coils to spark plugs.
5. **RH bank only:** Fit bolts securing plug top coils to RH camshaft cover and tighten to 9 Nm (6.5 lbf.ft).
6. **RH bank only:** Connect multiplugs to plug top coils and secure with locking clips.
7. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
8. Connect battery earth lead.

Coil - each - LH bank

18.20.46

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.


M18 0662

3. Release ht lead from plug top coil.
4. Release locking clip and disconnect multiplug from plug top coil.
5. Remove nut, release earth lead, remove bolt securing plug top coil to LH inlet manifold and remove coil.

Refit

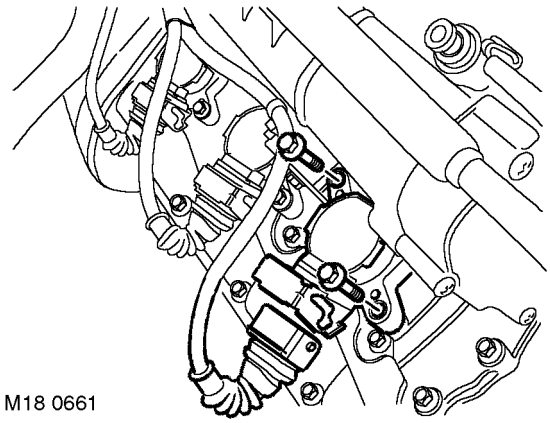
1. Fit plug top coil to LH inlet manifold, position earth lead, fit and tighten nut and bolt to 9 Nm (6.5 lbf.ft).
2. Connect multiplug to plug top coil and secure with locking clip.
3. Connect ht lead to plug top coil.
4. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
5. Connect battery earth lead.

Coil - each - RH bank

18.20.47

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.


M18 0661

3. Release locking clip and disconnect multiplug from plug top coil.
4. Remove 2 bolts securing plug top coil to RH camshaft cover.
5. Release and remove plug top coil from spark plug.

Refit

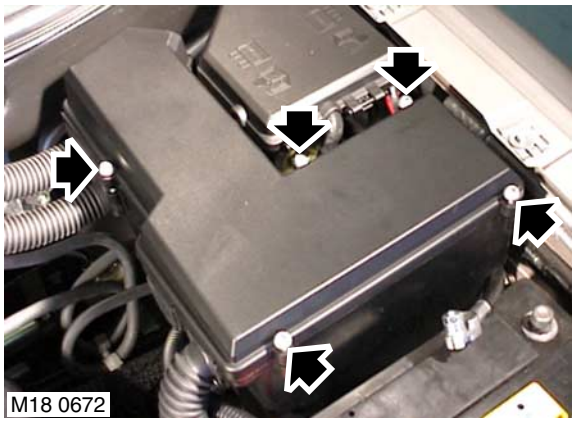
1. Position and fit plug top coil to spark plug.
2. Fit bolts securing plug top coil to RH camshaft cover and tighten to 9 Nm (6.5 lbf.ft).
3. Connect multiplug to plug top coil and secure with locking clip.
4. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
5. Connect battery earth lead.

Engine control module (ECM) - Non NAS

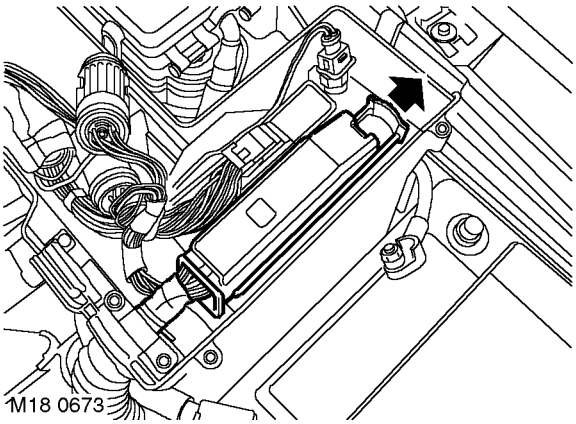
18.30.01

Remove

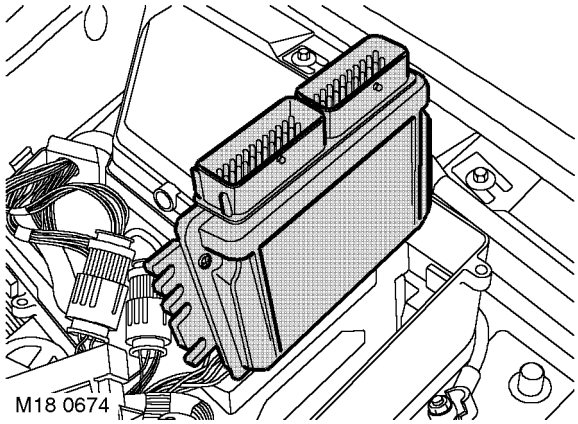
1. Disconnect battery earth lead.



2. Remove 5 Allen screws securing cover to 'E' box and remove cover.



3. Release latch and disconnect multiplug from ECM.



4. Remove ECM from 'E' box.

Refit

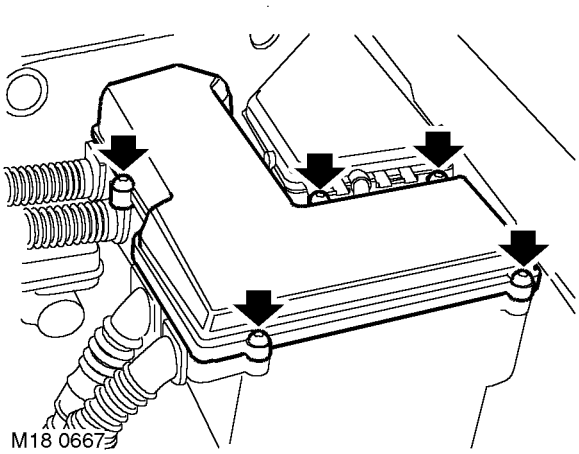
1. Fit ECM into 'E' box.
2. Position and connect multiplug to ECM and secure latch.
3. Fit 'E' box cover and tighten Allen screws to 2 Nm (1.5 lbf.ft).
4. Connect battery earth lead.

Engine control module (ECM) - fuel - NAS

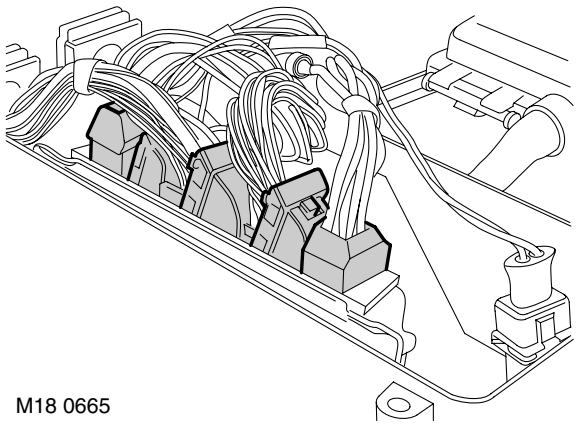
18.30.03

Remove

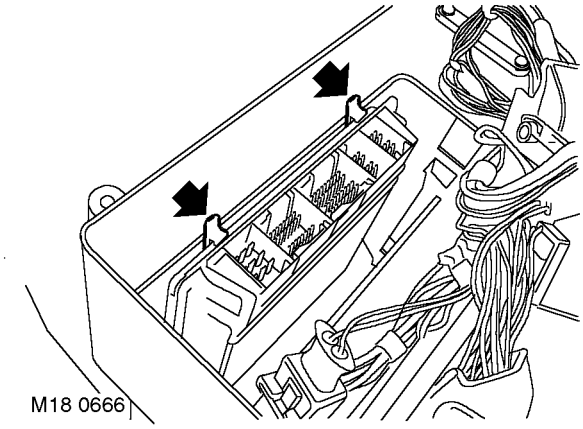
1. Disconnect battery earth lead.



2. Remove 5 Allen screws and 'E' box cover.



3. Disconnect 5 multiplugs from engine ECM.



4. Release 2 clips and remove ECM.

Refit

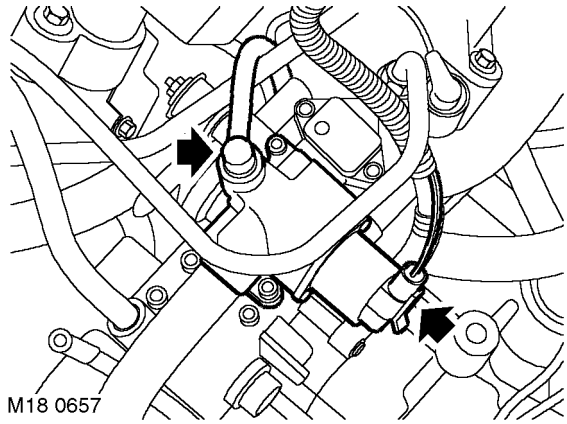
1. Fit ECM and connect multiplugs.
2. Fit 'E' box cover and tighten Allen screws to 2 Nm (1.5 lbf.ft).
3. Connect battery earth lead.
4. Initiate ECM using TestBook.

Idle Air Control Valve (IACV)

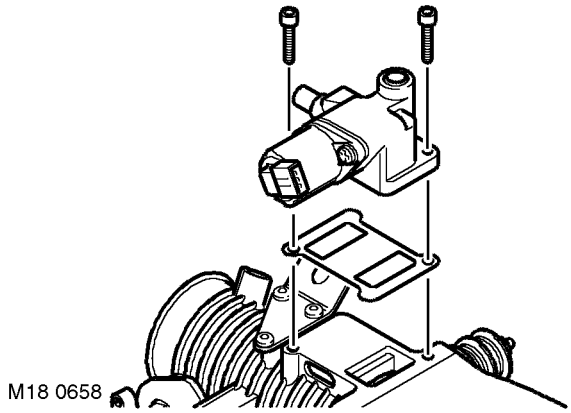
18.30.05

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Disconnect multiplug from IACV.
4. Depress locking collar and release vacuum hose from IACV housing.



5. Remove 2 Allen bolts securing IACV to throttle body.
6. Remove IACV and discard gasket.

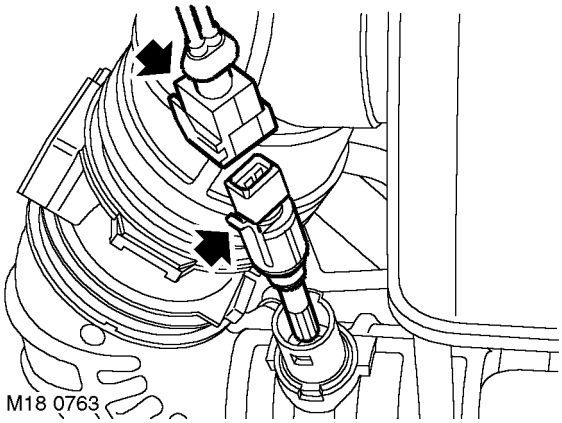
Refit

1. Clean mating faces of IACV and throttle body.
2. Fit new gasket to IACV.
3. Position IACV to throttle body, fit and tighten Allen bolts.
4. Connect vacuum hose to IACV.
5. Connect multiplug to IACV.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

Sensor - intake air temperature (IAT) - NAS

18.30.09

Remove



1. Disconnect multiplug from IAT sensor.
2. Release clip and remove IAT sensor. Discard seal.

Refit

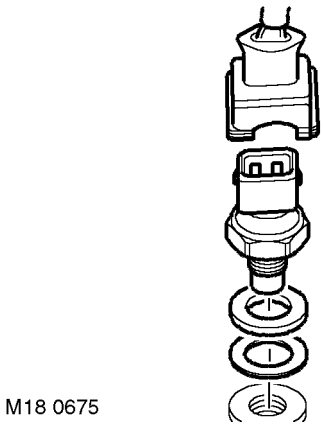
1. Clean IAT sensor and mating face.
2. Fit new seal to sensor.
3. Fit IAT sensor and connect multiplug.

Sensor - engine coolant temperature (ECT)

18.30.10

Remove

1. Disconnect battery earth lead.
2. Remove thermostat.
   COOLING SYSTEM - K SERIES KV6, REPAIRS, Thermostat.



3. Disconnect multiplug from coolant temperature sensor.
4. Remove coolant temperature sensor and discard sealing washer.
5. Remove coolant temperature sensor from cylinder block.
6. Remove steel shim and sealing washer from temperature sensor, discard sealing washer.

Refit

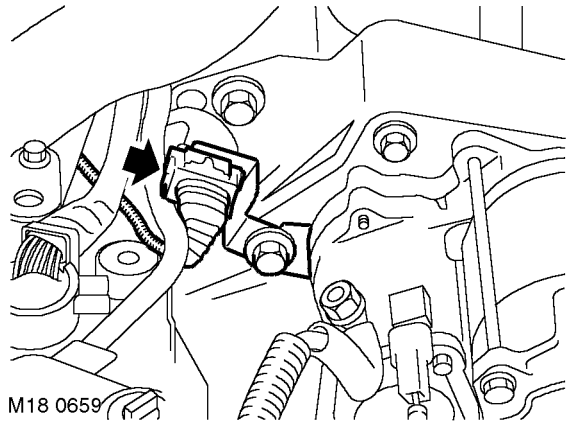
1. Clean coolant temperature sensor and mating face on cylinder block.
2. Fit new sealing washer, then steel shim to coolant temperature sensor.
3. Position coolant temperature sensor and tighten to 17 Nm (12.5 lbf.ft).
4. Fit thermostat.
   COOLING SYSTEM - K SERIES KV6, REPAIRS, Thermostat.
5. Connect battery earth lead.

Sensor - crankshaft position (CKP)

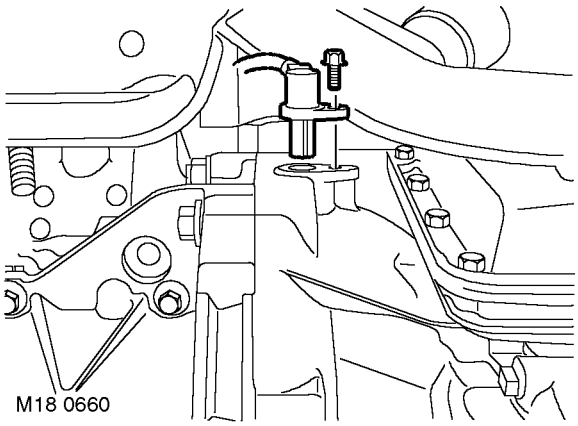
18.30.12

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Disconnect CKP sensor multiplug from engine harness.
4. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



5. Remove bolt securing CKP sensor to gearbox housing and remove sensor.

Refit

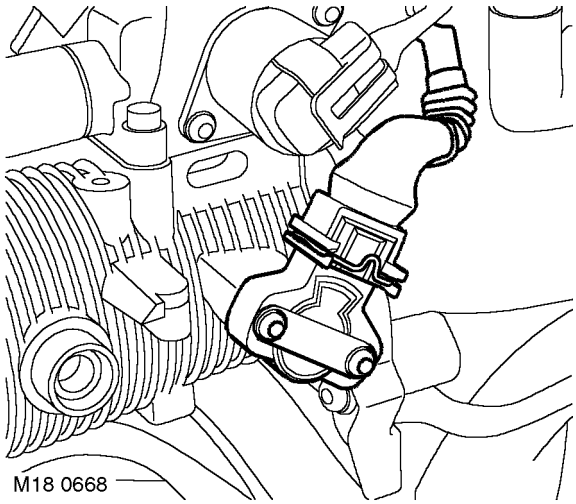
1. Clean CKP sensor and mating face.
2. Position CKP sensor, fit and tighten bolt to 9 Nm (6.5 lbf.ft).
3. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
4. Connect CKP sensor multiplug to engine harness.
5. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
6. Connect battery earth lead.

Sensor - throttle position (TP)

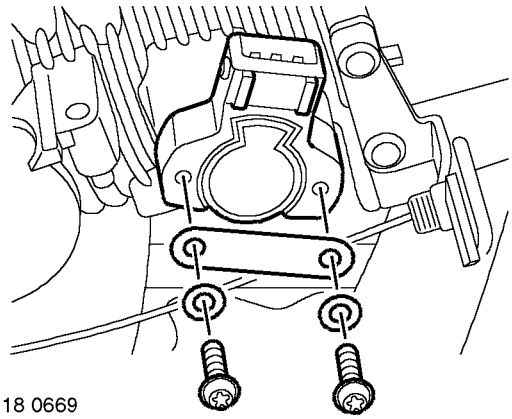
18.30.17

Remove

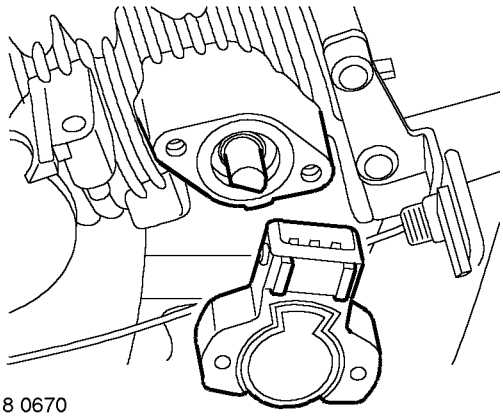
1. Disconnect battery earth lead.
2. Remove acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.


M18 0668

3. Disconnect multiplug from TP sensor.


M18 0669

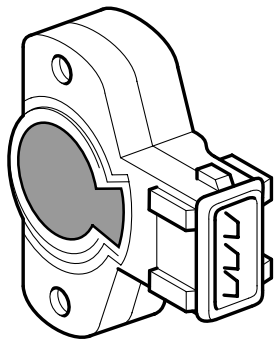
4. Remove and discard 2 Torx screws and wave washers securing TP sensor to inlet manifold.
5. Remove TP sensor specification plate.


M18 0670

6. Pull TP sensor from throttle spindle.
   CAUTION: Do not twist or apply leverage to throttle position sensor.

Refit

1. Clean mating faces of throttle housing and TP sensor.


M18 0695

2. Fit TP sensor to throttle spindle. Ensure that during fitting the machined flat on the throttle spindle is aligned with the mating portion of the TP sensor
   CAUTION: The throttle position sensor can be easily damaged during fitting. When pressing the sensor onto the throttle spindle, use fingers only, and only apply pressure to the area shown shaded in the illustration.
3. Rotate TP sensor in an anti-clockwise direction to align fixing holes.
   CAUTION: Do not rotate throttle position sensor in a clockwise direction and ensure that it is not rotated beyond its internal stops.
4. Fit TP sensor specification plate.

5. Fit new Torx screws and wave washers, tighten Torx screws to 1.5 Nm (1.1 lbf.ft).
6. Connect multiplug to TP sensor.
7. Operate throttle cable cam 2 or 3 times and ensure that full travel to the throttle open and the throttle closed positions is available.
8. Fit acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
9. Connect battery earth lead.

NOTE: A 'throttle initialisation' procedure MUST be carried out using TestBook whenever the TP sensor is removed or renewed.

Sensor - thermostat monitoring (TM) - KV6 - NAS

⊸ ***18.30.21***

Remove

1. Disconnect battery earth lead.
2. Remove coolant expansion tank cap to release pressure and refit cap.

   WARNING: Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.

3. Position absorbent cloth under TM sensor to collect spillage.


M18 0764

4. Disconnect multiplug from TM sensor.
5. Release and remove sensor. Discard seal.

Refit

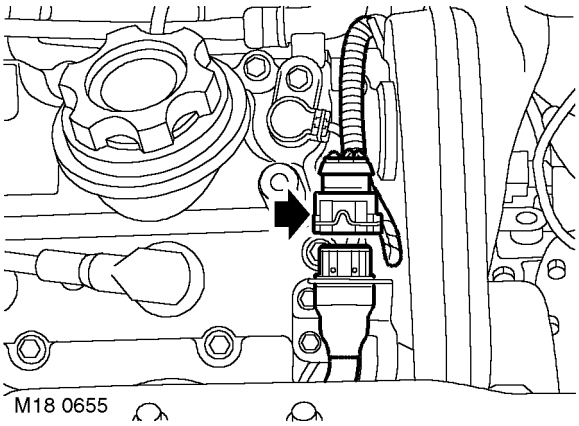
1. Clean sensor and mating face.
2. Using a new seal, fit and secure sensor.
3. Connect multiplug to sensor.
4. Remove absorbent cloth.
5. Check for leaks and fill expansion tank to 'MAX' mark.
6. Connect battery earth lead.

Sensor - camshaft position (CMP)

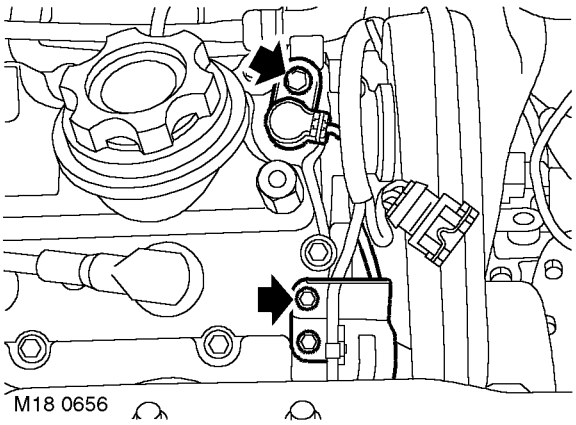
18.30.24

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Release CMP multiplug from bracket and disconnect multiplug.



4. Remove bolt securing CMP sensor multiplug bracket and release CMP sensor lead from behind bracket.
5. Remove bolt securing CMP sensor to camshaft cover.
6. Remove CMP sensor and discard seal.

Refit

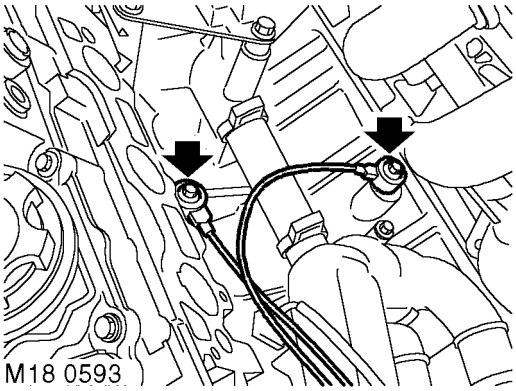
1. Clean CMP sensor and mating face.
2. Lubricate new seal with clean engine oil and fit to CMP sensor.
3. Position CMP sensor, fit and tighten bolt to 8 Nm (6 lbf.ft).
4. Feed CMP sensor lead behind multiplug bracket, align bracket, fit bolt and tighten to 8 Nm (6 lbf.ft).
5. Connect CMP sensor multiplug and secure to bracket.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

Sensor - knock (KS)

18.30.28

Remove

1. Disconnect battery earth lead.
2. Remove LH inlet manifold.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket - inlet manifold - LH.



3. Disconnect KS multiplug.
4. Note the routing of each KS harness.
5. Remove 2 bolts securing KS to cylinder block and remove sensors.

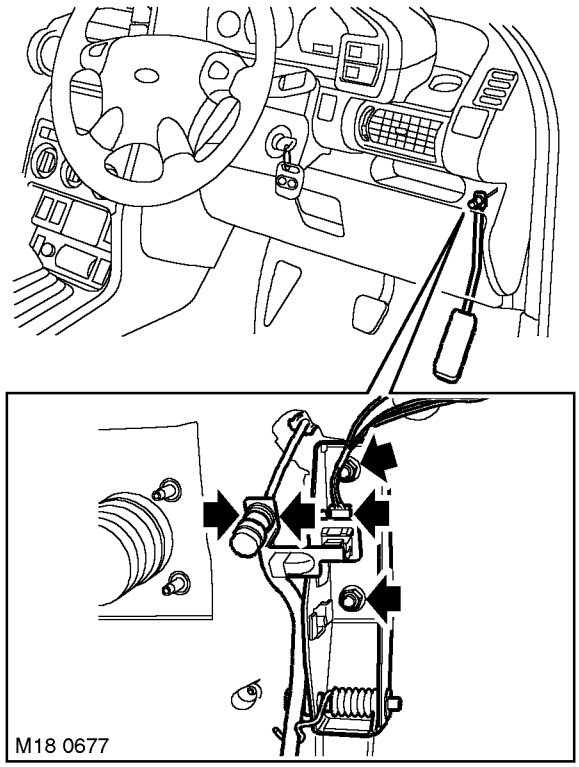
Refit

1. Clean KS and mating faces on cylinder block.
2. Position KS, ensure that harnesses are correctly routed, fit and tighten bolts to 25 Nm (18 lbf.ft).
3. Connect KS multiplug.
4. Fit LH inlet manifold.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket - inlet manifold - LH.
5. Connect battery earth lead.

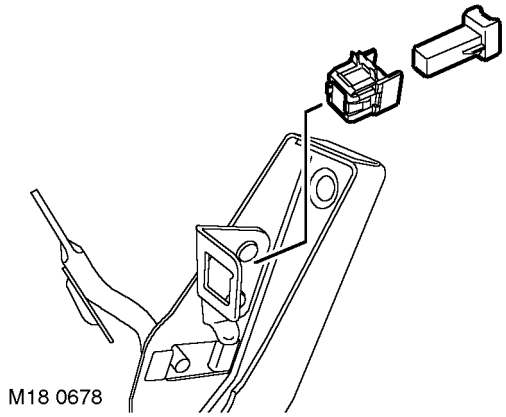
Sensor - throttle pedal position - Non NAS

18.30.36

Remove



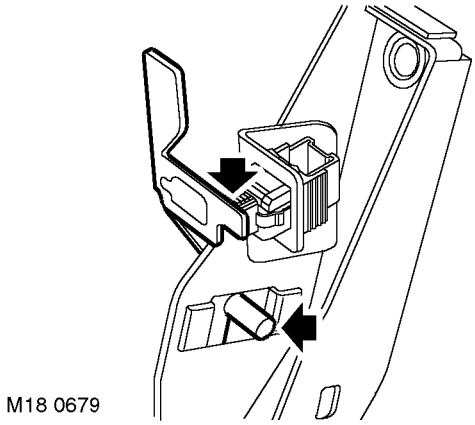
1. Remove 2 nuts securing throttle pedal assembly to bulkhead.
2. Release clip securing throttle inner cable to throttle pedal and disconnect inner cable from pedal.
3. Disconnect multiplug from throttle pedal sensor.
4. Remove throttle pedal assembly from vehicle.



5. Release throttle pedal sensor from sensor bracket on throttle pedal assembly.
6. Release clips securing sensor bracket to pedal assembly and remove bracket.

Refit

1. Fit sensor bracket to throttle pedal assembly and secure with clips
2. Position sensor and push fully into bracket on pedal assembly.



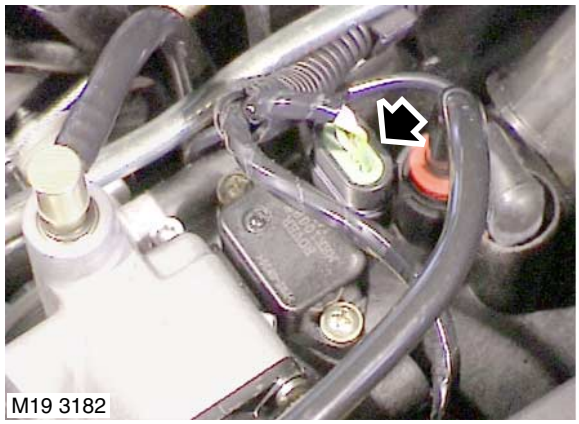
3. To correctly position throttle pedal sensor, move throttle pedal to the closed position and ensure that sensor is in contact with tang on throttle pedal.
4. Connect multiplug to throttle pedal sensor.
5. Connect throttle inner cable to throttle pedal and secure with clip.
6. Position throttle pedal assembly to bulkhead, fit and tighten nuts to 25 Nm (18 lbf.ft).

Sensor - combined - manifold absolute pressure/Intake air temperature (MAP/ IAT)

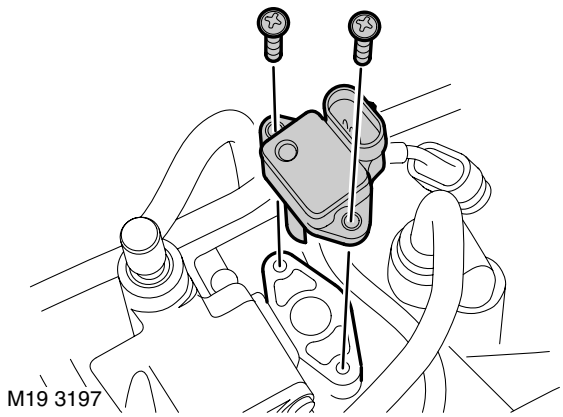
19.22.26

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Disconnect multiplug from MAP/IAT sensor.



4. Remove 2 screws securing MAP/IAT sensor to inlet manifold chamber, remove sensor.

Refit

1. Clean MAP/IAT sensor and mating face on inlet manifold chamber.
2. Position MAP/IAT sensor, fit and tighten screws.
3. Connect multiplug to MAP/IAT sensor.
4. Fit engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
5. Connect battery earth lead.

Fuel tank - drain

19.55.02

Drain

1. Disconnect both battery leads, negative lead first.
2. Remove fuel tank unit assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Pump - integral - fuel tank - rear.
   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.
3. Using a fuel recovery appliance, drain the fuel from the tank into a sealed container. Follow the manufacturer's instructions for the connection and safe use of the appliance.

Refill

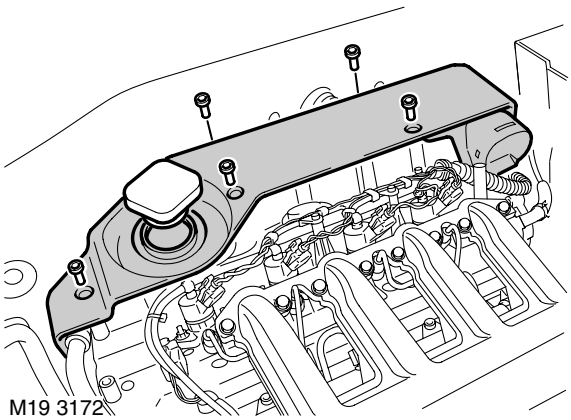
1. Fit fuel tank unit assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Pump - integral - fuel tank - rear.
2. Connect battery leads, earth lead last.

Element - air cleaner

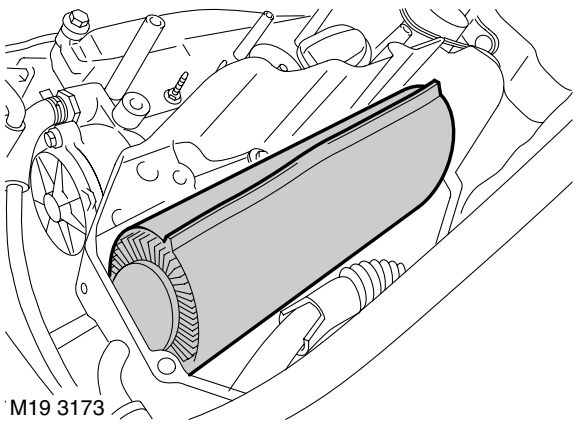
19.10.10

Remove

1. Disconnect battery earth lead.
2. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.


M19 3172

3. Remove engine oil filler cap. Cover aperture.
4. Remove 5 Allen screws and remove air cleaner cover.


M19 3173

5. Remove air cleaner element.

Refit

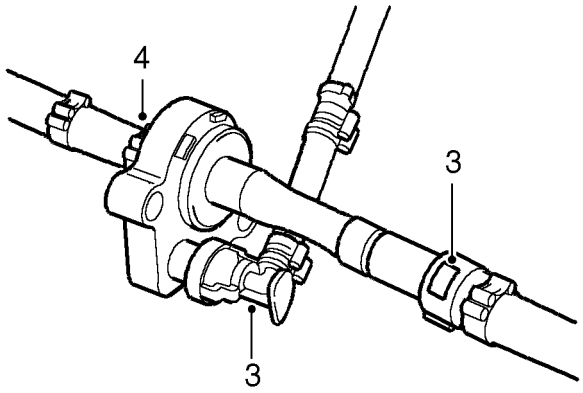
1. Clean inside of air cleaner.
2. Fit air cleaner element and engage spigot.
3. Fit air cleaner cover and tighten Allen screws to 8 Nm (6 lbf.ft).
4. Fit engine oil filler cap.
5. Fit intake duct assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
6. Connect battery earth lead.

Switch - fuel temperature

19.22.04

Remove

1. Disconnect battery earth lead.
2. Position absorbent cloth to collect fuel spillage.
   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



M19 3259

3. Disconnect quick release and fuel hose connectors from temperature switch.
   CAUTION: Always fit plugs to open connections to prevent contamination.
4. Release retaining clip and remove hose from fuel temperature switch.
5. Remove fuel temperature switch.
   NOTE: Do not carry out further dismantling if component is removed for access only.
6. Release retaining clip and remove hose from fuel temperature switch.

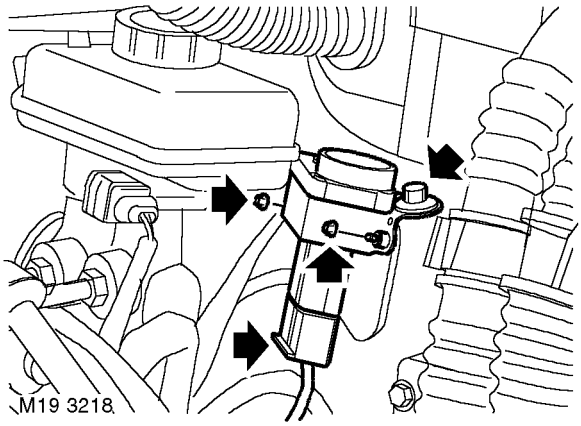
Refit

1. Connect hose to fuel temperature switch and secure with retaining clip.
2. Position fuel temperature switch.
3. Connect hose to fuel temperature switch and secure with retaining clip.
4. Connect quick release and fuel hose connectors to fuel temperature switch.
5. Connect battery earth lead.

Switch - inertia - fuel cut off

19.22.09

Remove



1. Disconnect multiplug from fuel cut-off switch.
2. Remove bolt securing fuel cut-off switch bracket to bulkhead.
3. Remove fuel cut-off switch from bulkhead.
4. Remove 2 nuts securing fuel cut-off switch to bracket.
5. Remove fuel cut-off switch from bracket.

Refit

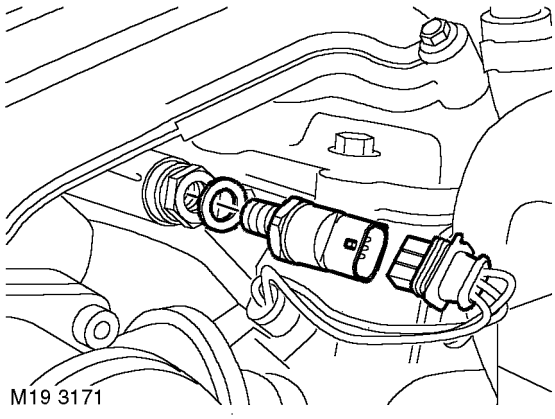
1. Position fuel cut-off switch to bracket.
2. Fit nuts securing fuel cut-off switch to bracket and tighten to 2 Nm (1.5 lbf.ft).
3. Position fuel cut-off switch bracket to bulkhead.
4. Fit and tighten bolt securing fuel cut-off switch bracket to bulkhead.
5. Connect multiplug to fuel cut-off switch.
6. To set the fuel cut-off switch, depress the top of the fuel cut-off switch.

Sensor - fuel pressure

19.22.33

Remove

1. Disconnect battery earth lead.
2. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.



3. Disconnect multiplug from fuel pressure sensor.

   CAUTION: Before disconnecting any part of the fuel system, it is imperative that all dust, dirt and debris is removed from around components to prevent ingress of foreign matter into fuel system.

4. Use a deep socket and carefully remove fuel pressure sensor. Discard sealing washer.

   CAUTION: Always fit plugs to open connections to prevent contamination.

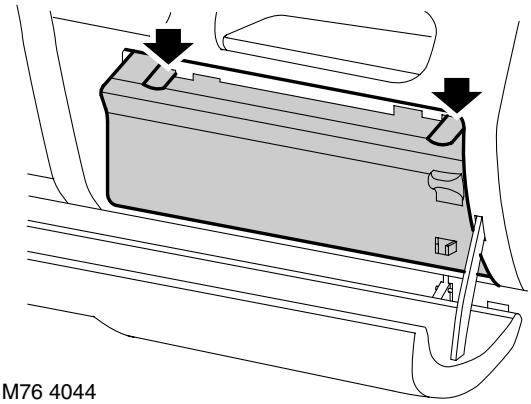
Refit

1. Clean fuel pressure sensor.
2. Fit new sealing washer to fuel pressure sensor. Use petroleum jelly to hold sealing washer in position on pressure sensor.
3. Fit fuel pressure sensor and tighten to 38 Nm (28 lbf.ft).
4. Connect multiplug to fuel pressure sensor.
5. Fit intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
6. Connect battery earth lead.

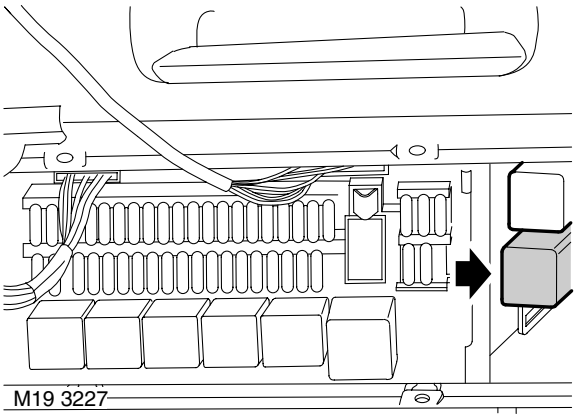
Relay - fuel pump

19.22.39

Remove


M76 4044

1. Open drivers glove box lid and remove fuse box cover.


M19 3227

2. Identify and remove fuel pump relay.

Refit

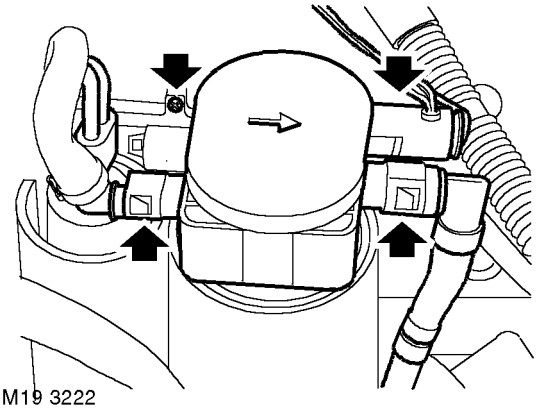
1. Fit fuel pump relay.
2. Fit fuse box cover and close glove box lid.

Filter - main

19.25.02

Remove

1. Disconnect battery earth lead.

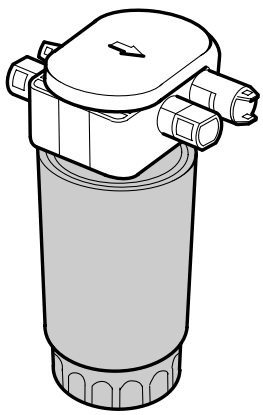

M19 3222

2. Remove screw securing fuel filter housing to bracket.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

3. Lift and tilt fuel filter housing away from bracket.
4. Disconnect multiplug from fuel filter head.
5. Position absorbent cloth beneath fuel filter.
6. Note orientation of fuel hoses, fully depress clips and carefully disconnect both fuel hoses from filter head.

   CAUTION: Always fit plugs to open connections to prevent contamination.


M19 3221

7. Remove fuel filter and head assembly.

8. Hold fuel filter body and unscrew filter head.

Refit

1. Clean fuel filter and mating face.
2. Lubricate sealing ring of new filter with clean oil.
3. Fit filter to filter head, tighten by hand until seal contacts filter head, then tighten a further half turn.
4. Fit fuel filter to housing.
5. In the correct orientation, connect hoses to fuel filter head.
6. Connect multiplug to fuel filter head.
7. Fit fuel filter housing to bracket and secure with screw.
8. Remove absorbent cloth.
9. Connect battery earth lead.

Matrix cooler - fuel

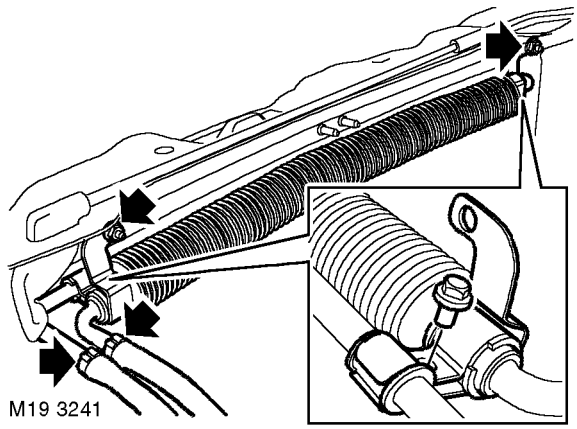
19.25.30

Remove

1. Disconnect battery earth lead.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

2. Remove engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
3. Clean area around fuel cooler matrix assembly and hose connections before commencing work. Care must be taken to ensure the matrix is not damaged during fitting.
4. Place container beneath fuel cooler matrix to contain any spillage.



5. Release 2 clips and remove fuel hoses from cooler matrix.

   CAUTION: Always fit plugs to open connections to prevent contamination.

6. Remove 2 nuts securing fuel cooler matrix to bonnet locking platform. Remove cooler from vehicle.
7. Remove 2 bolts, release and remove mounting brackets from fuel cooler.

Refit

1. Fit rubbers and mounting brackets to fuel cooler, tighten bolts to 10 Nm (7 lbf.ft).
2. Fit fuel cooler to mounting and tighten nuts to 10 Nm (7 lbf.ft).
3. Clean fuel hose connections.
4. Connect fuel hoses to cooler and fit clips.
5. Fit acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
6. Connect battery earth lead.

Pump - injection

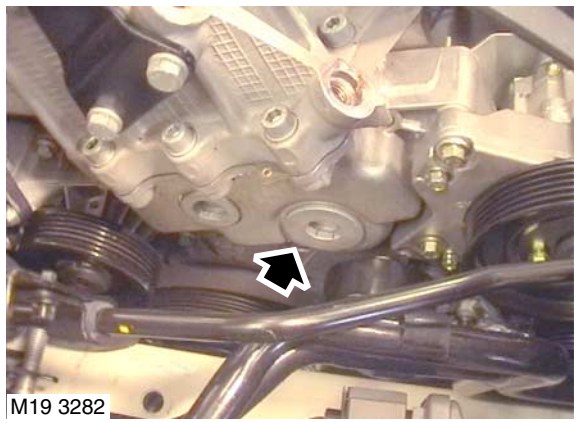
19.30.07

Remove

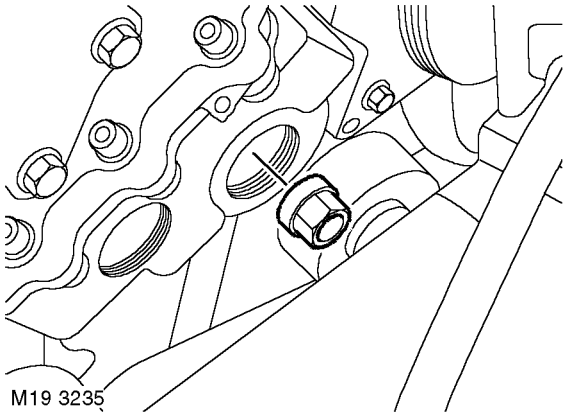
1. Disconnect battery earth lead.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

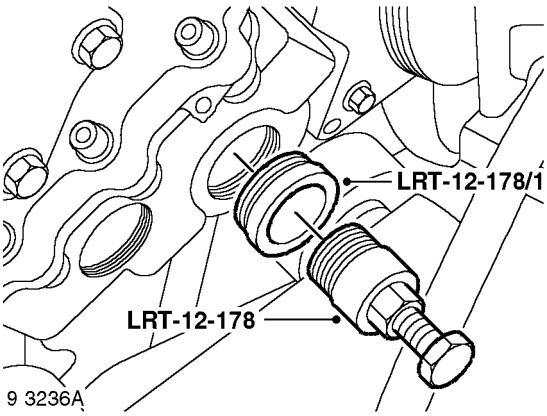
2. Remove inlet manifold gaskets.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.**
3. Remove starter motor.
   ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
4. Remove hydramount.
   ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
5. Remove ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**


M19 3282

6. Remove large access plug in timing case and discard seal.



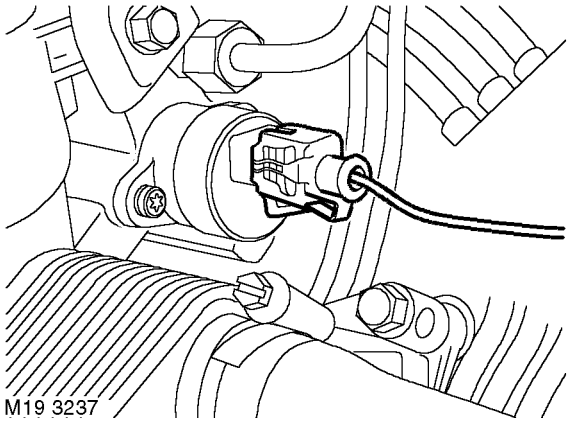
7. Remove fuel pump sprocket nut.



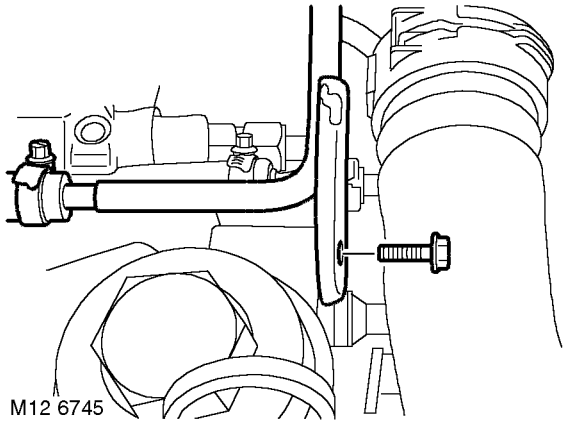
8. Fit **LRT-12-178/1** into timing cover.

9. Fit **LRT-12-178** to fuel pump sprocket and tighten centre screw to release sprocket from fuel pump.

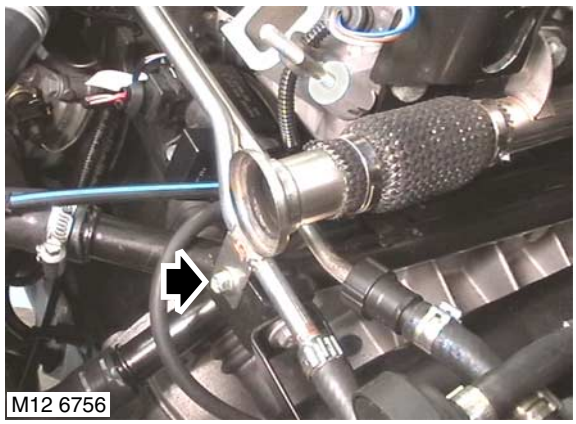
CAUTION: Do not remove puller from sprocket until fuel pump is fitted.



10. Disconnect multiplug from fuel pump.



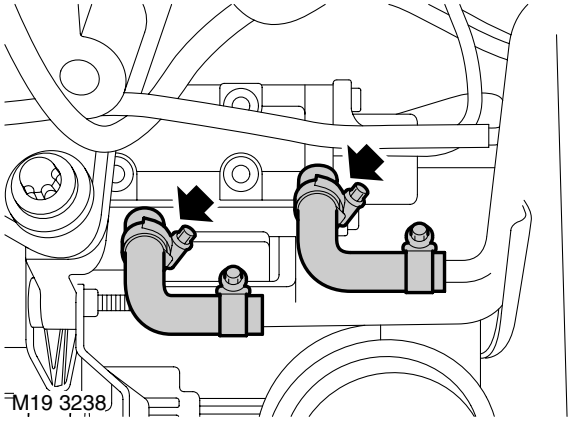
11. Remove bolt, fuel pipe bracket to oil filter housing.



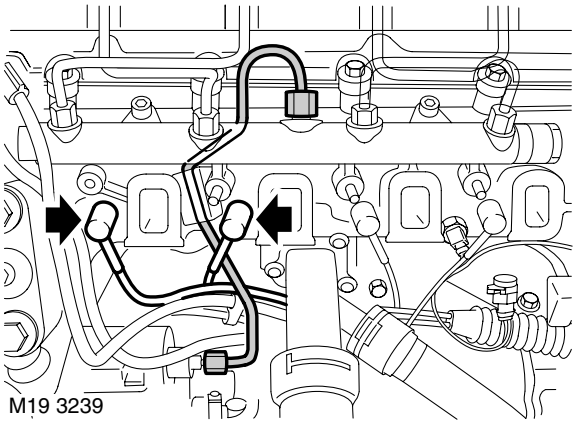
12. Remove bolt fuel rail to coolant rail.

13. Position cloth under fuel pump to collect fuel spillage.

CAUTION: Care must be taken to ensure that oil or fluid does not enter or contaminate the alternator.



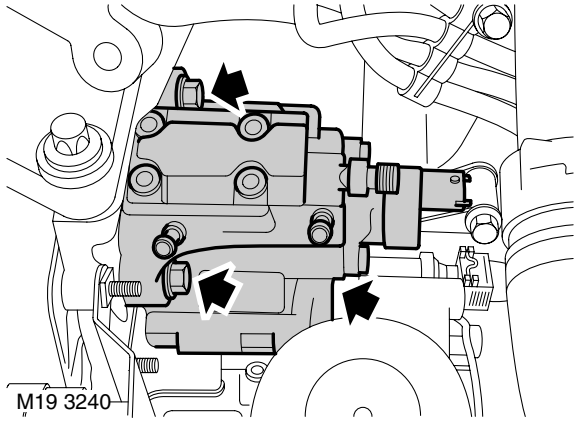
14. Loosen 2 clips and disconnect fuel hoses from pump.



15. Loosen 2 nuts and remove high pressure fuel pipe. Remove pipe support bush.

CAUTION: Always fit plugs to open connections to prevent contamination.

16. Disconnect caps from No 1 and 2 glow plugs and move clear of fuel pump.



17. Remove 3 nuts, release and remove fuel pump. Discard gasket.

Refit

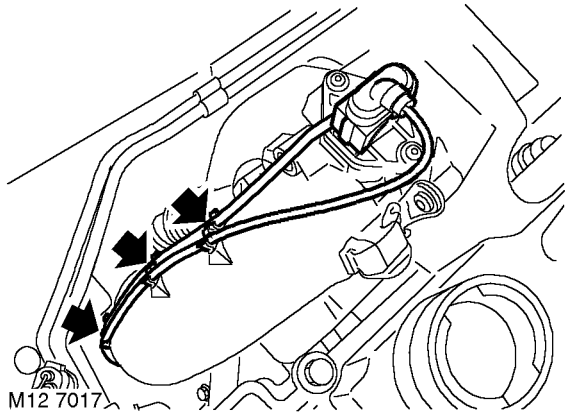
1. Clean fuel pump and mating face.
2. Fit new fuel pump gasket.
3. Fit fuel pump and tighten nuts to 24 Nm (18 lbf.ft).
4. Connect glow plug caps.
5. Clean high pressure fuel pipe unions.
6. Fit bush to fuel pipe, fit pipe and tighten union nuts to 20 Nm (15 lbf.ft).
7. Fit fuel hoses to pump and tighten clips.
8. Fit bolts retaining low pressure fuel rails and tighten to 10 Nm (7 lbf.ft).
9. Connect multiplug to pump.
10. Remove **LRT-12-178** and **LRT-12-178/1**.
11. Fit fuel pump sprocket retaining nut and tighten to 65 Nm (48 lbf.ft).
12. Clean access plug.
13. Fit new seal to access plug, fit plug and tighten to 30 Nm (22 lbf.ft).
14. Fit ancillary drive belt
    ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
15. Fit hydramount.
    ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
16. Fit starter motor.
    ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
17. Fit inlet manifold gaskets.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.**
18. Connect battery earth lead.

Turbocharger

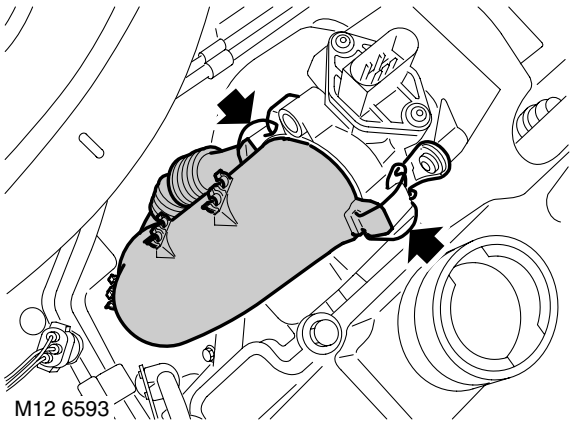
19.42.01

Remove

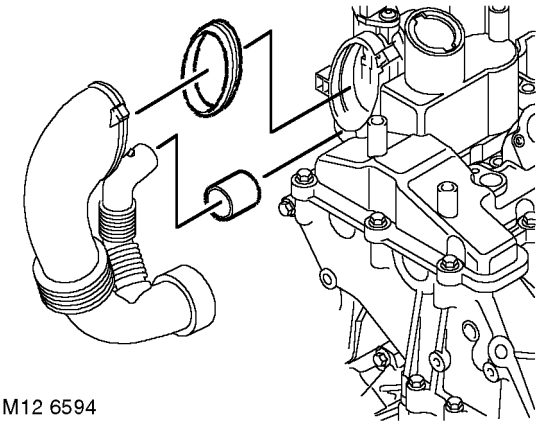
1. Disconnect battery earth lead.
2. Remove air cleaner element.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.
3. Remove IRD.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.


M12 7017

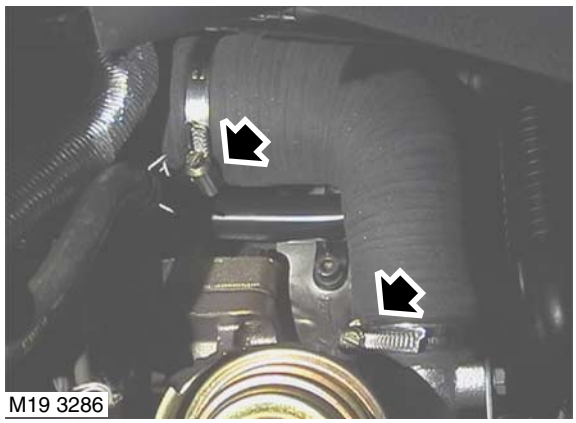
4. Release vacuum hose and harness from turbocharger duct.


M12 6593

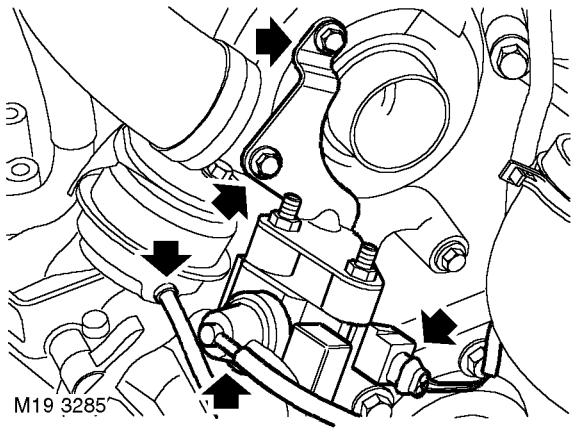
5. Release 2 clips securing turbocharger duct to MAF/IAT sensor and remove duct.


M12 6594

6. Remove seal, duct to MAF/IAT sensor.
7. Remove connector, engine breather pipe to air cleaner housing.

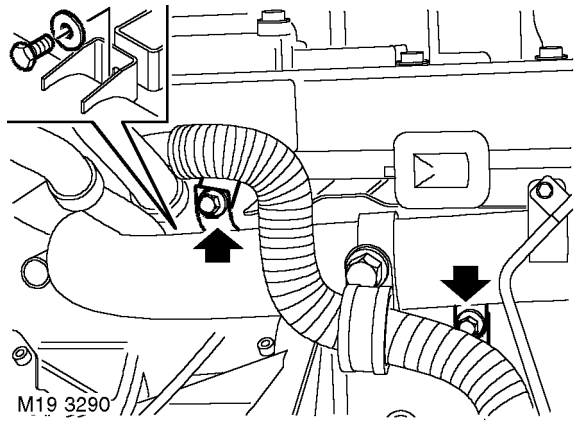

M19 3286

8. Loosen 2 clips and remove turbocharger outlet hose.

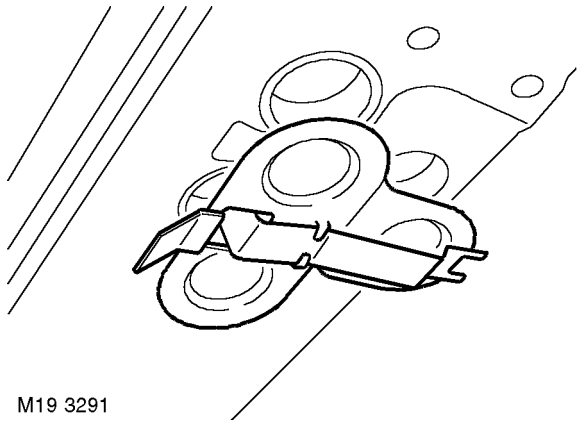

M19 3285

9. Disconnect multiplug from turbocharger boost control solenoid valve.
10. Disconnect vacuum hose from turbocharger boost control solenoid valve.

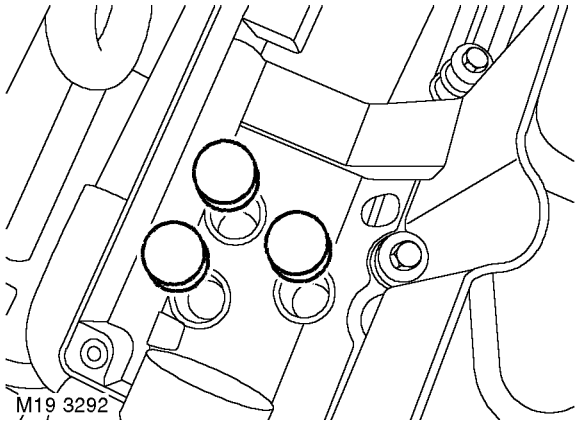
11. Disconnect vacuum hose from turbocharger boost control valve.
12. Remove 2 bolts and remove solenoid valve.



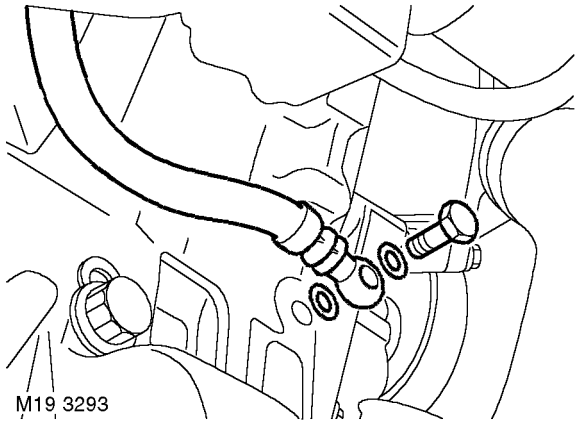
13. Remove 2 bolts turbocharger outlet pipe to coolant rail.
14. Loosen but do not remove remaining bolt, turbocharger outlet pipe to coolant rail.



15. Remove access plate from heat shield.

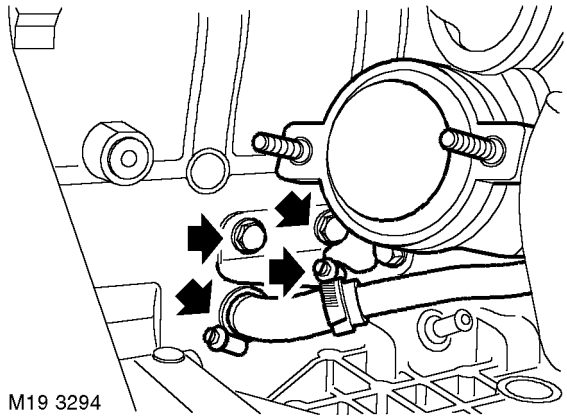


16. Remove 3 access plugs from base of air cleaner.

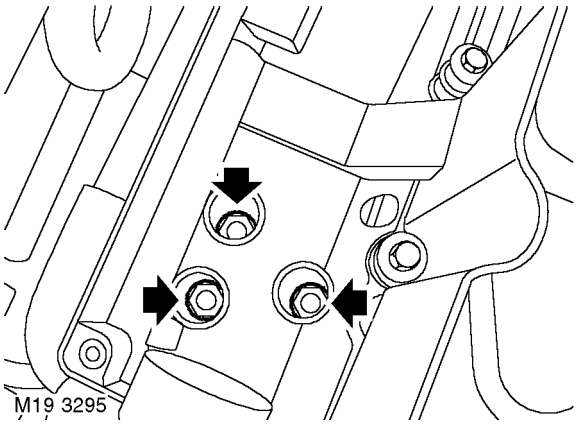


17. Remove turbocharger oil feed banjo bolt and discard sealing washers.

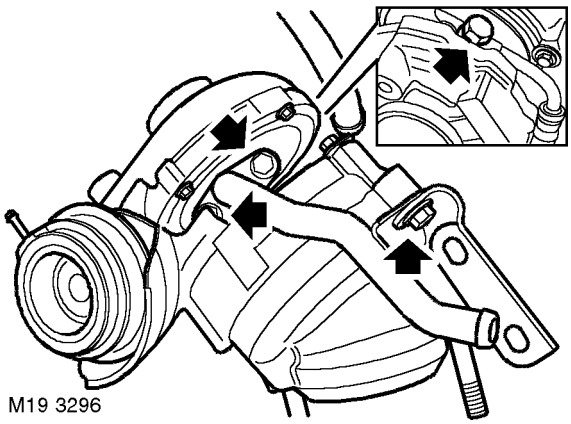
CAUTION: Always fit plugs to open connections to prevent contamination.


M19 3294

18. Loosen 2 clips and disconnect turbocharger oil drain hose from cylinder block.
19. Remove 2 bolts turbocharger oil drain pipe bracket to cylinder block.


M19 3295

20. With assistance, remove 3 bolts and turbocharger. Discard gasket.


M19 3296

21. Identify position of turbocharger oil feed pipe for refitting.
22. Remove banjo bolt and remove oil feed pipe from turbocharger. Discard sealing washers.
23. Remove bolt turbocharger oil drain pipe bracket.
24. Remove 2 bolts and oil drain pipe from turbocharger. Discard gasket.

Refit

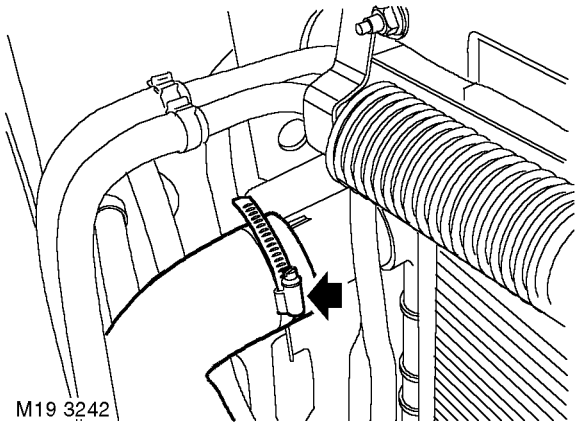
1. Clean turbocharger oil drain pipe and mating face.
2. Use new gasket and fit oil drain pipe to turbocharger.
3. Tighten turbocharger drain pipe flange bolts to 8 Nm (6 lbf.ft) and bracket bolt to 20 Nm (15 lbf.ft).
4. Clean oil feed pipe and mating face on turbocharger.
5. Use new sealing washers, fit oil feed pipe to turbocharger and tighten banjo bolt to 22 Nm (16 lbf.ft).
6. Clean turbocharger and exhaust manifold mating faces.
7. Fit new gasket, fit turbocharger and tighten bolts to 50 Nm (37 lbf.ft).
8. Clean turbocharger oil feed pipe and banjo bolt.
9. Use new sealing washers, align oil feed pipe and tighten banjo bolt to 22 Nm (16 lbf.ft).
10. Fit and tighten oil drain pipe bracket bolts to 20 Nm (15 lbf.ft).
11. Connect turbocharger drain hose and tighten clips.
12. Fit access plugs to base of air cleaner.
13. Fit access plate to heat shield.
14. Fit turbocharger outlet pipe bolts. Tighten 6 mm bolt to 10 Nm (7 lbf.ft) and 8 mm bolts to 20 Nm (15 lbf.ft).
15. Fit turbocharger outlet hose and tighten clips.
16. Fit boost control solenoid valve and tighten bolts to 10 Nm (7 lbf.ft).
17. Connect vacuum hoses.
18. Connect multiplug to solenoid valve.
19. Fit engine breather connector.
20. Fit upper seal to turbocharger duct and ensure lower seal to turbocharger is in good condition.
21. Fit duct to turbocharger, connect to engine breather and MAF/IAT sensor.
22. Secure duct with clips.
23. Fit vacuum hose and harness to clips.
24. Fit air cleaner element.
☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**
25. Fit IRD.
☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.**
26. Connect battery earth lead.

Intercooler

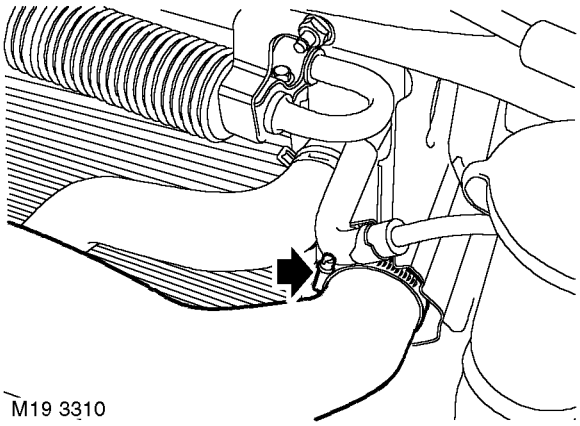
19.42.15

Remove

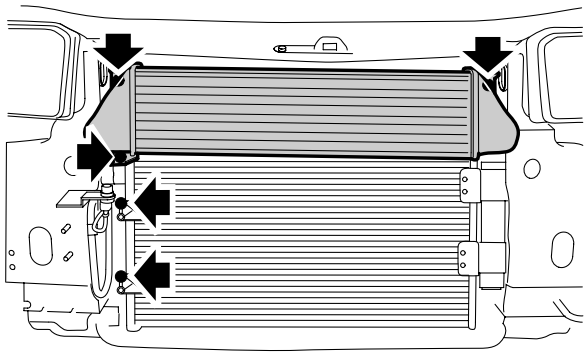
1. Disconnect battery earth lead.
2. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.


M19 3242

3. Loosen clip and remove inlet hose from intercooler.


M19 3310

4. Loosen clip and remove outlet hose from intercooler.


M19 3244

5. Remove 2 bolts securing condenser to radiator.
6. Remove 3 bolts securing intercooler to radiator.
7. Remove intercooler.

Refit

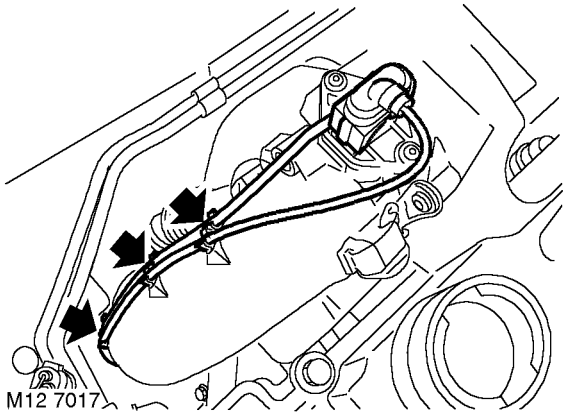
1. Fit intercooler.
2. Fit bolts securing intercooler to radiator, tighten to 3 Nm (2.2 lbf.ft).
   CAUTION: Ensure that bolts of the correct length are used on refit.
3. Fit bolts securing condenser to radiator and tighten to 3 Nm (2.2 lbf.ft).
4. Fit hoses to intercooler and tighten clips.
5. Fit front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
6. Connect battery earth lead.

Solenoid valve - boost control

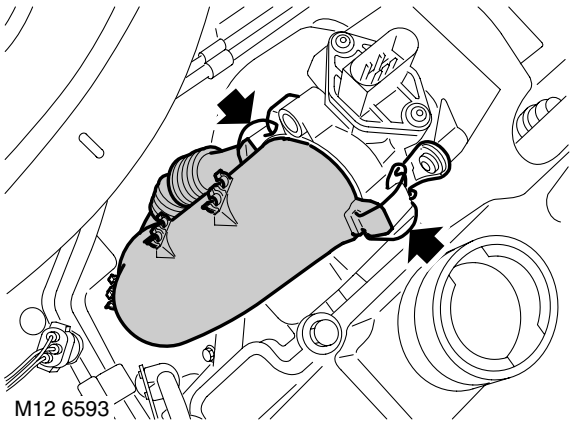
19.42.30

Remove

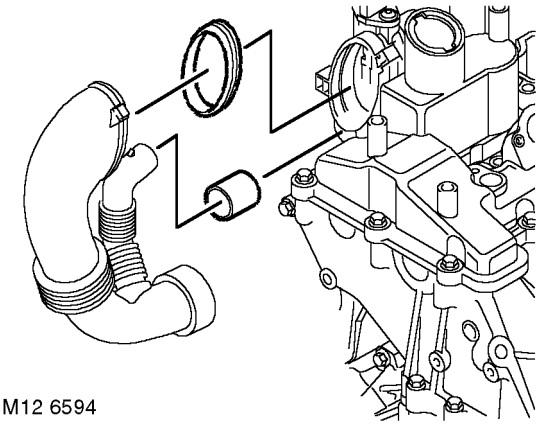
1. Disconnect battery earth lead.
2. Remove air cleaner element.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.


M12 7017

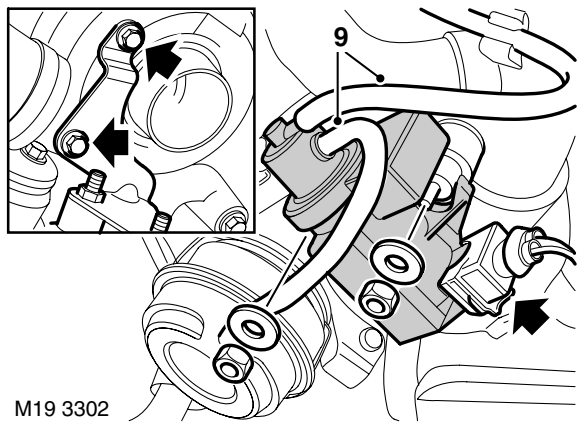
3. Release vacuum hose and harness from turbocharger duct.


M12 6593

4. Release 2 clips securing turbocharger duct to MAF/IAT sensor and remove duct.


M12 6594

5. Remove seal, duct to MAF/IAT sensor.
6. Remove connector, engine breather pipe to air cleaner housing.
7. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



M19 3302

8. Disconnect multiplug from turbocharger boost control solenoid valve.
9. Identify and disconnect vacuum hoses.
10. Remove 2 bolts and remove solenoid valve.
11. Remove 2 nuts and solenoid valve from bracket.
12. Check solenoid mounting rubbers for damage, remove and replace if required.

Refit

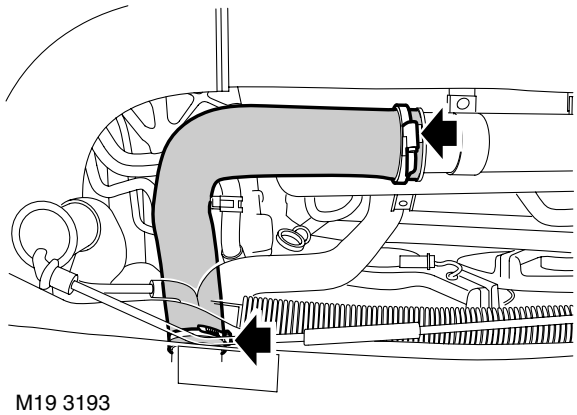
1. Fit mounting rubbers to bracket.
2. Fit solenoid valve to mounting bracket rubbers and tighten to 5 Nm (4 lbf.ft).
3. Fit solenoid valve mounting bracket to turbocharger and tighten bolts to 10 Nm (7 lbf.ft).
4. Connect vacuum hoses.
5. Connect multiplug.
6. Fit engine breather connector.
7. Fit upper seal to turbocharger duct and ensure lower seal to turbocharger is in good condition.
8. Fit duct to turbocharger, connect to engine breather and MAF/IAT sensor.
9. Secure duct with clips.
10. Fit vacuum hose and harness to clips.
11. Fit air cleaner element.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**
12. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
13. Connect battery earth lead.

Sensor - turbo charger boost pressure

19.42.38

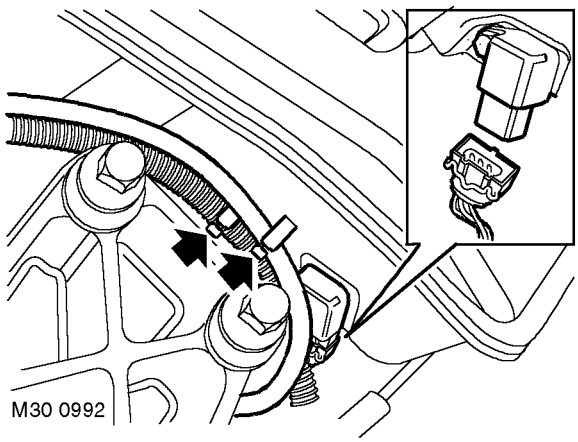
Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**



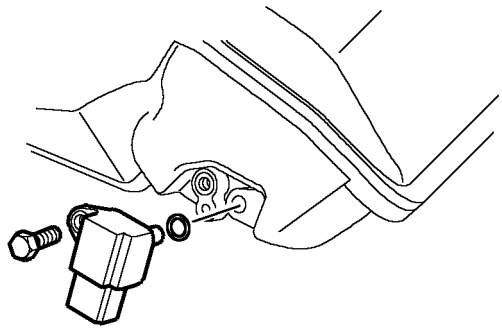
M19 3193

3. Loosen 2 clips and remove intercooler outlet hose.



M30 0992

4. Release harness and fuel return hose from clips on inlet manifold.
5. Disconnect multiplug from turbocharger boost pressure sensor.


M19 3194

6. Remove bolt and turbocharger boost pressure sensor. Discard seal.

Refit

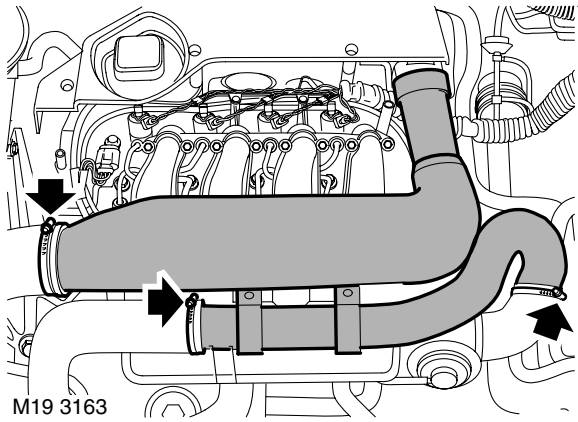
1. Clean turbocharger boost pressure sensor and mating face.
2. Fit new seal to turbocharger boost pressure sensor, fit sensor to inlet manifold and tighten bolt to 8 Nm (6 lbf.ft).
3. Connect multiplug to turbocharger boost pressure sensor.
4. Fit fuel return hose and harness to clips on inlet manifold.
5. Fit intercooler outlet hose and tighten clips.
6. Fit engine acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
7. Connect battery earth lead.

Ducting - intake assembly

⊸ ***19.42.51***

Remove

1. Remove engine acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**


M19 3163

2. Release 3 clips securing intake ducting assembly and release hoses.
3. Release injector harness from clip on ducting assembly.
4. Remove 2 screws securing intake duct assembly to cam cover and engine support bracket.
5. Release intake duct assembly from air cleaner housing.

   CAUTION: Always fit plugs to open connections to prevent contamination.

6. Remove intake duct assembly from vehicle.

Refit

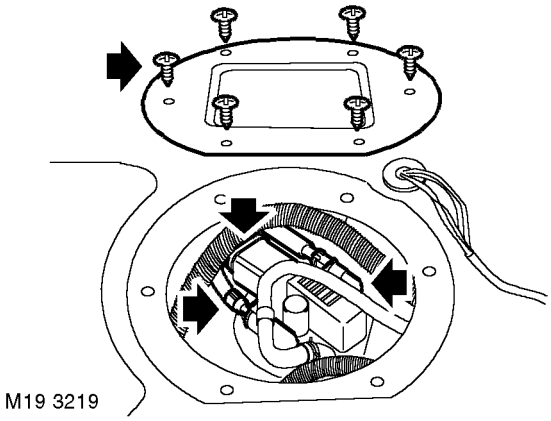
1. Clean intake duct assembly and connections.
2. Fit duct assembly to air cleaner housing, align with mounting fit and tighten screws.
3. Fit injector harness to support clip.
4. Connect hoses and tighten clips.
5. Fit engine acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**

Pump - integral - fuel tank - rear

19.45.03

Remove

1. Disconnect battery earth lead.
2. Open RH rear and tail doors.
3. Fold RH rear seat forward.
4. Remove 3 fasteners securing front and rear carpets.
5. Pull back loadspace carpet from fuel pump access panel.

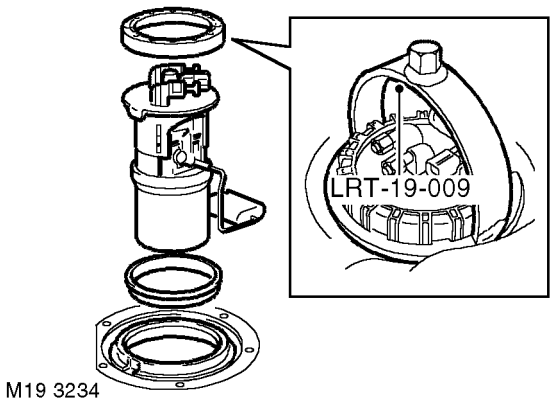

M19 3219

6. Remove 6 screws securing access panel.
7. Remove access panel.
8. Disconnect multiplug from fuel pump tank unit.
9. Identify hoses for refit, release and disconnect fuel feed and return hoses from fuel pump tank unit.

   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.

10. **Models with FBH:** Release clip and disconnect FBH fuel feed hose.

    CAUTION: Always fit plugs to open connections to prevent contamination.



M19 3234

11. Use **LRT-19-009** to remove locking ring from fuel pump housing.
12. Remove fuel pump tank unit and sealing ring.

Refit

1. Clean fuel pump housing and mating face on fuel tank.
2. Fit seal to fuel pump tank unit.
3. Fit fuel pump housing to fuel tank and use **LRT-19-009** to fit locking ring.
4. **Models with FBH:** Connect FBH fuel feed hose to tank unit and secure with clip.
5. Connect fuel feed and return hoses as identified on removal.
6. Connect multiplug to fuel pump tank unit.
7. Fit access panel and secure with screws.
8. Position carpet and secure with fasteners.
9. Reposition rear seat.
10. Close rear and tail doors.
11. Connect battery earth lead.

Regulator - fuel pressure

19.45.06

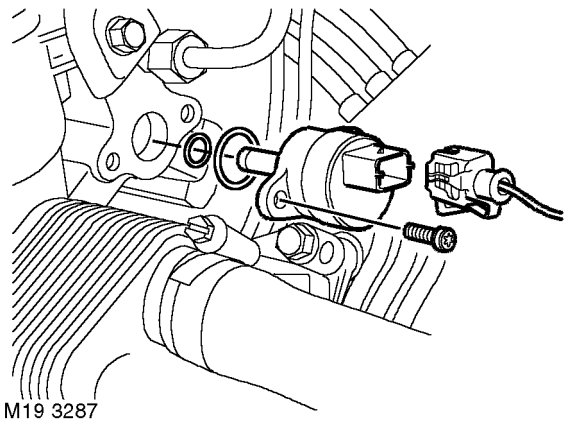
Remove

1. Disconnect battery earth lead.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

2. Remove inlet manifold gaskets.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.
3. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.
4. Position absorbent cloth to collect fuel spillage.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.


M19 3287

5. Disconnect multiplug from fuel pressure regulator.
6. Remove 2 Torx screws and carefully remove fuel pressure regulator. Discard 2 seals.

Refit

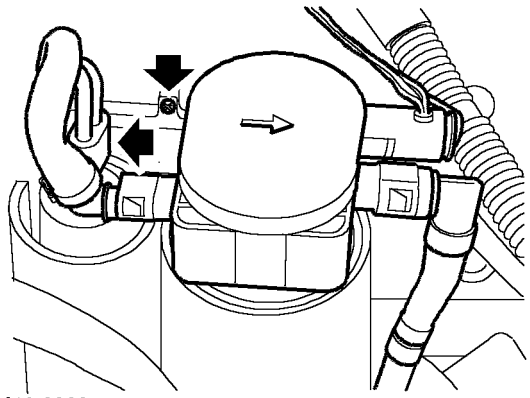
1. Clean fuel pressure regulator and mating face.
2. Fit new seals to fuel pressure regulator.
3. Fit regulator and tighten Torx screws to 9 Nm (7 lbf.ft).
4. Fit starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.
5. Fit inlet manifold gaskets.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.
6. Connect battery earth lead.

Lift pump - fuel

19.45.09

Remove

1. Disconnect battery earth lead.

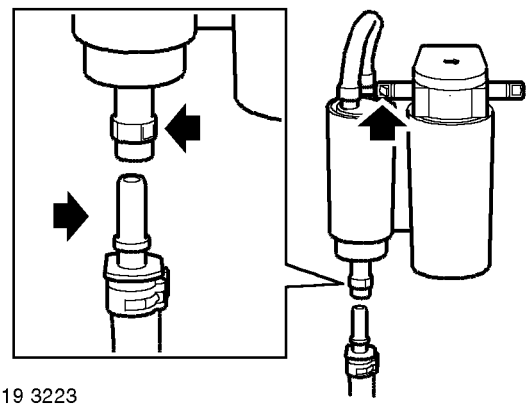


M19 3220

2. Remove screw securing fuel pump housing to bracket.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

3. Lift and tilt fuel pump housing away from bracket.
4. Disconnect multiplug from fuel pump.
5. Position absorbent cloth to collect fuel spillage.



M19 3223

6. Disconnect quick release fuel hose connectors from fuel pump and filter.

   CAUTION: Always fit plugs to open connections to prevent contamination.

7. Remove fuel pump.
8. Release retaining clips and remove hoses from fuel pump.

Refit

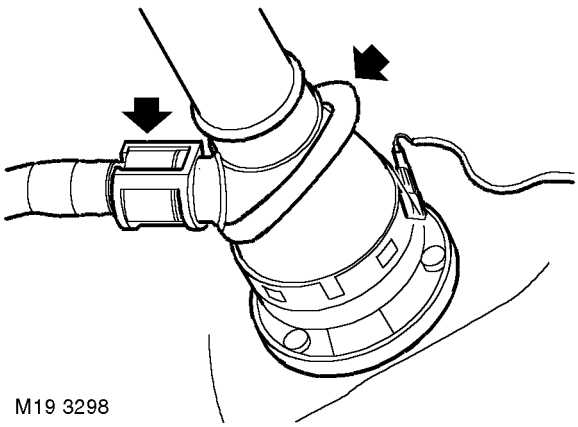
1. Connect hoses to fuel pump and secure with retaining clips.
2. Fit fuel pump to housing.
3. Connect quick release fuel hose connectors to pump and filter.
4. Connect multiplug to fuel pump.
5. Fit fuel pump housing to bracket and secure with screw.
6. Remove absorbent cloth.
7. Connect battery earth lead.

Tank

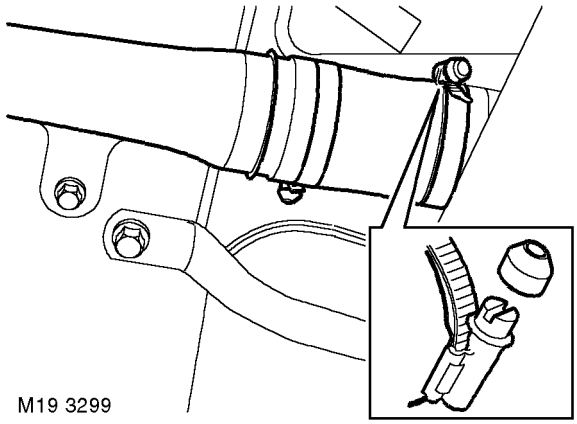
19.55.01

Remove

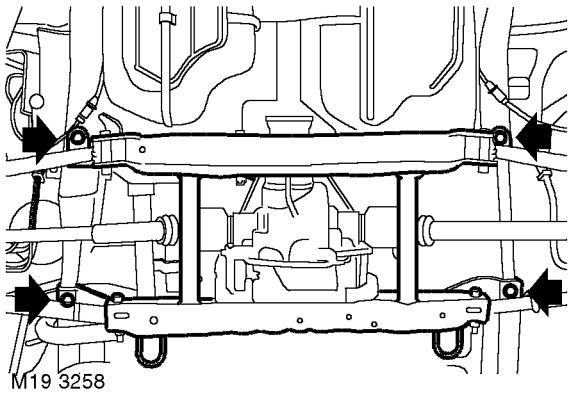
1. Position vehicle on ramp.
2. Disconnect battery earth lead.
3. Remove fuel pump assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Pump - integral - fuel tank - rear.
   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.
4. Using a fuel recovery appliance, drain the fuel from the tank into a sealed container. Follow the manufacturer's instructions for the connection and safe use of the appliance.
   WARNING: The fuel tank must be drained before it is removed from the vehicle.
5. Remove intermediate exhaust pipe.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - intermediate.
6. Remove propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft assembly.
7. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.


M19 3298

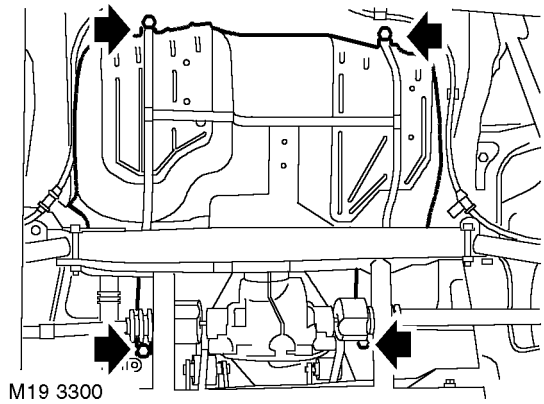
8. Release clip from breather hose and disconnect breather hose from filler neck.
9. Release clip and disconnect vent hose from fuel tank on vapour separator.


M19 3299

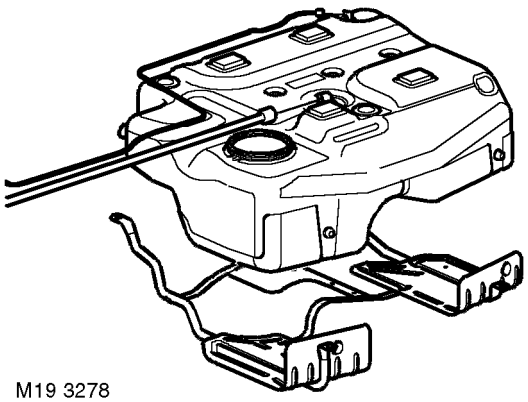
10. Remove tamper proof cover from filler hose clip and loosen clip.


M19 3258

11. Support weight of rear subframe and remove 4 bolts securing subframe to body.
12. Lower subframe.
    CAUTION: Do not allow sub frame to hang on rear brake hoses.


M19 3300

13. With assistance, remove 4 bolts securing fuel tank to body and remove tank.
    NOTE: Pull vent and breather hoses through body while lowering fuel tank.


M19 3278

14. Remove fuel tank from cradle. Collect heat and fire shields.
15. Remove clips from breather hose and vent pipes.
16. Disconnect breather hose and vent pipes from fuel tank.

Refit

1. Connect breather hose and vent pipes to fuel tank, secure with clips.
2. Position heat and fire shields. Fit cradle to fuel tank.
3. With assistance, fit bolts securing fuel tank to body and tighten to 45 Nm (33 lbf.ft).
   NOTE: Pass vent and breather hoses through body while fitting tank.
4. Raise subframe, fit bolts and tighten to 190 Nm (140 lbf.ft).
5. Connect breather hose to filler neck, fit and secure clip.
6. Connect vent hose to vapour separator, fit and secure clip.
7. Fit RH rear wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
8. Fit propeller shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft assembly.**
9. Fit intermediate exhaust pipe.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - intermediate.**
10. Fit fuel pump assembly.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Pump - integral - fuel tank - rear.**
11. Connect battery earth lead.

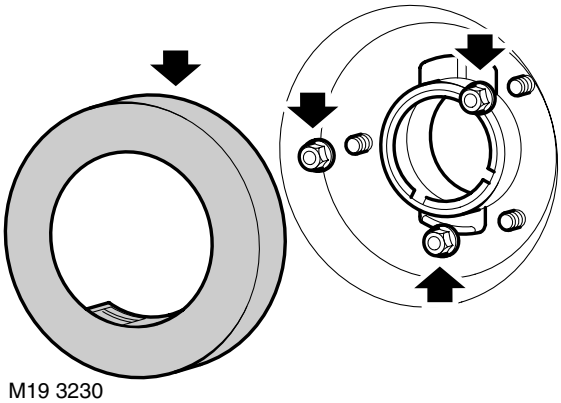
Filler neck

19.55.07

Remove

1. Disconnect battery earth lead.
2. Ensure fuel tank is less than half full. If not, drain fuel tank to less than half full.
   FUEL DELIVERY SYSTEM - DIESEL, ADJUSTMENTS, Fuel tank - drain.
3. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.
4. Remove fuel filler cap.

   CAUTION: Before disconnecting any part of the fuel system, it is imperative that all dust, dirt and debris is removed from around components to prevent ingress of foreign matter into fuel system.

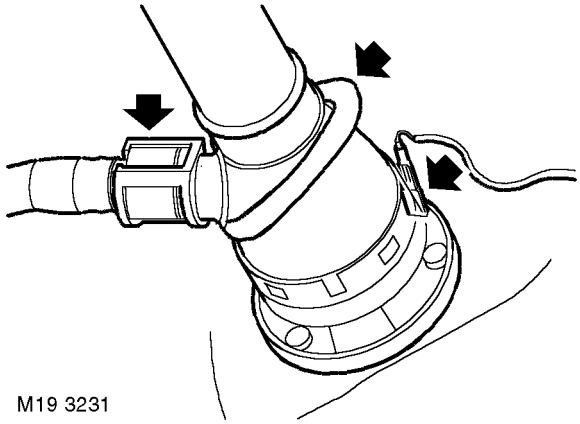


M19 3230

5. Unclip escutcheon from fuel filler neck.

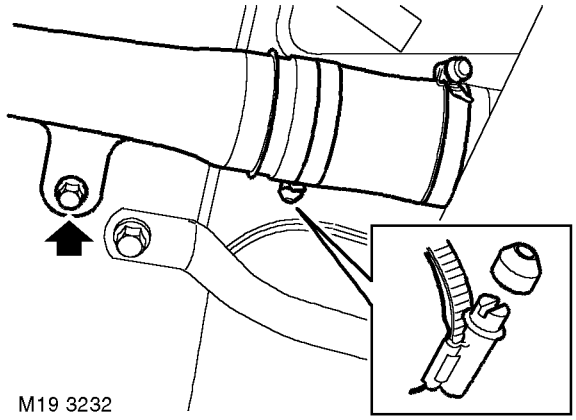
   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

6. Remove 3 nuts securing fuel filler neck to body.



M19 3231

7. Release clip from breather hose and disconnect breather hose from filler neck.
8. Release fuel tank vent pipe from filler neck.
9. Disconnect Lucar connector from fuel filler neck.



M19 3232

10. Remove bolt securing filler neck to body.
11. Remove tamper proof cover from filler hose clip and loosen clip.
12. Disconnect hose from filler neck and remove filler neck assembly.

Refit

1. Position filler neck assembly, connect to hose, secure clip and fit tamper proof cover.
2. Fit bolt securing filler neck to body and tighten to 9 Nm (7 lbf.ft).
3. Connect Lucar connector to fuel filler neck.

4. Position fuel tank vent pipe around filler neck.
5. Connect breather hose to filler neck, fit and secure clip.
6. Fit nuts securing fuel filler neck to body and tighten to 9 Nm (7 lbf.ft).
7. Clip escutcheon to fuel filler neck.
8. Fit fuel filler cap.
9. Fit RH rear wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
10. Connect battery earth lead.

Injector

🔧 ***19.60.10***

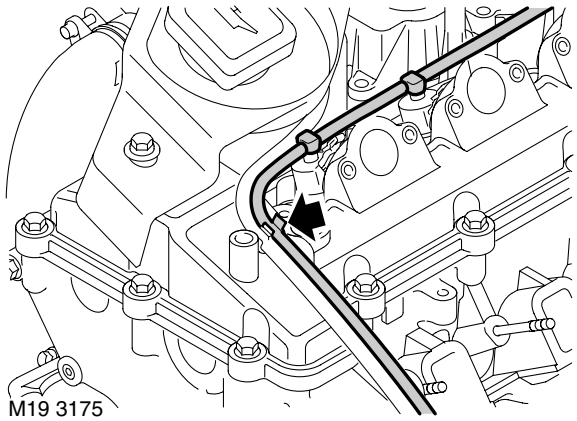
Remove

1. Disconnect battery earth lead.

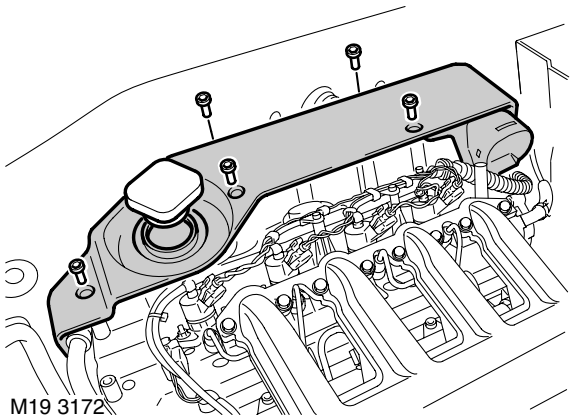
   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

2. Remove injector pipe.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Injector pipe.**
3. Cover engine air inlet tracts.

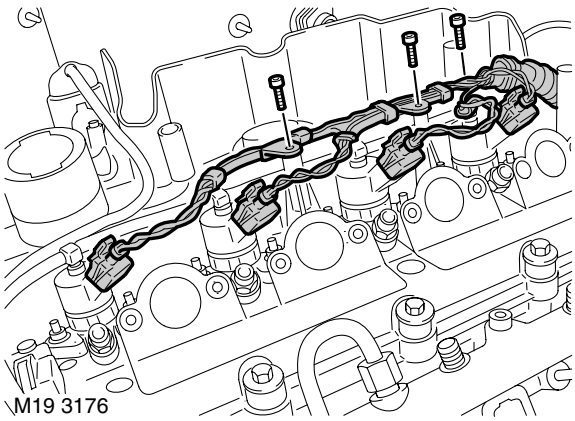
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.


M19 3175

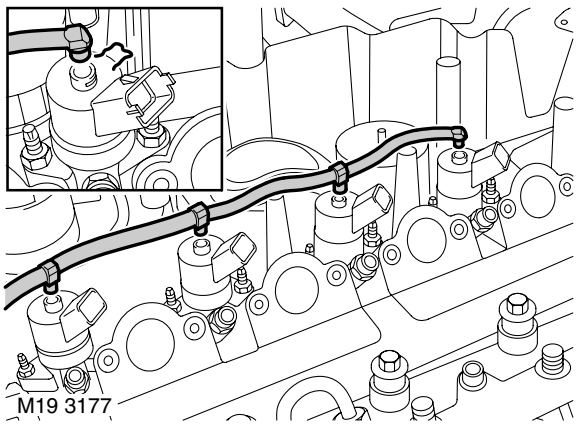
4. Release injector fuel return hose from clip on camshaft cover.



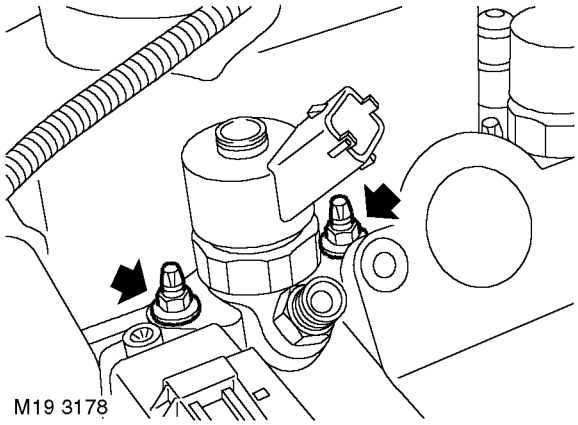
5. To remove No.1 injector only, remove oil filler cap, 5 screws and air cleaner cover.



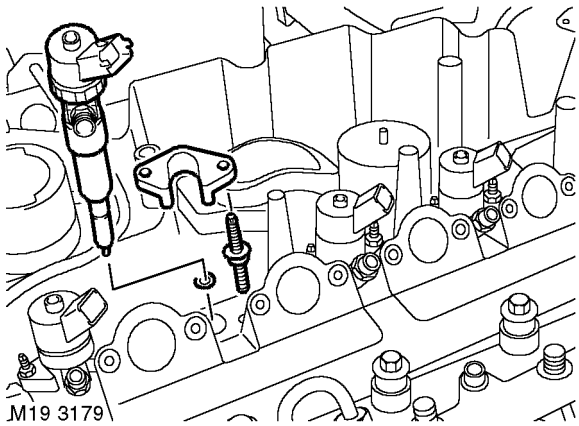
6. Disconnect multiplugs from injectors.
7. **To remove injector No 2, 3 or 4:** Remove 3 screws and move injector harness aside.



8. Depress closed end of clips and remove fuel return hoses from injector. Discard seals.



9. Remove 2 nuts securing injector.



10. Use Torx socket and rotate injector fixing studs anti-clockwise to extract injector.
11. Remove injector and clamp and discard sealing washer.

Refit

1. Clean injector and seat in cylinder head.
2. Tighten injector studs to 10 Nm (7 lbf.ft).
3. Using a new sealing washer refit injector and clamp.
4. Tighten injector clamp nuts to 10 Nm (7 lbf.ft).
5. Ensure fuel return hose connections are clean.
6. Fit new seals to fuel return hoses, depress clips and fit hoses to injectors.

7. If injector No. 2, 3 or 4 removed, position injector harness and secure with screws.
8. If injector No.1 removed, fit and secure air cleaner cover and fit oil filler cap.
9. Fit injector fuel return hose to camshaft cover clip.
10. Connect multiplugs to injectors.
11. Fit injector pipe.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Injector pipe.**
12. Connect battery earth lead.
13. Use TestBook to confirm correct operation.

Injector pipe

19.60.14

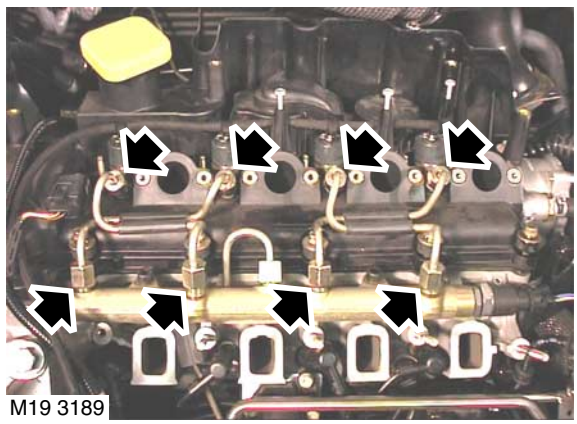
Remove

1. Disconnect battery earth lead.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

2. Remove inlet manifold gaskets.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.**
3. Position absorbent cloth to collect fuel spillage.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.


M19 3189

4. Remove clips from injector pipes.
5. Loosen unions and remove injector pipes.

   CAUTION: To prevent damage to components, use two spanners when loosening or tightening unions.

Refit

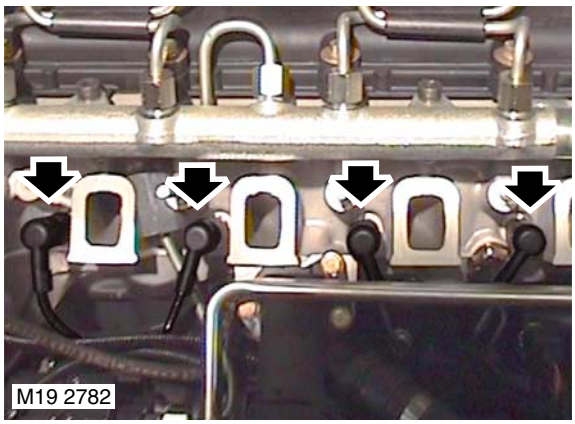
1. Clean injector pipe unions.
2. Fit injector pipes and tighten union nuts to 20 Nm (15 lbf.ft).
3. Fit clips to injector pipes.
4. Fit inlet manifold gaskets.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.**
5. Connect battery earth lead.

Glow plug

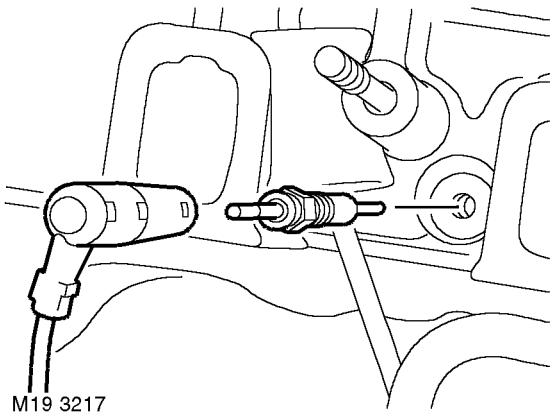
19.60.31

Remove

1. Disconnect battery earth lead.
2. Remove inlet manifold gaskets.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.



3. Remove connections from glow plugs.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.



4. Use a deep socket and remove 4 glow plugs.

Refit

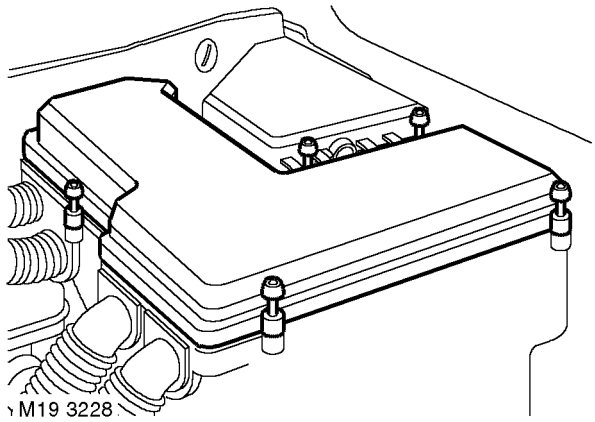
1. Thoroughly clean glow plugs and seating area in cylinder head.
2. Fit glow plugs and tighten to 20 Nm (15 lbf.ft).
3. Fit connections to glow plugs.
4. Fit inlet manifold gaskets.
   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Gaskets - induction manifold.
5. Connect battery earth lead.

Electronic control unit (ECU) - glow plugs

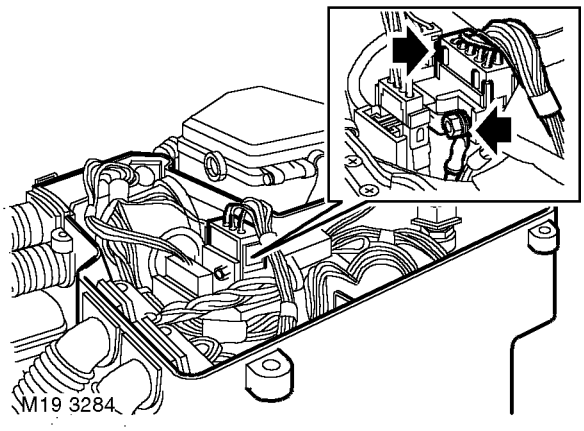
19.60.33

Remove

1. Disconnect battery earth lead.



2. Loosen 5 screws and remove 'E' - box lid.



3. Disconnect multiplug from glowplug ECU.
4. Remove nut securing lead to glowplug ECU, release lead and remove ECU.

Refit

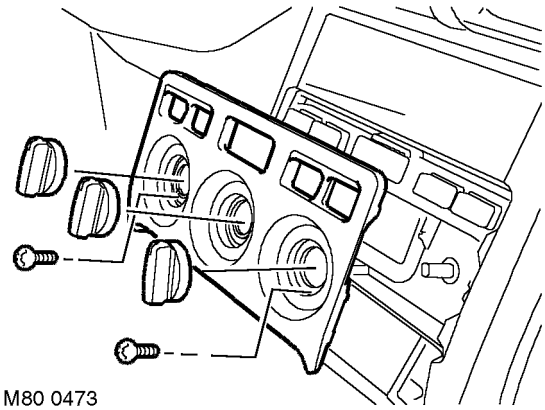
1. Fit glowplug ECU to 'E' box mounting.
2. Fit lead to glowplug ECU and secure with nut.
3. Connect multiplug to glowplug ECU.
4. Fit 'E' - box lid and tighten screws.
5. Connect battery earth lead.

Switch - cruise control

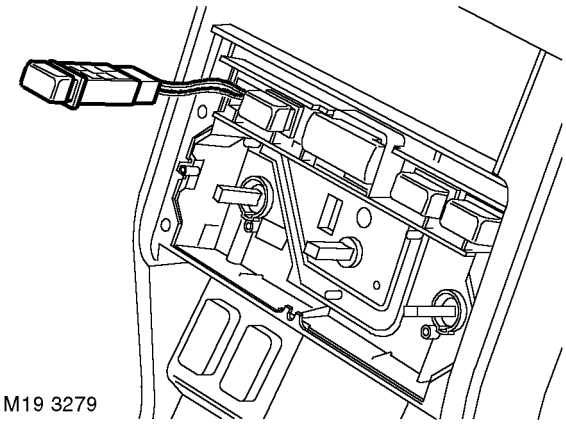
19.75.30

Remove

1. Remove radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.



2. Remove selector knobs from heater controls.
3. Remove 2 screws securing heater control finisher to heater controls and remove finisher.



4. Release cruise control switch, disconnect multiplug and remove switch.

Refit

1. Position cruise control switch, connect multiplug and secure switch.
2. Fit heater control finisher to heater controls and secure with screws.
3. Fit heater control knobs.
4. Fit radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.

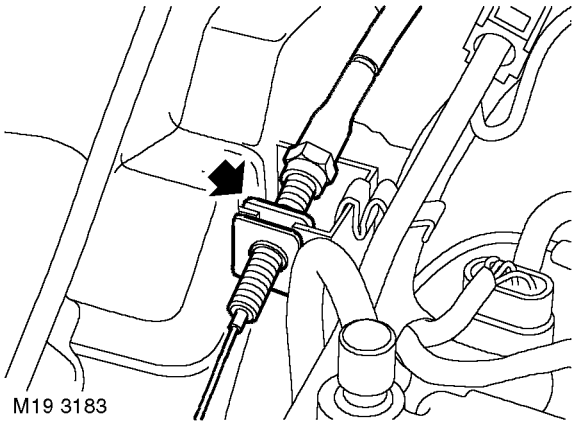
Throttle cable - check and adjust - KV6

19.20.05

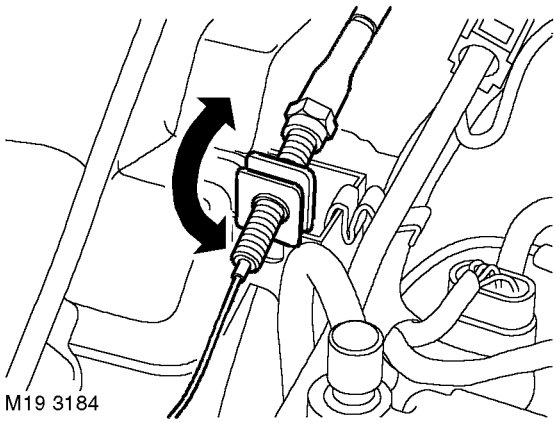
Check

1. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
2. Before adjusting cable, ensure that cable is correctly routed and located.

Adjust



1. Release cable adjusting nut from abutment bracket.



2. Hold throttle cam in fully closed position.
3. Rotate adjusting nut until all slack is taken out of inner cable and nut is in contact with rear face of abutment bracket. Ensure throttle does not open.
4. Fit throttle cable adjusting nut in abutment bracket.
5. Operate throttle pedal and ensure that full throttle pedal movement is available.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

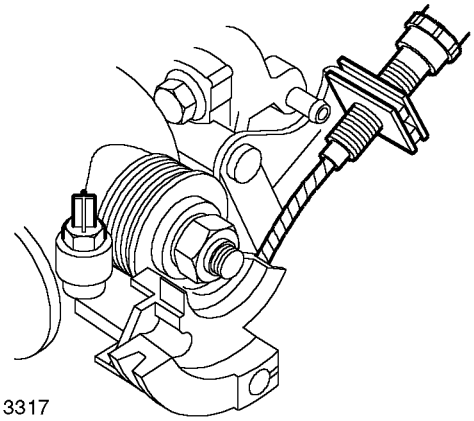
Throttle cable - check and adjust - K1.8

19.20.05

Check

1. Before adjusting cable, ensure that cable is correctly routed and located.

Adjust


M19 3317

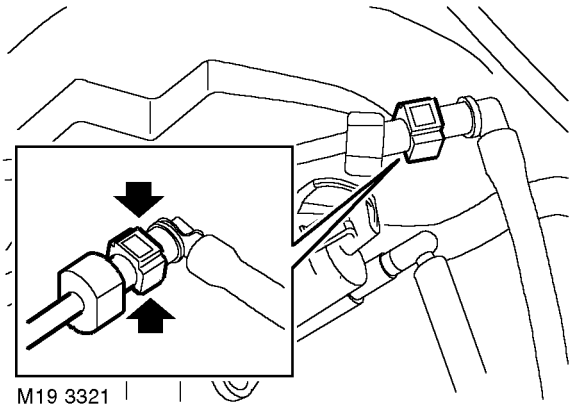
1. Release cable adjusting nut from abutment bracket.
2. Hold throttle cam in fully closed position.
3. Rotate adjusting nut until all slack is taken out of inner cable and nut is in contact with rear face of abutment bracket. Ensure throttle does not open.
4. Fit throttle cable adjusting nut in abutment bracket.
5. Operate throttle pedal and ensure that full throttle pedal movement is available.

Fuel system - depressurise - KV6 - Non NAS

19.50.02

Check

1. Remove acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
2. Position absorbent cloth around fuel feed pipe connection to collect spillage.
   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.


M19 3321

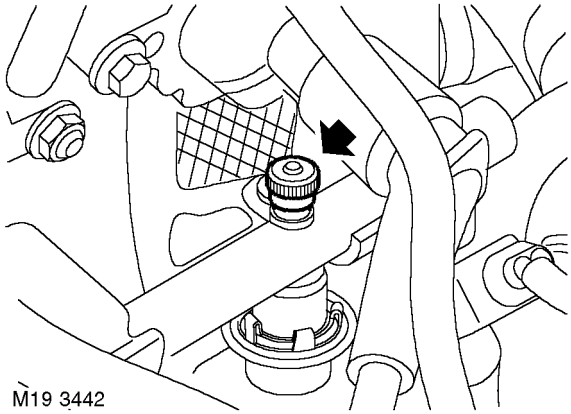
3. Pull back cover from hose connector and carefully release connector.
   WARNING: Depressurise the system before disconnecting any components. Fuel pressure will be present in the system even if the ignition has been switched off for some time.
4. Secure connector once pressure has been relieved.
5. Fit acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

Fuel system - depressurise - KV6 - NAS

19.50.02

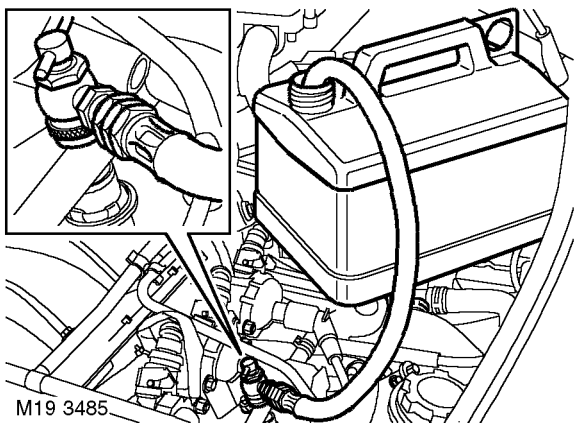
Check

1. Remove acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
2. Remove nut and bolt securing coil and position coil aside.



3. Remove schraeder valve cap.
4. Position absorbent cloth around fuel feed pipe connection to collect spillage.

   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



5. Connect adapter **LRT-19-006** to schraeder valve.
6. Position opposite end of adapter **LRT-19-006** into container, turn tap to release pressure.
7. Remove adapter **LRT-19-006** from schraeder valve.
8. Fit cap to schraeder valve.
9. Fit acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

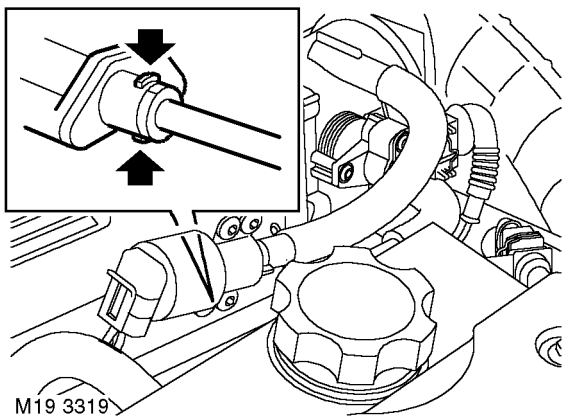
Fuel system - depressurise - K1.8

19.50.02

Check

1. Position absorbent cloth around fuel feed pipe connection to collect spillage.

   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



2. Disconnect fuel feed hose from fuel rail.
3. Connect feed hose to fuel rail once pressure has relieved.

Fuel system - pressure test - KV6 - Non NAS

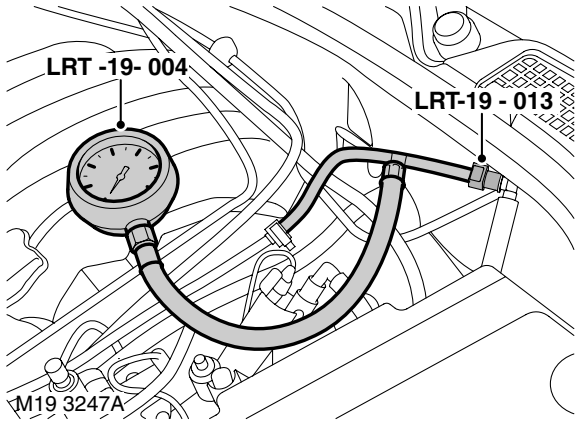
19.50.13

Check

1. Remove engine acoustic cover.

   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
2. Position absorbent cloth around fuel feed pipe connection to collect spillage.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.



3. Disconnect fuel inlet hose from fuel rail pipe.
4. Connect adaptor **LRT-19-013,** to pressure gauge **LRT-19-004** .
5. Position pressure gauge **LRT-19-004**, connect to fuel inlet hose and to fuel rail pipe, securing pressure gauge hose to fuel rail pipe with clip.
6. Start engine. Pressure at idle = 3.4 bar. If pressure below 3.4 bar suspect the following in order: fuel hoses, filter, regulator and pump.
7. Stop engine.
8. Release clip and disconnect **LRT-19-004** pressure gauge from fuel inlet hose and fuel rail pipe.
9. Disconnect adaptor **LRT-19-013** from **LRT-19-004** pressure gauge.
10. Connect fuel inlet hose to fuel rail pipe.
11. Fit engine acoustic cover.

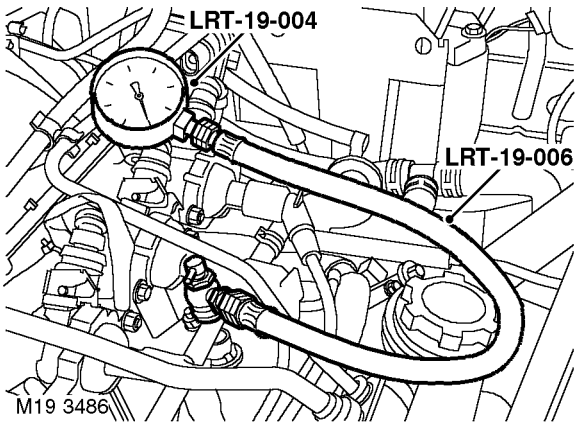
    ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

Fuel system - pressure test - KV6 - NAS

19.50.13

Remove

1. Remove acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
2. Position absorbent cloth beneath fuel rail.
   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.



3. Connect adaptor **LRT-19-006,** to pressure gauge **LRT-19-004** .
4. Remove schraeder valve cap.
5. Connect pressure gauge to fuel rail schraeder valve.
6. Start engine. Pressure at idle = 3.4 bar. If pressure is below 3.4 bar, suspect the following in order: fuel hoses, filter, regulator and pump.

Refit

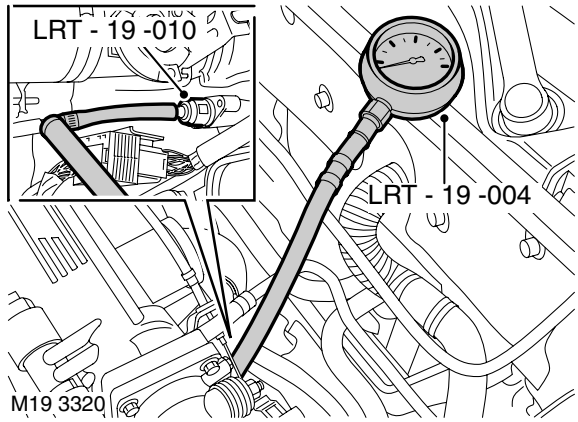
1. Stop engine.
2. Disconnect pressure gauge **LRT-19-006** and adapter **LRT-19-004** from fuel rail.
3. Fit acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

Fuel system - pressure test - K1.8

19.50.13

Check

1. Disconnect battery earth lead.
2. Position absorbent cloth beneath fuel pipe to catch spillage.
   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.



3. Disconnect fuel pipe from inlet manifold.
4. Connect adaptor **LRT-19-010** to **LRT-19-004** pressure gauge.
5. Connect adaptor **LRT-19-010** and pressure gauge **LRT-19-004** to manifold and fuel pipe.
6. Connect battery earth lead.
7. Start engine. Pressure at idle = 3.5 bar ± 0.2 bar.
8. Release clip, disconnect and plug fuel pressure regulator vacuum hose.
9. Start engine. Pressure at idle = 3.0 bar ± 0.2 bar.
10. Stop engine. If pressure is out of tolerance suspect the following in order: fuel hoses, regulator, filter and pump.
11. Remove plug, reconnect vacuum hose and secure hose with clip.
12. Disconnect battery earth lead.
13. Disconnect pressure gauge **LRT-19-004** and adaptor **LRT-19-010** from fuel pipe and manifold.
14. Disconnect adaptor **LRT-19-010** from **LRT-19-004** pressure gauge.
15. Connect fuel pipe to manifold.
16. Connect battery earth lead.

Fuel tank - drain

19.55.02

Drain

1. Disconnect both battery leads, negative lead first.
2. Remove fuel pump assembly.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.
3. Using a fuel recovery appliance, drain the fuel from the tank into a sealed container. Follow the manufacturer's instructions for the connection and safe use of the appliance.

   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

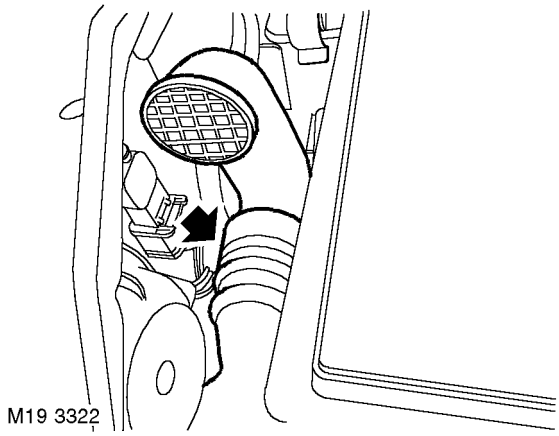
Refill

1. Fit fuel pump assembly.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.
2. Connect battery leads, earth lead last.

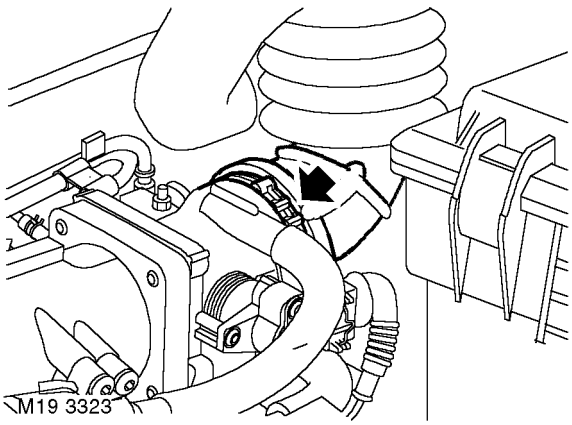
Air cleaner - K1.8

19.10.01

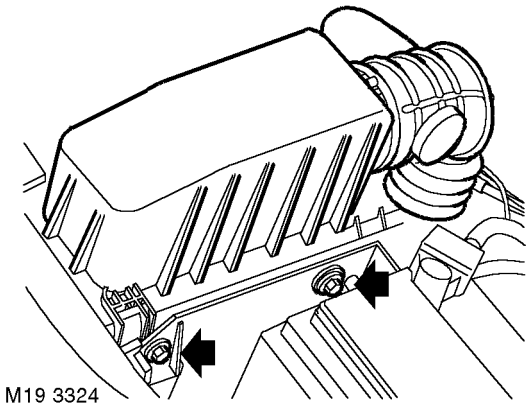
Remove



1. Release air intake duct from air cleaner.



2. Remove clip and disconnect air intake hose from throttle housing.



3. Remove 2 bolts securing air cleaner to battery tray.
4. Remove air cleaner assembly.

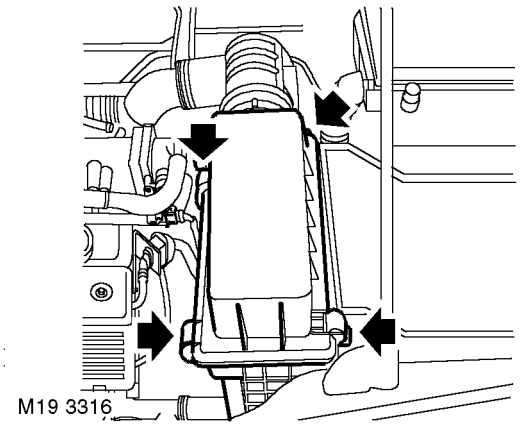
Refit

1. Position air cleaner assembly.
   NOTE: Ensure bottom of air cleaner is located on peg.
2. Fit bolts and tighten to 9 Nm (7 lbf.ft).
3. Connect air intake hose to throttle housing and secure with clip.
4. Connect air intake duct to air cleaner.

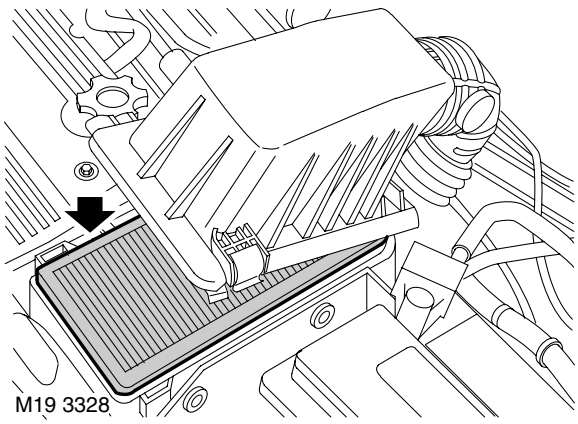
Element - air cleaner - K1.8

19.10.10

Remove


M19 3316

1. Release 4 clips securing air cleaner top casing.
2. Release casing and position aside.


M19 3328

3. Remove air cleaner element.

Refit

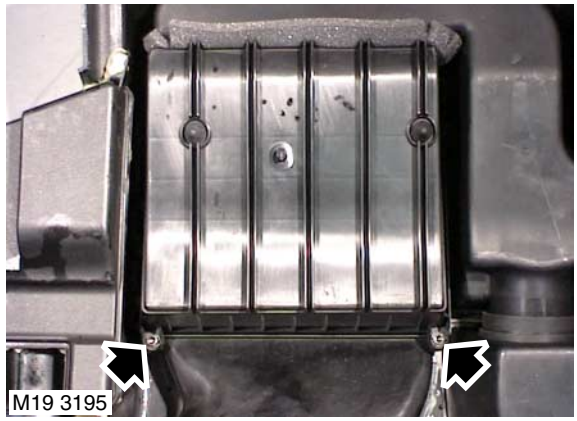
1. Clean inside of air cleaner.
2. Fit air cleaner element.
3. Position casing and secure with clips.

Element - air cleaner - KV6

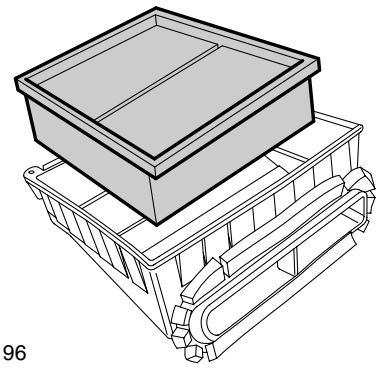
19.10.10

Remove

1. Remove acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.


M19 3195

2. Remove 2 screws securing air cleaner element cartridge to acoustic cover.


M19 3196

3. Release cartridge from acoustic cover and remove air cleaner element from cartridge.

Refit

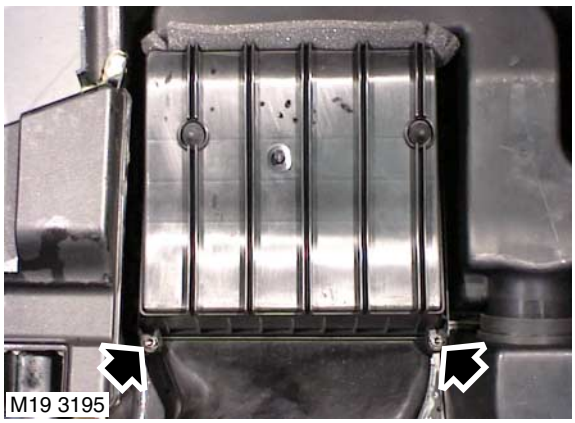
1. Clean air cleaner element cartridge.
2. Fit new air cleaner element in cartridge.
3. Position cartridge to acoustic cover, fit and tighten screws.
4. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.

Element - air cleaner - KV6 - NAS

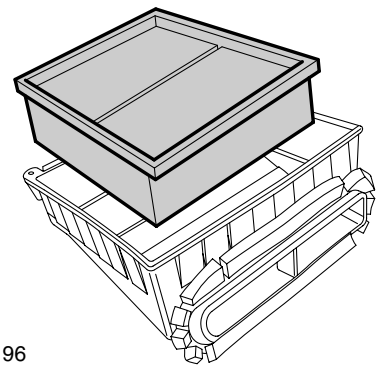
19.10.10

Remove

1. Remove acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
2. Remove 2 screws securing heat shield to acoustic cover, remove heat shield.


M19 3195

3. Remove 2 screws securing air cleaner element cartridge to acoustic cover.


M19 3196

4. Remove cartridge from acoustic cover and remove element.

Refit

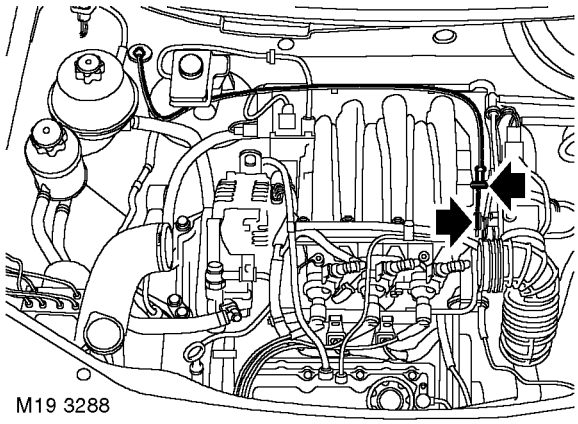
1. Clean cover and cartridge.
2. Fit element, fit cartridge to cover and secure with screws.
3. Fit heat shield and secure with screws.
4. Fit engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**

Cable - throttle - KV6

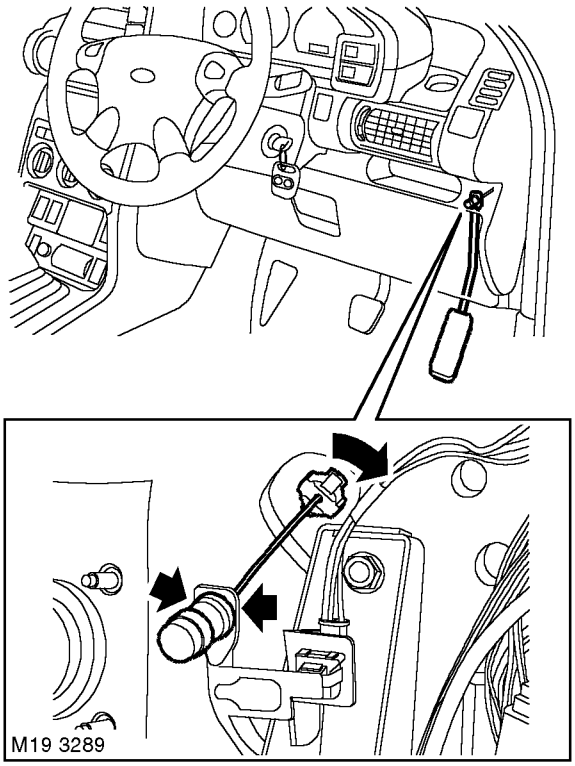
19.20.06

Remove

1. Remove engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**


M19 3288

2. Release throttle cable from clips on harness brackets.
3. Release throttle cable from abutment bracket and disconnect cable from throttle body cam.



4. Release clip securing throttle inner cable to throttle pedal and disconnect inner cable from pedal.
5. Rotate throttle outer cable to release from bulkhead and remove cable from vehicle.

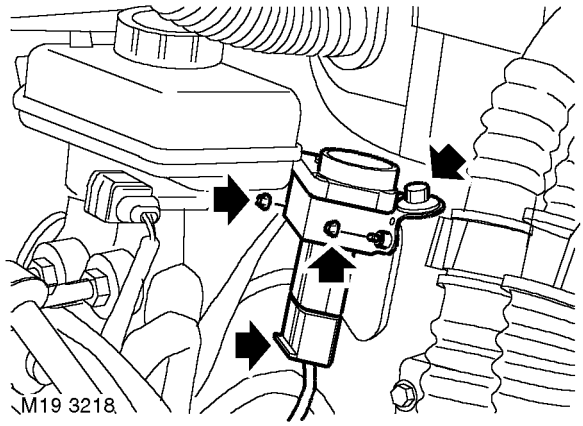
Refit

1. Position cable, secure to bulkhead and connect inner cable to throttle pedal.
2. Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket.
3. Secure throttle cable in clips on harness brackets.
4. Adjust throttle cable.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - KV6.**
5. Fit engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**

Switch - inertia

19.22.09

Remove



1. Disconnect multiplug from fuel cut-off switch.
2. Remove bolt securing fuel cut-off switch bracket to bulkhead.
3. Remove fuel cut-off switch from bulkhead.
4. Remove 2 nuts securing fuel cut-off switch to bracket.
5. Remove fuel cut-off switch from bracket.

Refit

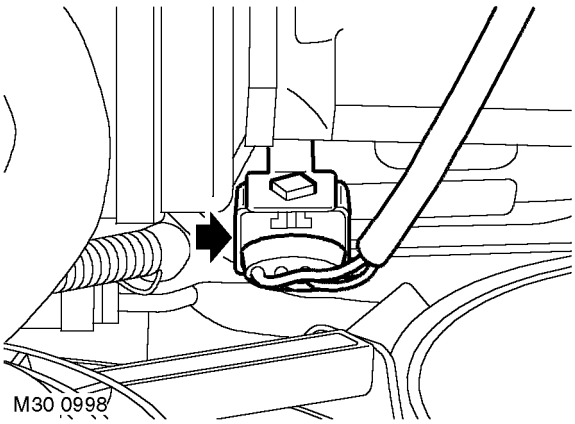
1. Position fuel cut-off switch to bracket.
2. Fit nuts securing fuel cut-off switch to bracket and tighten to 2 Nm (1.5 lbf.ft).
3. Position fuel cut-off switch bracket to bulkhead.
4. Fit and tighten bolt securing fuel cut-off switch bracket to bulkhead.
5. Connect multiplug to fuel cut-off switch.
6. To set the fuel cut-off switch, depress the top of the fuel cut-off switch.

Sensor - heated oxygen (H02S) - pre-catalyst - LH - KV6 - Non NAS

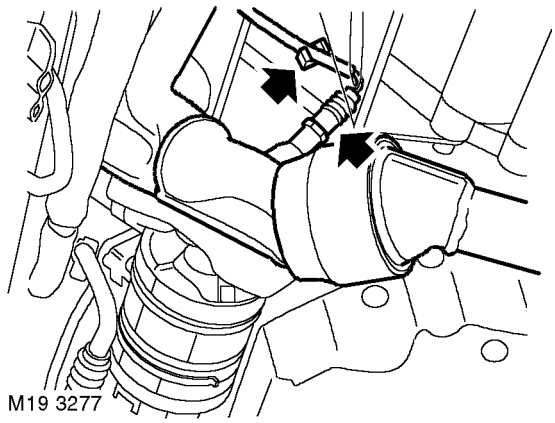
19.22.16

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



3. Release and disconnect HO2S multiplug.



4. Release HO2S harness from clip.
5. Remove HO2S from LH exhaust manifold.

Refit

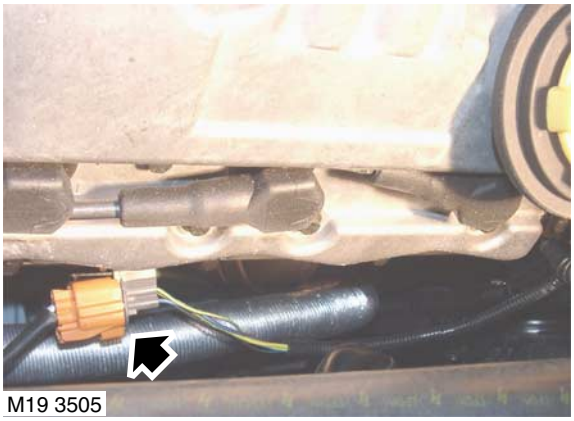
1. Clean HO2S and exhaust manifold mating face.
2. Fit HO2S and tighten to 55 Nm (41 lbf.ft).
3. Connect multiplug to HO2S, and secure to support bracket and harness clip.
4. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
5. Remove stand(s) and lower vehicle.

Sensor - heated oxygen (H02S) - pre-catalyst - LH - KV6 - NAS

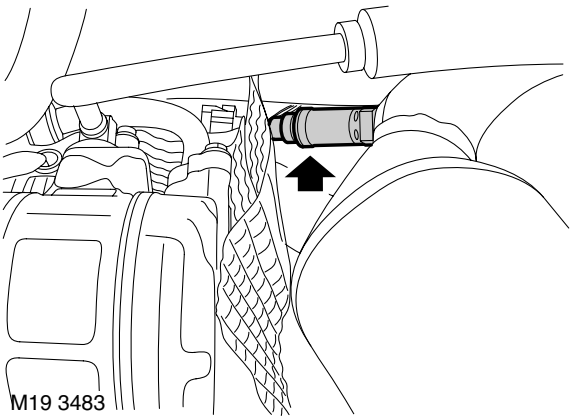
19.22.16

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
3. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M19 3505

4. Release and disconnect HO2S multiplug.
5. Release HO2S harness from clip.


M19 3483

6. Remove HO2S.

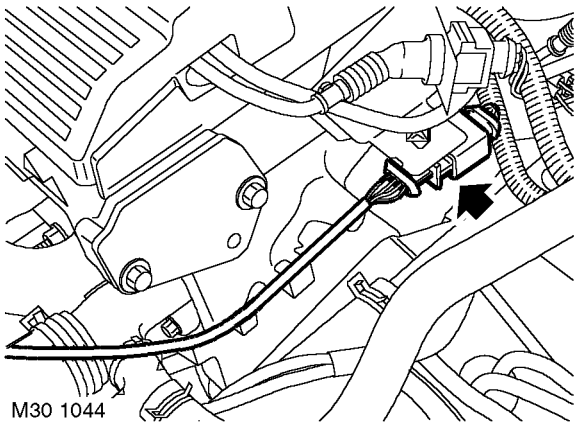
Refit

1. Clean HO2S and mating face.
2. Fit H02S and tighten to 55 Nm (40 lbf.ft).
3. Connect H02S multiplug and fit to bracket.
4. Fit H02S harness to clip.
5. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

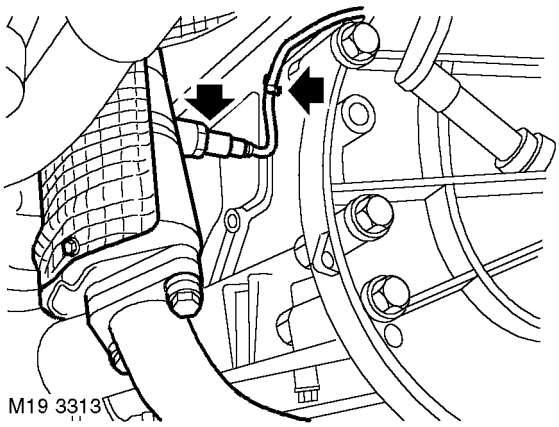
Sensor - heated oxygen (H02S) - front - K1.8

19.22.16

Remove



1. Release and disconnect HO2S multiplug.



2. Release HO2S harness from clip on cylinder block.
3. Using a 22 mm crowsfoot spanner, remove HO2S.

Refit

1. Clean HO2S, sealing washer and mating faces.
2. Fit HO2S and tighten to 55 Nm (41 lbf.ft).
3. Connect HO2S multiplug and secure to support bracket.
4. Secure HO2S harness to cylinder block clip.

Sensor - heated oxygen (H02S) - pre-catalyst - RH - KV6 - Non NAS

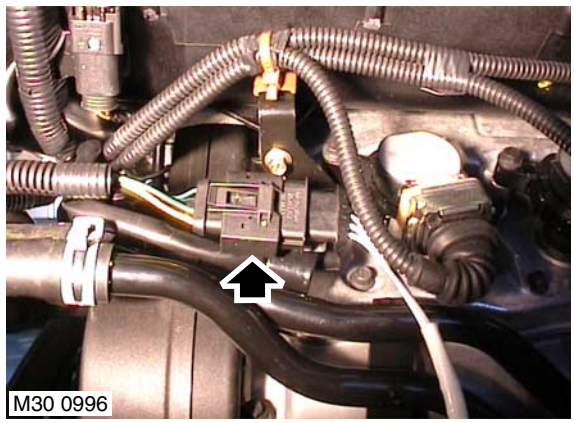
19.22.17

Remove

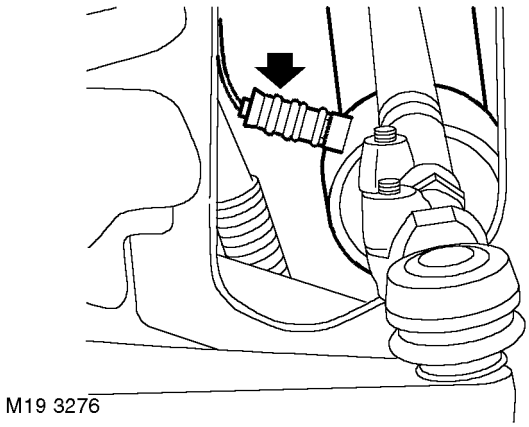
1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove LH front road wheel.



3. Release RH HO2S multiplug from coolant rail bracket and disconnect multiplug.



4. Remove HO2S from RH exhaust manifold.

Refit

1. Clean HO2S and exhaust manifold mating face.
2. Fit HO2S and tighten to 55 Nm (41 lbf.ft).
3. Connect RH HO2S multiplug, secure multiplug in coolant rail bracket.

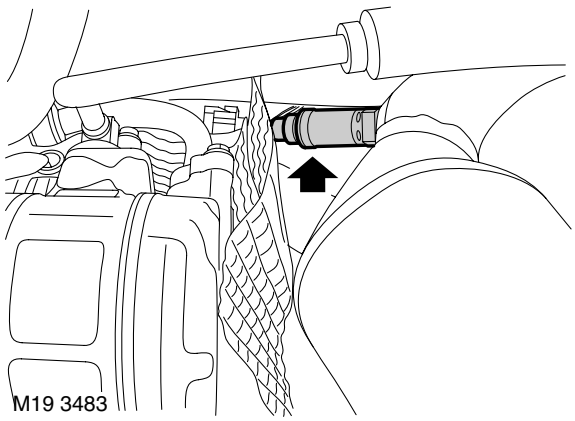
4. Fit LH front road wheel and tighten nuts to 115 Nm (85 lbf.ft).
5. Remove stands and lower vehicle.

Sensor - heated oxygen (H02S) pre-catalyst - RH - KV6 - NAS

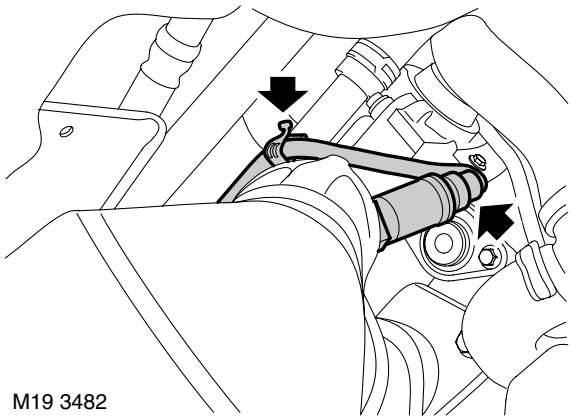
19.22.17

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Release and disconnect HO2S multiplug.



4. Release HO2S harness from clips.
5. Remove HO2S.

Refit

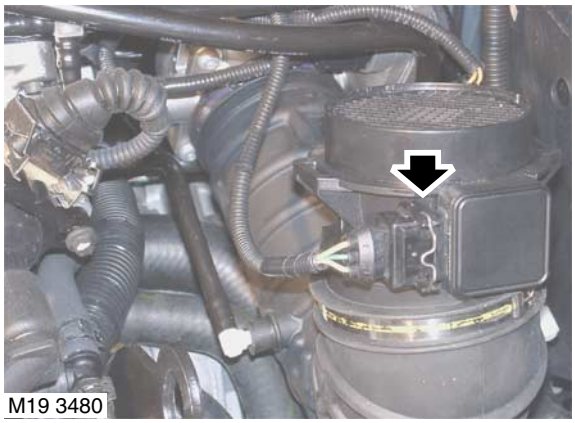
1. Clean HO2S and mating face.
2. Fit H02S and tighten to 55 Nm (40 lbf.ft).
3. Connect H02S multiplug and fit to bracket.
4. Fit harness into clips.
5. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
6. Connect battery earth lead.

Sensor - mass air flow (MAF) - NAS

19.22.25

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.


M19 3480

3. Disconnect multiplug from MAF sensor.
4. Release clip and remove MAF sensor.

Refit

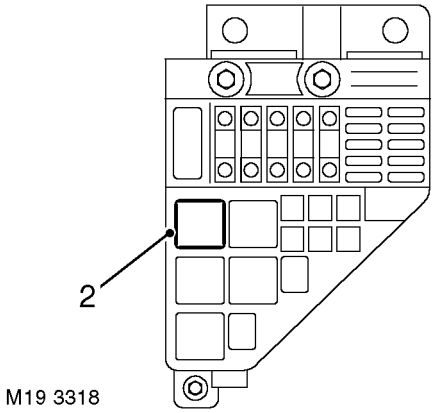
1. Fit MAF sensor and secure with clip.
2. Connect multiplug to MAF sensor.
3. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
4. Connect battery earth lead.

Relay - fuel pump

19.22.39

Remove

1. Open engine compartment fuse box.



M19 3318

2. Identify and remove fuel pump relay.

Refit

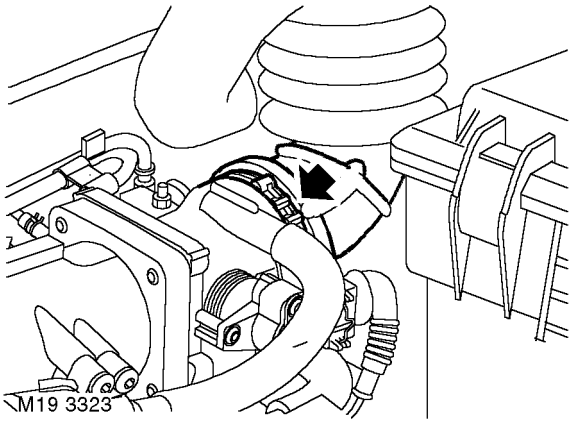
1. Fit fuel pump relay.
2. Close engine compartment fuse box.

Throttle housing - K1.8

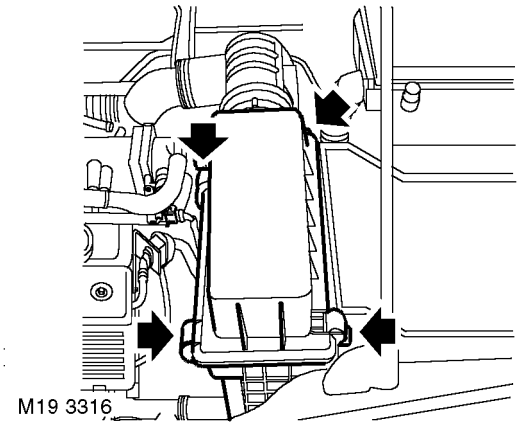
19.22.45

Remove

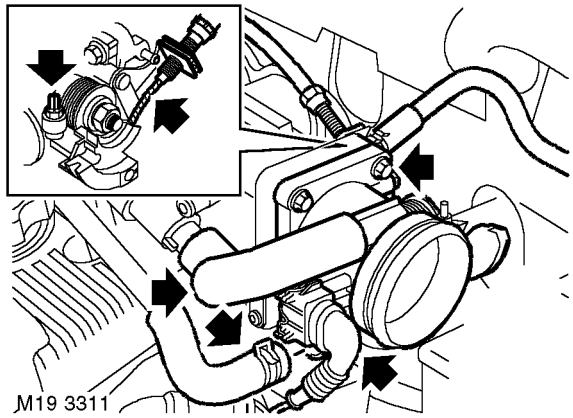
1. Disconnect battery earth lead.



2. Remove clip and disconnect air intake hose from throttle housing.



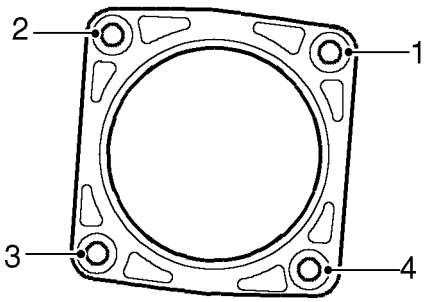
3. Release 4 clips and remove lid from air cleaner.



4. Disconnect idle air control valve (IACV) hose from throttle housing.
5. Disconnect multiplug from throttle position sensor.
6. Release clip and disconnect breather hose from throttle housing.
7. Release throttle cable adjusting nut from abutment bracket.
8. Disconnect throttle cable from throttle cam.
9. Remove 4 bolts securing throttle housing to inlet manifold.
10. Remove throttle housing.
11. Remove and discard 'O' ring from throttle housing.

Refit

1. Clean mating faces of throttle housing and inlet manifold.
2. Lubricate new 'O' ring with silicone grease and fit to throttle housing.
3. Position throttle housing to inlet manifold, align harness bracket and fit bolts finger tight.



M19 3312

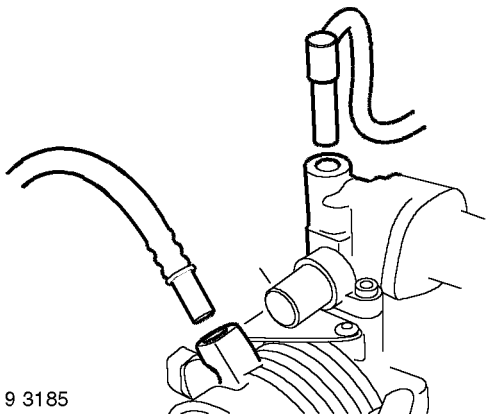
4. Tighten bolts in the sequence shown using the following procedure.
   - **a** Tighten to 4 Nm (3 lbf.ft).
   - **b** Back off one flat.
   - **c** Tighten to 9 Nm (7 lbf.ft).
5. Connect throttle cable to throttle cam.
6. Locate throttle cable adjusting nut in abutment bracket.
7. Connect breather hose to throttle housing and secure with clip.
8. Connect multiplug to throttle position sensor.
9. Fit IACV hose and align orientation marks.
10. Fit lid to air cleaner and secure clips.
11. Connect air intake hose to throttle housing and secure with clip.
12. Connect battery earth lead.
13. Retune using Testbook.

Throttle housing - KV6 - Non NAS

19.22.45

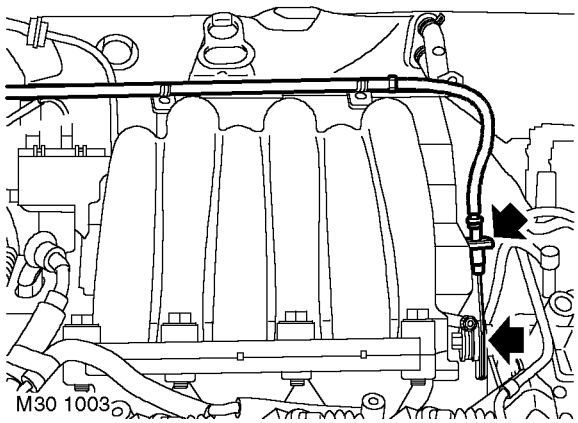
Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



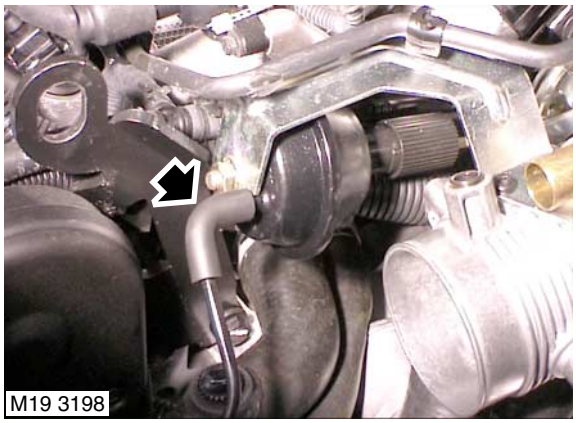
M19 3185

3. Depress locking collars and release engine breather/vacuum pipes from throttle and IACV.

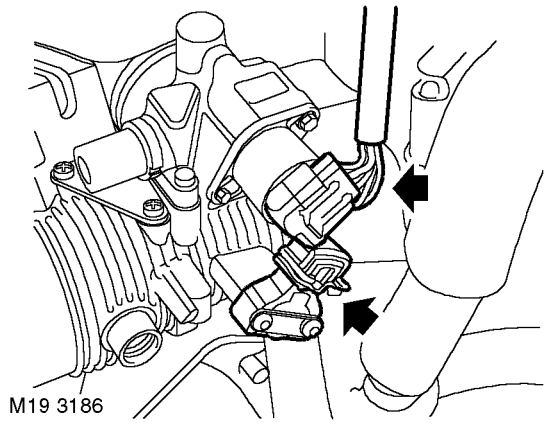


M30 1003

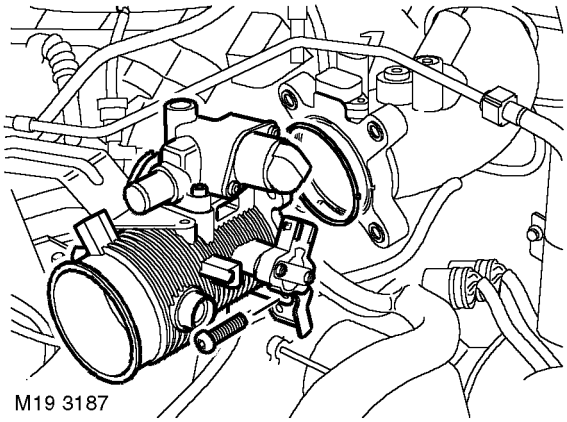
4. Release throttle cable from abutment bracket and disconnect cable from throttle body cam.


M19 3198

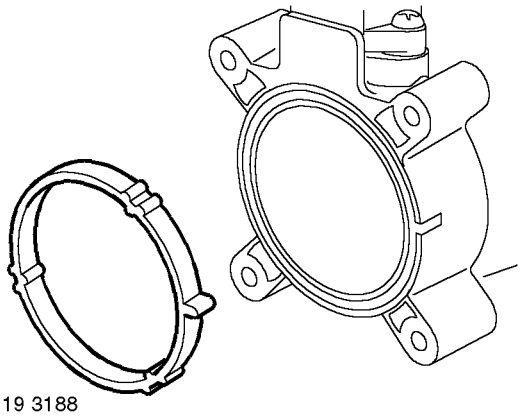
5. **Vehicles with cruise control:** Disconnect vacuum hose from cruise control actuator.


M19 3186

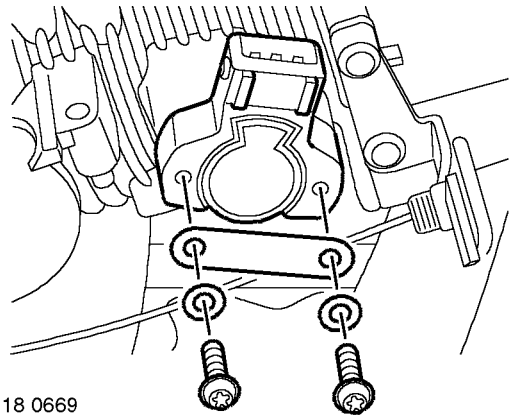
6. Disconnect multiplugs from primary TP sensor and IACV.


M19 3187

7. Remove 4 Torx screws securing throttle body to inlet manifold chamber, remove throttle body.

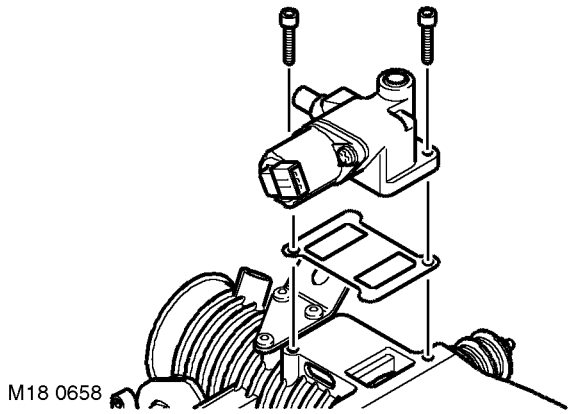

M19 3188

8. Remove and discard throttle body seal from inlet manifold chamber.
9. **Vehicles with cruise control:** Disconnect actuator arm from throttle linkage, remove 3 Torx screws securing actuator support bracket to throttle body and remove actuator assembly.


M18 0669

10. Remove and discard 2 Torx screws and wave washers securing primary TP sensor to throttle body. Remove primary TP sensor and specification plate.

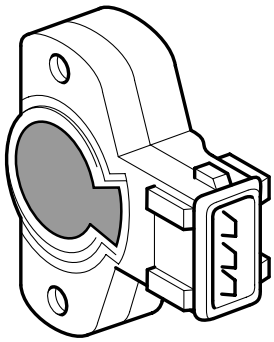
    CAUTION: Do not twist or apply leverage to throttle position sensor.


M18 0658

11. Remove 2 Allen screws securing IACV to throttle body, remove IACV and discard gasket.

Refit

1. Clean mating faces of IACV and throttle body.
2. Fit new gasket, position IACV to throttle body, fit and tighten Allen screws to 6 Nm (4.5 lbf.ft).
3. Clean TP sensor and throttle body mating face.


M18 0695

4. Fit TP sensor to throttle spindle. Ensure that during fitting the machined flat on the throttle spindle is aligned with the mating portion of the TP sensor

CAUTION: The throttle position sensor can be easily damaged during fitting. When pressing the sensor onto the throttle spindle, use fingers only, and only apply pressure to the area shown shaded in the illustration.

5. Rotate TP sensor in an anti-clockwise direction to align fixing holes.

CAUTION: Do not rotate throttle position sensor in a clockwise direction and ensure that it is not rotated beyond its internal stops.

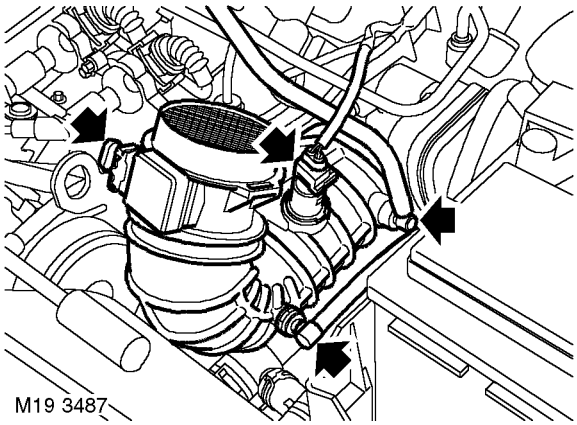
6. Fit TP sensor specification plate.
7. Fit new Torx screws and wave washers, tighten Torx screws to 1.5 Nm _1.0 lbf.ft).
8. **Vehicles with cruise control:** Position actuator support bracket to throttle body. Fit Torx screws and tighten to 9 Nm (7 lbf.ft). Connect actuator arm to throttle linkage.
9. Clean throttle body and mating face on inlet manifold chamber.
10. Fit new seal to inlet manifold chamber.
11. Position throttle body to inlet manifold chamber, fit and tighten Torx screws to 7 Nm (5 lbf.ft).
12. Connect multiplugs to TP sensor and IACV.
13. **Vehicles with cruise control:** Connect cruise control actuator vacuum hose.
14. Connect primary throttle cable to throttle cam and abutment bracket.
15. Connect engine breather/vacuum pipes to throttle body and IACV.
16. Adjust throttle cable.
☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - KV6.**
17. Connect battery earth lead.
18. Fit engine acoustic cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
19. Retune using TestBook

Throttle housing - KV6 - NAS

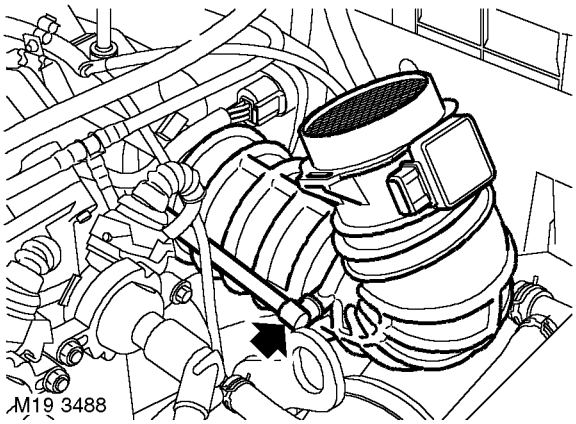
19.22.45

Remove

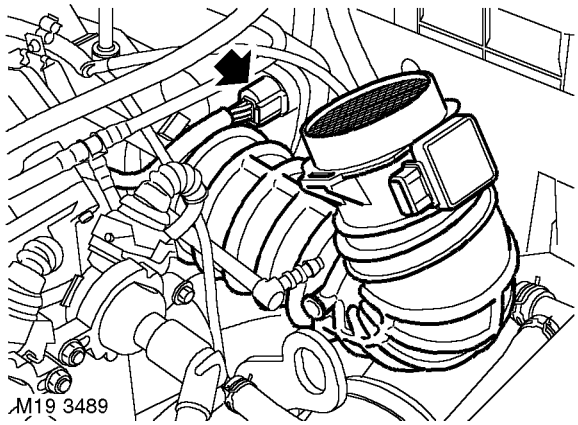
1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



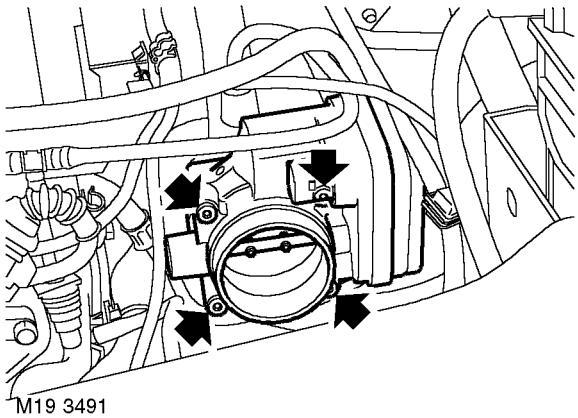
3. Disconnect multiplug from MAF sensor.
4. Disconnect multiplug from IAT sensor.
5. Release clip and disconnect vacuum enhancer from intake hose.



6. Disconnect engine breather pipe from intake hose.
7. Disconnect injector air supply pipe from intake hose.



8. Disconnect multiplug from throttle body.
9. Release clip and remove intake hose and MAF sensor assembly.



10. Remove 4 Torx screws securing throttle body.
11. Remove throttle body and discard gasket.

Refit

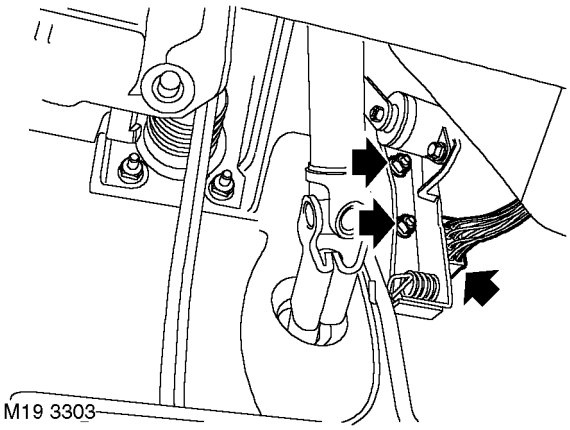
1. Clean throttle body and mating face.
2. Using a new seal, fit throttle body and tighten Torx screws to 7 Nm (5.2 lbf.ft).
3. Connect multiplug to throttle body.
4. Fit intake hose assembly and secure with clip.
5. Connect engine breather pipe.
6. Connect injector air supply pipe.
7. Connect vacuum enhancer and secure with clip.
8. Connect IAT sensor multiplug.
9. Connect multiplug to MAF sensor.
10. Fit engine acoustic cover.
    ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
11. Connect battery earth lead.

Sensor - throttle position (TP) - NAS

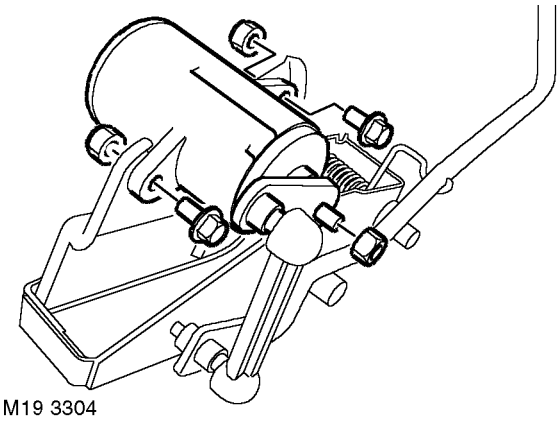
19.22.49

Remove

1. Disconnect battery earth lead.


M19 3303

2. Remove 2 nuts and release throttle pedal from studs.
3. Release TP sensor multiplug from bracket and disconnect from main harness.


M19 3304

4. Remove nut and release lever from sensor.
5. Remove 2 nuts and bolts and remove sensor.

Refit

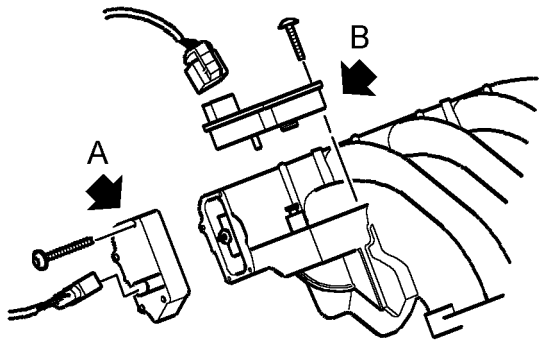
1. Fit TP sensor and tighten nuts and bolts to 10 Nm (7 lbf.ft).
2. With throttle pedal held closed, fit lever to sensor and tighten nut to 10 Nm (7 lbf.ft).
3. Position throttle pedal, connect multiplug and secure to pedal bracket.
4. Fit pedal to studs and tighten nuts to 25 Nm (18 lbf.ft).
5. Connect battery earth lead.
6. Use TestBook to confirm correct operation.

Variable Induction System (VIS) motor - KV6

19.22.64

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



M19 3275

a Balance valve VIS motor.
b Power valve VIS motor.

3. Disconnect multiplug from VIS motor to be removed.
4. Remove 4 screws securing VIS motor to inlet manifold chamber.
5. Carefully remove VIS motor from inlet manifold chamber.

Refit

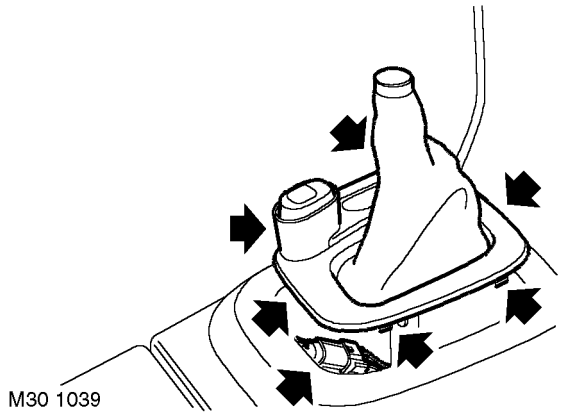
1. Clean VIS motor and manifold chamber mating faces.
2. Ensure that the seal which is already fitted on the new VIS motor is correctly positioned.
3. Fit VIS motor, carefully locating drive pin into groove and seal correctly positioned on the manifold chamber.
4. Fit and tighten screws securing VIS motor to inlet manifold chamber to 1.7 Nm (1.25 lbf.ft).
5. Connect multiplug to VIS motor.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

Sensor - heated oxygen (H02S) - post catalyst - LH - KV6 - Non NAS

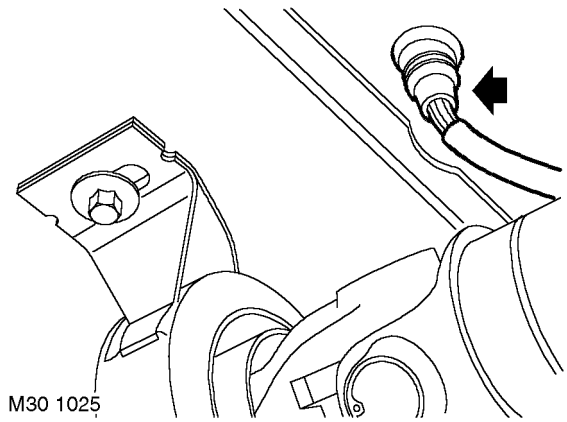
19.22.71

Remove

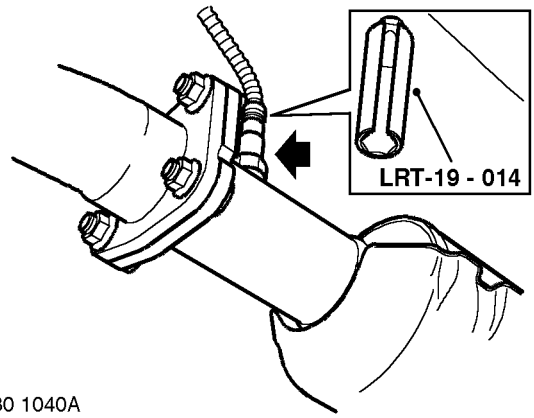
1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove gear selector knob.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gear knob.



3. Release clips securing selector lever trim panel to centre console and move trim panel aside.
4. Disconnect HO2S multiplug from harness.



5. Release grommet and withdraw HO2S harness multiplug through grommet aperture.



6. Remove HO2S.

Refit

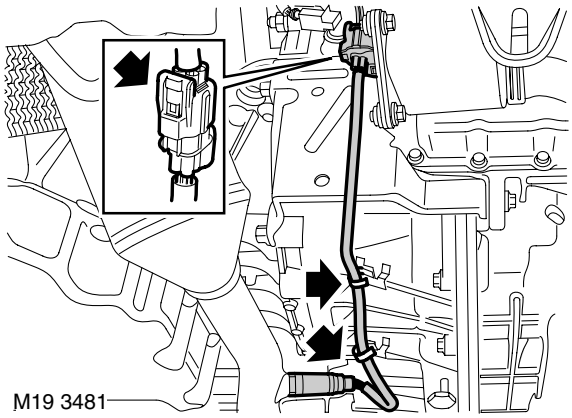
1. Clean HO2S and mating face.
2. Fit HO2S and tighten to 55 Nm (41 lbf.ft) using tool **LRT-19-014.**
3. Feed HO2S harness through grommet aperture and secure grommet.
4. Connect HO2S multiplug.
5. Fit trim panel and gaiter to centre console and secure clips.
6. Fit gear selector knob.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gear knob.
7. Remove stand(s) and lower vehicle.

Sensor - heated oxygen (H02S) - post catalyst - LH - KV6 - NAS

19.22.71

Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle and support on stands.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



3. Release HO2S harness from clips.
4. Release and disconnect HO2S multiplug.
5. Remove HO2S.

Refit

1. Clean HO2S and mating face.
2. Fit H02S and tighten to 55 Nm (40 lbf.ft).
3. Connect H02S multiplug and fit to bracket.
4. Fit harness into clips.
5. Remove stands and lower vehicle.
6. Connect battery earth lead.

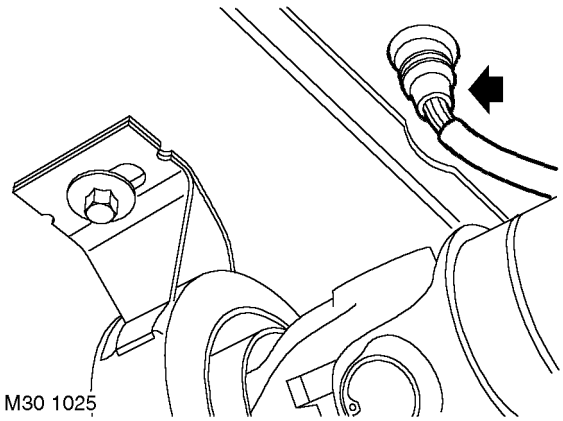
Sensor - heated oxygen (H02S) - post cat - front - K1.8

19.22.71

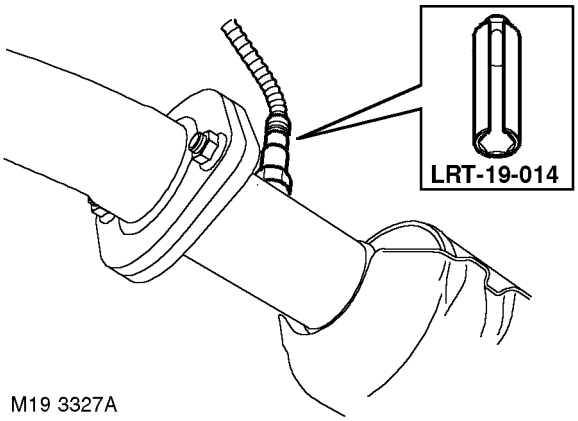
Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Release clips securing gear lever gaiter to centre console.
3. Disconnect HO2S multiplug from harness.



4. Release grommet and withdraw HO2S harness multiplug through grommet aperture.



5. Remove HO2S.

Refit

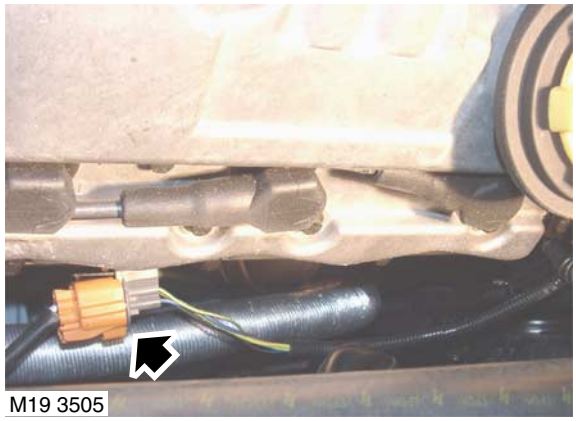
1. Clean HO2S and mating face.
2. Fit HO2S and tighten to 55 Nm (41 lbf.ft) using tool **LRT-19-014.**
3. Feed HO2S harness through grommet aperture and secure grommet.
4. Connect HO2S multiplug.
5. Fit gaiter to centre console and secure with clips.
6. Remove stand(s) and lower vehicle.

Sensor - heated oxygen (H02S) - post catalyst - RH - KV6 - NAS

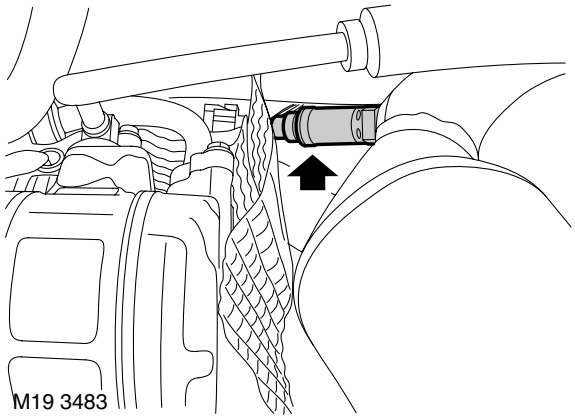
19.22.72

Remove

1. Disconnect battery earth lead.
2. Raise vehicle on 4 post ramp.
3. Release HO2S harness from clips.



4. Release and disconnect HO2S multiplug.



5. Remove HO2S.

Refit

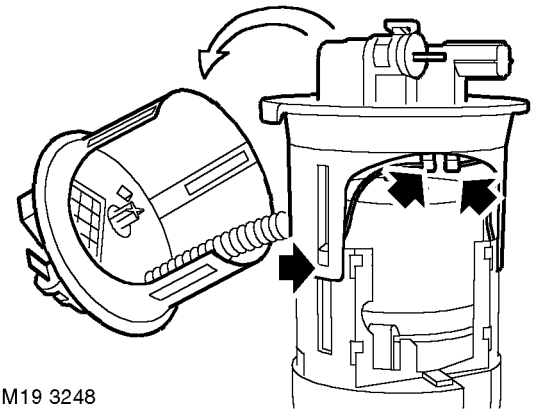
1. Clean HO2S and mating face.
2. Fit H02S and tighten to 55 Nm (40 lbf.ft).
3. Connect H02S multiplug and fit to bracket.
4. Fit harness into clips.
5. Lower ramp.
6. Connect battery earth lead.

Filter - main

19.25.02

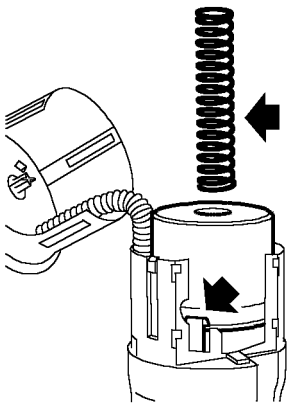
Remove

1. Disconnect battery earth lead.
2. Remove sender unit.
   INSTRUMENTS, REPAIRS, Sender unit - fuel tank gauge.



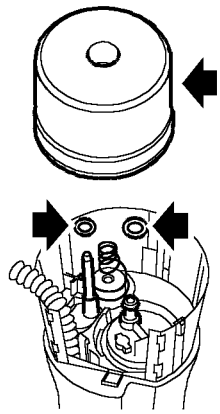
M19 3248

3. Disconnect 2 Lucars from top of pump unit assembly.
4. Release 3 slots in top of pump unit assembly from lugs in base.
5. Carefully manoeuvre top of pump unit assembly away from base, ensuring that fuel feed hose does not become strained.



M19 3249

6. Collect compression spring from fuel filter.
7. Carefully release 3 sprag clips securing fuel filter.



M19 3250

8. Release fuel filter from inlet and outlet connections.
9. Remove fuel filter.
10. Collect 'O' rings.

Refit

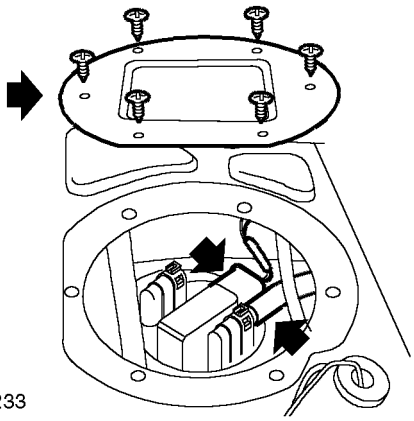
1. Lubricate NEW 'O' rings with silicone grease and fit to ports.
2. Carefully fit fuel filter to ports and push fully home, ensuring that sprag clips engage fully.
   WARNING: Ensure earthing spring fitted to fuel pressure regulator is correctly located.
3. Position spring to fuel filter recess and engage in top location.
   WARNING: Ensure that filter earthing tag is correctly located to contact the base of fuel filter.
4. Engage pump top to base, ensuring that slots engage correctly with lugs.
   WARNING: During refit, ensure that all electrical connections are made correctly. Earth tag on fuel pump negative terminal must not become distorted.
5. Fit sender unit.
   INSTRUMENTS, REPAIRS, Sender unit - fuel tank gauge.
6. Connect battery earth lead.

Pump - fuel

19.45.08

Remove

1. Disconnect battery earth lead.
2. Open RH rear and tail doors.
3. Fold RH rear seat forward.
4. Remove 2 fasteners securing front and rear carpets.
5. Pull back loadspace carpet from fuel pump access panel.



M19 3233

6. Remove 6 screws securing access panel.

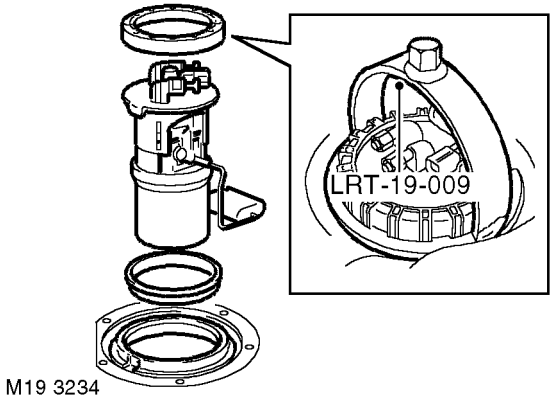
   WARNING: Depressurise the system before disconnecting any components. Fuel pressure will be present in the system even if the ignition has been switched off for some time.

7. Remove access panel.

   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.

8. Disconnect multiplug and fuel hose from fuel pump housing.

   CAUTION: Always fit plugs to open connections to prevent contamination.



M19 3234

9. Use **LRT-19-009** to remove locking ring from fuel pump housing.
10. Remove fuel pump housing and discard sealing ring.

Refit

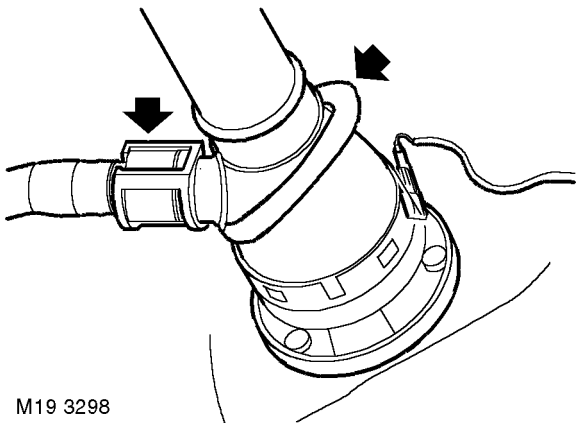
1. Clean fuel pump housing and mating face on fuel tank.
2. Fit new seal to fuel pump housing.
3. Fit fuel pump housing to fuel tank, fit and tighten locking ring to 35 Nm (26 lbf.ft) using **LRT-19-009.**
4. Connect multiplug and fuel hose to fuel pump housing.
5. Fit access panel and secure with screws.
6. Position carpet and secure with fasteners.
7. Reposition rear seat.
8. Close rear and tail doors.
9. Connect battery earth lead.

Tank - Non NAS

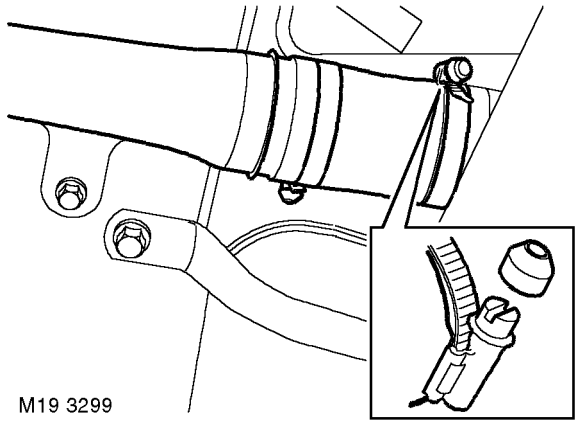
19.55.01

Remove

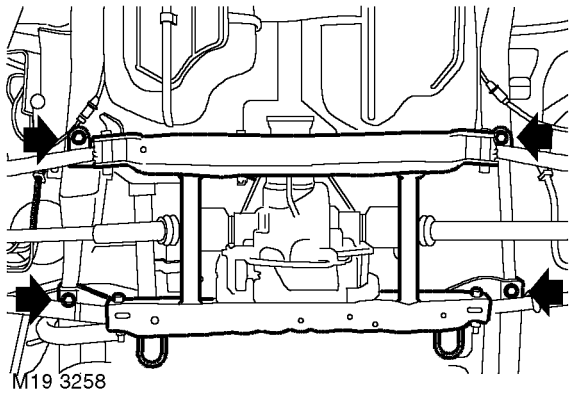
1. Position vehicle on ramp.
2. Disconnect battery earth lead.
3. Remove fuel pump assembly.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.
   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.
4. Using a fuel recovery appliance, drain the fuel from the tank into a sealed container. Follow the manufacturer's instructions for the connection and safe use of the appliance.
   WARNING: The fuel tank must be drained before it is removed from the vehicle.
5. Remove intermediate exhaust pipe.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - intermediate.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - Non NAS.
6. Remove propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft assembly.
7. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.


M19 3298

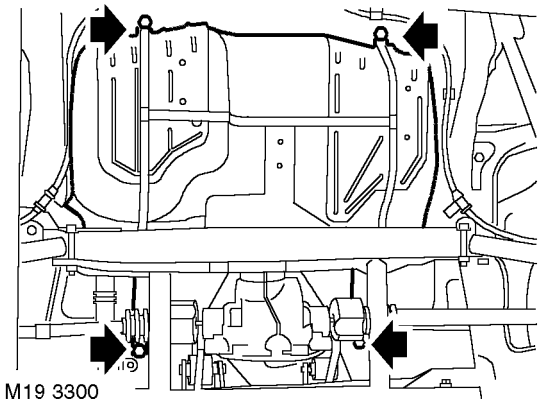
8. Release clip from breather hose and disconnect breather hose from filler neck.
9. Release clip and disconnect vent hose from fuel tank on vapour separator.


M19 3299

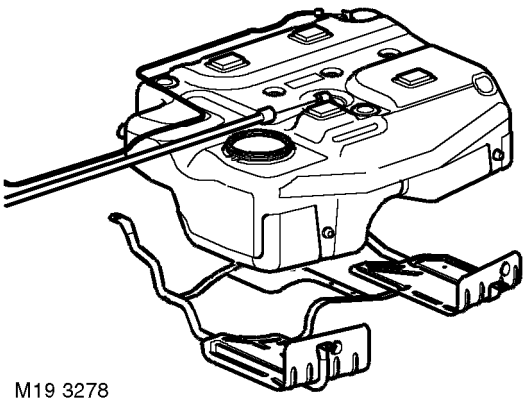
10. Remove tamper proof cover from filler hose clip and loosen clip.


M19 3258

11. Support weight of rear subframe and remove 4 bolts securing subframe to body.
12. Lower subframe.
    CAUTION: Do not allow sub frame to hang on rear brake hoses.


M19 3300

13. With assistance, remove 4 bolts securing fuel tank to body and remove tank.
NOTE: Pull vent and breather hoses through body while lowering fuel tank.


M19 3278

14. Remove fuel tank from cradle. Collect heat and fire shields.
15. Remove clips from breather hose and vent pipes.
16. Disconnect breather hose and vent pipes from fuel tank.

Refit

1. Connect breather hose and vent pipes to fuel tank, secure with clips.
2. Position heat and fire shields. Fit cradle to fuel tank.
3. With assistance, fit bolts securing fuel tank to body and tighten to 45 Nm (33 lbf.ft).
NOTE: Pass vent and breather hoses through body while fitting tank.

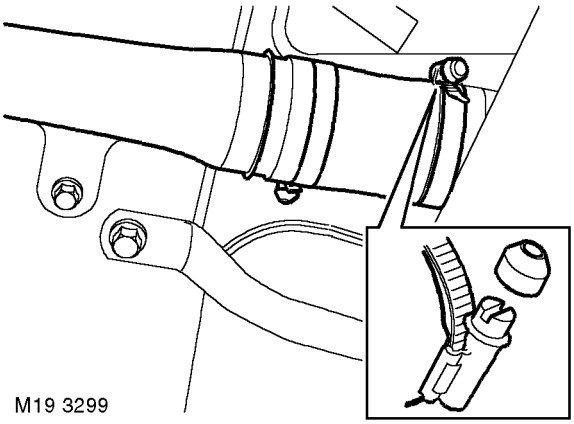
4. Raise subframe, fit bolts and tighten to 190 Nm (140 lbf.ft).
5. Connect breather hose to filler neck, fit and secure clip.
6. Connect vent hose to vapour separator, fit and secure clip.
7. Fit RH rear wheel arch liner.
☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
8. Fit propeller shaft.
☞ **DRIVESHAFTS, REPAIRS, Propeller shaft assembly.**
9. Fit intermediate exhaust pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - intermediate.**
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - Non NAS.**
10. Fit fuel pump assembly.
☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.**
11. Connect battery earth lead.

Tank - NAS

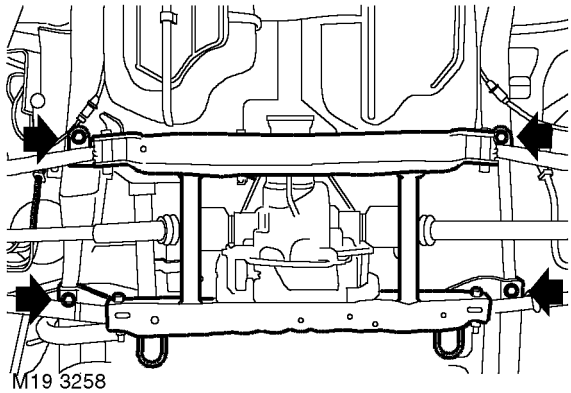
19.55.01

Remove

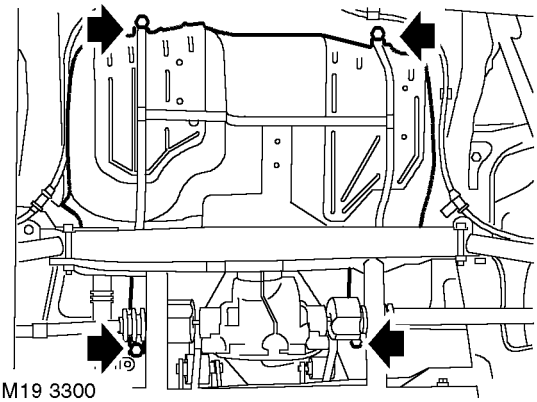
1. Position vehicle on ramp.
2. Disconnect battery earth lead.
3. Using a fuel recovery appliance, drain the fuel from the tank into a sealed container. Follow the manufacturer's instructions for the connection and safe use of the appliance.
   FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Fuel tank - drain.
   WARNING: The fuel tank must be drained before it is removed from the vehicle.
4. Remove intermediate exhaust pipe.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - NAS.
5. Remove propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft assembly.
6. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.


M19 3299

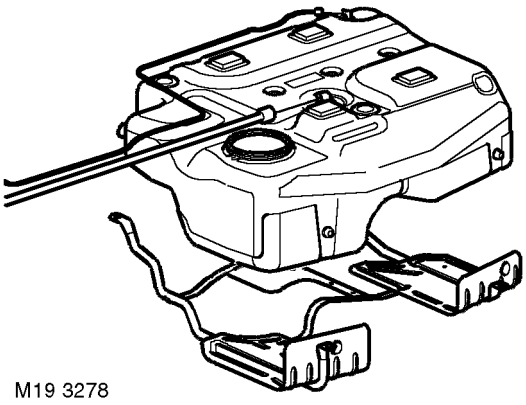
7. Remove tamper proof cover from filler hose clip and loosen clip.


M19 3258

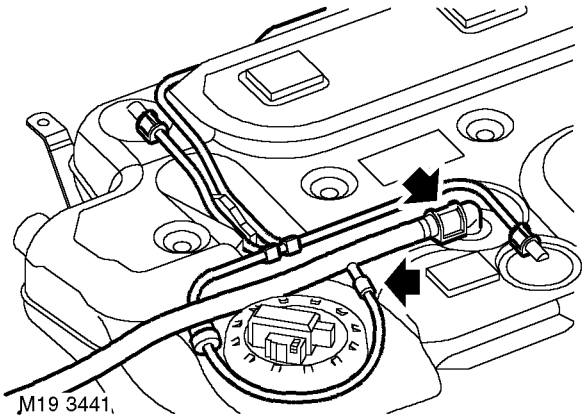
8. Support weight of rear subframe and remove 4 bolts securing subframe to body.
9. Lower subframe.
   CAUTION: Do not allow sub frame to hang on rear brake hoses.


M19 3300

10. With assistance, remove 4 bolts securing fuel tank to body and remove tank.
    NOTE: Pull vent and breather hoses through body while lowering fuel tank.


M19 3278

11. Remove fuel tank from cradle. Collect heat and fire shields.
12. Remove clips from breather hose and vent pipes.


M19 3441

13. Disconnect breather hose and vent pipe from fuel tank.

Refit

1. Connect breather hose and vent pipe to tank, secure with clips.
2. Position heat and fire shields. Fit cradle to fuel tank.
3. With assistance, fit bolts securing fuel tank to body and tighten to 45 Nm.
NOTE: Pass vent and breather hoses through body while fitting tank.
4. Raise subframe, fit bolts and tighten to 190 Nm.
5. Connect breather hose to filler neck, fit and secure clip.
6. Fit RH rear wheel arch liner.
☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
7. Fit propeller shaft.
☞ **DRIVESHAFTS, REPAIRS, Propeller shaft assembly.**
8. Fit intermediate exhaust pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - NAS.**
9. Fit fuel pump assembly.
☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.**
10. Connect battery earth lead.

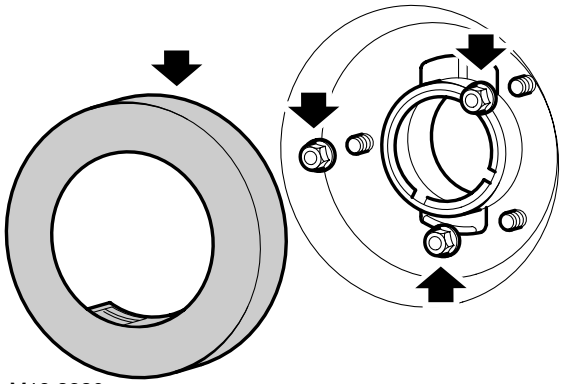
Filler neck

19.55.07

Remove

1. Disconnect battery earth lead.
2. Ensure fuel tank is less than half full. If not, drain fuel tank to less than half full.
   FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Fuel tank - drain.
3. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.
4. Remove fuel filler cap.

   CAUTION: Before disconnecting any part of the fuel system, it is imperative that all dust, dirt and debris is removed from around components to prevent ingress of foreign matter into fuel system.

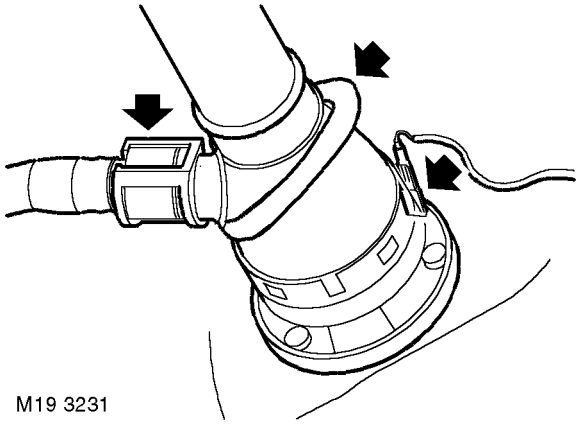


M19 3230

5. Unclip escutcheon from fuel filler neck.

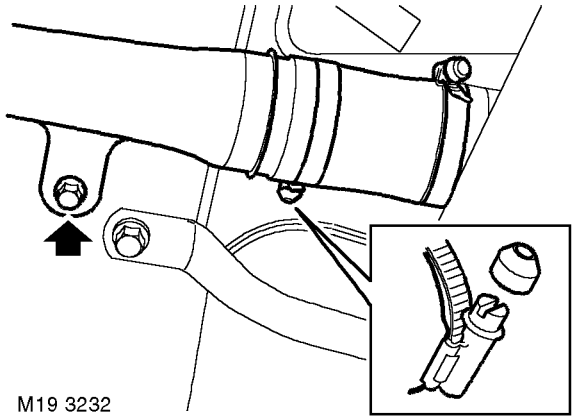
   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.

6. Remove 3 nuts securing fuel filler neck to body.



M19 3231

7. Release clip from breather hose and disconnect breather hose from filler neck.
8. Release fuel tank vent pipe from filler neck.
9. Disconnect Lucar connector from fuel filler neck.



M19 3232

10. Remove bolt securing filler neck to body.
11. Remove tamper proof cover from filler hose clip and loosen clip.
12. Disconnect hose from filler neck and remove filler neck assembly.

Refit

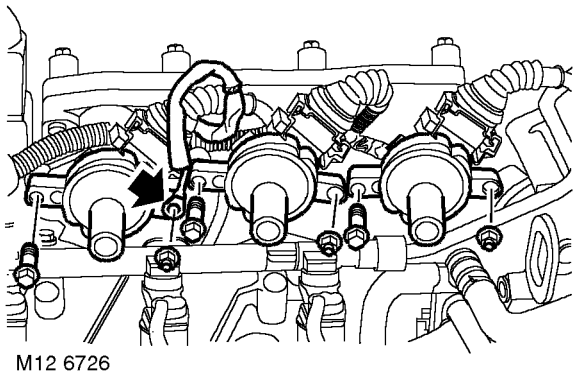
1. Position filler neck assembly, connect to hose, secure clip and fit tamper proof cover.
2. Fit bolt securing filler neck to body and tighten to 9 Nm (7 lbf.ft).
3. Connect Lucar connector to fuel filler neck.
4. Position fuel tank vent pipe around filler neck.
5. Connect breather hose to filler neck, fit and secure clip.
6. Fit nuts securing fuel filler neck to body and tighten to 9 Nm (7 lbf.ft).
7. Clip escutcheon to fuel filler neck.
8. Fit fuel filler cap.
9. Fit RH rear wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.**
10. Connect battery earth lead.

Fuel rail - KV6 - Non NAS

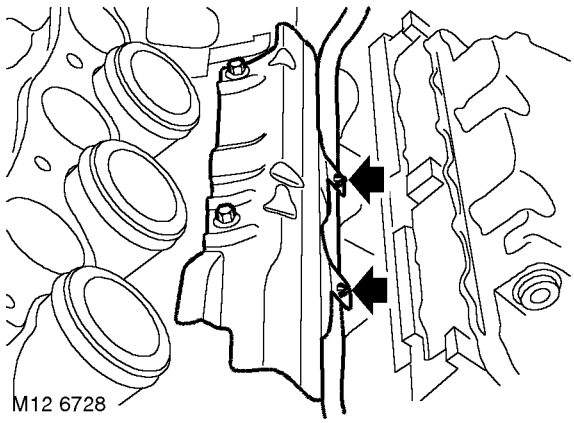
🔧 ***19.60.04.99***

Remove

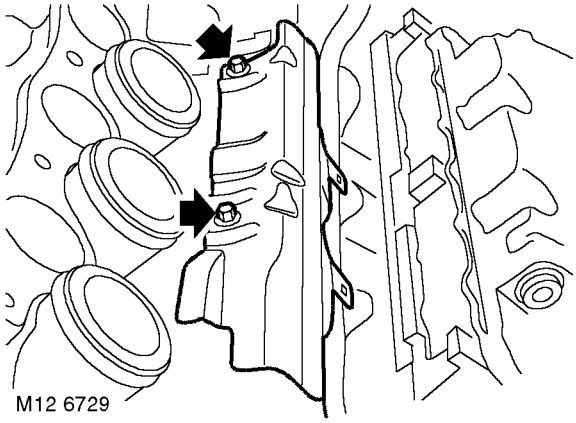
1. Disconnect battery earth lead.
2. Remove inlet manifold chamber.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**


M12 6726

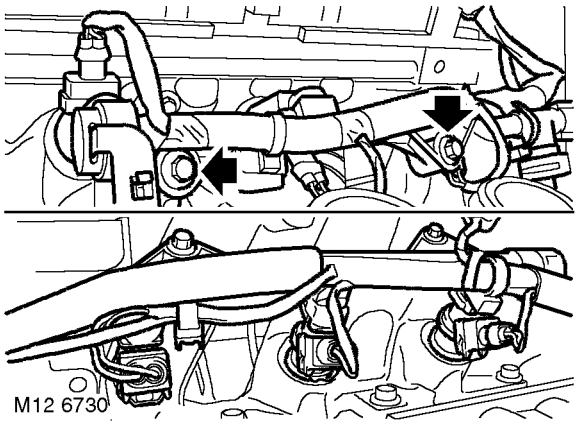
3. Note position of coil earth lead, remove 3 nuts and 3 bolts securing ignition coils to LH inlet manifold.
4. Remove ignition coils and position aside.


M12 6728

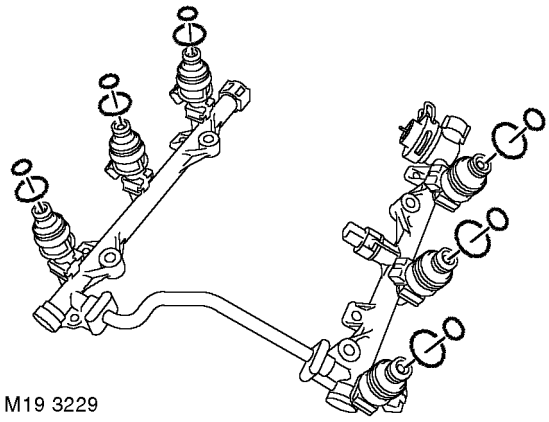
5. Disconnect clips securing RH injector harness to injector protection cover.



6. Remove 2 bolts securing protection cover and RH fuel rail to RH inlet manifold, remove cover.



7. Remove 2 bolts securing fuel rail to LH inlet manifold.
8. Release clips and disconnect injector multiplugs.
9. Release injectors from manifolds, raise fuel rail assembly, disconnect 4 clips securing injector harness to fuel rails and move harness aside.



10. Remove fuel rail.
CAUTION: Always fit plugs to open connections to prevent contamination.

11. Remove and discard 'O' rings from injectors.

Refit

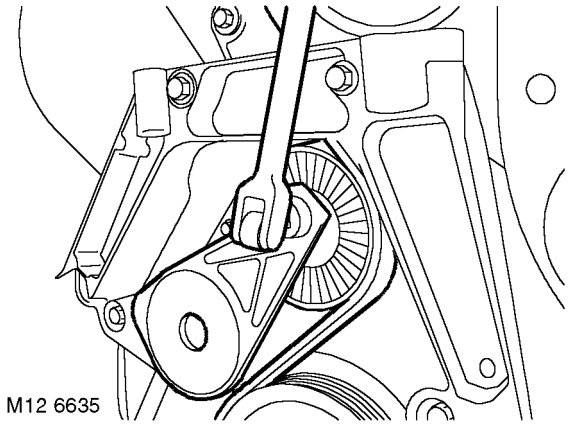
1. Lubricate new 'O' rings with castor oil and fit to injectors.
2. Remove plugs from inlet manifolds.
3. Position injector harness to LH fuel rail and secure with clips.
4. Position injectors and fuel rail to inlet manifolds.
5. Connect multiplugs to injectors.
6. Position injector cover to RH fuel rail and secure injector harness to protection cover with clips.
7. Fit bolts securing fuel rail to inlet manifolds and tighten to 9 Nm (7 lbf.ft).
8. Position ignition coils to LH inlet manifold.
9. Position earth lead, fit nuts and bolts securing ignition coils to LH inlet manifold and tighten to 9 Nm (7 lbf.ft).
10. Fit inlet manifold chamber.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
11. Connect battery earth lead.

Fuel rail - KV6 - NAS

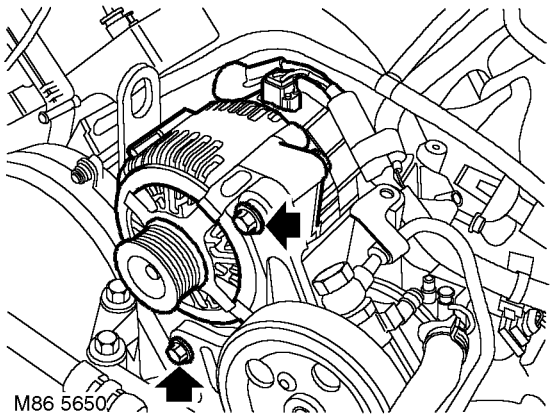
19.60.04.99

Remove

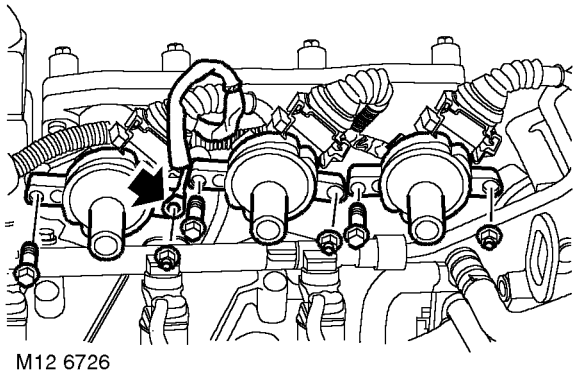
1. Disconnect battery earth lead.
2. Remove inlet manifold chamber.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.
3. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M12 6635

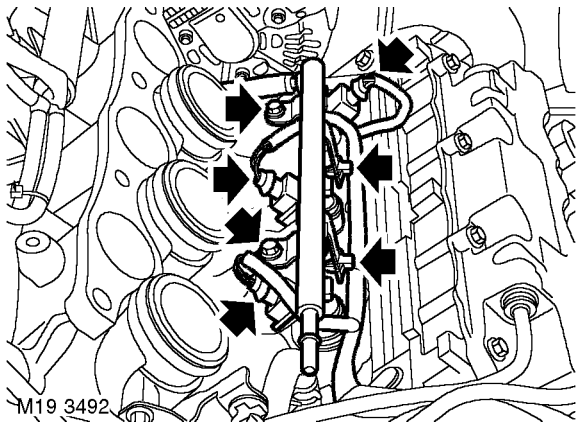
4. Using a 3/8" socket bar raise ancillary drive belt tensioner and release drive belt from alternator and PAS pump pulleys.


M86 5650

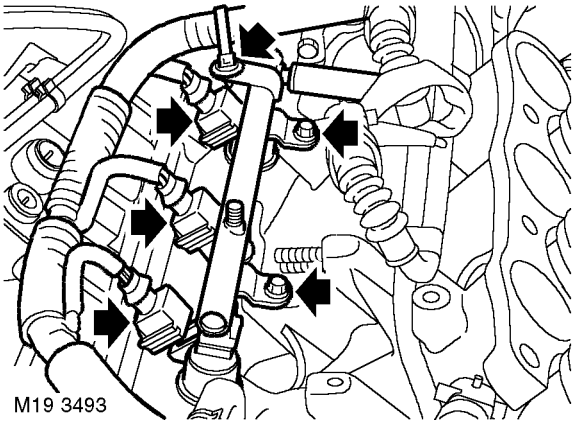
5. Remove nuts and bolts securing alternator.
6. Release alternator and place aside.


M12 6726

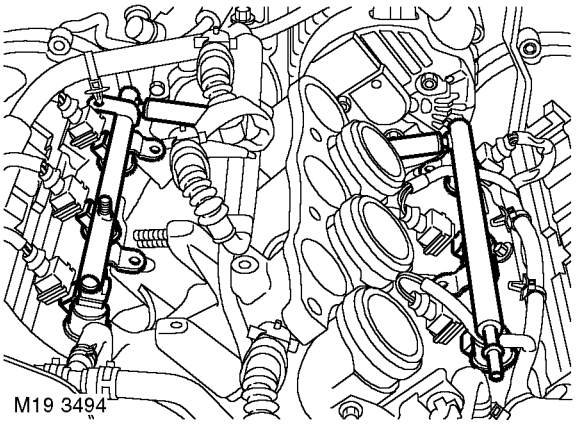
7. Note position of coil earth lead, remove 3 nuts and 3 bolts securing ignition coils to LH inlet manifold.
8. Remove ignition coils and position aside.


M19 3492

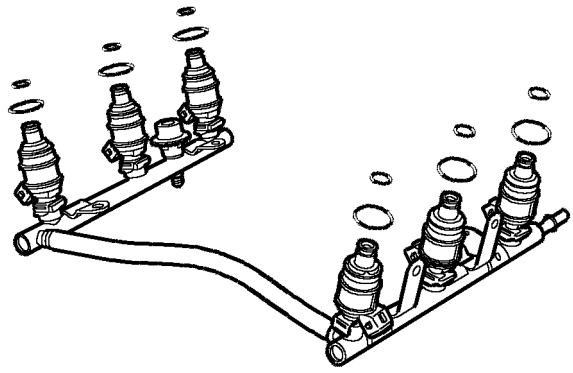
9. Disconnect clips securing RH injector harness to injector protection cover.
10. Remove 2 bolts securing RH fuel rail to RH inlet manifold.
11. Release clips and disconnect injector multiplugs.


M19 3493

12. Remove 2 bolts securing fuel rail to LH inlet manifold.
13. Release clips and disconnect injector multiplugs.


M19 3494

14. Release injectors from manifolds, raise fuel rail assembly, disconnect 4 clips securing injector harness to fuel rails and move harness aside.


M19 3495

15. Remove fuel rail and discard 'O' rings
CAUTION: Always fit plugs to open connections to prevent contamination.

Refit

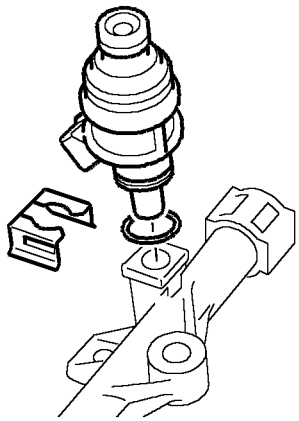
1. Lubricate new 'O' rings with castor oil and fit to injectors.
2. Remove plugs from inlet manifolds.
3. Position injector harness to fuel rail and secure with clips.
4. Position injectors and fuel rail to inlet manifolds.
5. Connect multiplugs to injectors.
6. Fit and tighten 4 bolts securing fuel rail to inlet manifold to 8 Nm (6 lbf.ft).
7. Position ignition coils to LH inlet manifold.
8. Position earth lead, fit nuts and bolts securing ignition coils to LH inlet manifold and tighten to 9 Nm (7 lbf.ft).
9. Position alternator and secure with nuts and bolts, tighten to 45 Nm (33 lbf.ft).
10. Using a 3/8" square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
11. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
12. Fit inlet manifold chamber.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.**
13. Connect battery earth lead.

Injector - KV6

19.60.10

Remove

1. Disconnect battery earth lead.
2. Remove fuel rail.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - Non NAS.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - NAS.



M19 3272

3. Remove clip securing injector to fuel rail.
4. Remove injector from fuel rail, remove and discard 'O' ring from injector.
   CAUTION: Always fit plugs to open connections to prevent contamination.

Refit

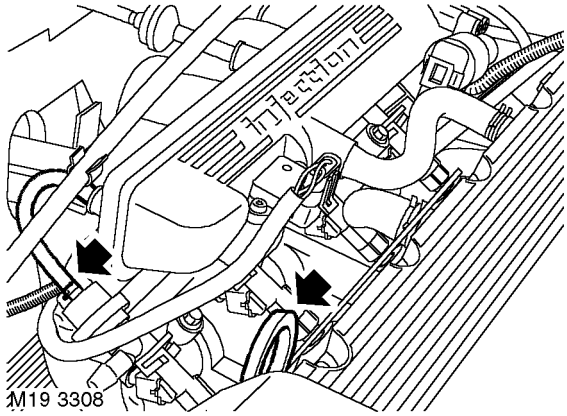
1. Clean injector and mating face in fuel rail.
2. Remove cap from new injector and fit to old injector.
3. Lubricate new 'O' ring with castor oil and fit to injector.
4. Fit injector to fuel rail and secure with clip.
5. Fit fuel rail.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - Non NAS.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - NAS.
6. Connect battery earth lead.

Injectors - set - K1.8

19.60.12

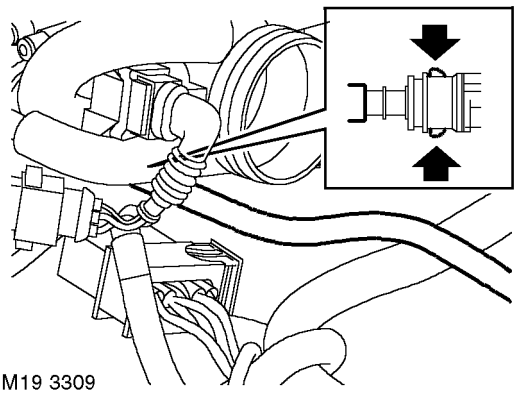
Remove

1. Disconnect battery earth lead.



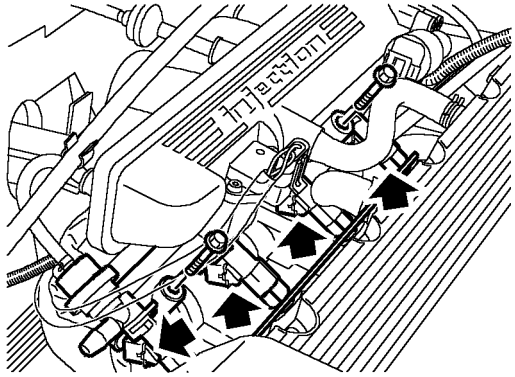
M19 3308

2. Release clip and disconnect vacuum pipe from fuel pressure regulator.
3. Remove engine oil dipstick.
4. Position absorbent cloth beneath fuel rail.



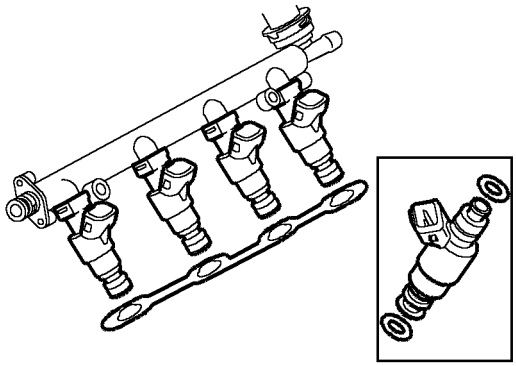
M19 3309

5. Release fuel feed hose from fuel rail.
   CAUTION: Always fit plugs to open connections to prevent contamination.



M19 3306

6. Remove 2 bolts securing fuel rail to inlet manifold.
7. Release fuel rail and injectors from inlet manifold.
8. Release and remove injector spacer.
9. Disconnect multiplug from injectors.


M19 3307

10. Remove the fuel rail complete with injectors.
11. Release spring clips securing injectors to fuel rail and remove fuel injectors.
12. Remove and discard 2 'O' rings from each injector.
13. Fit protective caps to each end of injectors.

Refit

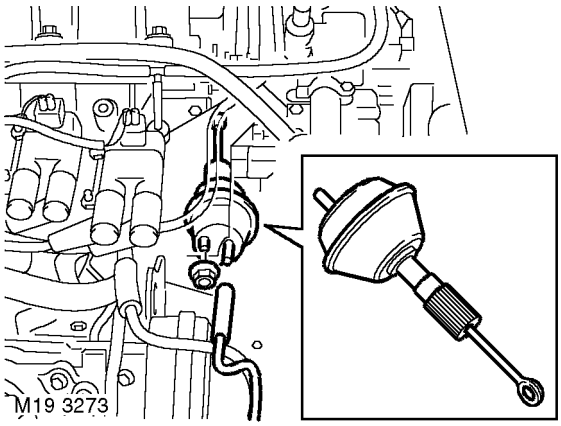
1. Remove protective caps from each injector.
2. Clean injectors and recesses in fuel rail and inlet manifold.
3. Lubricate new 'O' ring with castor oil and fit to injector.
4. Fit injectors to fuel rail and secure with spring clips.
5. Position fuel rail assembly and connect injector multiplugs.
6. Fit injector spacer.
7. Push each injector into inlet manifold.
8. Fit bolts securing fuel rail to inlet manifold and tighten to 8 Nm (6 lbf.ft).
9. Connect fuel feed hose to fuel rail.
10. Fit engine oil dipstick.
11. Connect vacuum pipe to fuel pressure regulator and secure with clip.
12. Connect battery earth lead.

Actuator unit - cruise control - KV6

19.75.05

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Disconnect vacuum hose from actuator.
4. Remove nut securing actuator to mounting bracket.
5. Release operating rod from throttle cam and remove actuator.

Refit

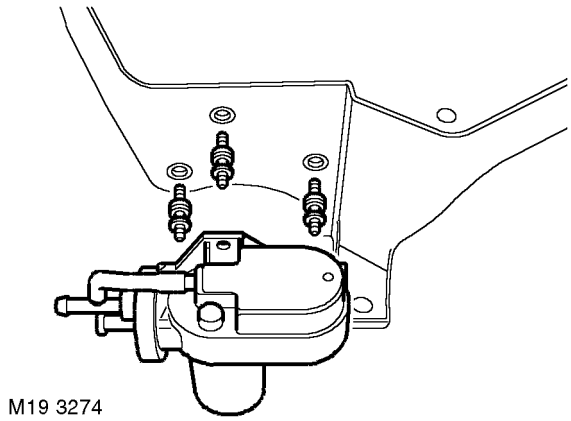
1. Position actuator and connect operating rod to throttle cam.
2. Position actuator into mounting bracket, fit and tighten nut.
3. Connect vacuum hose to actuator.
4. Check pull rod to retainer clearance, with lever fully returned, pull rod should just be held by retainer.
5. Release retainer by turning anti-clockwise, eliminate clearance then rotate retainer half turn clockwise. Check pull rod is just held and rotate retainer a further quarter turn clockwise to lock.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

Vacuum pump - cruise control - KV6

19.75.06

Remove

1. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.



2. Release 3 rubber mountings securing vacuum pump to battery carrier and remove vacuum pump.
3. Remove 3 rubber mountings from vacuum pump.

Refit

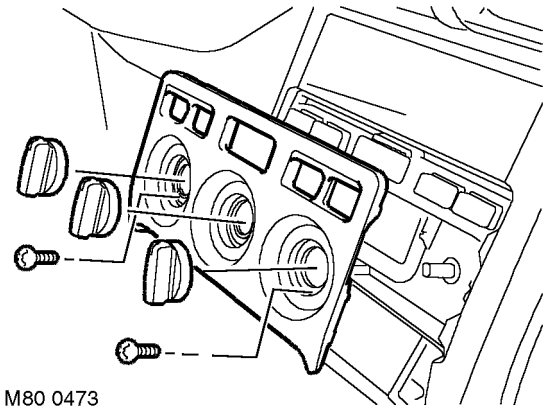
1. Fit rubber mountings to vacuum pump.
2. Position vacuum pump to battery carrier and secure with rubber mountings.
3. Fit battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.

Switch - cruise control - KV6

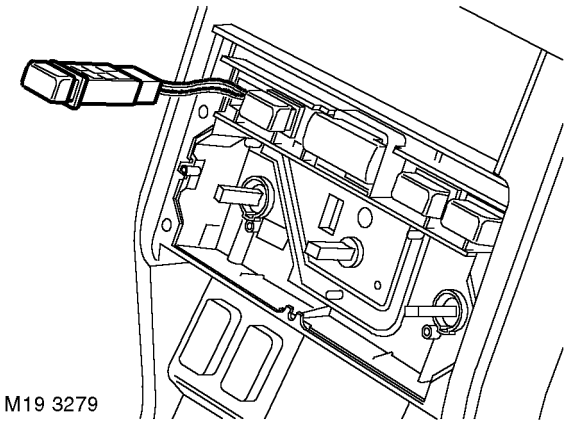
19.75.30

Remove

1. Remove radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.


M80 0473

2. Remove selector knobs from heater controls.
3. Remove 2 screws securing heater control finisher to heater controls and remove finisher.


M19 3279

4. Release cruise control switch, disconnect multiplug and remove switch.

Refit

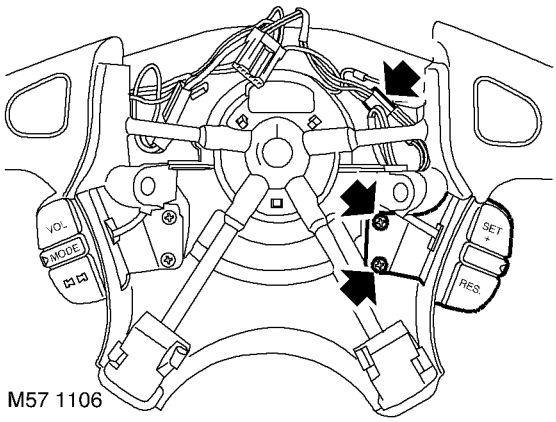
1. Position cruise control switch, connect multiplug and secure switch.
2. Fit heater control finisher to heater controls and secure with screws.
3. Fit heater control knobs.
4. Fit radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.

Switch - multi-purpose

19.75.33

Remove

1. Remove airbag module from steering wheel.
   RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.



M57 1106

2. Release cruise control switch leads from clip and disconnect multiplug.
3. Remove 2 screws securing cruise control switch and remove switch.

Refit

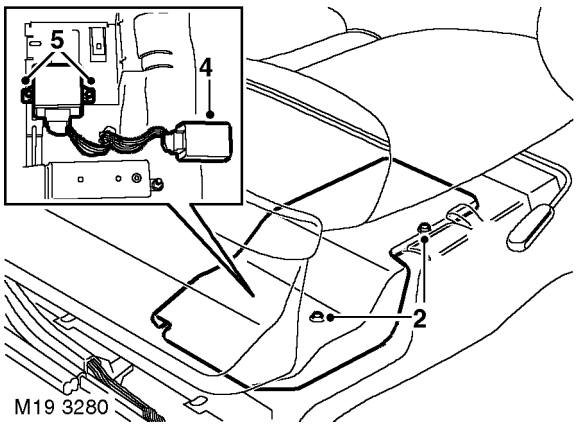
1. Fit cruise control switch and secure with screws.
2. Connect switch multiplug and fit leads in clip.
3. Fit drivers airbag.
   RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.

ECU - cruise control - KV6

19.75.49

Remove

1. Slide RH front seat fully rearwards.



2. Remove 2 screws securing ECU cover.
3. Remove cover.
4. Release interface ECU from bracket and move aside.
5. Remove 2 screws securing cruise control ECU.
6. Disconnect multiplug from ECU and remove ECU.

Refit

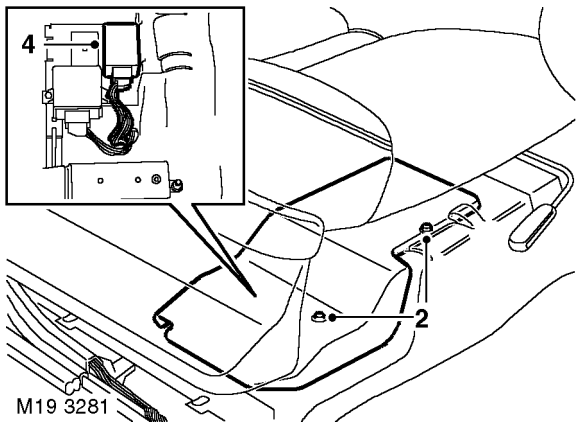
1. Connect multiplug to ECU.
2. Position ECU and tighten screws.
3. Secure interface ECU to bracket.
4. Fit ECU cover and secure with screws.
5. Position seat to mid position.

Interface ECU - cruise control - KV6

19.75.55

Remove

1. Slide RH front seat fully rearwards.



2. Remove 2 screws securing ECU cover.
3. Remove cover.
4. Release interface ECU from bracket, disconnect multiplug and remove ECU.

Refit

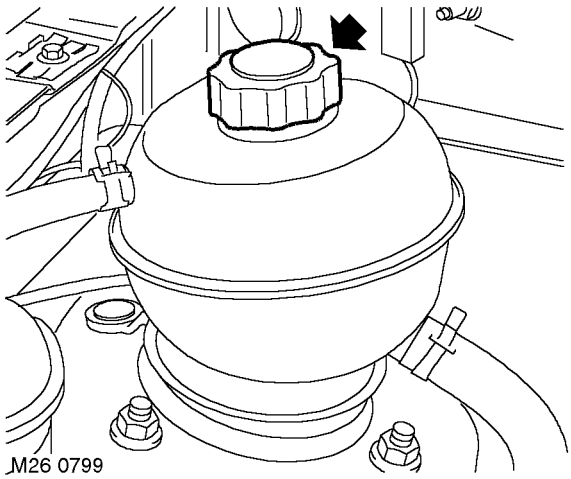
1. Position ECU, connect multiplug and secure ECU to bracket.
2. Fit ECU cover and secure with screws.
3. Position seat to mid position.

Coolant - drain and refill

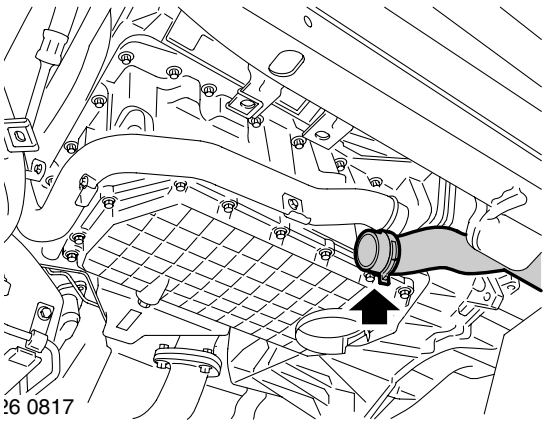
26.10.01

Drain

1. Visually check engine and cooling system for signs of coolant leaks.
   WARNING: Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.
2. Examine hoses for signs of cracking, distortion and security of connections.
3. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M26 0799

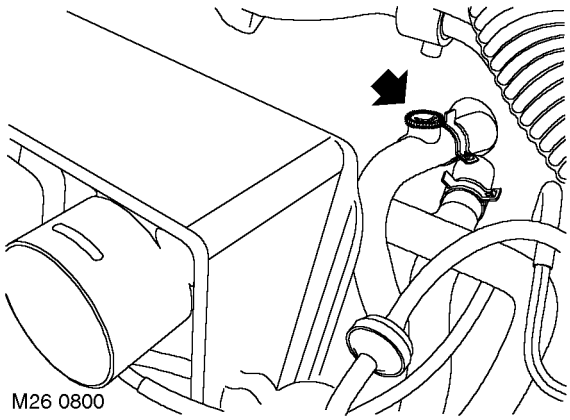
4. Remove expansion tank filler cap.
5. Position container to collect coolant.


26 0817

6. Release clip and remove hose from lower coolant rail, allow system to drain.

Refill

1. Flush system with water under low pressure.
   CAUTION: Do not use water under high pressure as it could damage the radiator.
2. Fit hose to lower coolant rail and secure with clip.
3. Prepare coolant to required concentration.
   CAPACITIES, FLUIDS AND LUBRICANTS, Fluids.


M26 0800

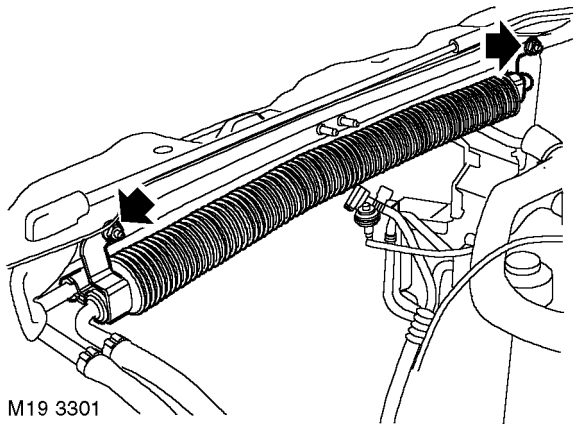
4. Remove bleed screw from coolant pipe.
5. Ensure heater control is set to maximum.
6. Slowly fill the system through the coolant expansion tank until a steady flow of coolant is emitted from the bleed hole.
7. Close bleed screw as coolant emerges, carefully by hand.
8. Fit expansion tank filler cap.
9. Start and run engine until normal operating temperature is reached.
   CAUTION: DO NOT operate air conditioning
10. Ensure warm air is available at vents.
    NOTE: If warm air is not available, an air-lock may be present in heater matrix. If necessary, allow engine to cool, remove expansion tank filler cap and repeat bleed operation at heater hose
11. Switch off engine and allow to cool.
12. Check for leaks and top-up coolant to 'MAX' mark on expansion tank
13. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.

Cooling fan and motor

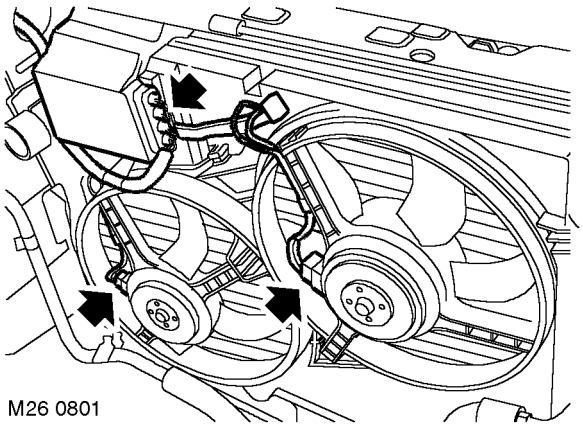
26.25.22

Remove

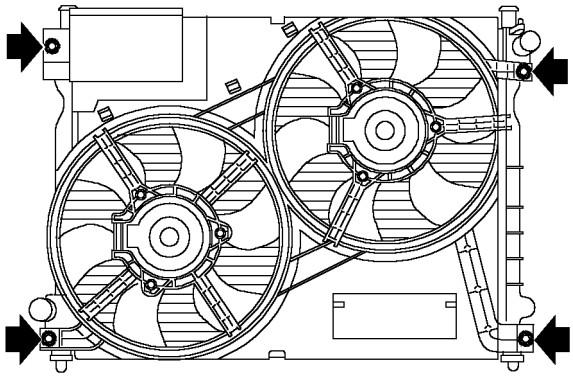
1. Disconnect battery earth lead.
2. Remove acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.


M19 3301

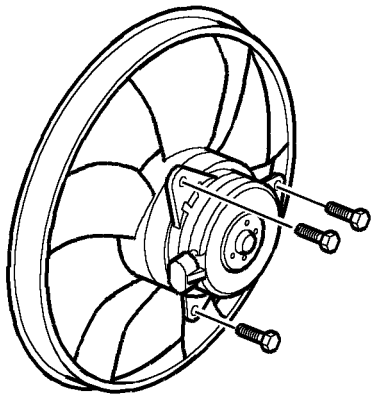
3. Remove 2 nuts securing fuel cooler matrix to bonnet locking platform, move cooler aside.


M26 0801

4. Release multiplugs from relay housing and fan motors.
5. Release harness from fan cowling.


M26 0794

6. Remove 4 bolts securing fan cowl to radiator.
7. With assistance manoeuvre fan cowl and motor assembly from vehicle.


M26 0806

8. Remove 3 bolts securing motor to fan cowl, release motor and fan assembly.

Refit

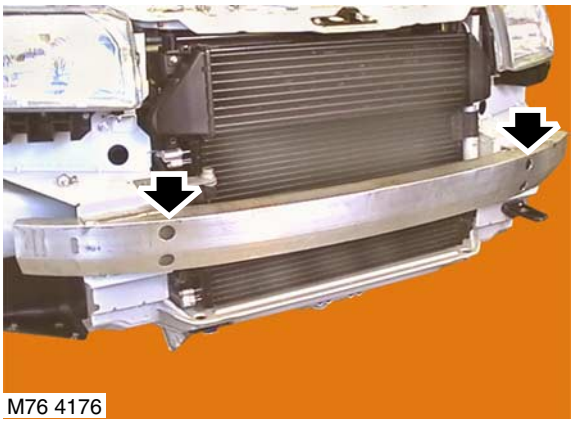
1. Position fan and motor assembly to fan cowl, fit and tighten bolts to 5 Nm (4 lbf.ft).
2. Position fan cowl to radiator, fit and tighten bolts to 5 Nm (4 lbf.ft).
3. Secure relay and harness to fan cowl.
4. Connect multiplugs.
5. Fit fuel cooler to mounting and tighten nuts to 10 Nm (7.5 lbf.ft).
6. Fit acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

Radiator assembly

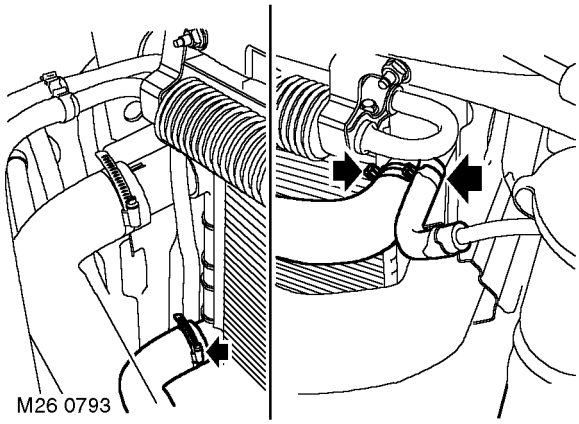
26.40.01

Remove

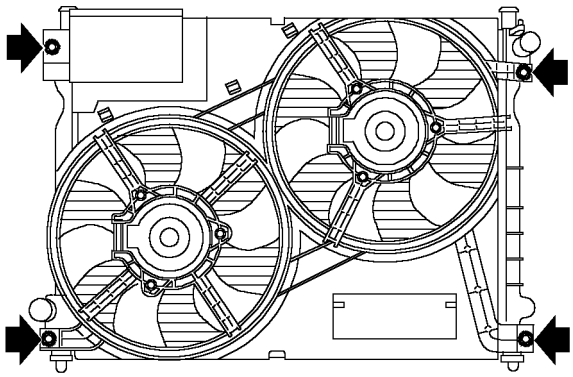
1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
3. **Models without A/C:** Remove bumper valance.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.


M76 4176

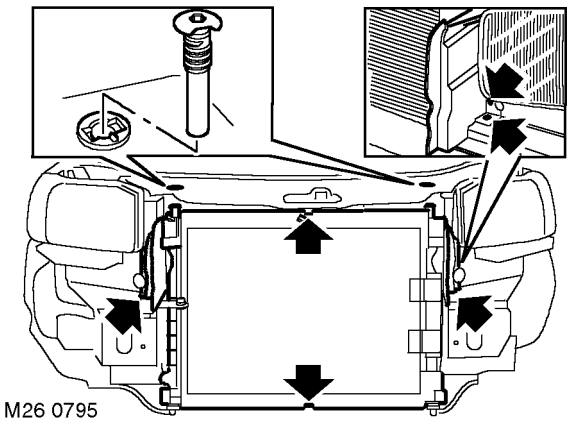
4. **Models without A/C:** Remove 4 nuts and 4 bolts securing armature to body and remove armature.
5. **Models without A/C:** Remove intercooler.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Intercooler.
6. **Models with A/C:** Remove A/C condenser.
   AIR CONDITIONING, REPAIRS, Condenser.
7. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.


M26 0793

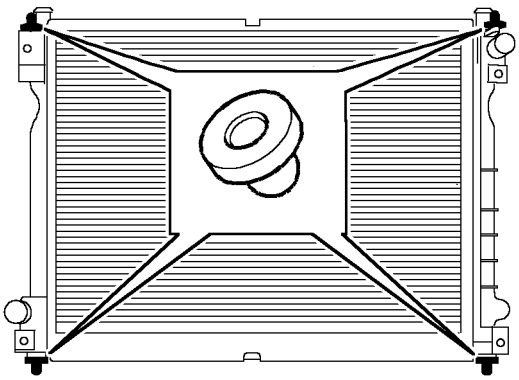
8. Release clips and remove top and bottom hoses.
   CAUTION: Always fit plugs to open connections to prevent contamination.
9. Release clip and remove expansion hose from radiator.


M26 0794

10. Remove 4 bolts securing fan cowl to radiator.


M26 0795

11. Remove 4 scrivets securing radiator baffles to body, release baffles and remove from vehicle.
12. Remove radiator upper retaining pegs from bonnet locking platform. Ease top of radiator forward.
13. Remove 2 cowl retaining clips from radiator.
14. Release radiator from lower mountings and remove from vehicle.


M26 0796

15. Remove 4 rubber mountings from radiator.

Refit

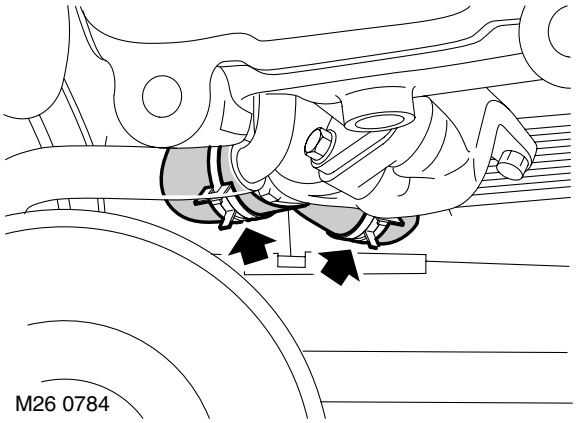
1. Fit mounting rubbers to radiator.
2. Align radiator with fan cowl and fit clips.
3. Fit radiator and engage lower mountings in chassis.
4. Fit radiator top mountings to bonnet locking platform.
5. Fit bolts fan cowl to radiator, tighten to 5 Nm (4 lbf.ft).
6. Connect expansion tank hose and secure with clip.
7. Connect bottom and top hoses to radiator secure with clips.
8. **Models with A/C:** Fit A/C condenser.
☞ **AIR CONDITIONING, REPAIRS, Condenser.**
9. **Models without A/C:** Fit intercooler.
☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Intercooler.**
10. Fit radiator baffles and secure with scrivets.
11. **Models without A/C:** Position armature, fit and tighten 4 nuts and bolts securing armature to body.
12. **Models without A/C:** Fit bumper valance.
☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
13. Refill cooling system.
☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
14. Fit acoustic cover.
☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
15. Connect battery earth lead.

Coolant pump and thermostat

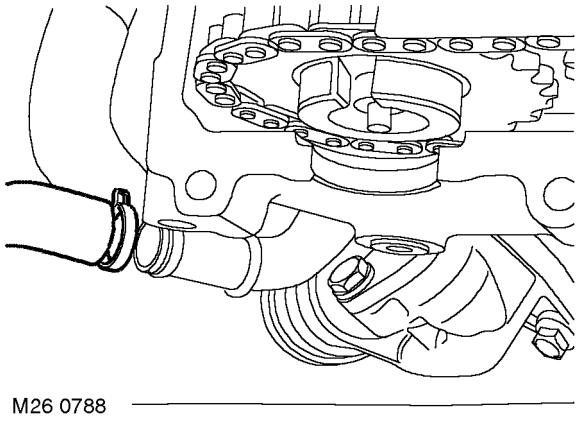
26.50.01

Remove

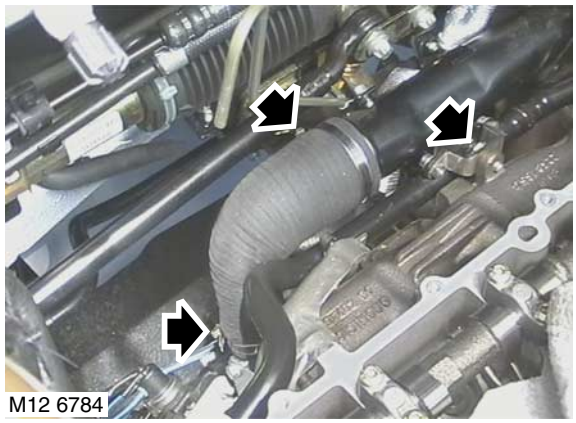
1. Disconnect battery earth lead.
2. Remove camshaft cover gasket.
   ENGINE - Td4, REPAIRS, Gasket - camshaft cover.
3. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
4. Remove RH front road wheel.
5. Remove ancillary drive belt.
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.
6. Remove engine lower steady.
   ENGINE - Td4, REPAIRS, Engine steady - lower.
7. Remove hydramount.
   ENGINE - Td4, REPAIRS, Hydramount - engine - RH.



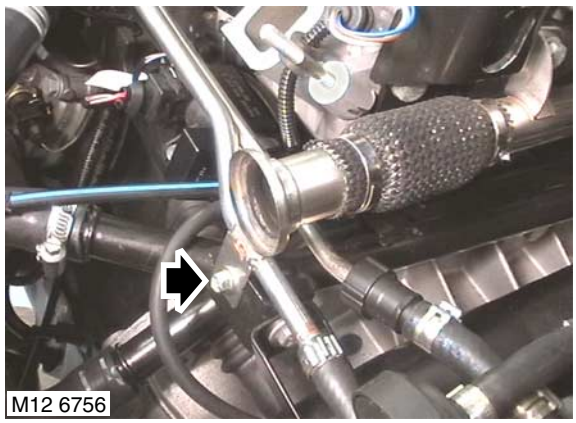
8. Release 2 clips securing hose to coolant rail and thermostat housing.
9. Release and remove hose.



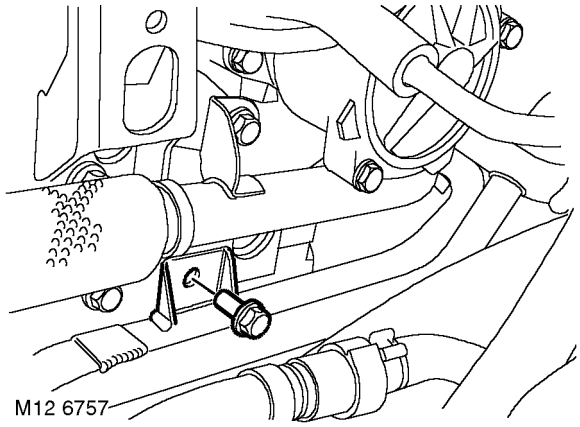
10. Release clip and disconnect expansion tank hose from coolant rail.



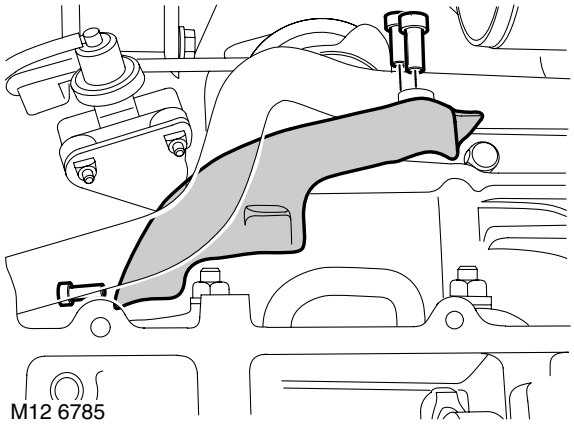
11. Loosen clips and remove turbocharger outlet hose.
12. Remove bolt coolant rail to exhaust manifold.



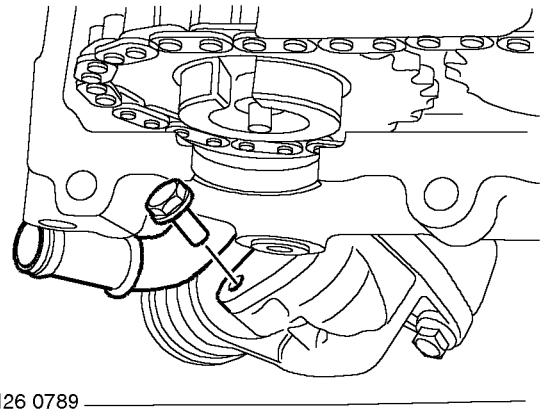
13. Remove bolt, fuel rail to coolant rail.



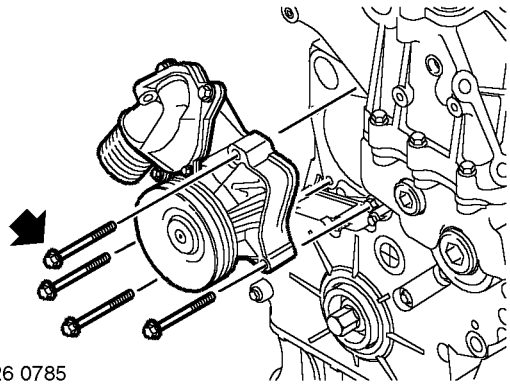
14. Remove bolt, coolant rail to cylinder head.



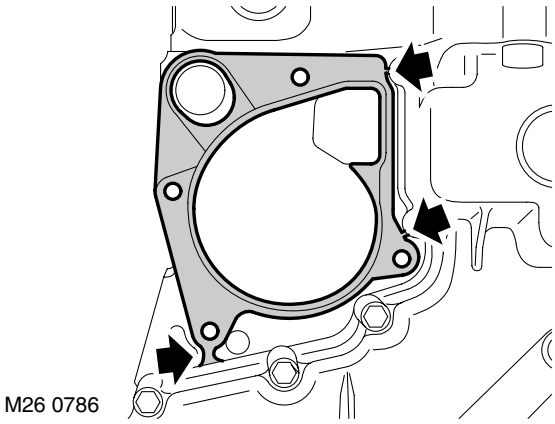
15. Remove 3 Allen screws securing heat shield to coolant rail.



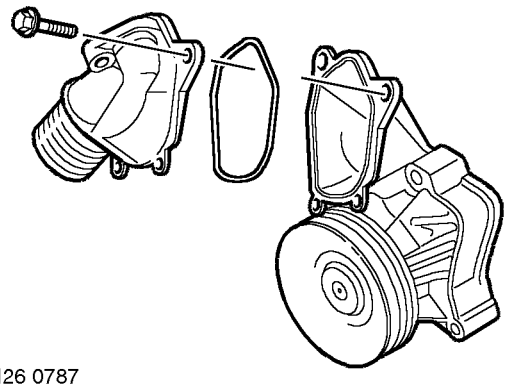
16. Remove bolt, release coolant rail from thermostat housing and discard seal.
17. Remove heat shield.
18. Adjust height of engine on hoist for access to coolant pump bolts.



19. Remove 4 bolts and coolant pump.



20. If applicable, cut tags on coolant pump gasket (applies to original fit gaskets only).
21. Remove and discard coolant pump gasket.



22. Remove 4 bolts and remove thermostat housing from coolant pump. Discard seal.

Refit

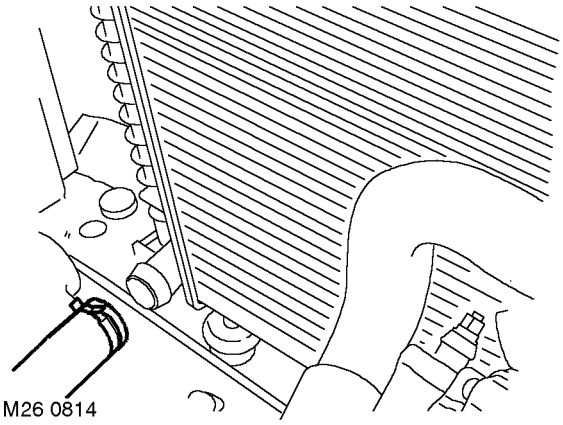
1. Clean mating face of thermostat housing and coolant pump.
2. Fit new seal to thermostat housing.
3. Fit thermostat housing to coolant pump and tighten bolts to 8 Nm (6 lbf.ft).
4. Clean coolant pump and mating faces on engine and upper coolant rail.
5. Fit a new gasket and coolant pump to engine. Tighten bolts to 10 Nm (7.5 lbf.ft).
6. Fit heatshield.
7. Fit new seal to coolant rail, fit rail to thermostat housing and tighten bolt to 8 Nm (6 lbf.ft).
8. Tighten Allen screws securing heat shield to 8 Nm (6 lbf.ft).
9. Tighten bolts securing coolant rail to 20 Nm (15 lbf.ft).
10. Tighten bolt fuel rail to coolant rail to 10 Nm (7.5 lbf.ft).
11. Fit turbocharger outlet hose and tighten clips.
12. Connect expansion tank hose to coolant rail and secure with clip.
13. Fit hose to coolant rail, connect to thermostat housing and secure hose with clips.
14. Fit hydramount.
    ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
15. Remove engine lower steady.
    ☞ **ENGINE - Td4, REPAIRS, Engine steady - lower.**
16. Fit ancillary drive belt.
    ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
17. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
18. Fit camshaft cover gasket.
    ☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
19. Connect battery earth lead.
20. Refill cooling system.
    ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

Coolant - drain & refill

26.10.01

Drain

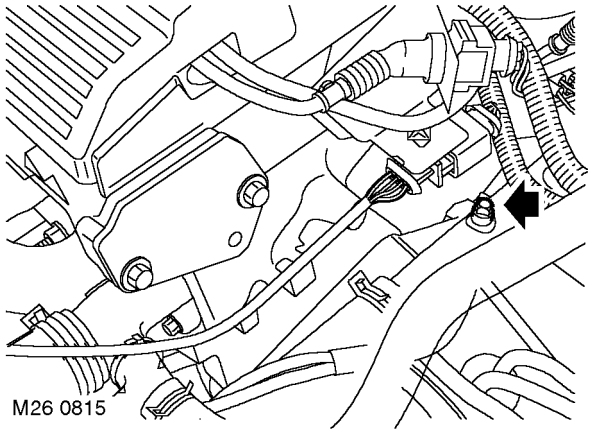
1. Visually check engine and cooling system for signs of coolant leaks.
2. Examine hoses for signs of cracking, distortion and security of connections.
3. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
4. Remove expansion tank filler cap.
   WARNING: Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.
5. Position container to collect coolant.


M26 0814

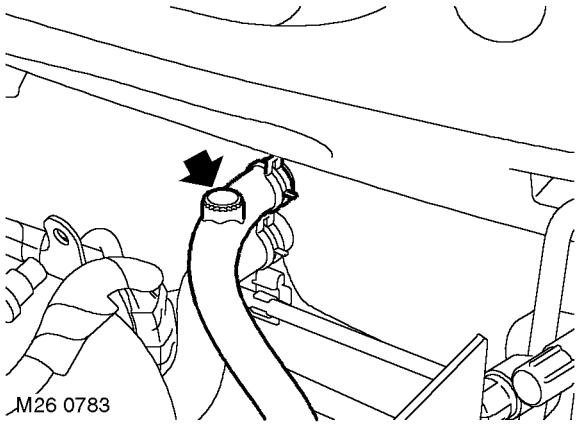
6. Release clip and disconnect bottom hose from radiator.
7. Allow cooling system to drain.

Refill

1. Flush system with water under low pressure. **Do not use water under high pressure as it could damage the radiator.**
2. Connect bottom hose and secure with clip.
3. Prepare coolant to required concentration.
   CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.


M26 0815

4. Remove bleed screw from coolant pipe.


M26 0783

5. Remove bleed screw from heater return hose.
6. Slowly fill system through expansion tank until a steady flow of coolant is emitted from bleed hole in coolant pipe.
7. Fit and tighten bleed screw in coolant pipe.
8. Continue filling system until coolant emerges from bleed hole in heater return hose.
9. Fit and close bleed screw in heater return hose.
10. Continue filling until coolant reaches expansion tank neck and remains static.
11. Fit expansion tank filler cap.
12. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
13. Start and run engine until normal operating temperature is reached.
    CAUTION: DO NOT operate air conditioning
14. Switch off engine and allow to cool.
15. Check for leaks and top-up coolant to 'MAX' mark on expansion tank

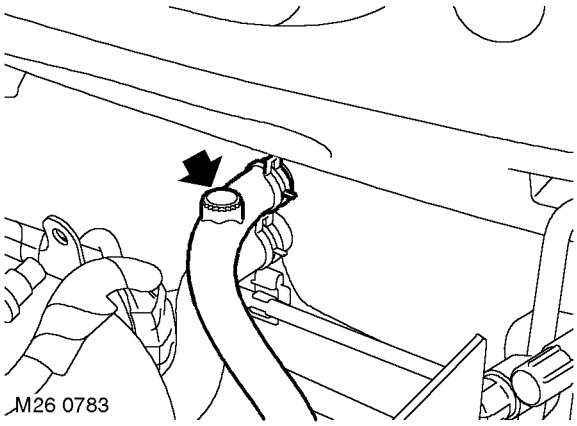
Coolant - refill system

26.10.03

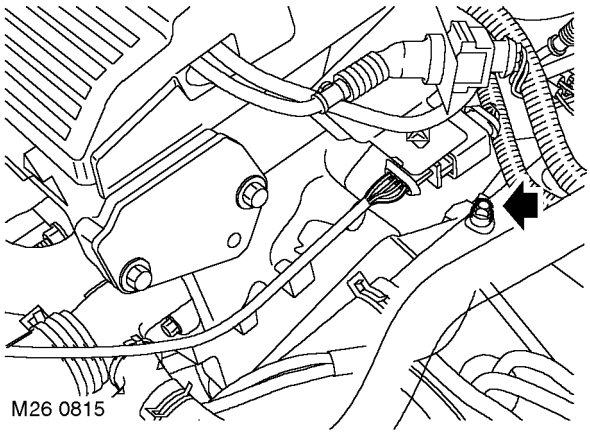
1.

Refill

1. Prepare coolant to required concentration.
☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
2. Ensure heater control is set to maximum.



3. Remove bleed screw from heater return hose.



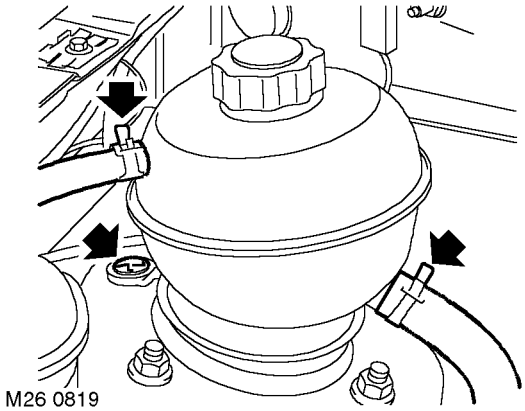
4. Remove bleed screw from coolant rail.
5. Slowly fill the system through the coolant expansion tank until a steady flow of coolant is emitted from the bleed hole.
6. Fit and close bleed screw in heater return hose.
7. Fit and close bleed screws in coolant rails.
8. Fit expansion tank filler cap.
9. Start and run engine until normal operating temperature is reached.
CAUTION: DO NOT operate air conditioning
10. Ensure warm air is available at vents.
NOTE: If warm air is not available, an air-lock may be present in heater matrix. If necessary, allow engine to cool, remove expansion tank filler cap and repeat bleed operation at heater hose
11. Switch off engine and allow to cool.
12. Check for leaks and top-up coolant to 'MAX' mark on expansion tank

Tank - expansion

26.15.01

Remove

1. Position container to collect coolant.


M26 0819

2. Release clip and disconnect coolant rail hose from expansion tank.
3. Release clip and disconnect bleed hose from expansion tank.
4. Remove screw securing expansion tank and remove expansion tank.

Refit

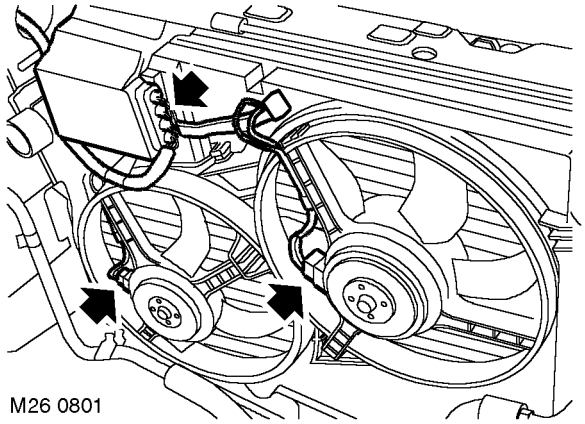
1. Position expansion tank and secure with screw.
2. Connect coolant rail hose and bleed hose and secure with clips.
3. Check for leaks and top-up coolant to 'MAX' mark on expansion tank.

Cooling fan and motor - non A/C

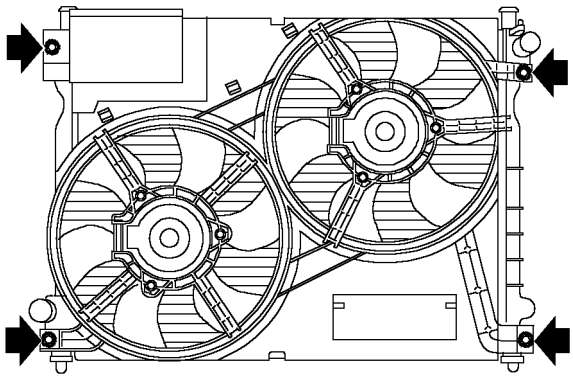
26.25.22

Remove

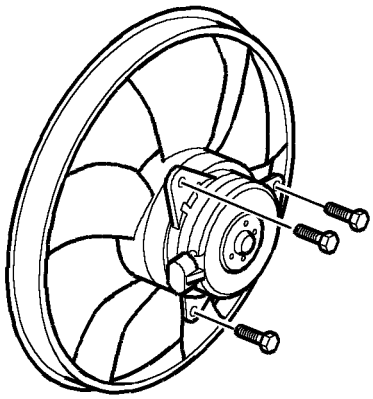
1. Disconnect battery earth lead.


M26 0801

2. Release multiplugs from relay housing and fan motors.
3. Release harness from fan cowling.


M26 0794

4. Remove 4 bolts securing fan cowl to radiator.
5. With assistance manoeuvre fan cowl and motor assembly from vehicle.



M26 0806

6. Remove 3 bolts securing motor to fan cowl, release motor and fan assembly.

Refit

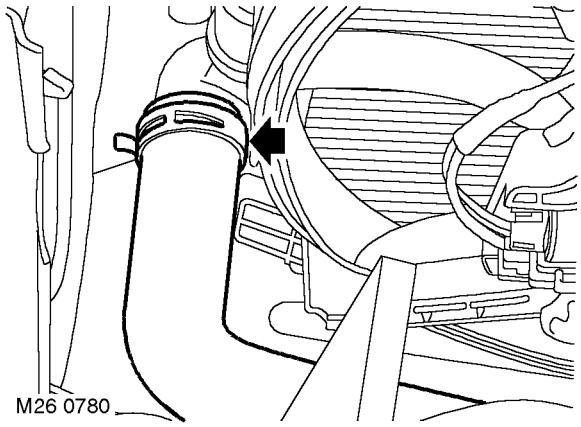
1. Position fan and motor assembly to fan cowl, fit and tighten bolts to 5 Nm (4 lbf.ft).
2. Position fan cowl to radiator, fit and tighten bolts to 5 Nm (4 lbf.ft).
3. Secure relay and harness to fan cowl.
4. Connect multiplugs.
5. Connect battery earth lead.

Cooling fan and motor - A/C

26.25.22

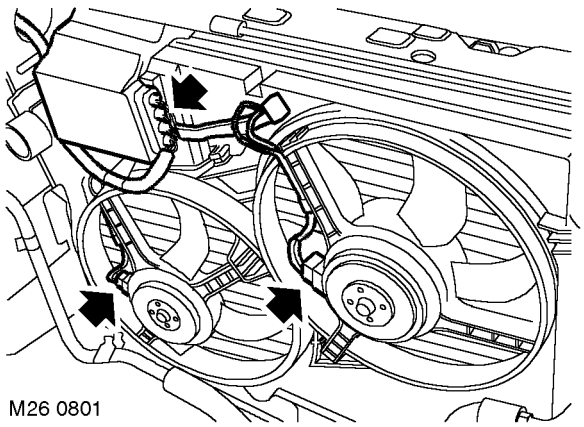
Remove

1. Disconnect battery earth lead.
2. Remove battery tray.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
3. Drain cooling system.
   COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.



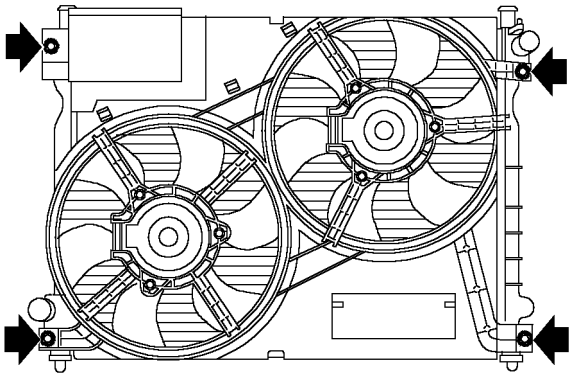
M26 0780

4. Release clip and disconnect top hose from radiator.



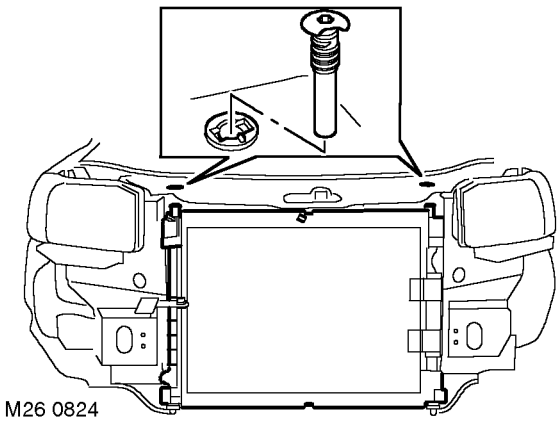
M26 0801

5. Release multiplugs from relay housing and fan motors.
6. Release harness from fan cowling.



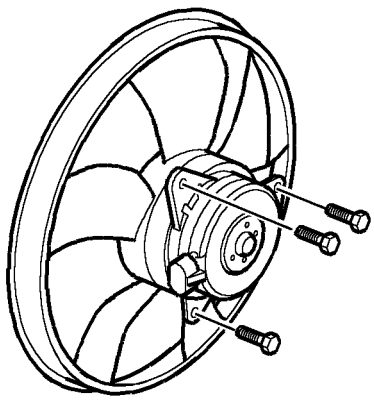
M26 0794

7. Remove 4 bolts securing fan cowl to radiator.



M26 0824

8. Remove 2 retaining pins securing radiator to bonnet landing panel.
9. With assistance manoeuvre fan cowl and motor assembly from vehicle.



M26 0806

10. Remove 6 bolts securing fan motors to fan cowl and remove fan motors.

Refit

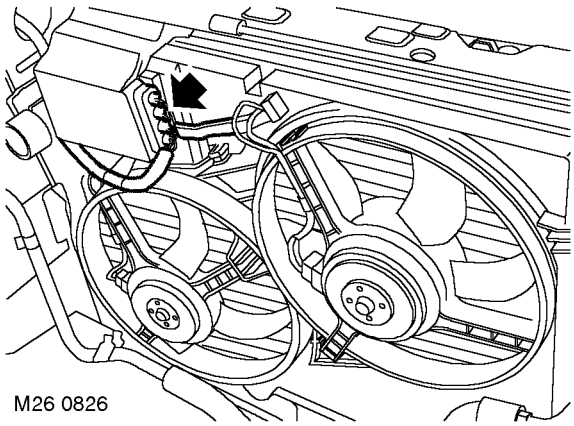
1. Position fan motors fit bolts and tighten to 5 Nm (4 lbf.ft).
2. Position fan cowl to radiator, fit and tighten bolts to 5 Nm (4 lbf.ft).
3. Fit radiator retaining pins.
4. Connect multiplugs.
5. Secure relay and harness to fan cowl.
6. Connect top hose to radiator and secure with clip.
7. Connect bottom hose to radiator and secure with clip.
8. Refill cooling system.
☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**
9. Fit battery tray.
☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
10. Connect battery earth lead.

Control unit - radiator cooling fan

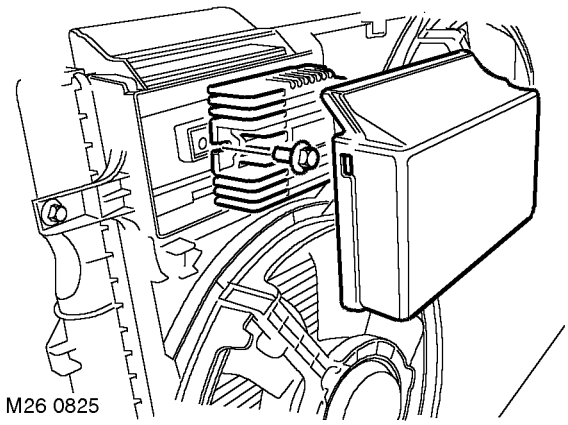
26.25.43

Remove

1. Disconnect battery earth lead.


M26 0826

2. Disconnect cooling fan control unit multiplug.


M26 0825

3. Remove cover from cooling fan control unit.
4. Remove bolt securing cooling fan control unit and remove control unit.

Refit

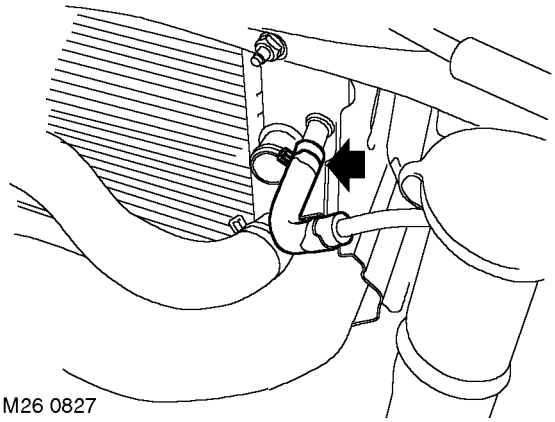
1. Position cooling fan control unit, fit bolt and tighten to 5 Nm (4 lbf.ft).
2. Fit cooling fan control unit cover.
3. Connect cooling fan control unit multiplug.
4. Connect battery earth lead.

Radiator assembly

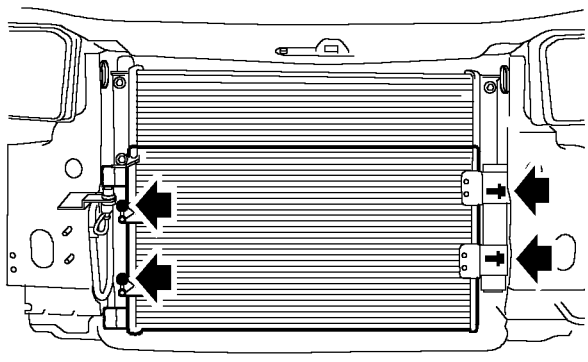
26.40.01

Remove

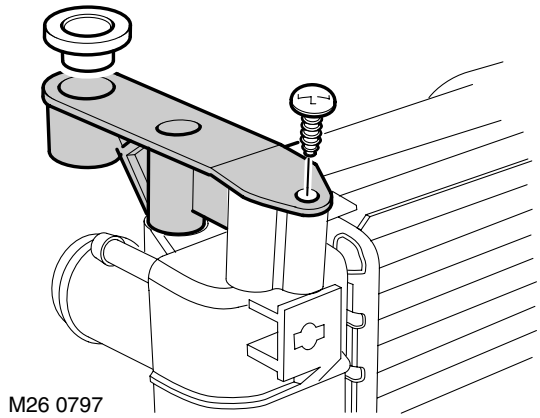
1. Disconnect battery earth lead.
2. Remove front bumper assembly.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
3. Remove cooling fan assembly.
   COOLING SYSTEM - K SERIES 1.8, REPAIRS, Cooling fan and motor - A/C.
   COOLING SYSTEM - K SERIES 1.8, REPAIRS, Cooling fan and motor - non A/C.


M26 0827

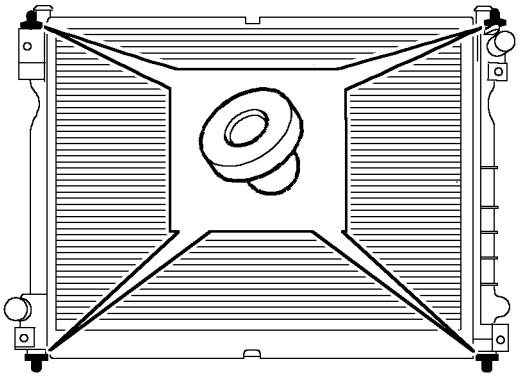
4. Release clip and remove expansion hose from radiator.


M26 828

5. Remove 4 bolts securing condenser to radiator.
6. Release radiator from lower mountings and remove from vehicle.


M26 0797

7. Remove radiator top mounting extension brackets.


M26 0796

8. Remove 4 rubber mountings from radiator.

Refit

1. Fit mounting rubbers to radiator.
2. Fit top support brackets to radiator.
3. Fit radiator and engage lower mountings in chassis.
4. Fit bolts securing condenser to radiator and tighten to 3 Nm (2.2 lbf.ft).

   CAUTION: Ensure that bolts of the correct length are used on refit.

5. Connect expansion tank hose and secure with clip.
6. Fit cooling fan assembly.

   ☞ **COOLING SYSTEM - K SERIES 1.8, REPAIRS, Cooling fan and motor - A/C.**

   ☞ **COOLING SYSTEM - K SERIES 1.8, REPAIRS, Cooling fan and motor - non A/C.**
7. Fit front bumper assembly.

   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
8. Connect battery earth lead.

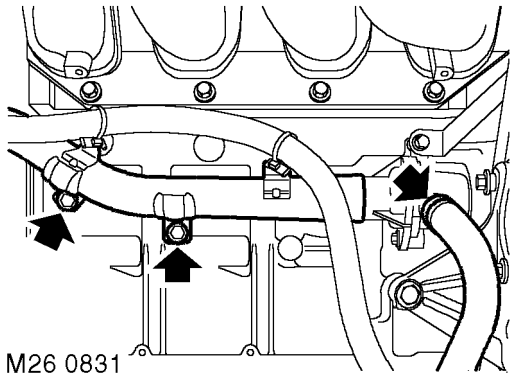
Thermostat

26.45.01

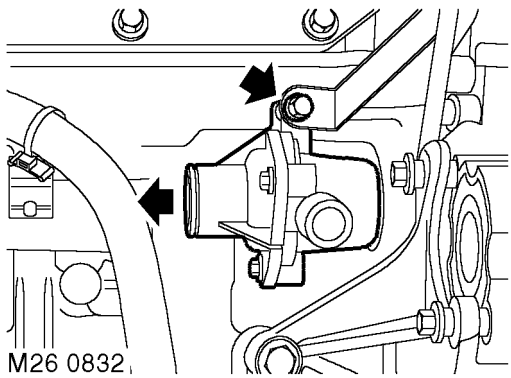
Remove

1. Disconnect battery earth lead.
2. Drain cooling system.

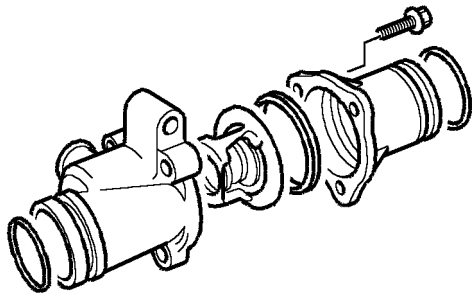
   ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**


M26 0831

3. Loosen clip and disconnect heater hose from thermostat housing.
4. Remove 2 bolts securing coolant rail to cylinder block.
5. Release coolant rail from thermostat housing.


M26 0832

6. Remove bolt securing thermostat housing to cylinder block.
7. Release and remove thermostat housing from coolant pump.

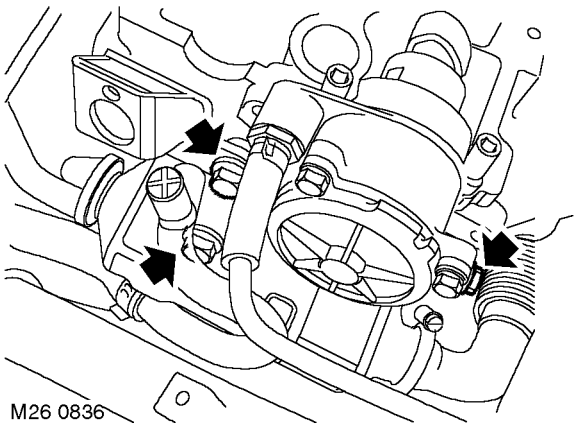


M26 0833

8. Remove and discard 2 'O' rings from thermostat housing outlets.
9. Remove 3 bolts securing thermostat housing cover to thermostat housing.
10. Remove thermostat housing cover.
11. Remove thermostat from housing.
12. Remove rubber seal from thermostat.

Refit

1. Examine thermostat rubber seal for signs of deterioration or damage, renew if necessary.
2. Fit rubber seal to thermostat.
3. Clean mating faces of thermostat and cover.



M26 0836

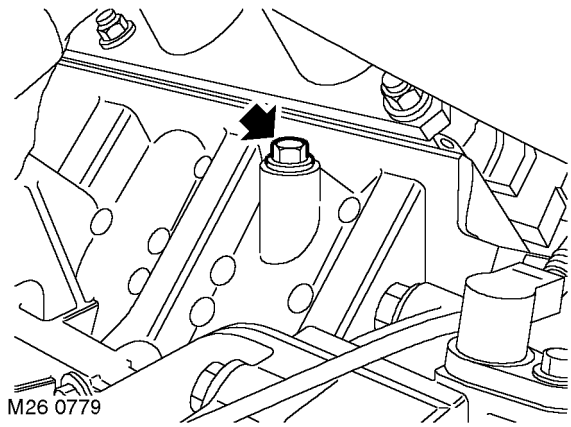
4. Fit thermostat.
5. Align thermostat to shoulder in thermostat housing.
6. Fit thermostat housing cover and tighten bolts to 9 Nm (7 lbf.ft).
7. Clean 'O' ring grooves on thermostat housing outlets.
8. Lubricate new 'O' rings with rubber grease and fit to thermostat housing outlets.
9. Position thermostat housing to coolant pump and push into place.
10. Align dipstick tube bracket to thermostat housing.
11. Fit bolt securing thermostat housing to cylinder block and tighten to 9 Nm (7 lbf.ft).
12. Connect coolant rail to thermostat housing.
13. Align coolant rail to cylinder block, fit bolts and tighten to 9 Nm (7 lbf.ft).
14. Connect heater hose to thermostat housing and tighten clip.
15. Refill cooling system.
    ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**
16. Connect battery earth lead.

Coolant - drain and refill

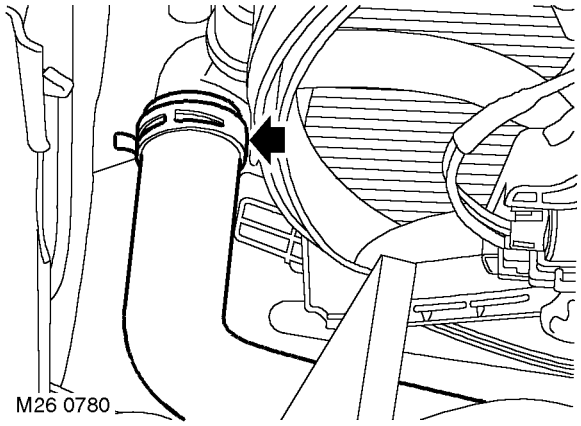
26.10.01

Drain

1. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
2. Visually check engine and cooling system for signs of coolant leaks.
   WARNING: Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.
3. Examine hoses for signs of cracking, distortion and security of connections.
4. Remove expansion tank filler cap.
5. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Position container to collect coolant.


M26 0779

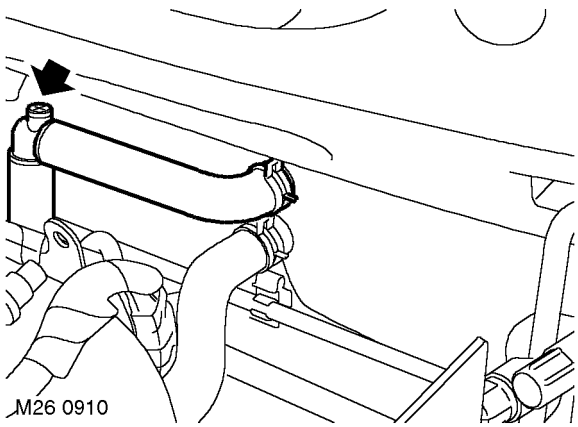
7. Remove cylinder block drain plug.


M26 0780

8. Release clip and remove bottom hose from radiator.
9. Allow cooling system to drain.

Refill

1. Flush system with water under low pressure. **Do not use water under high pressure as it could damage the radiator.**
2. Clean cylinder block drain plug and apply Loctite 242 to first 3 threads.
3. Fit cylinder block drain plug and tighten to 20 Nm (15 lbf.ft).
4. Fit bottom hose to radiator and secure with clip.
5. Prepare coolant to required concentration.
   CAPACITIES, FLUIDS AND LUBRICANTS, Fluids.


M26 0910

6. Remove bleed screw from heater return hose.
7. Slowly fill the system through the coolant expansion tank until a steady flow of coolant is emitted from the bleed hole.
8. Fit and close bleed screw in heater return hose.
9. Continue to fill system through the expansion tank until coolant reaches to the base of the expansion tank bleed hose.
10. Fit expansion tank filler cap.

11. Start and run engine until coolant in expansion tank has dropped to bottom of tank.
CAUTION: DO NOT operate air conditioning

12. Switch off engine and allow to cool.
13. Remove expansion tank filler cap and add coolant until it reaches the base of the bleed hose.
14. Fit expansion tank filler cap.
15. Start and run engine until normal operating temperature is reached.
CAUTION: The bottom hose must be warm/ hot, this will ensure the thermostat is fully open.

16. Ensure warm air is available at vents.
NOTE: If warm air is not available, an air-lock may be present in heater matrix. If necessary, allow engine to cool, remove expansion tank filler cap and repeat bleed operation at heater hose

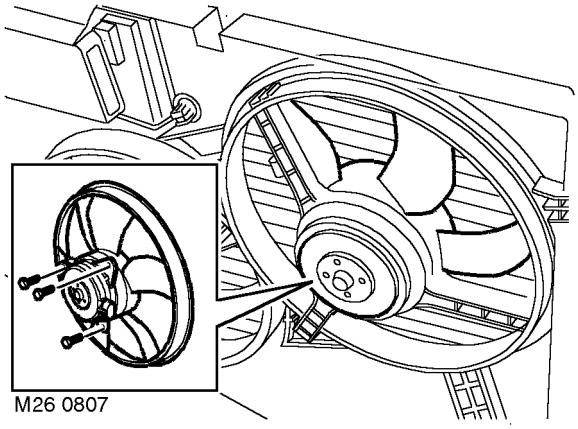
17. Switch off engine and allow to cool.
18. Check for leaks and top-up coolant to 'MAX' mark on expansion tank
19. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
20. Fit engine acoustic cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**

Cooling fan and motor

26.25.22

Remove

1. Remove radiator.
   COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.


M26 0807

2. Remove 3 bolts securing LH cooling fan and motor assembly to fan cowl. Remove fan and motor assembly.

Refit

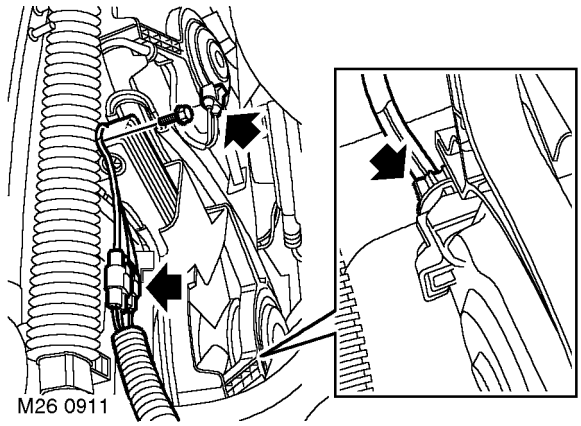
1. Position fan and motor assembly to fan cowl, fit and tighten bolts to 5 Nm (4 lbf.ft).
2. Fit radiator.
   COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.

Control unit - radiator cooling fan - 2002 MY On

26.25.43

Remove

1. Disconnect battery earth lead.


M26 0911

2. Release multiplugs from clips and disconnect 2 body harness multiplugs.
3. Disconnect multiplug from LH cooling fan and release harness from 4 retaining clips.
4. Disconnect multiplug from RH cooling fan and release harness from 2 retaining clips.
5. Remove screw securing control unit.
6. Release control unit from fan cowl.

Refit

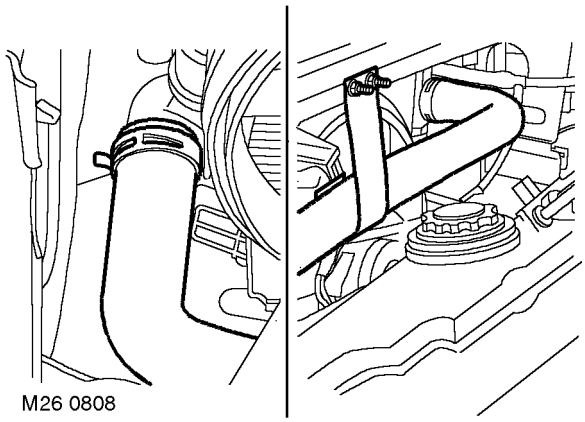
1. Carefully position control unit in cowl and secure with screw.
2. Connect body harness multiplugs and secure to cowl.
3. Secure LH and RH harness to retaining clips and connect multiplugs.
4. Connect battery earth lead.

Radiator assembly

26.40.01

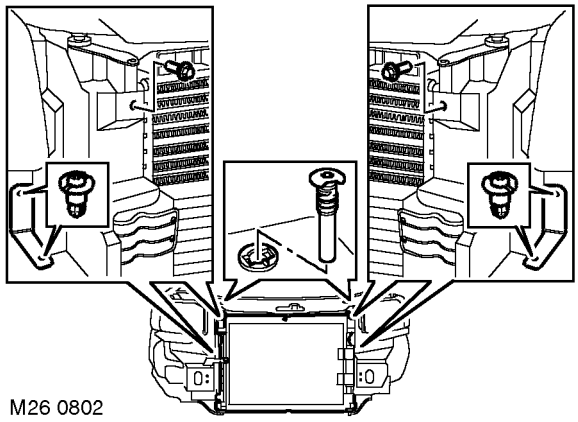
Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
3. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
4. **Models without A/C:** Remove bumper valance.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
5. **Models without A/C:** Remove 4 nuts and 4 bolts securing armature to body and remove armature.
6. **Models with A/C:** Remove A/C condenser.
   AIR CONDITIONING, REPAIRS, Condenser.

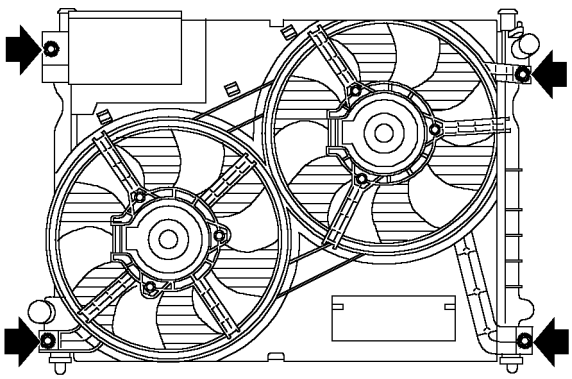

M26 0808

7. Release clips and remove top and bottom hoses.
   CAUTION: Always fit plugs to open connections to prevent contamination.

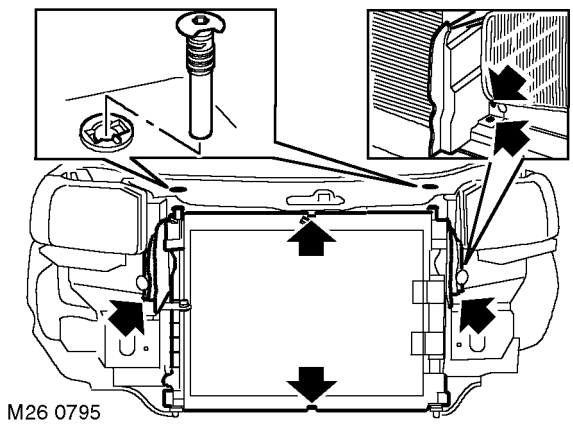
8. Release clip and remove expansion hose from radiator.


M26 0802

9. Remove 2 bolts and 4 scrivets securing LH and RH radiator baffles and remove baffles.
10. Remove radiator upper retaining pegs from bonnet locking platform. Ease top of radiator forward.

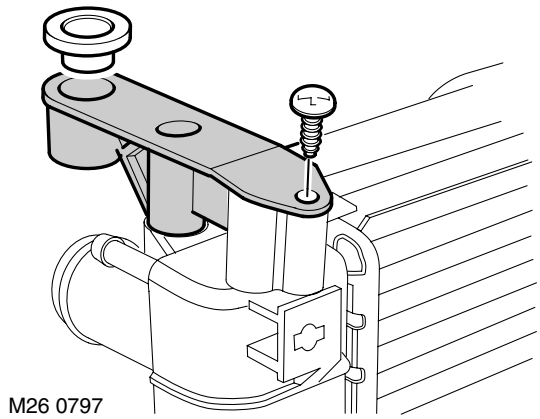

M26 0794

11. Remove 4 bolts securing fan cowl to radiator.

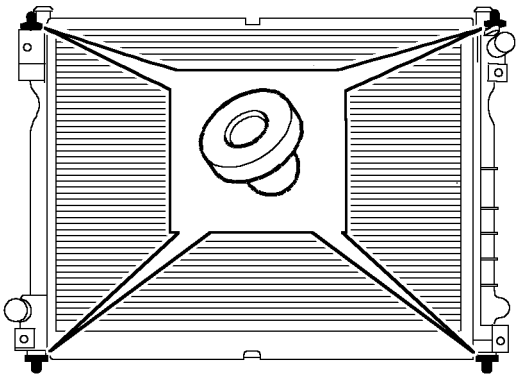

M26 0795

12. Remove 2 cowl retaining clips from radiator.

13. Release radiator from lower mountings and remove from vehicle.


M26 0797

14. Remove radiator top mounting extension brackets.


M26 0796

15. Remove 4 rubber mountings from radiator.

Refit

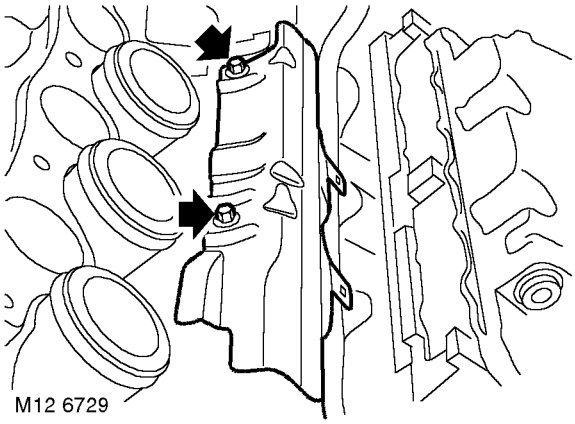
1. Fit mounting rubbers to radiator.
2. Fit top support brackets to radiator.
3. Position fan cowl to radiator, fit and tighten bolts to 5 Nm (4 lbf.ft).
4. Secure fan cowl to radiator with clips.
5. Fit radiator and engage lower mountings in chassis.
6. Fit radiator top mountings to bonnet locking platform.
7. Position LH and RH radiator baffles, secure with scrivets, fit and tighten top bolts to 5 Nm (4 lbf.ft).
8. Connect expansion tank hose and secure with clip.
9. Connect bottom and top hoses to radiator secure with clips.
10. Models with A/C: Fit A/C condenser.
☞ **AIR CONDITIONING, REPAIRS, Condenser.**
11. Models without A/C: Position armature, fit and tighten 4 nuts and bolts securing armature to body.
☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
12. Models without A/C: Fit bumper valance.
☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
13. Refill cooling system.
☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
14. Fit acoustic cover.
☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
15. Connect battery earth lead.

Thermostat

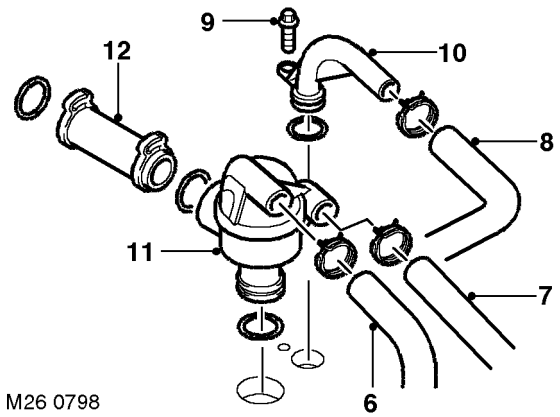
26.45.01

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
3. Remove inlet manifold chamber.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.



4. Remove 2 bolts securing injector protection cover and RH fuel rail to inlet manifold, position cover aside.
5. Release 2 clips securing engine harness to rear engine lifting bracket and bracket on RH inlet manifold.



6. Release clip and disconnect bottom hose from thermostat housing.
7. Loosen clip and disconnect heater hose from thermostat housing.
8. Release clip and disconnect top hose from coolant elbow.
9. Remove bolt securing thermostat housing and coolant elbow to cylinder block.
10. Remove coolant elbow from cylinder block.
11. Remove thermostat housing and coolant pipe from cylinder block.
12. Release clip and remove coolant pipe from thermostat housing.
13. Remove and discard 4 'O' rings from thermostat housing, coolant elbow and coolant pipe.

Refit

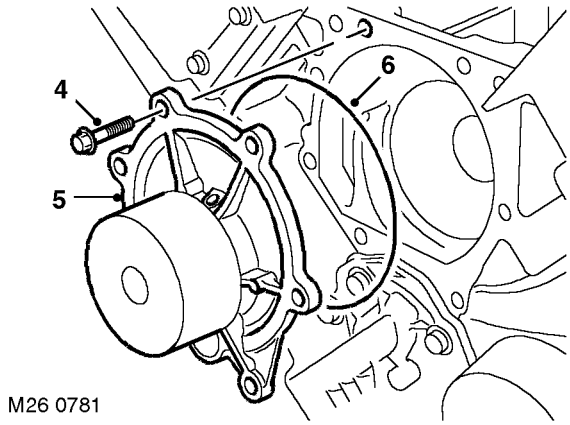
1. Lubricate new 'O' rings with rubber grease and fit to sealing grooves in thermostat housing, coolant elbow and coolant pipe.
2. Fit coolant pipe into thermostat housing, ensure clip connectors are uppermost.
3. Position thermostat housing and coolant pipe above cylinder block, engage coolant pipe in cylinder block and press thermostat housing firmly into position. Ensure mounting flange on thermostat housing is aligned to bolt hole in cylinder block.
4. Fit coolant elbow into cylinder block, press firmly into place. Ensure mounting flange is aligned correctly to thermostat housing flange.
5. Fit bolt to coolant elbow and thermostat housing flanges. Tighten bolt to 18 Nm (13 lbf.ft).
6. Connect top hose to coolant elbow and secure with clip.
7. Connect heater and bottom hoses to thermostat housing, secure with clips.
8. Position and secure engine harness to brackets with clips.
9. Position injector protection cover to RH fuel rail, fit and tighten bolts to 9 Nm (7 lbf.ft).
10. Fit inlet manifold chamber.
    MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Seals - inlet manifold chamber.
11. Fill cooling system.
    COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
12. Connect battery earth lead.

Coolant pump

26.50.01

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
3. Remove camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.

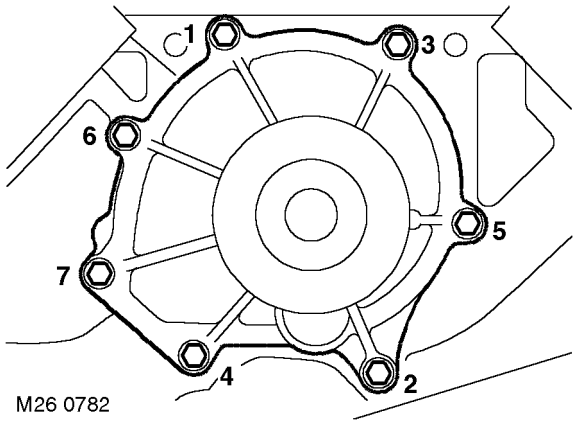


M26 0781

4. Remove and discard 7 bolts securing coolant pump to cylinder block.
5. Release coolant pump from cylinder block and remove.
6. Remove and discard 'O' ring from coolant pump.

Refit

1. Clean coolant pump and mating face of cylinder block.
2. Lubricate new 'O' ring with rubber grease and fit to coolant pump.



M26 0782

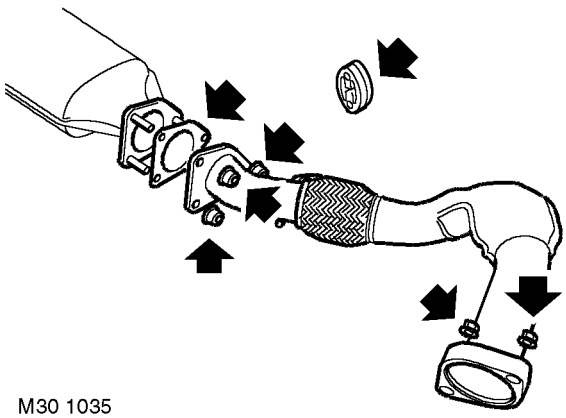
3. Fit coolant pump to cylinder block. Fit new bolts and tighten progressively in the sequence illustrated to 9 Nm (7 lbf.ft).
4. Fit camshaft timing belt.
   ENGINE - K SERIES KV6, REPAIRS, Camshaft timing belt.
5. Fill cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
6. Connect battery earth lead.

Exhaust pipe - front

30.10.09

Remove

1. Raise vehicle on 4 post ramp.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



M30 1035

3. Remove 2 nuts securing front pipe clamping plate.
4. Remove 3 nuts securing front pipe to intermediate pipe.
5. Release intermediate pipe from front pipe.
6. Remove and discard exhaust flange gasket.
7. Release rubber mounting from front pipe.
8. Remove exhaust front pipe.

Refit

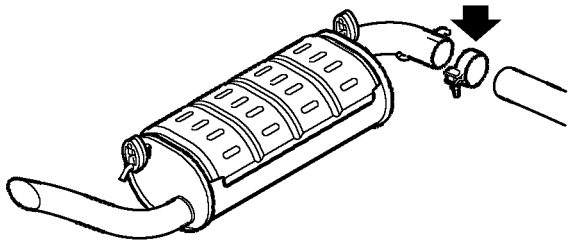
1. Clean exhaust pipe and turbocharger down pipe flanges.
2. Align front pipe flanges, fit new gasket and start nuts.
3. Connect rubber mounting to front pipe.
4. Tighten front pipe to intermediate pipe flange nuts to 60 Nm (44 lbf.ft).
5. Tighten front pipe clamping plate to 50 Nm (37 lbf.ft).
6. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
7. Lower vehicle.

Exhaust pipe - intermediate

30.10.11

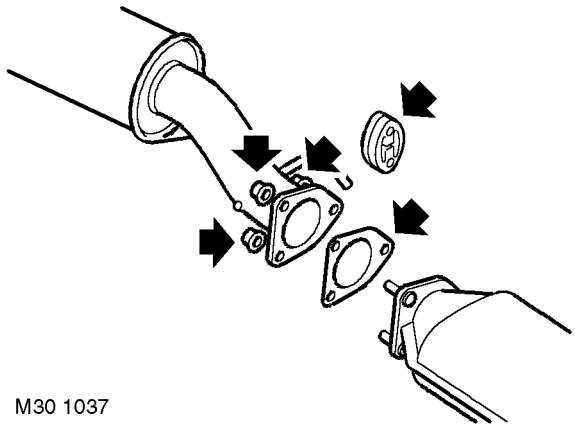
Remove

1. Raise vehicle on 4 post ramp.



M30 1036

2. Loosen tail pipe clamp nut and release tail pipe from intermediate pipe.



M30 1037

3. Remove 3 nuts securing front pipe to intermediate pipe.
4. Release intermediate pipe from front pipe.
5. Remove and discard gasket.
6. Release rubber mounting from intermediate pipe.
7. With assistance release and remove intermediate pipe.

Refit

1. Clean intermediate pipe/silencer, front pipe and tail pipe mating faces.
2. Fit new gasket to front pipe flange.
3. With assistance fit intermediate pipe to tail pipe and front pipe.
4. Fit nuts to intermediate pipe flange and tighten to 60 Nm (44 lbf.ft).
5. Tighten tail pipe clamp nut to 55 Nm (41 lbf.ft).
6. Fit intermediate pipe to rubber mounting.
7. Lower vehicle.

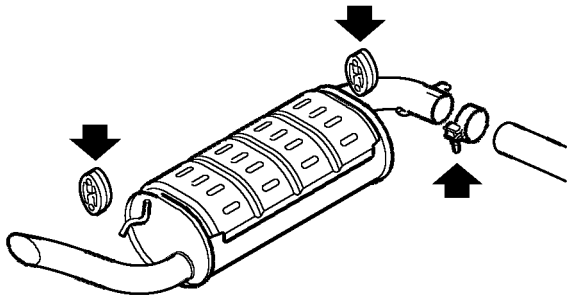
Exhaust pipe - tail

30.10.22

Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



M30 1038

2. Loosen tail pipe clamp nut.
3. Release 2 rubber mountings from tail pipe.
4. Remove tail pipe.

Refit

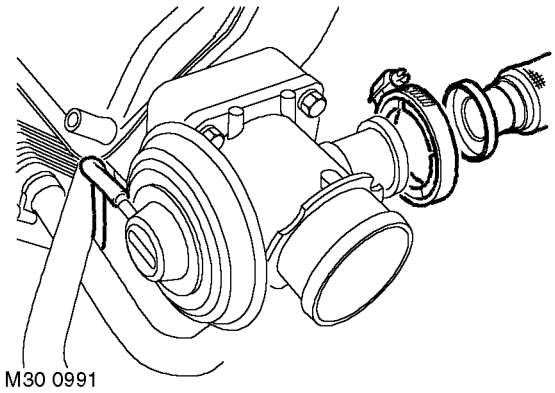
1. Clean mating faces of tail pipe and intermediate pipe.
2. Fit tail pipe and connect rubber mountings.
3. Tighten tail pipe clamp nut to 55 Nm (41 lbf.ft).
4. Remove stands and lower vehicle.

Gaskets - induction manifold

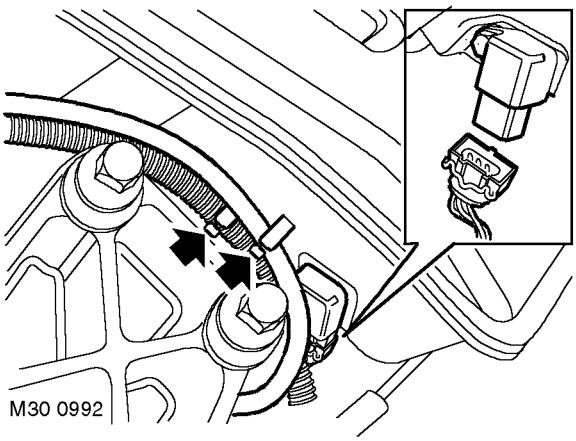
30.15.08

Remove

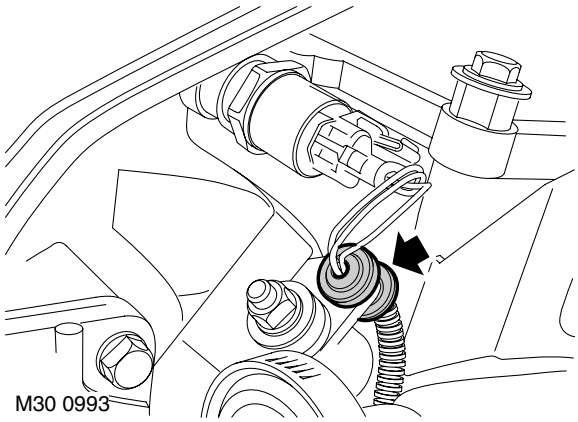
1. Disconnect battery earth lead.
2. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.


M30 0991

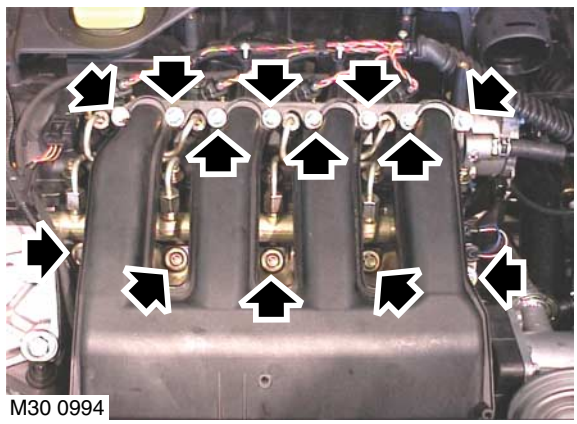
3. Disconnect vacuum hose from EGR valve.
4. Loosen clamp screw and remove clamp from EGR pipe to EGR valve.


M30 0992

5. Release harness and fuel return hose from clips on inlet manifold.
6. Disconnect multiplug from turbocharger boost pressure sensor.


M30 0993

7. Release fuel pressure sensor harness grommet from inlet manifold.


M30 0994

8. Remove 9 bolts and 4 nuts securing inlet manifold.
9. Remove inlet manifold and discard gaskets.

Refit

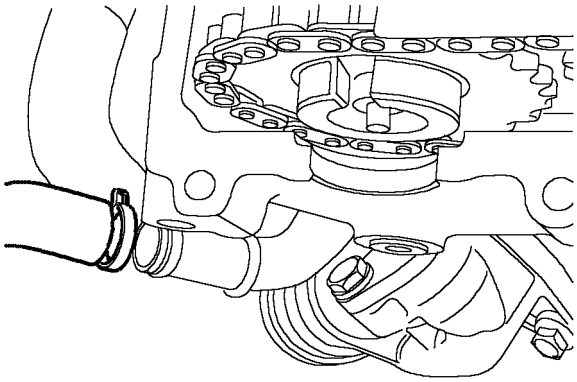
1. Clean inlet manifold and mating faces.
2. Clean EGR pipe flange and EGR valve mating face.
3. Fit new gaskets to inlet manifold.
4. Fit inlet manifold and tighten fixings evenly. Tighten M6 bolts to 10 Nm (7.5 lbf.ft)and M7 bolt and nuts to 15 Nm (11 lbf.ft).
5. Fit grommet to inlet manifold.
6. Connect multiplug to turbocharger boost pressure sensor.
7. Fit fuel return hose and harness to clips on inlet manifold.
8. Fit EGR pipe clamp and tighten screw to 10 Nm (7.5 lbf.ft).
9. Connect vacuum hose to EGR valve.
10. Fit intake ducting assembly.
    FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
11. Connect battery earth lead.

Gasket- exhaust manifold - manual transmission

30.15.12

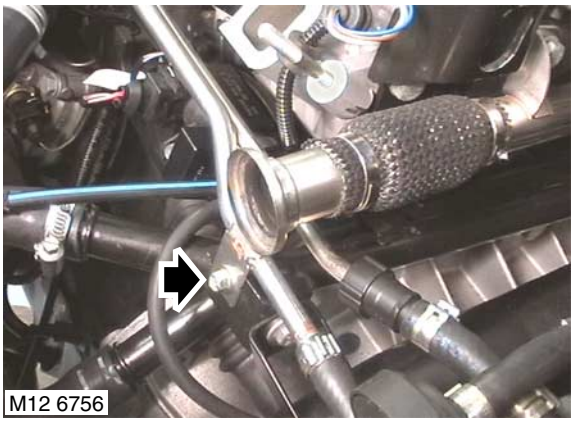
Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
3. Remove camshaft cover gasket.
   ENGINE - Td4, REPAIRS, Gasket - camshaft cover.



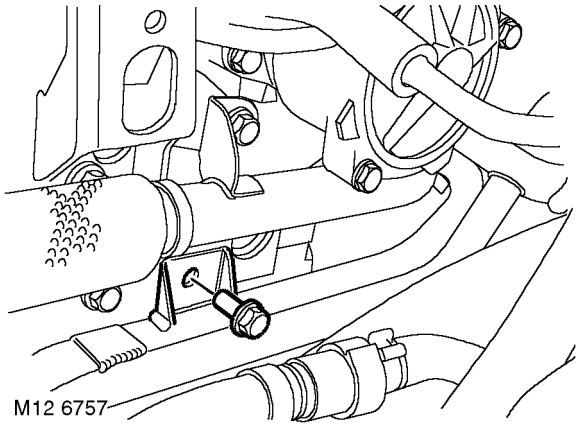
M26 0788

4. Release clip and disconnect expansion tank hose from coolant rail.



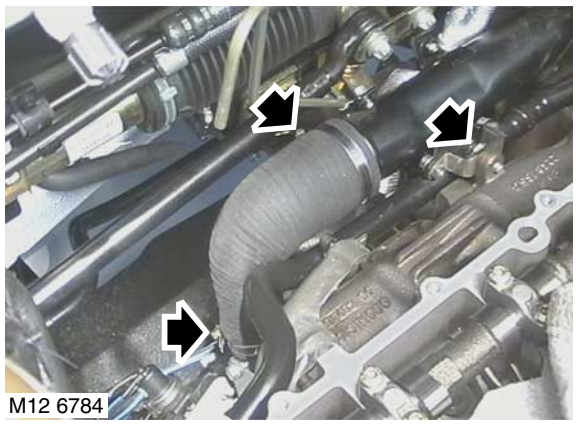
M12 6756

5. Remove bolt, fuel rail to coolant rail.



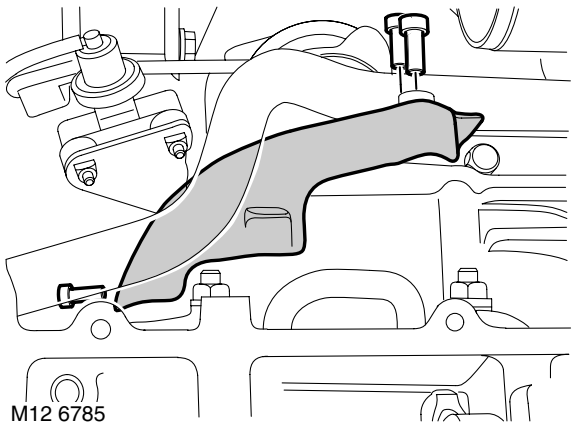
M12 6757

6. Remove bolt, coolant rail to cylinder head.



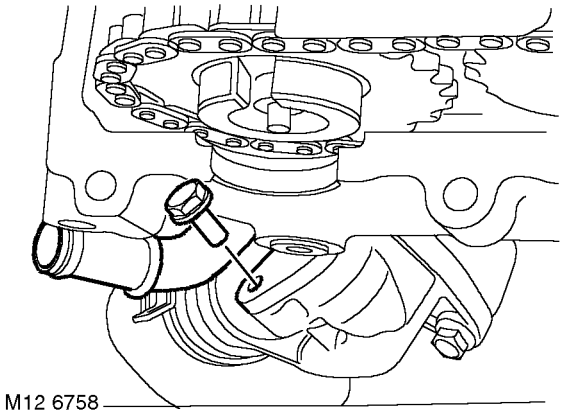
M12 6784

7. Remove bolt, coolant rail to exhaust manifold.
8. Loosen clips and remove turbocharger outlet hose.

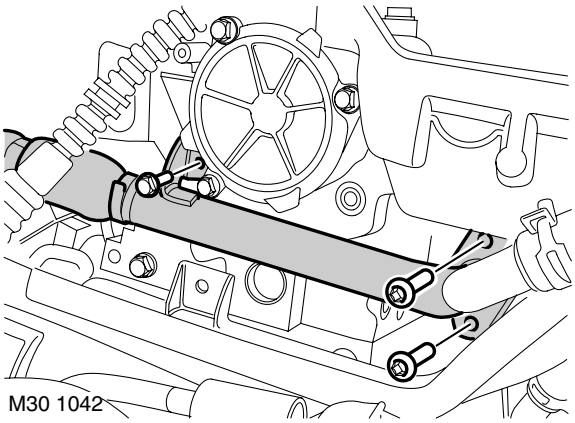


M12 6785

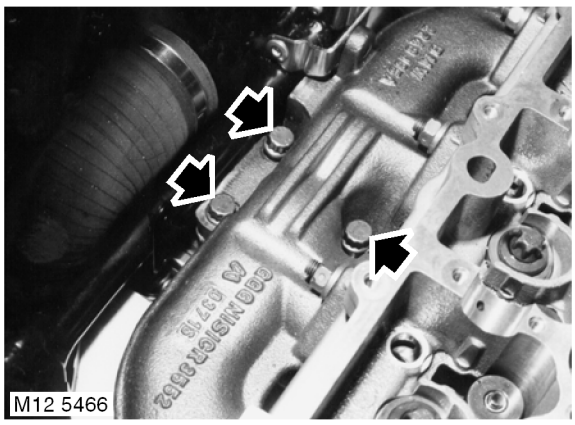
9. Remove 3 Allen screws, heat shield to coolant rail.


M12 6758

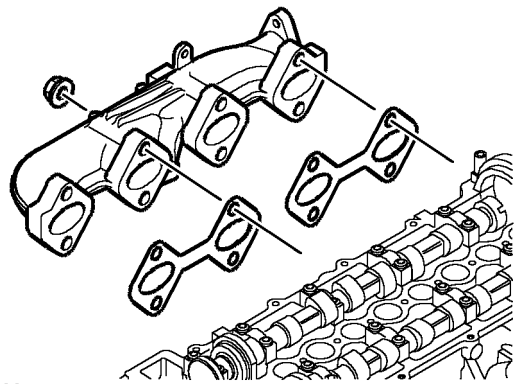
10. Remove bolt, release coolant rail from thermostat housing and discard seal.
11. Remove heat shield.


M30 1042

12. Loosen bolt, EGR pipe to cylinder head.
13. Remove 2 Torx screws EGR pipe to exhaust manifold.


M12 5466

14. Remove 3 bolts, turbocharger to exhaust manifold. Discard gasket.


M30 1041

15. Remove 8 nuts and remove exhaust manifold. Discard gaskets.

Refit

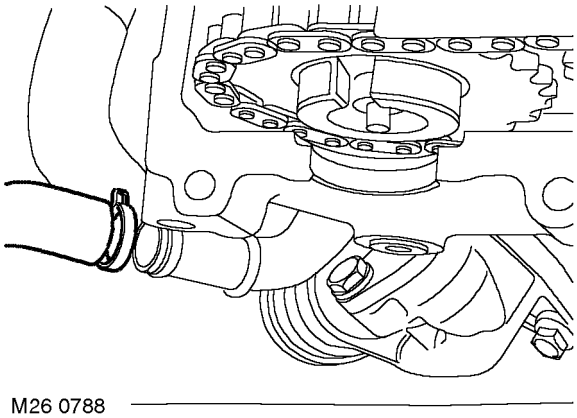
1. Clean exhaust manifold and mating faces.
2. Use new gaskets and fit exhaust manifold to cylinder head.
3. Fit nuts securing exhaust manifold and tighten to 24 Nm (18 lbf.ft).
4. Use new gasket, align turbocharger and tighten bolts to 50 Nm (37 lbf.ft).
5. Clean EGR pipe and mating face.
6. Fit Torx screws EGR pipe to manifold and tighten to 22 Nm (16 lbf.ft).
7. Tighten bolt, EGR pipe to cylinder head to 20 Nm (15 lbf.ft).
8. Fit heat shield.
9. Clean coolant rail and thermostat housing mating face.
10. Fit new seal to coolant rail, fit rail to thermostat housing and tighten bolt to 8 Nm (6 lbf.ft).
11. Tighten Allen screws securing heat shield to 8 Nm (6 lbf.ft).
12. Tighten bolts securing coolant rail to 20 Nm (15 lbf.ft).
13. Tighten bolt fuel rail to coolant rail to 10 Nm (7.5 lbf.ft).
14. Connect expansion tank hose to coolant rail and secure with clip.
15. Fit turbocharger outlet hose and tighten clips.
16. Fit camshaft cover gasket.
☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
17. Fill cooling system.
☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
18. Connect battery earth lead.

Gasket- exhaust manifold - automatic transmission

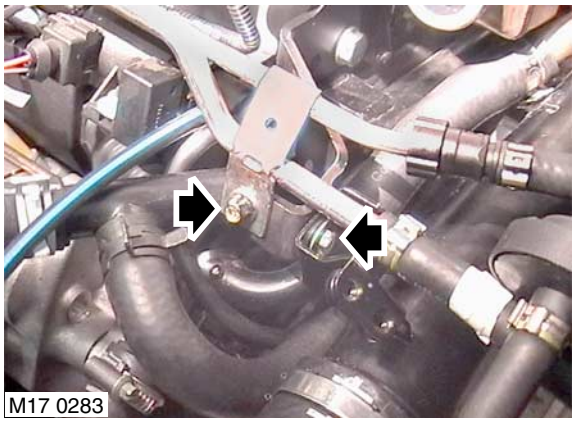
30.15.12

Remove

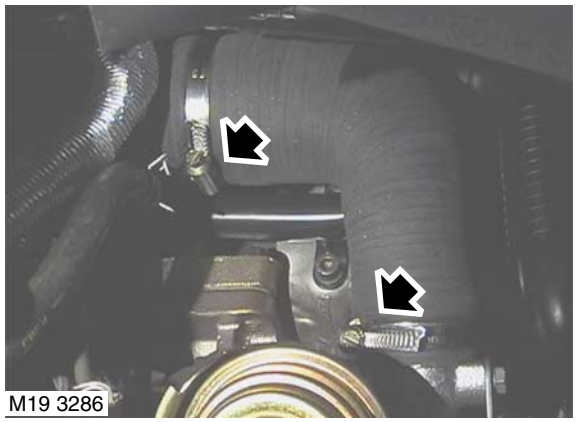
1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
3. Remove camshaft cover gasket.
   ENGINE - Td4, REPAIRS, Gasket - camshaft cover.


M26 0788

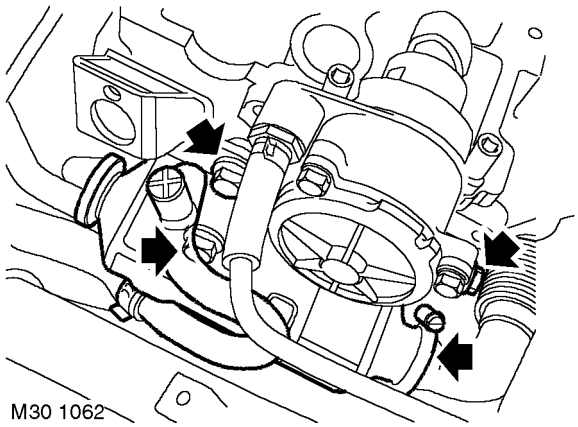
4. Release clip and disconnect expansion tank hose from coolant rail.


M17 0283

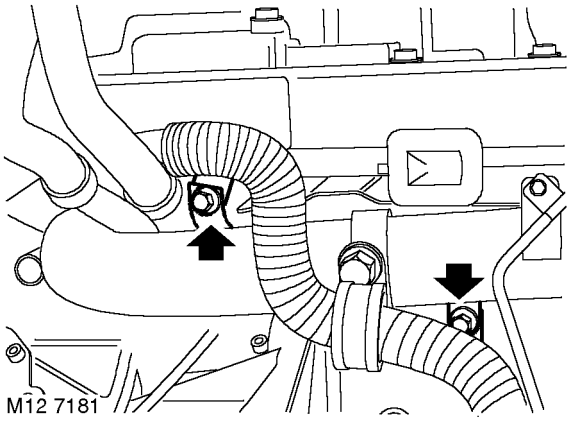
5. Remove bolt, fuel rails to support bracket.
6. Remove bolt securing turbocharger outlet pipe to support bracket.


M19 3286

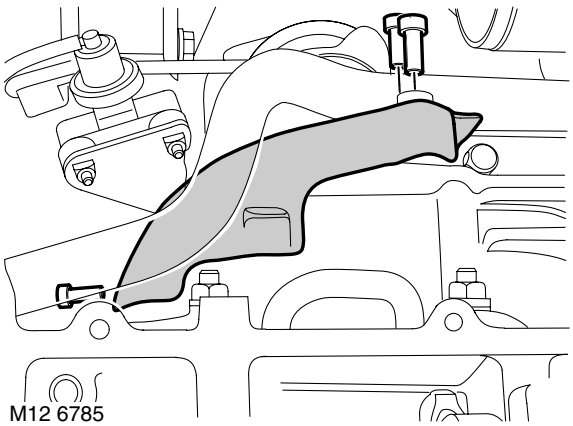
7. Loosen clips and remove turbocharger outlet hose.


M30 1062

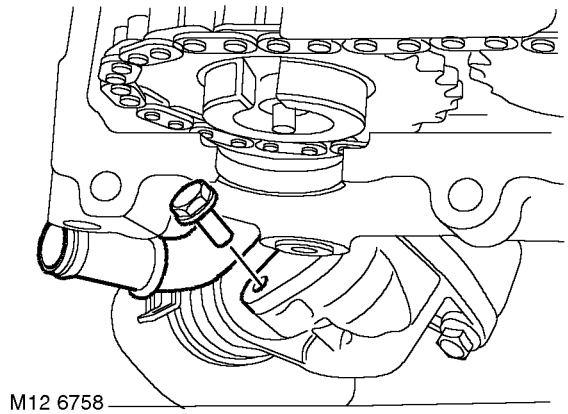
8. Loosen clamp screw securing EGR pipe to cooler and release clamp from cooler.
9. Remove 3 bolts securing EGR cooler to cylinder head and lifting bracket.



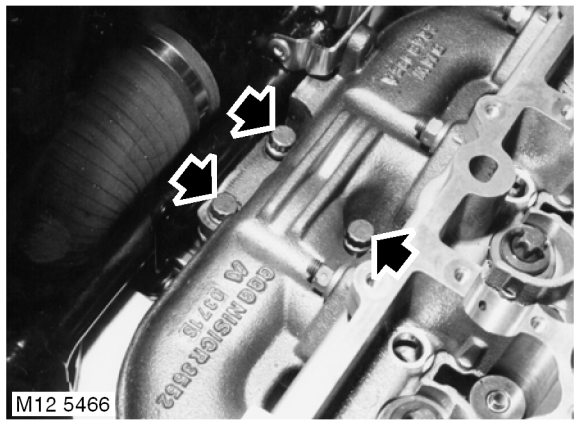
10. Remove bolt securing turbocharger outlet pipe to coolant rail.
11. Remove bolt, turbocharger outlet pipe to bracket on exhaust manifold.



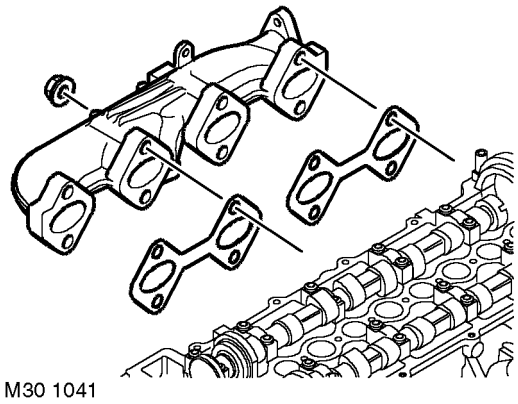
12. Remove 3 Allen screws heat shield to coolant rail.



13. Remove bolt, release coolant rail from thermostat housing and discard seal.
14. Remove heat shield.



15. Remove 3 bolts, turbocharger to exhaust manifold. Discard gasket.



16. Remove 8 nuts and remove exhaust manifold. Discard gaskets.

Refit

1. Clean exhaust manifold and mating faces.
2. Use new gaskets and fit exhaust manifold to cylinder head.
3. Fit nuts securing exhaust manifold and tighten to 24 Nm (18 lbf.ft).
4. Use new gasket, align turbocharger and tighten bolts to 50 Nm (37 lbf.ft).
5. Clean EGR pipe and mating face.
6. Fit heat shield.
7. Clean coolant rail and thermostat housing mating face.
8. Fit new seal to coolant rail, fit rail to thermostat housing and tighten bolt to 8 Nm (6 lbf.ft).
9. Tighten Allen screws securing heat shield to 8 Nm (6 lbf.ft).
10. Align EGR cooler and coolant rail, tighten bolts to 25 Nm (18 lbf.ft).
11. Fit EGR pipe clamp and tighten screw.

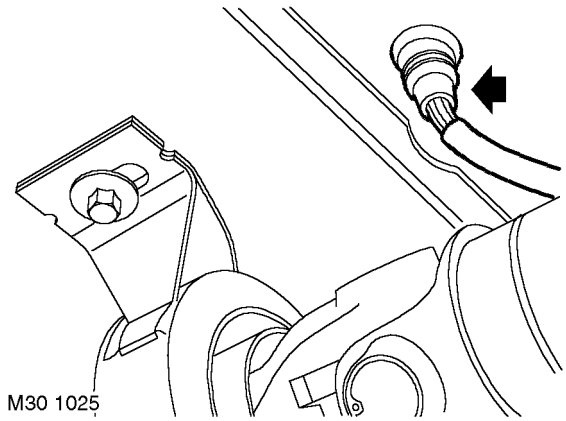
12. Align turbocharger outlet pipe and tighten 8 mm bolts to 25 Nm (18 lbf.ft) and 6 mm bolt to 10 Nm (7.5 lbf.ft).
13. Fit bolt securing fuel rails to support bracket and tighten to 10 Nm (7.5 lbf.ft).
14. Connect expansion tank hose to coolant rail and secure with clip.
15. Fit turbocharger outlet hose and tighten clips.
16. Fit camshaft cover gasket.
☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
17. Connect battery earth lead.
18. Fill cooling system.
☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

Exhaust pipe - front

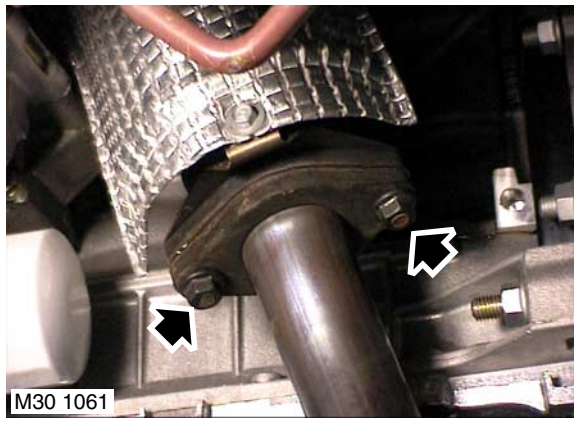
30.10.09

Remove

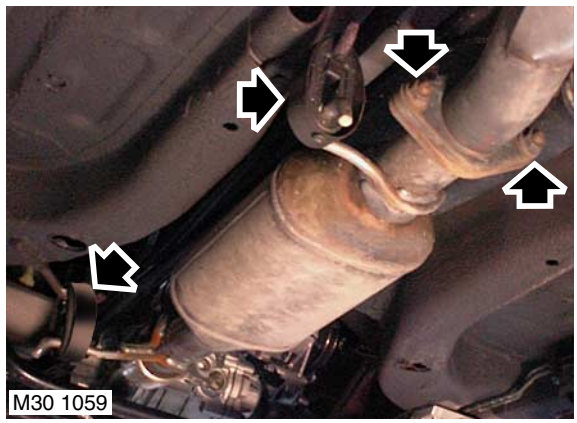
1. Release clips securing gear lever gaiter to centre console.
2. Move gaiter aside and disconnect post catalyst HO2S multiplug.
3. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



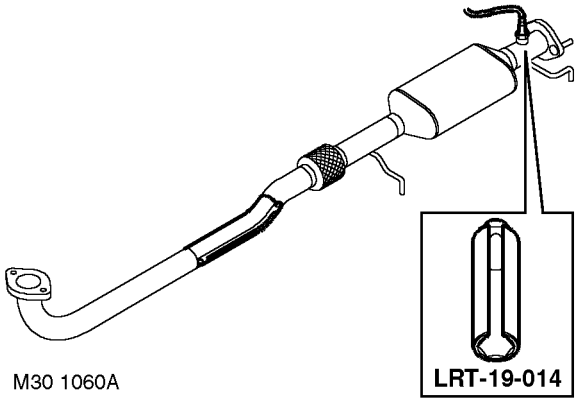
4. Release grommet and withdraw HO2S harness multiplug through grommet aperture.



5. Remove 2 nuts securing exhaust front pipe to exhaust manifold.
6. Release exhaust front pipe from exhaust manifold and collect gasket.



7. Remove 2 nuts and release front pipe from intermediate pipe/silencer.
8. Collect flange gasket.
9. Release front pipe from rubber mountings.
10. Remove exhaust front pipe.



M30 1060A

11. Remove 4 nuts securing heat shield to front pipe.
12. Remove heat shield.
13. Remove HO2S.

Refit

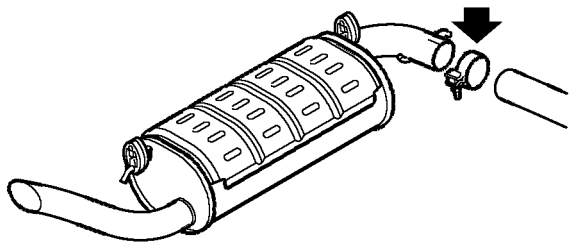
1. Clean HO2S and mating face.
2. If refitting existing HO2S, apply anti-seize compound to HO2S threads.
3. Fit HO2S and tighten to 55 Nm (41 lbf.ft) using tool **LRT-19-014.**
4. Fit heat shield to front pipe, fit nuts and tighten to 9 Nm (7 lbf.ft).
5. Clean mating faces of front pipe and intermediate pipe.
6. Position exhaust pipe to front rubber mountings.
7. Using new gasket, connect front pipe to intermediate pipe, fit nuts and tighten to 60 Nm (44 lbf.ft).
8. Clean front pipe and manifold mating faces.
9. Using new gasket, connect front pipe to manifold, fit nuts and tighten to 60 Nm (44 lbf.ft).
10. Feed HO2S harness through grommet aperture and secure grommet.
11. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
12. Connect HO2S multiplug.
13. Secure gaiter to console.

Exhaust pipe - intermediate

30.10.11

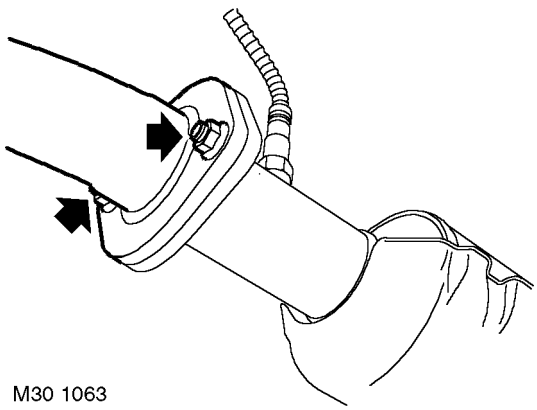
Remove

1. Raise vehicle on 4 post ramp.



M30 1036

2. Loosen tail pipe clamp nut and release tail pipe from intermediate pipe.



M30 1063

3. Remove 2 nuts securing front pipe to intermediate pipe.
4. Release intermediate pipe from front pipe.
5. Remove and discard gasket.
6. With assistance release and remove intermediate pipe.

Refit

1. Clean intermediate pipe/silencer, front pipe and tail pipe mating faces.
2. Fit new gasket to front pipe flange.
3. With assistance fit intermediate pipe to tail pipe and front pipe.
4. Fit nuts to intermediate pipe flange and tighten to 60 Nm (44 lbf.ft).
5. Tighten tail pipe clamp nut to 55 Nm (41 lbf.ft).
6. Lower vehicle.

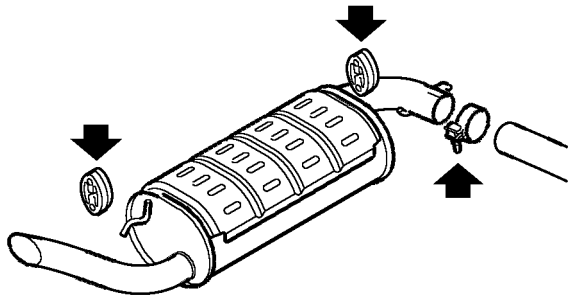
Exhaust pipe - tail

30.10.22

Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



M30 1038

2. Loosen tail pipe clamp nut.
3. Release 2 rubber mountings from tail pipe.
4. Remove tail pipe.

Refit

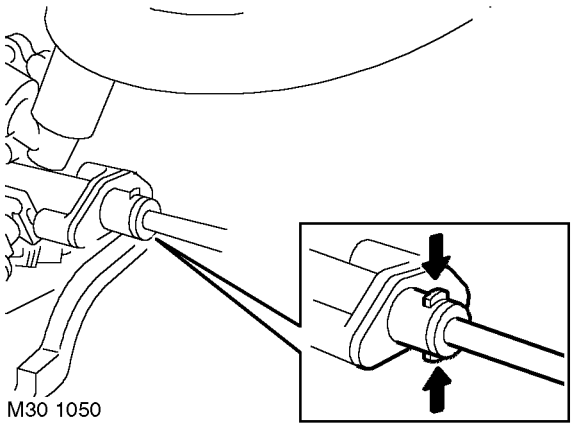
1. Clean mating faces of tail pipe and intermediate pipe.
2. Fit tail pipe and connect rubber mountings.
3. Tighten tail pipe clamp nut to 55 Nm (41 lbf.ft).
4. Remove stands and lower vehicle.

Gasket(s) - induction manifold - LH/each - renew

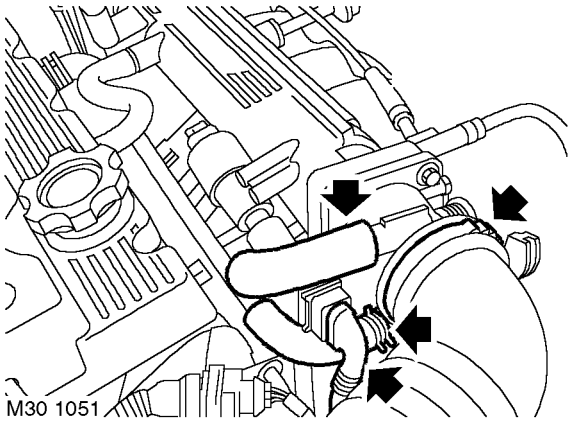
30.15.08

Remove

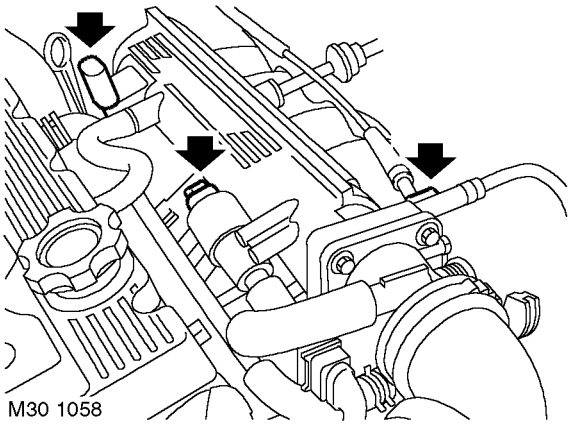
1. Disconnect battery earth lead.
2. Drain cooling system
   COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.



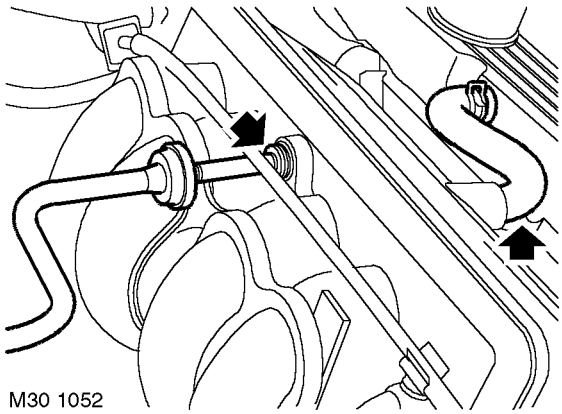
3. Position absorbent cloth to collect fuel spillage.
4. Release fuel feed pipe from fuel rail.
   CAUTION: Always fit plugs to open connections to prevent contamination.



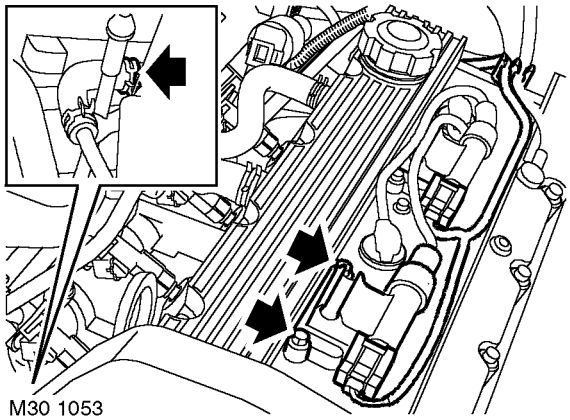
5. Release clip and disconnect air intake hose from throttle housing.
6. Release clip and disconnect purge hose from inlet manifold.
7. Release clip and disconnect breather hose from throttle housing.
8. Release and remove IACV hose from throttle housing.
9. Disconnect multiplug from TP sensor.



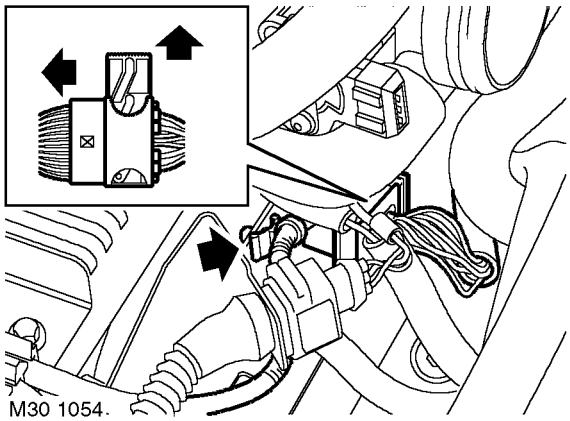
10. Disconnect multiplug from IACV and release harness clip.
11. Remove cover and disconnect MAP sensor multiplug.
12. Release throttle cable from abutment bracket and throttle cam.



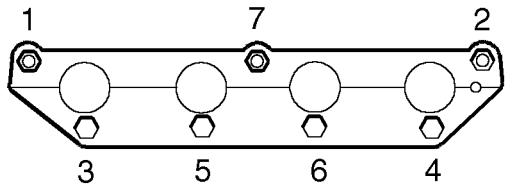
13. Disconnect breather hose from inlet manifold.
14. Depress locking collar and disconnect brake servo hose from inlet manifold chamber.


M30 1053

15. Release clip and disconnect coolant hose from inlet manifold.
16. Remove 3 screws securing coil cover and remove cover.
17. Remove 2 bolts securing RH coil and release coil.
18. Disconnect coil multiplugs and release coil harness from retaining clips.

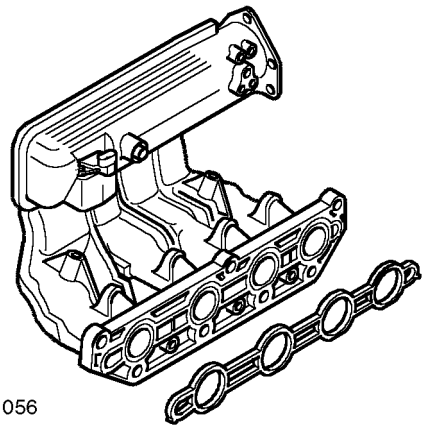

M30 1054

19. Release injector harness multiplug from bracket and disconnect multiplug.



M30 1057

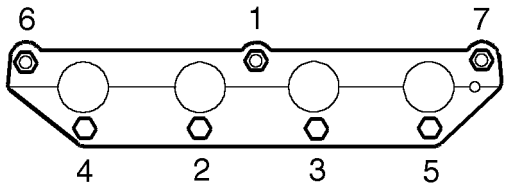
20. Working in the sequence shown, progressively loosen then remove 7 nuts securing inlet manifold to cylinder head.


M30 1056

21. Remove inlet manifold and discard gasket.

Refit

1. Ensure mating surfaces are clean and metal inserts are fitted in inlet manifold stud and bolt holes.
2. Fit new gasket to inlet manifold.
CAUTION: Gaskets must be fitted dry.



M30 1055

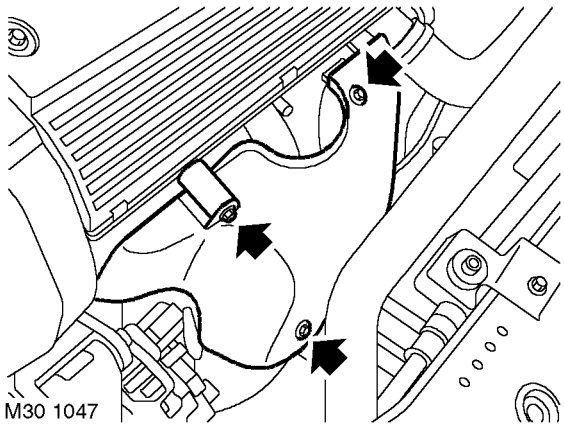
3. Fit manifold to cylinder head, fit nuts and tighten in the sequence shown to 17 Nm (12.5 lbf.ft).
4. Connect coolant hose to manifold and secure with clip.
5. Connect multiplug to injector harness and secure multiplug to bracket.
6. Connect coil multiplugs, fit bolts securing RH coil and tighten to 10 Nm (7.5 lbf.ft).
7. Secure coil harness in clips.
8. Position coil cover, fit bolts and tighten to 10 Nm (7.5 lbf.ft).
9. Connect brake servo hose to inlet manifold.
10. Connect breather hose to manifold and secure into collar.
11. Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket.
12. Connect multiplug to MAP sensor and fit cover.
13. Connect multiplug to IACV and secure harness clip.
14. Connect IACV hose to throttle housing.
15. Connect multiplug to TP sensor.
16. Connect breather hose to throttle housing and secure with clip.
17. Connect purge hose to throttle housing and secure with clip.
18. Connect air intake hose to throttle housing and secure with clip.
19. Connect fuel feed hose to fuel rail.
20. Connect battery earth lead.
21. Fill cooling system.
22. Adjust throttle cable.

Heat shield - exhaust manifold - without A/C

30.15.09

Remove

1. Disconnect battery earth lead.



M30 1047

2. Remove nut and 2 bolts securing heat shield.
3. Remove heat shield.
4. Remove spacer from stud.

Refit

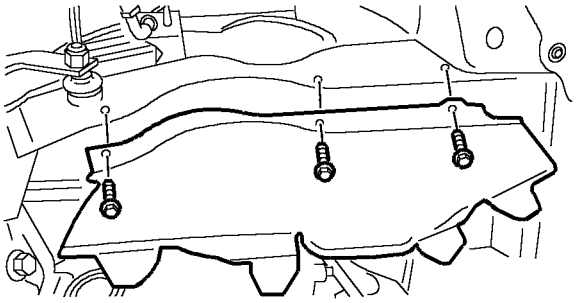
1. Fit spacer to stud.
2. Fit heat shield.
3. Fit bolts securing manifold heat shield and tighten to 10 Nm (7.5 lbf.ft).
4. Fit nut securing manifold heat shield and tighten to 25 Nm (18 lbf.ft).
5. Connect battery earth lead.

Heat shield - exhaust manifold - with A/C

30.15.09

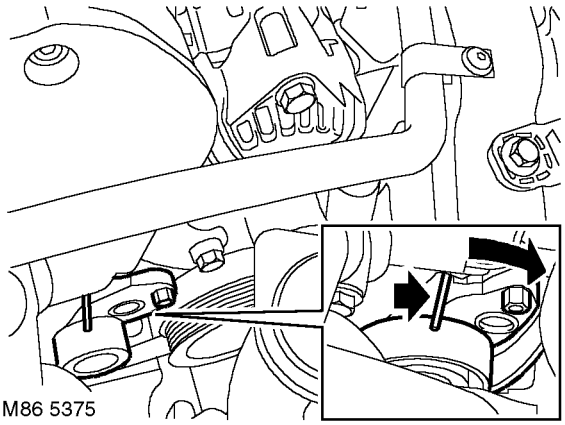
Remove

1. Disconnect battery earth lead.
2. Turn steering on RH lock.



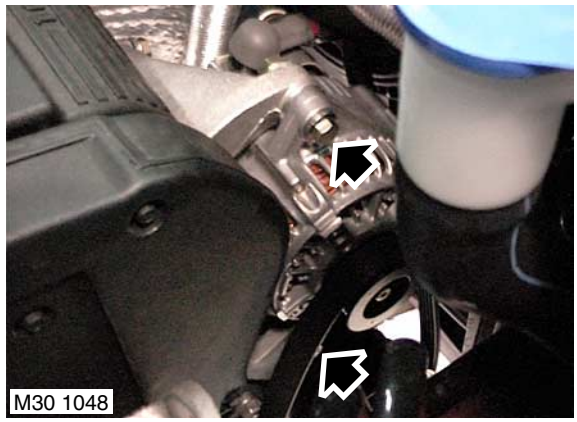
M12 6977

3. Remove 3 bolts securing RH splash shield to body and remove shield.



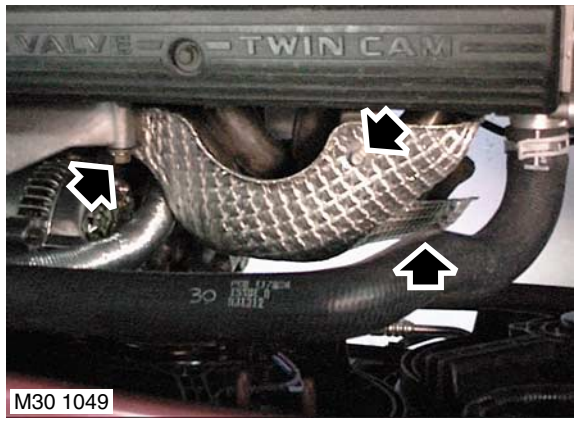
M86 5375

4. Fit a 13 mm spanner to hexagon on belt tensioner and rotate fully clockwise to release tension from drive belt.
5. To hold tensioner in this position, fit a suitable pin, not exceeding 3 mm diameter, through centre of hexagon into tensioner backplate.
6. Release auxiliary drive belt from alternator pulley.



M30 1048

7. Remove top bolt securing alternator and loosen lower bolt.
8. Position alternator forward to clear heat shield.



M30 1049

9. Remove nut and 2 bolts securing heat shield.
10. Remove heat shield.

Refit

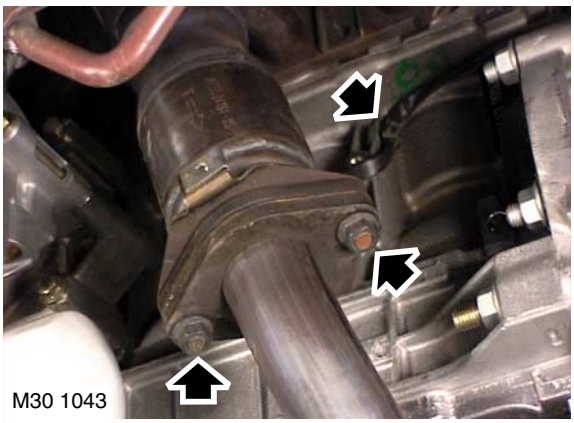
1. Fit heat shield.
2. Locate heat shield to alternator bracket stud, fit nut and bolts. Tighten nut to 25 Nm (18 lbf.ft) and bolts to 10 Nm (7.5 lbf.ft).
3. Align alternator to bracket and fit bolt.
4. Tighten both alternator bolts to 45 Nm (33 lbf.ft).
5. Locate drive belt to pulleys, remove locking pin and release drive belt tensioner.
6. Ensure auxiliary drive belt is correctly located on all pulleys.
7. Fit splash shield and secure with bolts.
8. Straighten steering.
9. Connect battery earth lead.

Gasket(s) - exhaust manifold

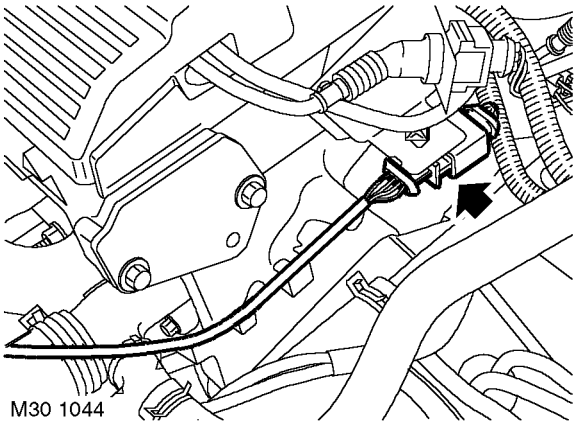
30.15.12

Remove

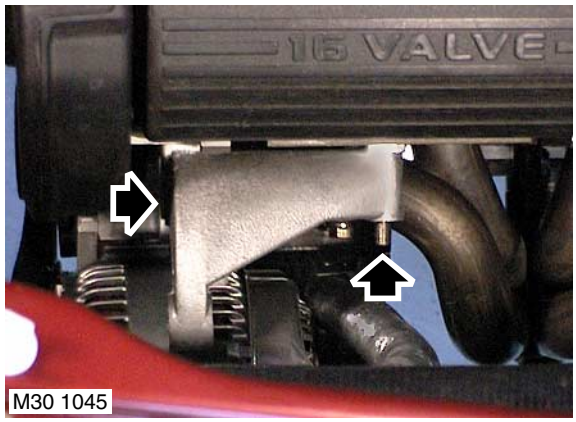
1. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
2. Remove exhaust manifold heat shield.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Heat shield - exhaust manifold - with A/C.



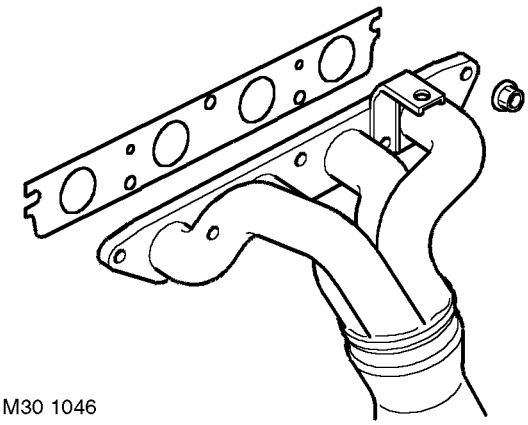
3. Remove 2 nuts securing downpipe flange to exhaust manifold, release downpipe.
4. Remove and discard exhaust flange gasket.



5. Release HO2S harness from clip on cylinder block.
6. Release and disconnect HO2S multiplug.



7. Remove bolt securing alternator mounting bracket. Rotate bracket clear of alternator and remove bracket.
8. Remove alternator bracket stud.



9. Remove 5 nuts securing exhaust manifold to head.
10. Remove exhaust manifold, remove and discard gasket.

Refit

1. Clean exhaust manifold and mating face on cylinder head.
2. Fit new exhaust manifold gasket to cylinder head.
3. Position exhaust manifold, fit nuts and progressively tighten, from centre outwards to 45 Nm (33 lbf.ft).
4. Fit alternator bracket stud.
5. Fit alternator mounting bracket.
6. Fit bolt securing alternator mounting bracket and tighten to 25 Nm (18 lbf.ft).

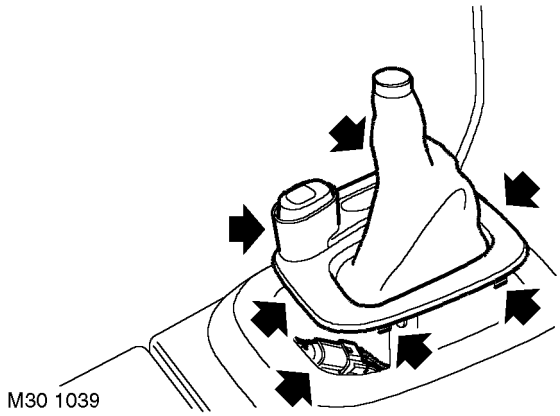
7. Secure HO2S harness to cylinder block clip.
8. Connect HO2S multiplug to harness and fit harness to bracket.
9. Clean exhaust pipe and exhaust manifold down pipe flanges.
10. Using new gasket, connect front pipe to manifold, fit nuts and tighten to 60 Nm (44 lbf.ft).
11. Fit exhaust manifold heat shield.
    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Heat shield - exhaust manifold - with A/C.**
12. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Front pipe - Non NAS

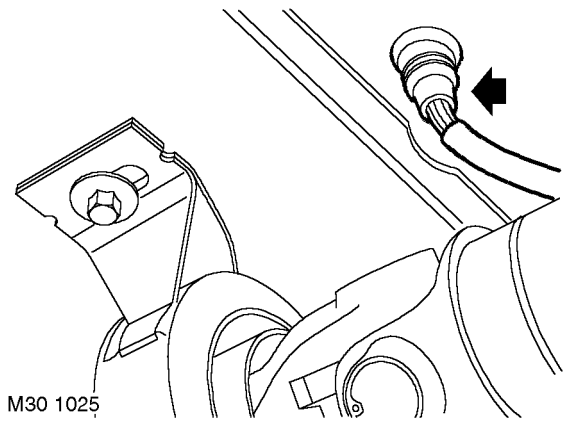
30.10.09

Remove

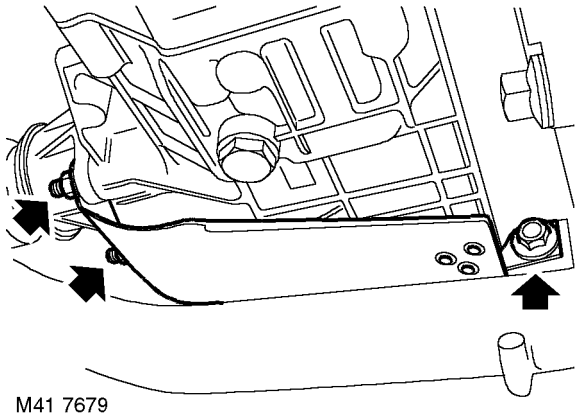
1. Remove gear selector knob.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gear knob.


M30 1039

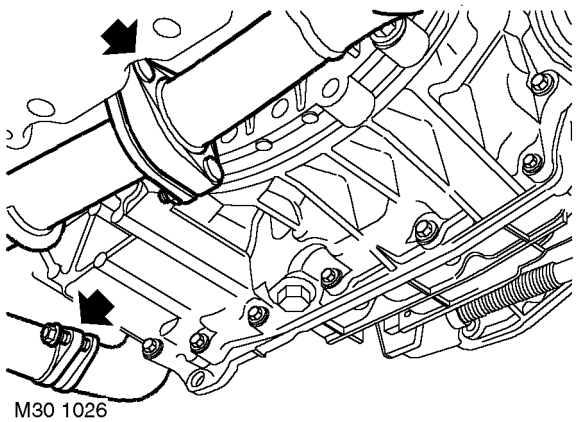
2. Release clips securing selector lever trim panel to centre console and move trim panel aside.
3. Release and disconnect post catalyst HO2S multiplug.
4. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M30 1025

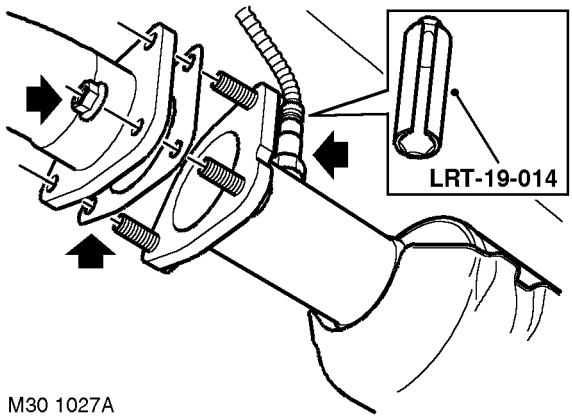
5. Release grommet and withdraw HO2S harness multiplug through grommet aperture.


M41 7679

6. Remove nut securing exhaust heat shield to mounting bracket.
7. Remove 2 nuts securing heat shield to IRD pinion housing.
8. Remove heat shield.


M30 1026

9. Remove 4 nuts securing front pipe flanges to exhaust manifolds.
10. Release manifold flanges.



11. Remove 3 nuts securing front pipe to intermediate pipe.
12. Release intermediate pipe from front pipe.
13. Remove gasket.
14. Remove exhaust front pipe.
15. Remove HO2S.

Refit

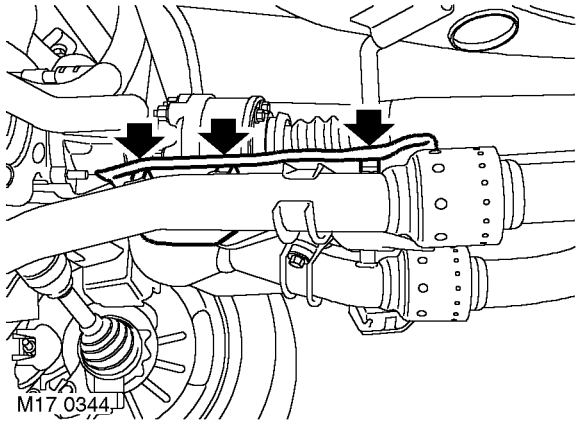
1. Clean HO2S and mating face.
2. If refitting existing HO2S, apply anti-seize compound to HO2S threads.
3. Fit HO2S and tighten to 55 Nm (41 lbf.ft)using tool **LRT-19-014.**
4. Clean exhaust pipe and manifold flanges.
5. Fit exhaust front pipe.
6. Using new gasket, connect intermediate pipe to front pipe, fit nuts and tighten to 50 Nm (37 lbf.ft).
7. Position LH exhaust manifold flange to front pipe, fit and tighten nuts to 50 Nm (37 lbf.ft).
8. Position RH exhaust manifold flange to front pipe, fit and tighten nuts to 50 Nm (37 lbf.ft).
9. Fit exhaust heatshield and fit nuts finger tight.
10. Tighten nut securing exhaust heatshield to exhaust mounting bracket to 45 Nm (33 lbf.ft).
11. Tighten nuts securing exhaust heatshield to pinion housing to 25 Nm (18 lbf.ft).
12. Feed HO2S harness through grommet aperture and secure grommet.
13. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
14. Connect HO2S multiplug.
15. Fit trim panel and gaiter to centre console and secure clips.
16. Fit gear selector knob.
    AUTOMATIC GEARBOX - JATCO, REPAIRS, Gear knob.

Front pipe - NAS

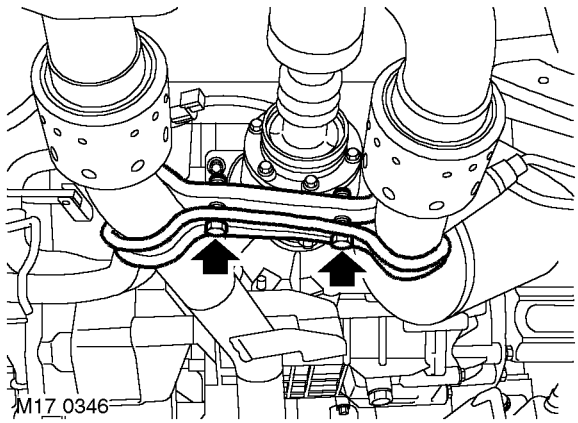
30.10.09

Remove

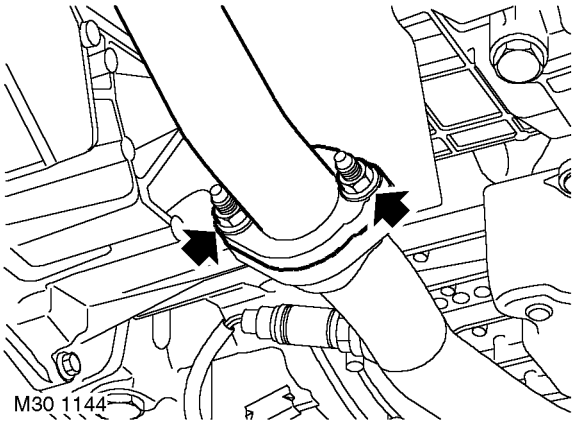
1. Disconnect battery earth lead.
2. Remove intermediate pipe and silencer.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - NAS.



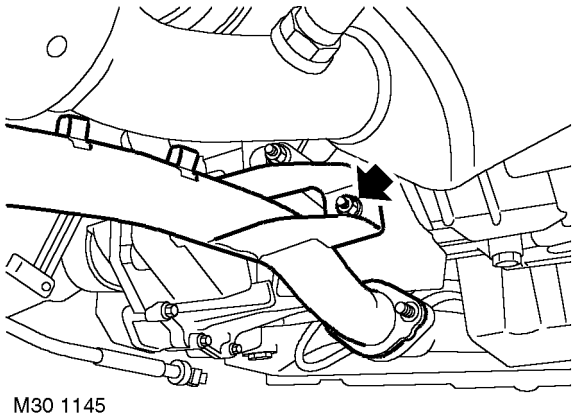
3. Remove 3 bolts securing heat shield and remove heat shield from front pipe.



4. Remove 2 bolts securing pipe clamp and remove lower half of clamp.



5. Remove 2 nuts securing front pipe to manifold.



6. Remove bolt securing front pipe to bracket and remove front pipe. Discard gasket.

Refit

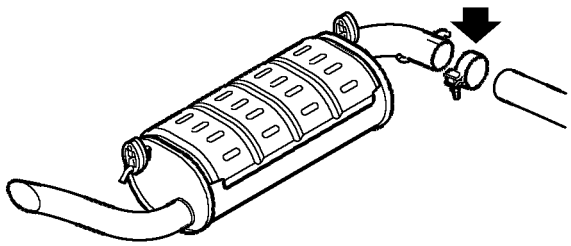
1. Clean front pipe and manifold mating faces.
2. Using a new gasket, fit front pipe and fit but do not tighten nuts.
3. Fit bolt securing front pipe to bracket but do not tighten.
4. Fit lower half of pipe clamp, fit bolts but do not tighten.
5. Fit intermediate pipe and silencer.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Intermediate pipe - NAS.
6. Tighten nuts securing front pipe to manifold to 50 Nm (37 lbf.ft).
7. Tighten bolts securing clamp to 10 Nm (7 lbf.ft).
8. Tighten bolt securing front pipe to bracket to 25 Nm (18 lbf.ft).
9. Connect battery earth lead.

Intermediate pipe - Non NAS

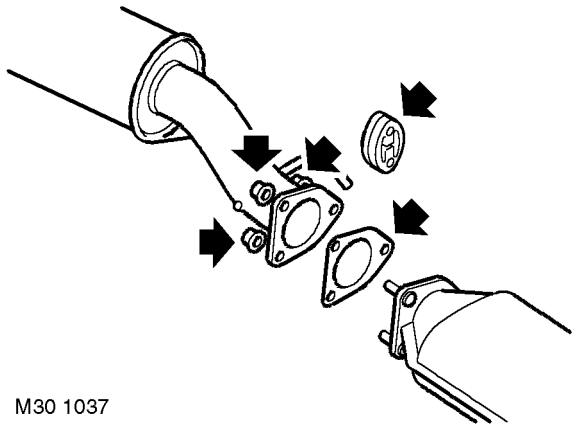
30.10.11

Remove

1. Raise vehicle on 4 post ramp.



2. Loosen tail pipe clamp nut and release tail pipe from intermediate pipe.



3. Remove 3 nuts securing front pipe to intermediate pipe.
4. Release intermediate pipe from front pipe.
5. Remove and discard gasket.
6. Release rubber mounting from intermediate pipe.
7. With assistance release and remove intermediate pipe.

Refit

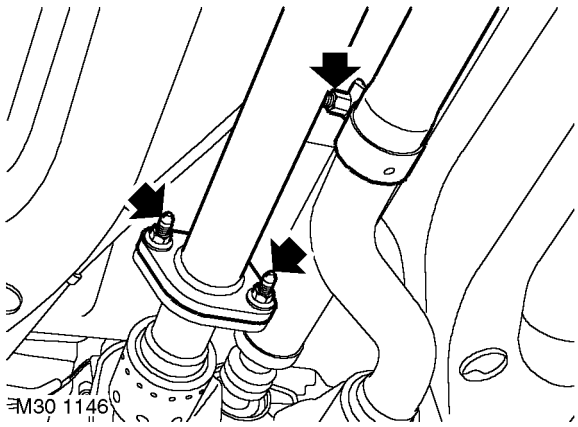
1. Clean intermediate pipe/silencer, front pipe and tail pipe mating faces.
2. Fit new gasket to front pipe flange.
3. With assistance fit intermediate pipe to tail pipe and front pipe.
4. Fit nuts to intermediate pipe flange and tighten to 60 Nm (44 lbf.ft).
5. Tighten tail pipe clamp nut to 55 Nm (41 lbf.ft).
6. Fit intermediate pipe to rubber mounting.
7. Lower vehicle.

Intermediate pipe - NAS

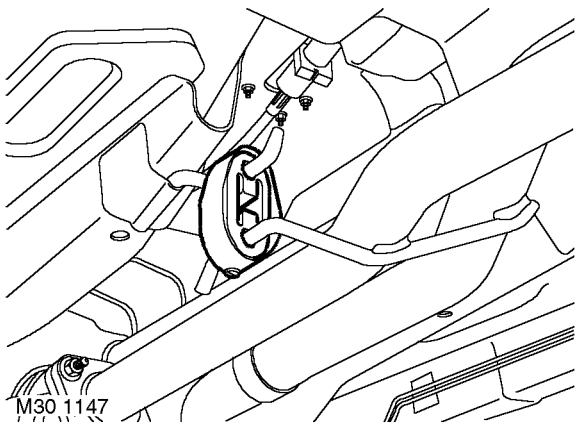
30.10.11

Remove

1. Raise vehicle on 4 post ramp.
2. Remove tail pipe and silencer.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Tail pipe & silencer.



3. Remove 2 nuts securing intermediate pipe to front pipe.
4. Loosen nut securing intermediate pipe clamp to catalyst.



5. Release intermediate pipe from mounting.
6. Release and remove intermediate pipe.
7. Remove and discard gasket.

Refit

1. Clean intermediate pipe and mating faces.
2. Fit new gasket to front pipe flange.
3. Fit intermediate pipe and connect mounting.
4. Tighten intermediate pipe flange nuts to 60 Nm (44 lbf.ft).
5. Tighten clamp nut to 55 Nm (40 lbf.ft).
6. Fit tail pipe and silencer.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Tail pipe & silencer.**
7. Lower vehicle.

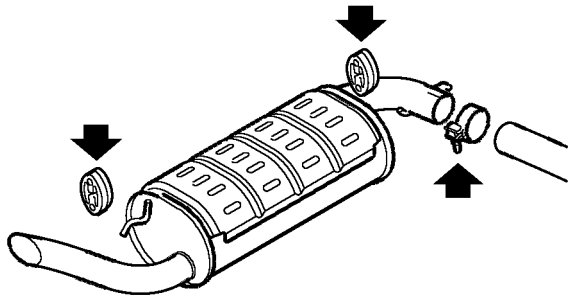
Tail pipe & silencer

30.10.22

Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



M30 1038

2. Loosen tail pipe clamp nut.
3. Release 2 rubber mountings from tail pipe.
4. Remove tail pipe.

Refit

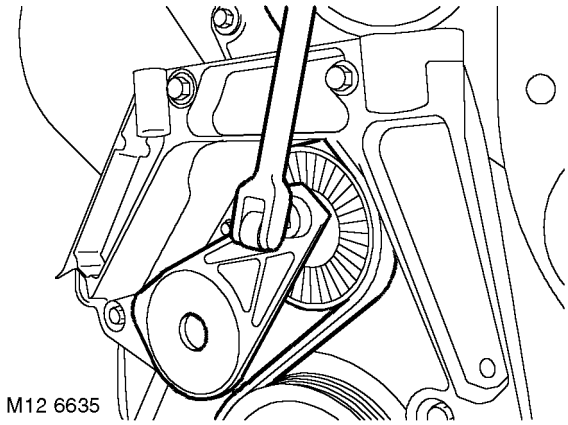
1. Clean mating faces of tail pipe and intermediate pipe.
2. Fit tail pipe and connect rubber mountings.
3. Tighten tail pipe clamp nut to 55 Nm (41 lbf.ft).
4. Remove stands and lower vehicle.

Heat shield - A/C compressor - KV6 - NAS

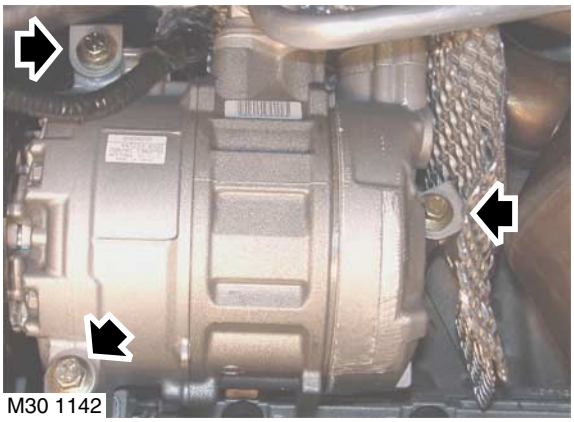
30.10.32

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.


M12 6635

3. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and release drive belt from alternator pulley.
4. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M30 1142

5. Remove 3 bolts securing A/C compressor to fixing brackets and position compressor aside.
6. Remove compressor heat shield.

Refit

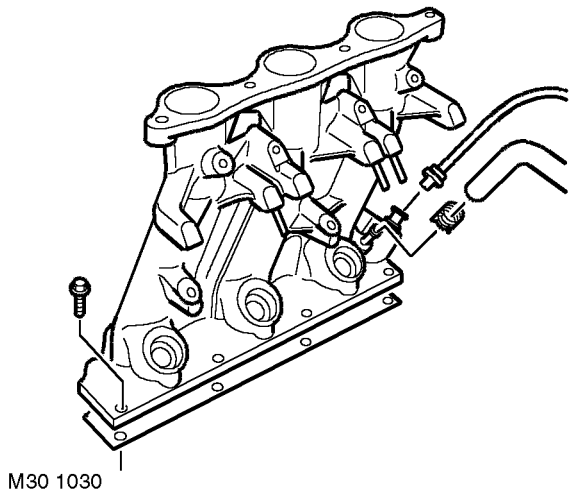
1. Clean compressor and mounting bracket mating faces.
2. Fit compressor heat shield.
3. Position compressor to mounting and align heat shield. Fit and tighten bolts to 25 Nm (18 lbf.ft).
4. Using a 3/8" square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
5. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Fit engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
7. Connect battery earth lead.

Gasket - inlet manifold - LH

30.15.08

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
3. Remove fuel rail.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - Non NAS.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - NAS.



M30 1030

4. Depress locking collar and release breather hose from LH inlet manifold.
5. Release clip and disconnect coolant hose from LH inlet manifold.
6. Progressively loosen and remove 7 bolts securing LH inlet manifold to cylinder head.
7. Remove inlet manifold and discard gasket.

Refit

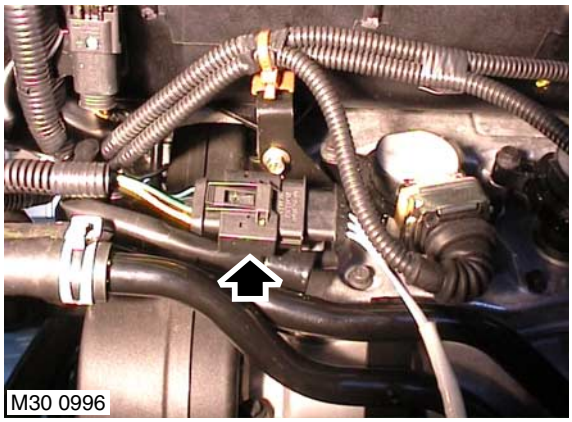
1. Clean inlet manifold and cylinder head mating faces.
2. Fit new inlet manifold gasket to cylinder head, position inlet manifold, fit and tighten bolts to 25 Nm (18 lbf.ft).
3. Connect breather hose to LH inlet manifold.
4. Connect coolant hose to inlet manifold and secure clip.
5. Fit fuel rail.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - Non NAS.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - NAS.
6. Fill cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
7. Connect battery earth lead.

Gasket - exhaust manifold - RH - Non NAS

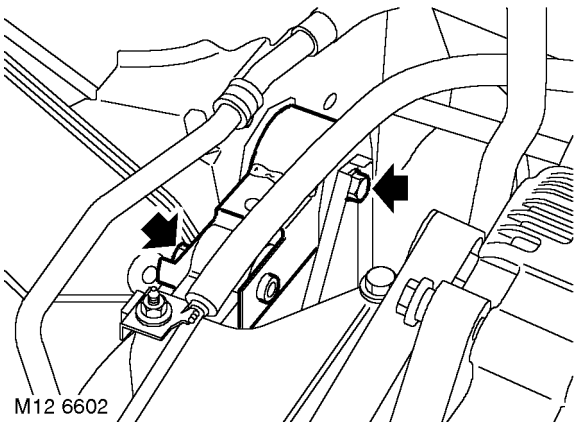
30.15.16

Remove

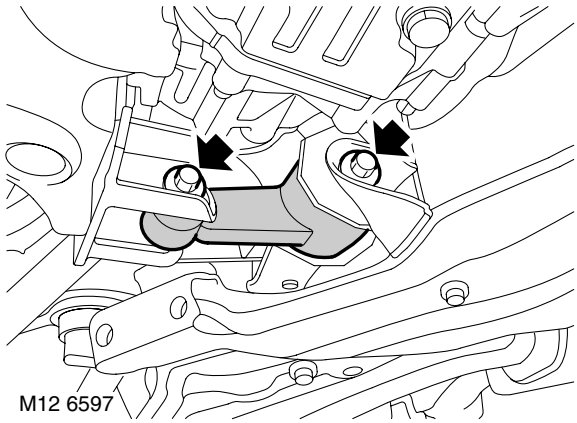
1. Disconnect battery earth lead.



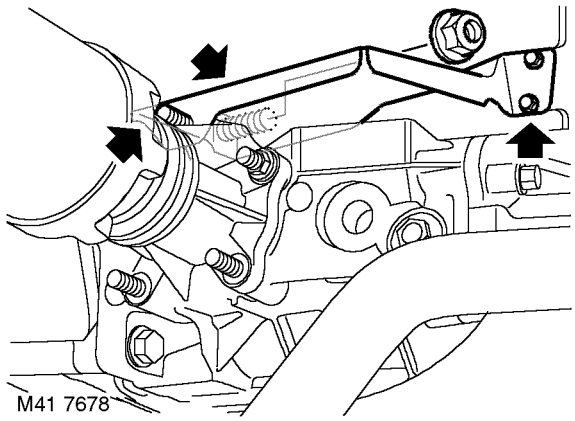
2. Release RH HO2S multiplug from coolant rail bracket and disconnect multiplug.



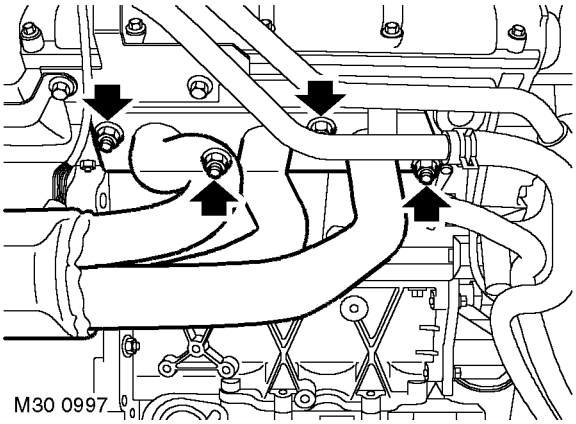
3. Remove bolt securing upper RH engine steady to top arm.
4. Loosen bolt securing upper RH engine steady to body, pivot engine steady away from top arm.
5. Raise vehicle on a ramp.
6. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
7. Remove exhaust front pipe.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - Non NAS.



8. Remove bolt securing lower engine steady to sump mounting bracket.
9. Loosen bolt securing lower engine steady to subframe, pivot steady away from sump mounting bracket.
10. Remove cable tie and release gear selector cable from clip on body.



11. Remove 2 bolts securing IRD heat shield to lower engine steady mounting bracket.
12. Remove nut securing heat shield to IRD pinion housing.
13. Remove nut securing heat shield to IRD housing and remove heat shield.



14. Remove 4 nuts securing RH exhaust manifold to cylinder head.
15. Remove exhaust manifold, remove and discard gasket.

Refit

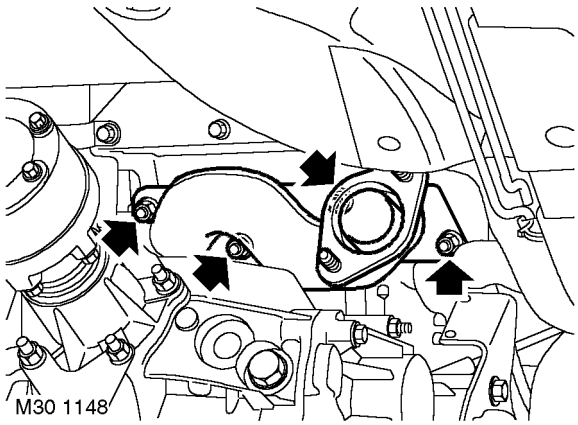
1. Clean exhaust manifold and mating face on cylinder head.
2. Fit new exhaust manifold gasket, position exhaust manifold, fit nuts and tighten to 45 Nm (33 lbf.ft).
3. Position heat shield to IRD unit.
4. Fit nut securing heat shield to IRD housing and tighten to 45 Nm (33 lbf.ft).
5. Fit nut securing heat shield to IRD pinion housing and tighten to 25 Nm (18 lbf.ft).
6. Fit 2 bolts securing heat shield to lower engine steady mounting bracket and tighten to 9 Nm (7 lbf.ft).
7. Fit gear selector cable in body clip and secure with cable tie.
8. Position lower engine steady to sump mounting, fit and tighten bolt to 100 Nm (74 lbf.ft).
9. Tighten bolt securing lower engine steady to subframe to 100 Nm (74 lbf.ft).
10. Fit exhaust front pipe.
    MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - Non NAS.
11. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
12. Lower vehicle on ramp.
13. Connect RH HO2S multiplug, secure multiplug in coolant rail bracket.
14. Position upper RH engine steady to top arm, fit and tighten bolt to 100 Nm (74 lbf.ft).
15. Tighten bolt securing upper RH engine steady to body to 100 Nm (74 lbf.ft).
16. Connect battery earth lead.

Gasket(s) - exhaust manifold - RH - KV6 - NAS

30.15.16

Remove

1. Disconnect battery earth lead.
2. Remove RH catalytic converter.
   EMISSION CONTROL, REPAIRS, Catalytic converter - RH - KV6 - NAS.



3. Remove 4 nuts securing exhaust manifold to cylinder head, remove manifold and discard gasket.

Refit

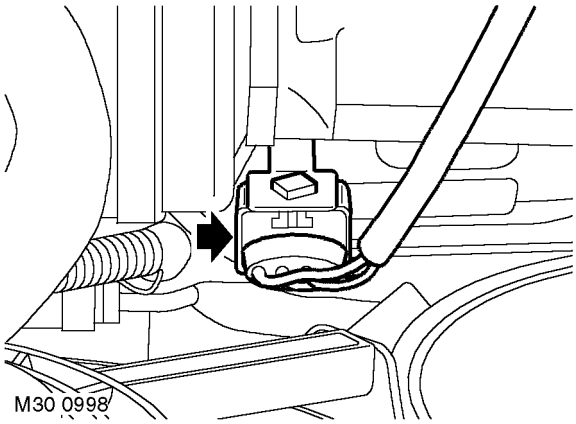
1. Clean exhaust manifold and mating face.
2. Using new gasket, fit exhaust manifold and tighten nuts to 45 Nm (33 lbf.ft).
3. Fit RH catalytic converter.
   EMISSION CONTROL, REPAIRS, Catalytic converter - RH - KV6 - NAS.
4. Connect battery earth lead.

Gasket - exhaust manifold - LH - Non NAS

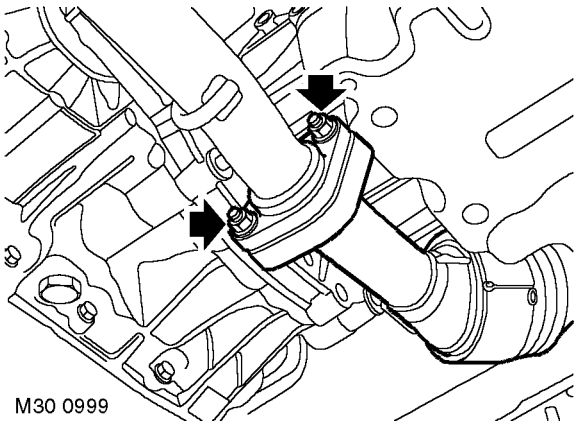
30.15.17

Remove

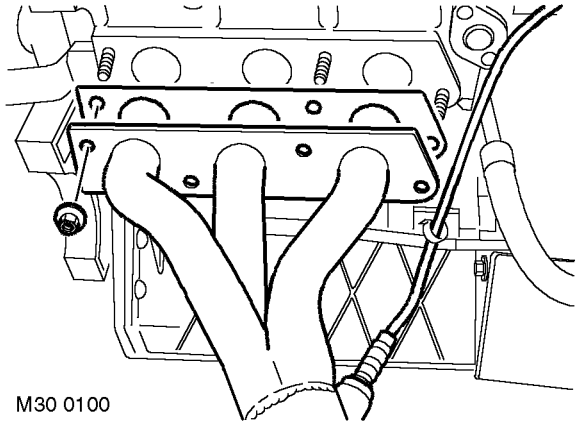
1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.



3. Release HO2S multiplug from support bracket on LH camshaft cover, disconnect multiplug.
4. Raise vehicle on ramp.
5. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



6. Remove 2 nuts securing front exhaust pipe to manifold flange.
7. Lower vehicle on ramp.



8. Release HO2S lead from clip on cylinder block. Remove 4 nuts securing exhaust manifold to cylinder head, remove manifold and discard gasket.

Refit

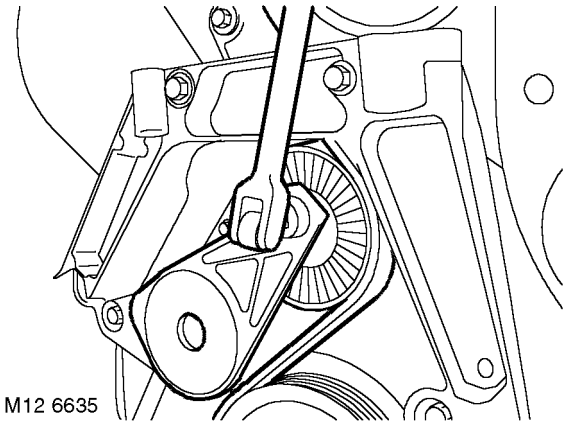
1. Clean exhaust manifold and mating face on cylinder head.
2. Fit new exhaust manifold gasket to cylinder head.
3. Position exhaust manifold to cylinder head, fit and tighten nuts to 45 Nm (33 lbf.ft).
4. Raise vehicle on ramp.
5. Position LH exhaust manifold flange to front pipe, fit and tighten nuts to 50 Nm (37 lbf.ft).
6. Secure HO2S lead in clip on cylinder block.
7. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
8. Lower vehicle on ramp.
9. Connect HO2S multiplug and secure to support bracket.
10. Fit engine acoustic cover.
    ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
11. Connect battery earth lead.

Gasket(s) - exhaust manifold - LH - NAS

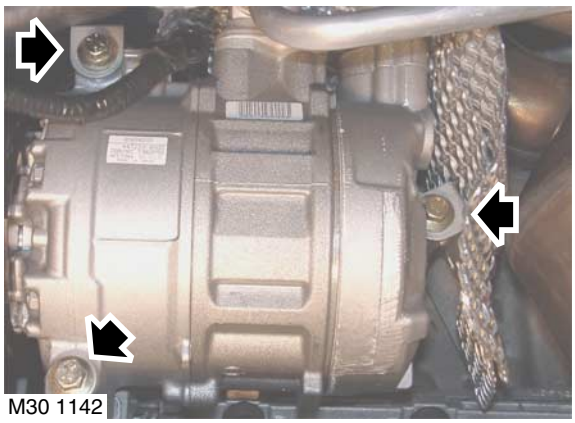
30.15.17

Remove

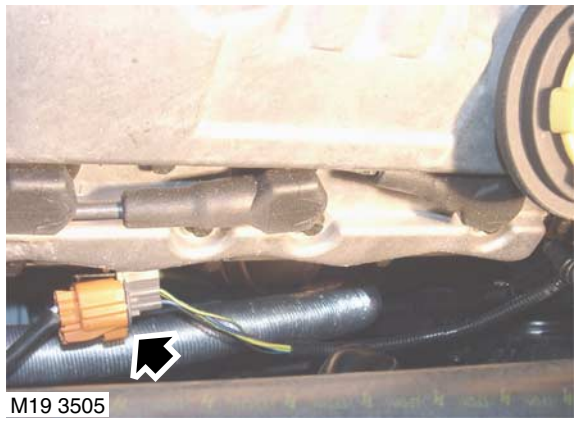
1. Position vehicle on 4 post ramp.
2. Disconnect battery earth lead.
3. Remove engine acoustic cover.
   ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
4. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M12 6635

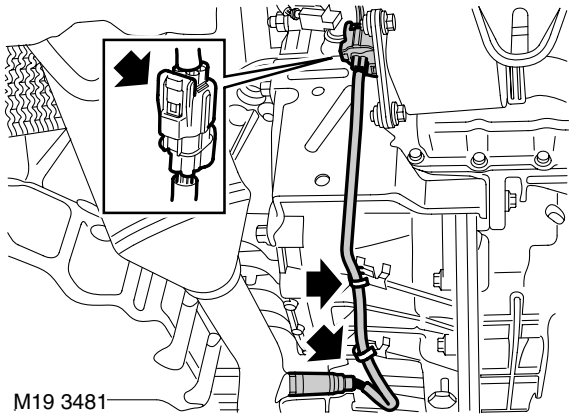
5. Using a 3/8" socket bar raise ancillary drive belt tensioner and release drive belt from alternator and PAS pump pulleys.


M30 1142

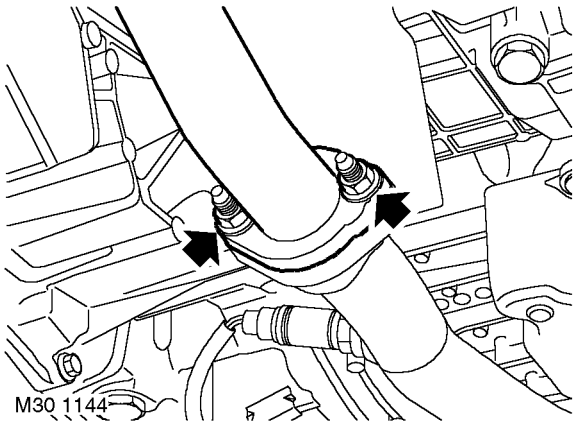
6. Remove 3 bolts securing A/C compressor to fixing brackets and position compressor aside.
7. Remove compressor heat shield.


M19 3505

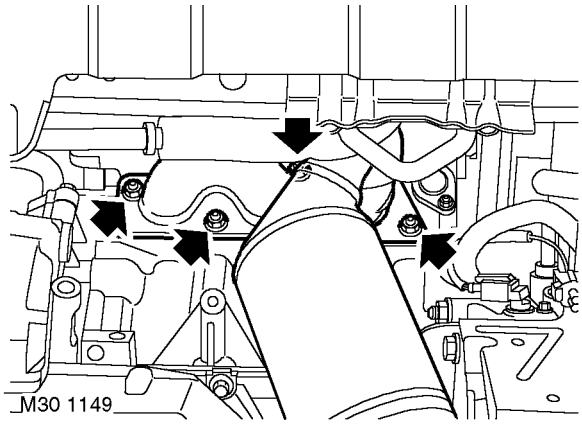
8. Release and disconnect HO2S multiplug.
9. Release HO2S harness from clip.


M19 3481

10. Release and disconnect post catalyst HO2S multiplug.
11. Release HO2S harness from clips.


M30 1144

12. Remove 2 nuts securing exhaust front pipe to exhaust manifold.



13. Remove 4 nuts securing manifold and remove exhaust manifold.
14. Remove and discard manifold and down pipe gaskets.

Refit

1. Clean exhaust manifold and mating faces.
2. Using new gaskets, fit exhaust manifold and tighten nuts to cylinder head to 45 Nm (33 lbf.ft) and nuts to front pipe to 50 Nm (37 lbf.ft).
3. Connect H02S multiplugs, secure multiplugs to brackets and harness to clips.
4. Clean compressor and mounting bracket mating faces.
5. Fit compressor heat shield.
6. Position compressor to mounting and align heat shield. Fit and tighten bolts to 25 Nm (18 lbf.ft).
7. Using a 3/8" square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
8. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
9. Fit engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
10. Connect battery earth lead.

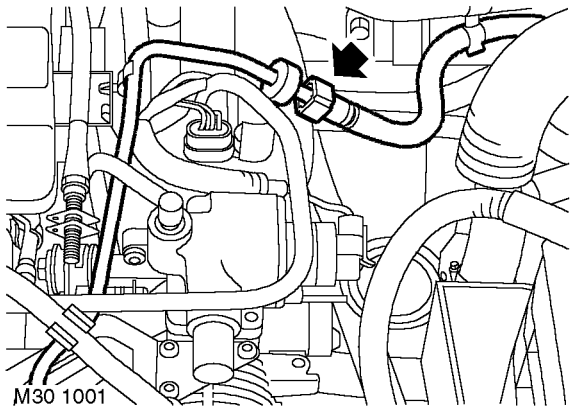
Seals - inlet manifold chamber

⊸ ***30.15.37***

Remove

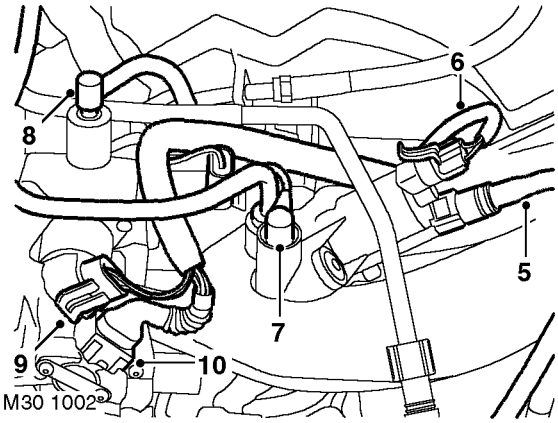
1. Disconnect battery earth lead.
2. Remove vacuum enhancer.
   ☞ **BRAKES, REPAIRS, Vacuum - enhancer - KV6.**
3. Position absorbent cloth around fuel feed pipe connection to collect spillage.

   WARNING: The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.

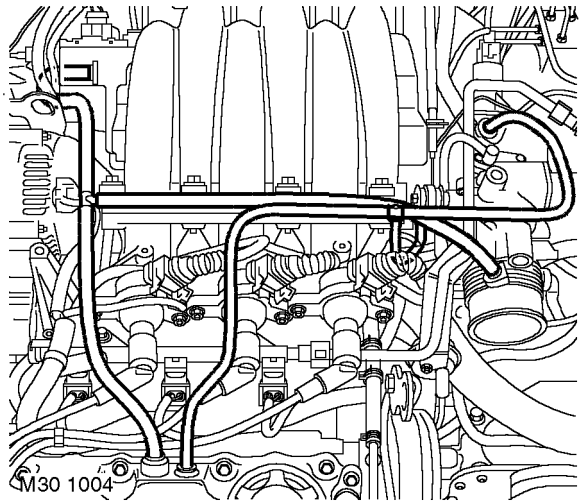


4. Pull back rubber sleeve on fuel pipe connector, release connector and disconnect fuel pipe from fuel rail pipe.

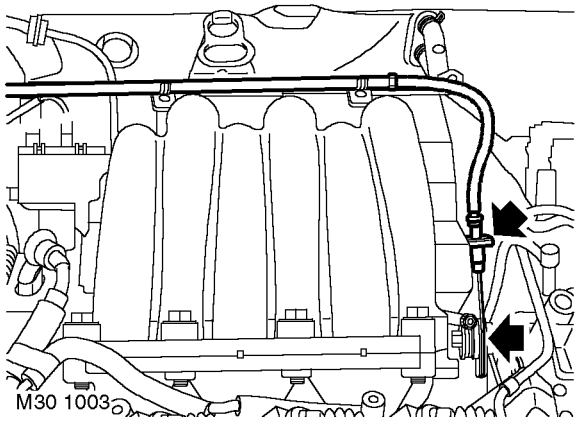
   CAUTION: Always fit plugs to open connections to prevent contamination.



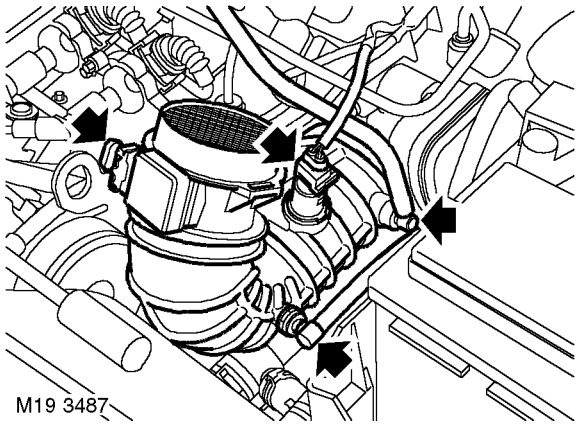
5. Release clip and disconnect hose from purge control valve.
   CAUTION: Always fit plugs to open connections to prevent contamination.
6. Disconnect multiplug from purge control valve.
7. **Non NAS models:** Disconnect small vacuum hose from purge control valve.
8. **Non NAS models:** Depress locking collar and release vacuum hose from IACV housing .
9. **Non NAS models:** Disconnect multiplug from IACV.
10. **Non NAS models:** Disconnect multiplug from TP sensor.



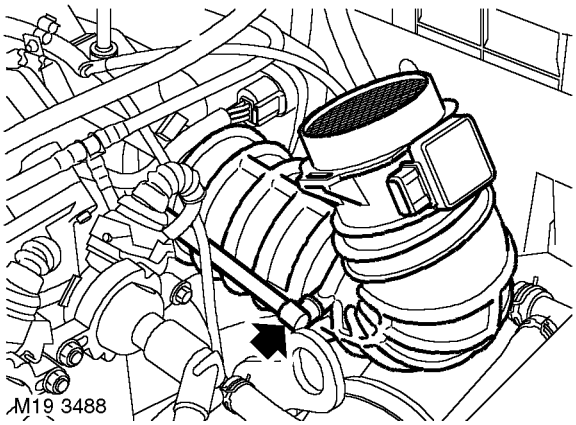
11. Depress locking collars and release vacuum/ breather hose from purge control valve and LH camshaft cover. Release clip securing hose to 'T' piece and remove hose.
12. Depress locking collars and release vacuum/ breather hoses from throttle body, LH and RH camshaft cover and remove hose.



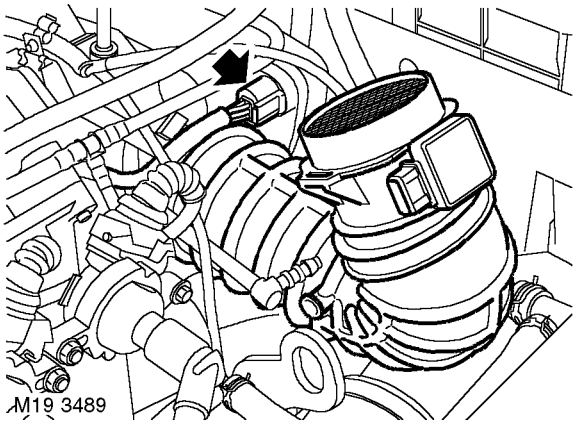
13. **Non NAS models:** Release throttle cable from clips on harness brackets.
14. **Non NAS models:** Release throttle cable from abutment bracket and disconnect cable from throttle body cam.



15. **NAS models:** Disconnect multiplugs from IAT and MAF sensors.
16. **NAS models:** Disconnect engine breather pipe from intake hose.

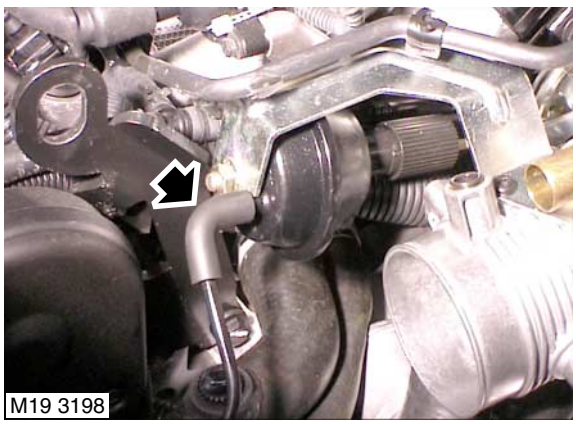


17. **NAS models:** Disconnect injector air supply pipe from intake hose.

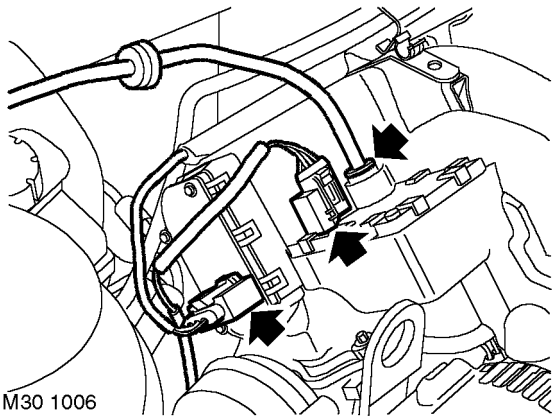


18. **NAS models:** Disconnect multiplug from throttle body.

19. **NAS models:** Release clip and remove intake hose and MAF sensor assembly.

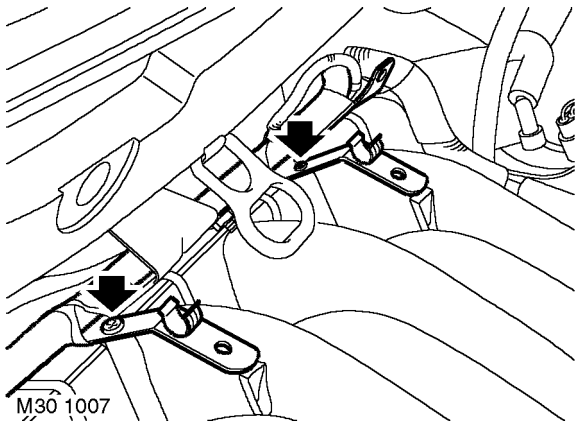


20. Disconnect cruise control actuator vacuum pipe.

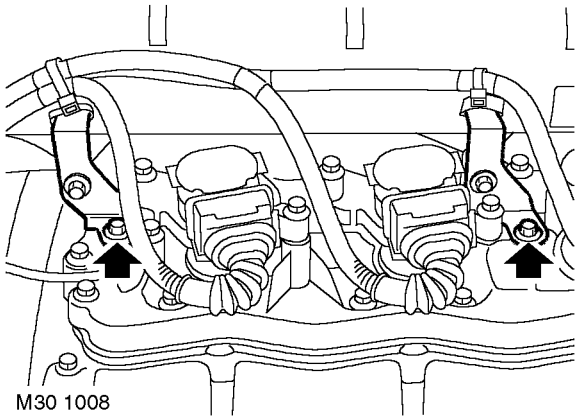


21. Depress locking collar and disconnect brake servo hose from inlet manifold chamber.

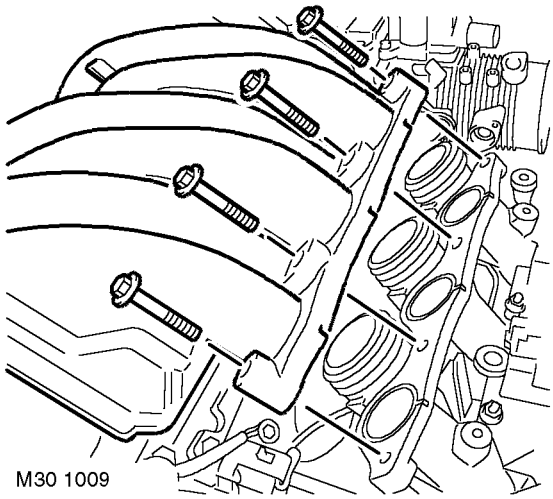
22. Disconnect multiplugs from VIS motors.



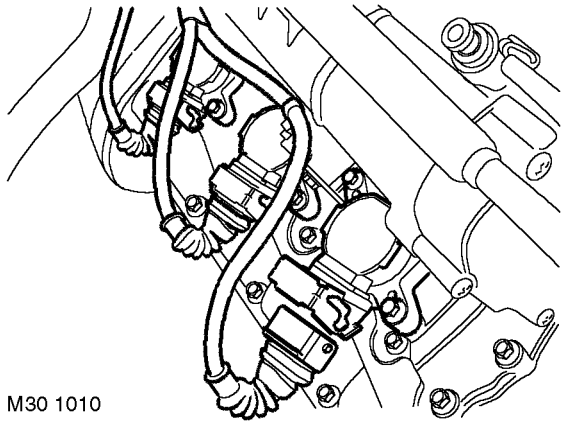
23. Remove 2 screws securing engine harness brackets to inlet manifold chamber and position harness aside.



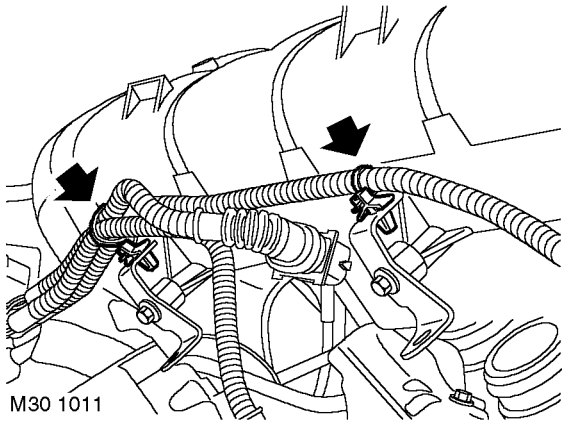
24. Remove 2 bolts securing inlet manifold chamber rear support brackets to RH camshaft cover.



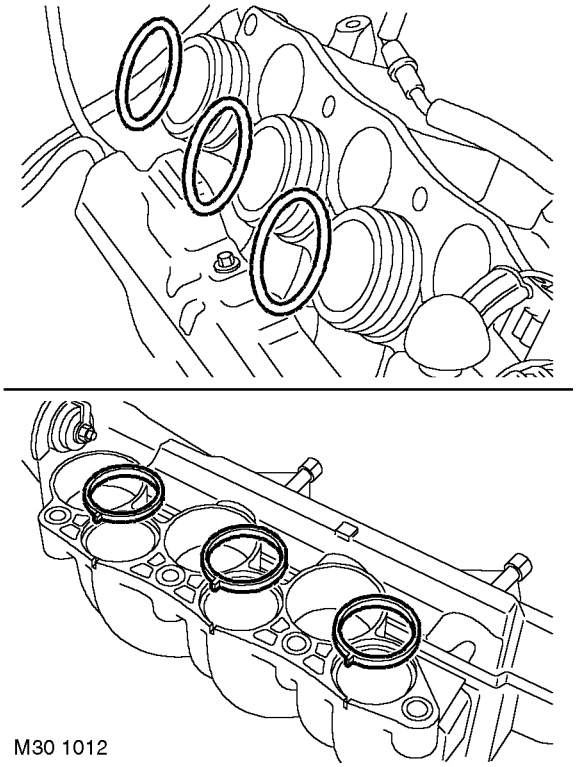
25. Remove 4 bolts securing inlet manifold chamber to LH inlet manifold.
26. Release and raise inlet manifold chamber from inlet manifolds.



27. Release 3 locking clips and disconnect 3 multiplugs from RH plug top coils.



28. Release 2 clips securing RH plug top coil harness to inlet manifold camber rear support brackets.
29. Remove inlet manifold chamber.



30. Remove and discard seals from inlet manifold chamber and 'O' rings from RH inlet manifold.

Refit

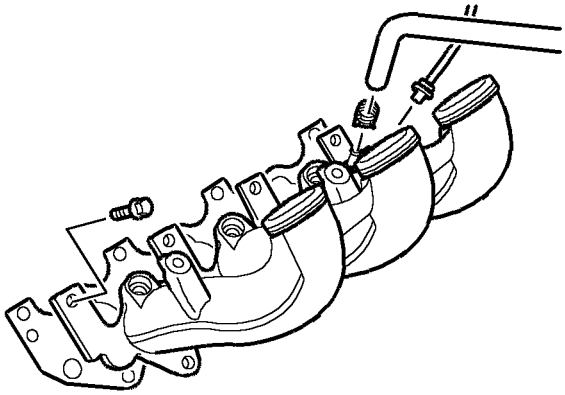
1. Clean seal faces on inlet manifold chamber and inlet manifolds.
2. Fit new 'O' rings to RH inlet manifold and new seals to manifold chamber.
3. Position inlet manifold chamber, secure RH coil harness clips in inlet manifold chamber support brackets.
4. Connect multiplugs to plug top coils and secure with locking clips.
5. Align inlet manifold chamber to inlet manifolds, fit and tighten bolts to 18 Nm (13 lbf.ft).
6. Align inlet manifold chamber support brackets to RH camshaft cover, fit and tighten bolts to 10 Nm (7.5 lbf.ft).
7. Position engine harness brackets to inlet manifold chamber, fit and tighten screws.
8. Connect multiplugs to VIS motors.
9. **NAS models:** Connect engine breather pipe.
10. **NAS models:** Connect multiplugs to IAT and MAF sensors.
11. Connect brake servo vacuum hose to inlet manifold chamber.
12. Connect vacuum/breather hoses to LH and RH camshaft covers and to throttle body.
13. Connect cruise control actuator vacuum pipe.
14. **Non NAS models:** Connect vacuum hose to IACV housing.
15. **Non NAS models:** Connect multiplugs to TP and IACV sensors.
16. Connect vacuum/breather hoses to LH camshaft cover, 'T' piece and purge control valve.
17. **Non NAS models:** Connect small vacuum hose to purge control valve.
18. Connect multiplug to purge control valve .
19. Connect EVAP hose to purge control valve.
20. Connect fuel hose to fuel rail pipe, fit rubber sleeve over hose connector.
21. Remove absorbent cloth.
22. **Non NAS models:** Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket.
23. **Non NAS models:** Secure throttle cable in clips on harness brackets.
24. Adjust throttle cable, if fitted.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - KV6.**
25. Remove vacuum enhancer.
    ☞ **BRAKES, REPAIRS, Vacuum - enhancer - KV6.**
26. Connect battery earth lead.

Gasket - inlet manifold - RH

30.15.43

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
3. Remove fuel rail.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - Non NAS.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - NAS.


M30 1029

4. Release clip and disconnect coolant hose from RH inlet manifold.
5. Depress locking collar and release breather hose from RH inlet manifold.
6. Progressively loosen and remove 7 bolts securing RH inlet manifold to cylinder head.
7. Remove inlet manifold and gasket.
8. Remove bolt securing coolant breather hose mounting bracket to inlet manifold and remove bracket.

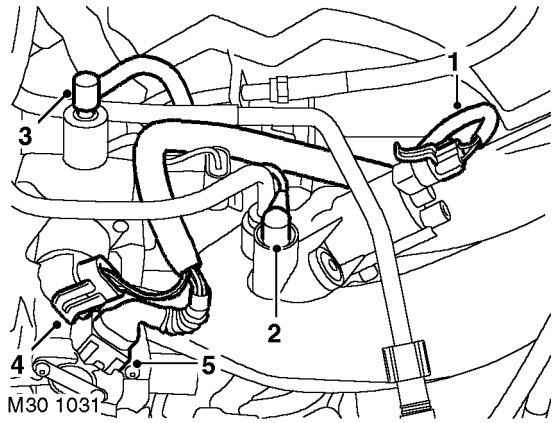
Refit

1. Clean inlet manifold and cylinder head face.
2. Position coolant/breather hose bracket to inlet manifold, fit and tighten bolt to 9 Nm (7 lbf.ft).
3. Fit new inlet manifold gasket to cylinder head, position inlet manifold, fit and tighten bolts to 25 Nm (18 lbf.ft).
4. Connect coolant hose to inlet manifold and secure clip.
5. Connect breather hose to manifold and secure into collar.
6. Fit fuel rail.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - Non NAS.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Fuel rail - KV6 - NAS.
7. Fill cooling system.
   COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.
8. Connect battery earth lead.

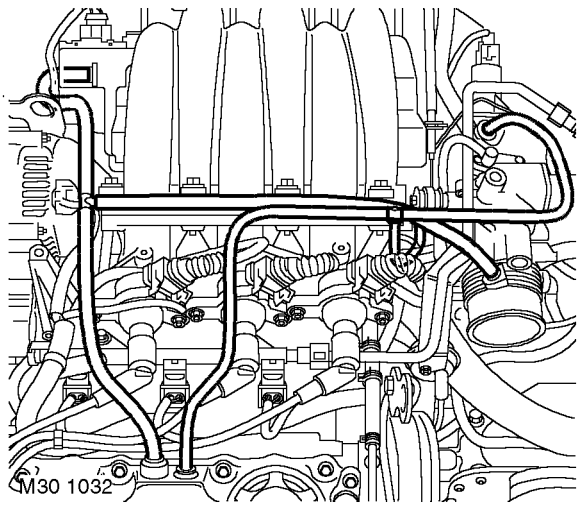
Gasket(s) - manifold chamber

30.15.37.01

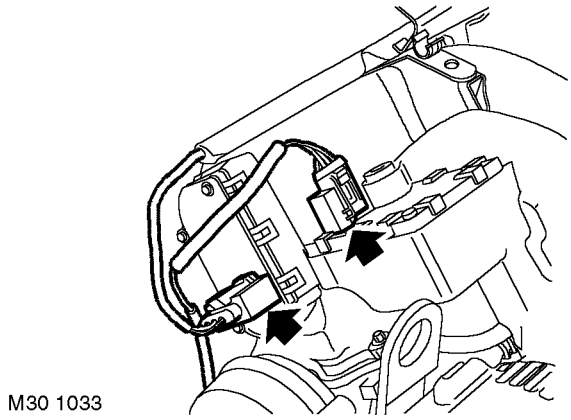
Remove



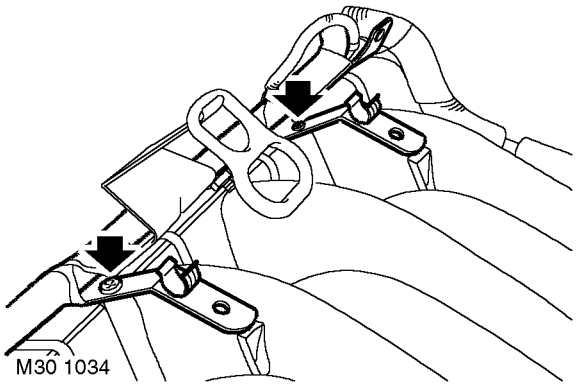
1. Disconnect multiplug from purge control valve.
2. Disconnect small vacuum hose from purge control valve.
3. Depress locking collar and release vacuum hose from IACV housing .
4. Disconnect multiplug from IACV.
5. Disconnect multiplug from TP sensor.



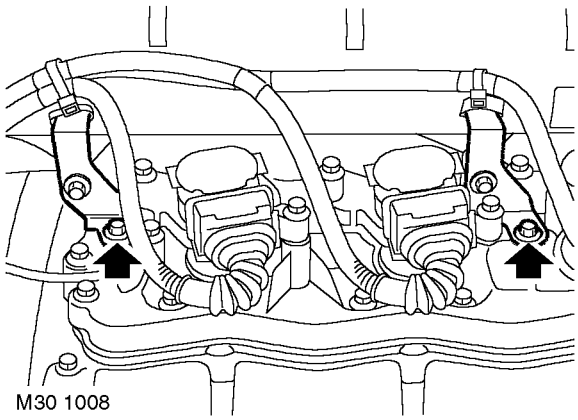
6. Depress locking collars and release vacuum/ breather hose from purge control valve and LH camshaft cover. Release clip securing hose to 'T' piece and remove hose.
7. Depress locking collars and release vacuum/ breather hoses from throttle body, LH and RH camshaft cover and remove hose.



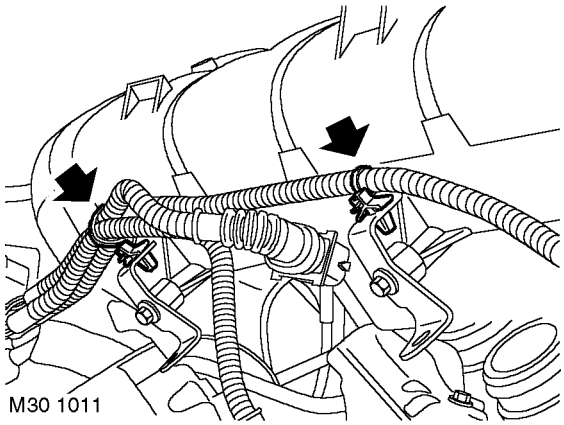
8. Disconnect multiplugs from VIS motors.



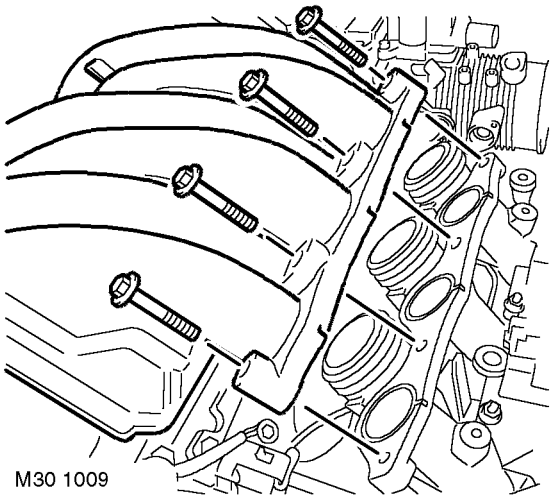
9. Remove 2 screws securing engine harness brackets to inlet manifold chamber and position harness aside.



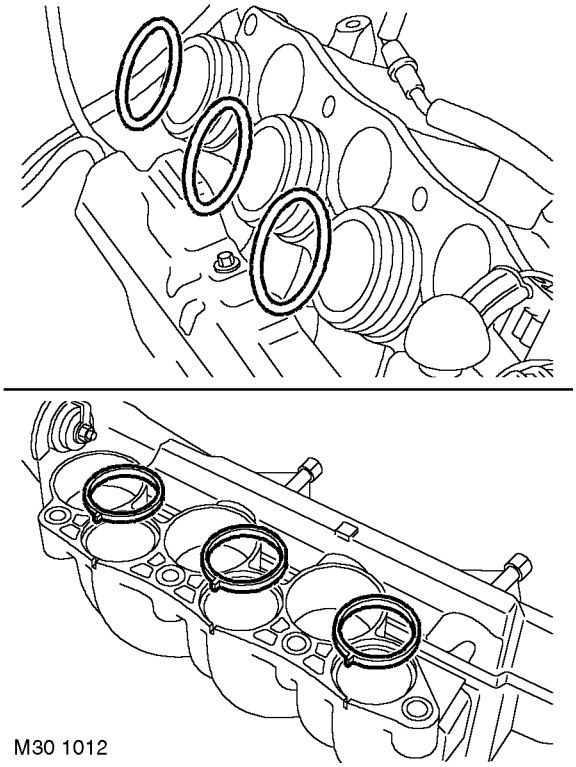
10. Remove 2 bolts securing inlet manifold chamber rear support brackets to RH camshaft cover.


M30 1011

11. Release 2 clips securing RH plug top coil harness to inlet manifold camber rear support brackets.


M30 1009

12. Remove 4 bolts securing inlet manifold chamber to LH inlet manifold.
13. Release and raise inlet manifold chamber from inlet manifolds.
14. Remove inlet manifold chamber.


M30 1012

15. Remove and discard seals from inlet manifold chamber and 'O' rings from RH inlet manifold.

Refit

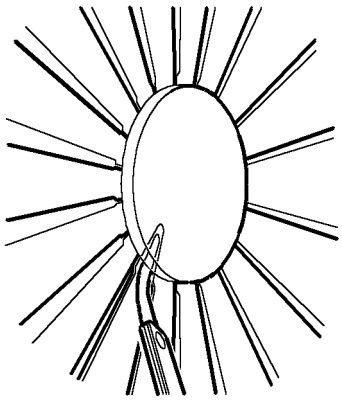
1. Clean seal faces on inlet manifold chamber and inlet manifolds.
2. Fit new 'O' rings to RH inlet manifold and new seals to manifold chamber.
3. Position inlet manifold chamber, secure RH coil harness clips in inlet manifold chamber support brackets.
4. Align inlet manifold chamber to inlet manifolds, fit and tighten bolts to 18 Nm (13 lbf.ft).
5. Align inlet manifold chamber support brackets to RH camshaft cover, fit and tighten bolts to 10 Nm (7.5 lbf.ft).
6. Position engine harness brackets to inlet manifold chamber, fit and tighten screws.
7. Connect multiplugs to VIS motors.
8. Connect vacuum/breather hoses to LH and RH camshaft covers and to throttle body.
9. Connect vacuum hose to IACV housing.
10. Connect multiplugs to TP and IACV sensors.
11. Connect vacuum/breather hoses to LH camshaft cover, 'T' piece and purge control valve.
12. Connect small vacuum hose to purge control valve.
13. Connect multiplug to purge control valve .

Clutch assembly/drive plate & release bearing - Td4

33.10.07

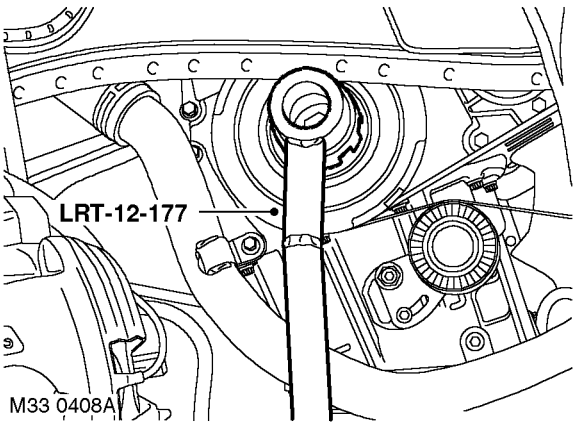
Remove

1. Disconnect battery earth lead.
2. Remove gearbox assembly.
   MANUAL GEARBOX - GETRAG, REPAIRS, Gearbox.



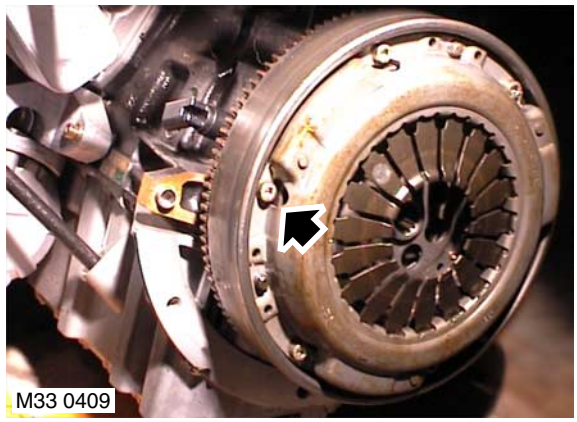
M33 0407

3. Place a circular piece of flat plate across diaphragm fingers and insert feeler gauges between plate and fingers to measure finger clearance. A single finger exceeding the limit should be ignored. **Diaphragm finger clearance:** Service limit 1.0 mm.



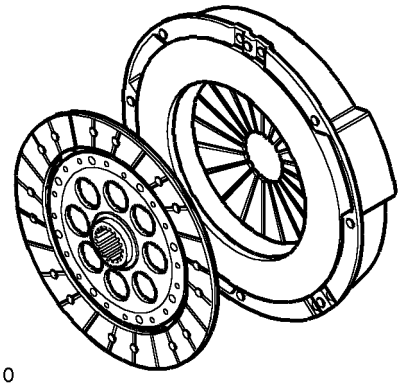
M33 0408A

4. Use **LRT-12-177** to restrain crankshaft.



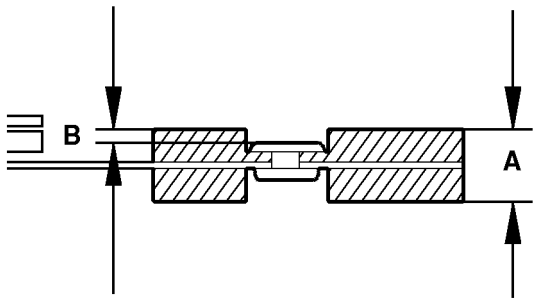
M33 0409

5. Progressively loosen and remove 6 Allen screws securing clutch cover.



M33 0410

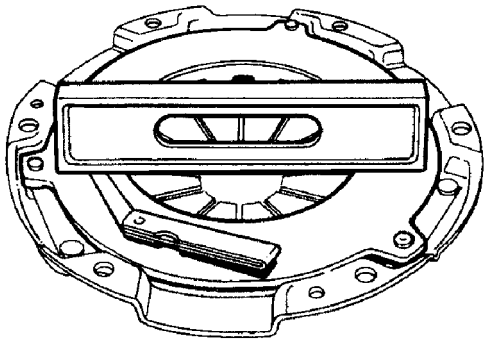
6. Remove clutch cover and drive plate.



M33 0411

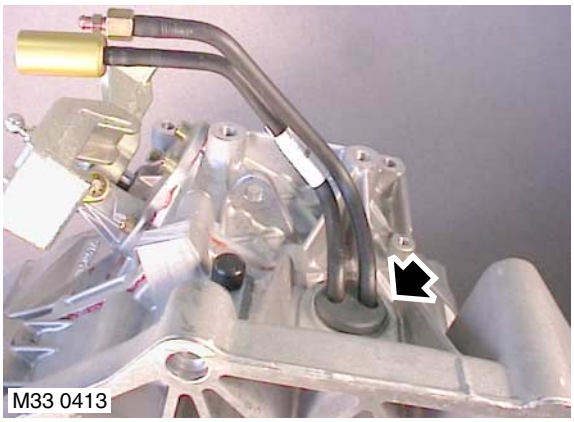
7. Measure clutch plate thickness, renew drive plate if less than service limit. **Drive Plate thickness (compressed) A:** New drive plate = 7.5 mm. Service limit = 5.9 mm.

8. Measure rivet depth, renew plate if less than service limit. **Rivet depth B:** New drive plate = 1.2 mm. Service limit = 0.2 mm.
9. Check pressure plate for signs of wear or damage. Check for signs of overheating on drive straps (deep yellow to blue colour), renew pressure plate if necessary.
   NOTE: Renew a clutch pressure plate which has been accidentally dropped.



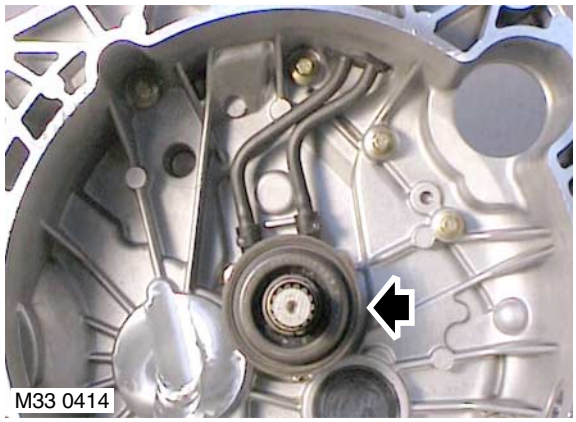
M33 0412

10. Using a straight edge and feeler gauges check the surface of the pressure plate for flatness at 4 separate points. Renew pressure plate if warping exceeds service limit. **Pressure plate warping:** Service limit = 0.15 mm.



M33 0413

11. Release grommet securing clutch pipes.

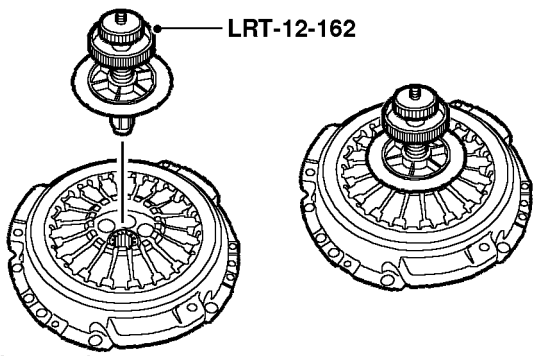


M33 0414

12. Remove release bearing.
13. Examine release bearing for signs of wear or damage, renew if necessary.

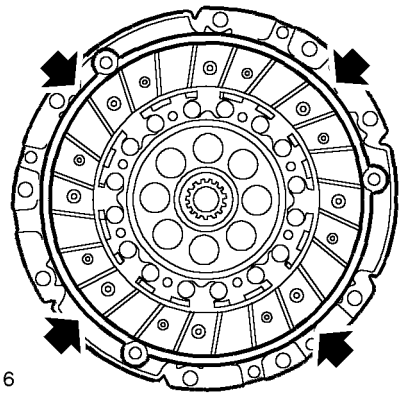
Refit

1. Clean release bearing guide sleeve.
2. Lubricate release bearing guide sleeve with molybdenum disulphide grease.
3. Fit release bearing and secure clutch pipe grommet.
4. Clean pressure plate and flywheel, dowels and dowel holes.
5. Inspect flywheel for signs of scoring or other damage. Renew if worn or damaged.
6. Smear clutch drive plate splines with molybdenum disulphide grease.
7. Position drive plate to pressure plate with 'GEARBOX SIDE' marking towards gearbox.



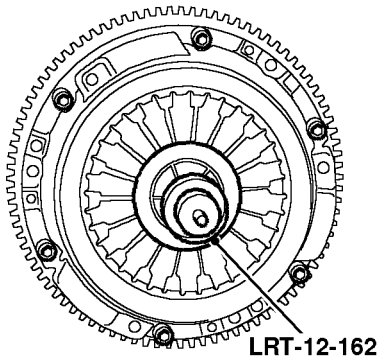
M33 0415A

8. Use **LRT-12-162** to align drive plate and pressure plate.



M33 0416

9. Ensure drive plate is aligned to centre of pressure plate.
10. Fit clutch assembly to flywheel and locate on dowels.



M33 0417A

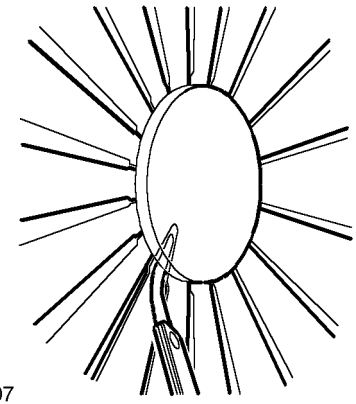
11. Fit Allen screws and working in diagonal sequence, tighten progressively to 25 Nm (18 lbf.ft).
12. Remove drive plate alignment tool **LRT-12-162.**
13. Fit gearbox assembly.
    ☞ **MANUAL GEARBOX - GETRAG, REPAIRS, Gearbox.**
14. Connect battery earth lead.

Clutch assembly/drive plate and release bearing - K1.8

⊸ ***33.10.07***

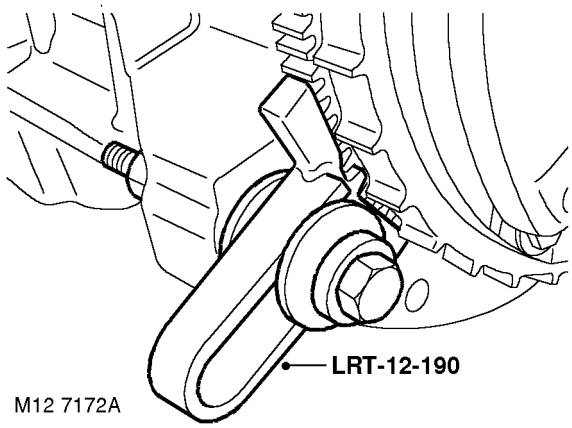
Remove

1. Disconnect battery earth lead.
2. Remove gearbox assembly.
   ☞ **MANUAL GEARBOX - PG1, REPAIRS, Gearbox.**
3. Remove clutch release bearing from guide sleeve and release fork.
4. Examine release bearing for signs of wear or damage, renew if necessary.



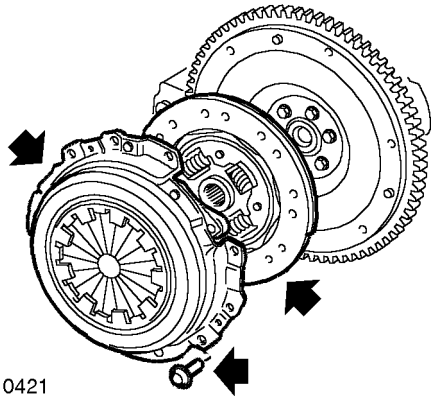
M33 0407

5. Place a circular piece of flat plate across diaphragm fingers, insert feeler gauges between plate and each diaphragm finger, measure finger clearance which has a service limit of 1.0 mm. A single finger exceeding the service limit should be ignored.

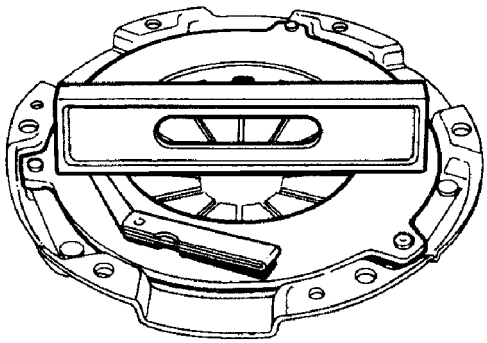


M12 7172A

6. Position flywheel locking tool, **LRT-12-190** to engine and secure with bolt.


M33 0421

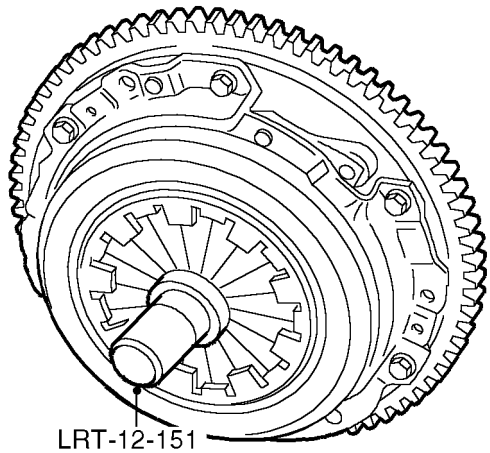
7. Progressively loosen and then remove 6 bolts securing clutch cover assembly to flywheel.
8. Remove clutch cover and drive plate.
9. Inspect clutch drive plate for signs of wear or oil contamination. Renew drive plate if necessary.
10. Measure clutch plate thickness, renew clutch plate if thickness is less than the service limit of 5.60 mm.
11. Measure rivet depth, renew clutch plate if rivet depth is less than the service limit of 0.20 mm.


M33 0412

12. Using a straight edge and feeler gauges, check the surface of the pressure plate for flatness at 4 separate points. Renew pressure plate if warping exceeds the service limit of 0.18 mm.

Refit

1. Clean pressure plate and flywheel, dowels and dowel holes.
2. Inspect flywheel for signs of scoring or other damage. Renew if worn or damaged.
3. Smear clutch drive plate splines with molybdenum disulphide grease.
4. Position drive plate to flywheel with 'FLYWHEEL SIDE' marking towards flywheel.



M33 0398

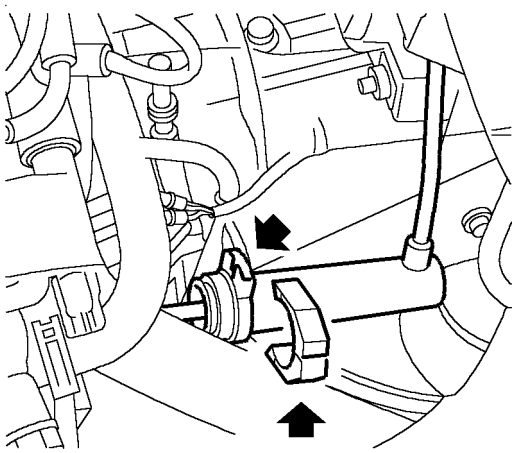
5. Fit pressure plate to flywheel and position clutch alignment tool, **LRT-12-151.**
6. Fit 6 bolts securing pressure plate to flywheel, tighten bolts sufficiently until drive plate is held in its central position. Remove **LRT-12-151** from pressure plate.
7. Working in a diagonal sequence, progressively tighten pressure plate bolts to 25 Nm (18 lbf.ft).
8. Remove flywheel locking tool **LRT-12-190.**
9. Clean clutch release fork and release bearing guide sleeve.
10. Apply smear of Molybdenum disulphide grease to release bearing sleeve.
11. Fit release bearing to release fork and slide onto guide sleeve.
12. Operate clutch release lever to ensure that release bearing is correctly located on release fork and slides smoothly on guide sleeve.
13. Fit gearbox assembly.
    ☞ **MANUAL GEARBOX - PG1, REPAIRS, Gearbox.**
14. Connect battery earth lead.

Hydraulic assembly - RHD - K1.8

33.15.03

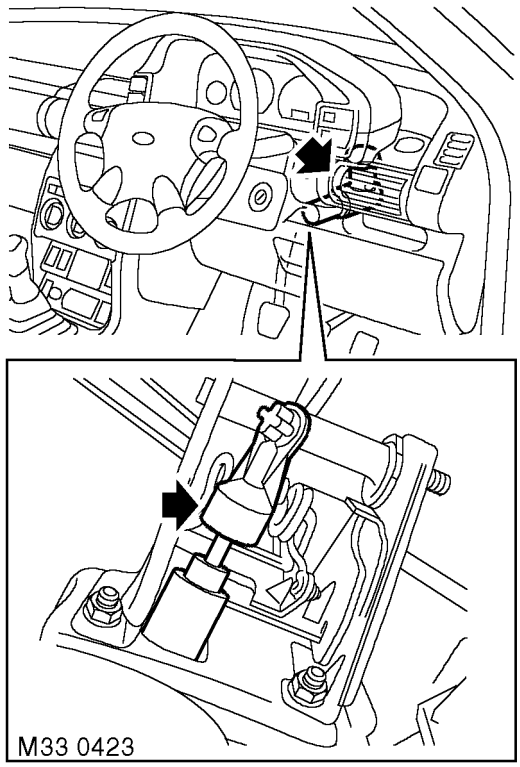
Remove

1. Remove air cleaner assembly.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.



M33 0422

2. Remove 'C' clip from slave cylinder and release cylinder from support bracket.



M33 0423

3. Release master cylinder push rod from clutch pedal.
4. Rotate master cylinder clockwise and release from bulkhead.
5. Note the routing of clutch pipe and release pipe from clips.
6. Manoeuvre the clutch hydraulic assembly from vehicle.

Refit

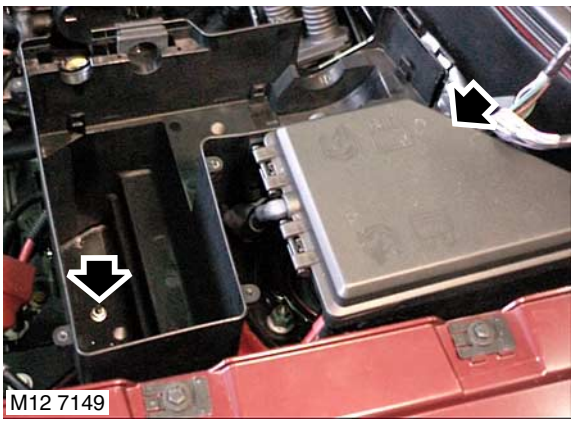
1. Manoeuvre the clutch hydraulic assembly into position and secure clutch pipe in clips.
2. Position clutch master cylinder to bulkhead and rotate anti-clockwise to secure in bulkhead.
3. Connect clutch master cylinder push rod to clutch pedal.
4. Position clutch slave cylinder to support bracket and secure with 'C' clip.
5. Operate clutch to confirm correct operation of system.
6. Fit air cleaner assembly.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.

Master cylinder - LHD - Td4

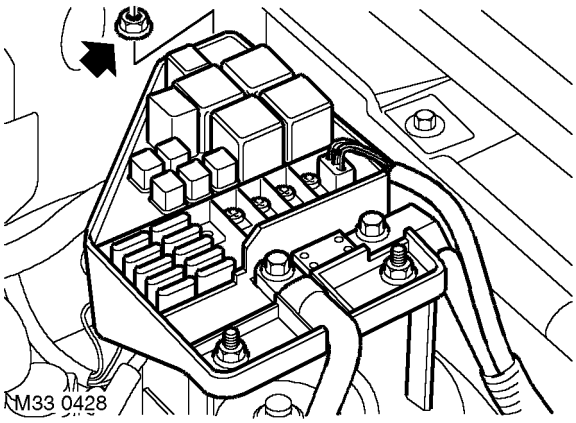
33.20.01

Remove

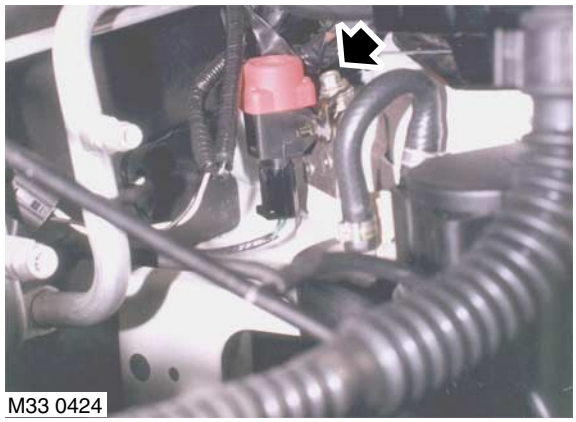
1. Remove battery.
   CHARGING AND STARTING, REPAIRS, Battery.
2. Remove ECM.
   ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).



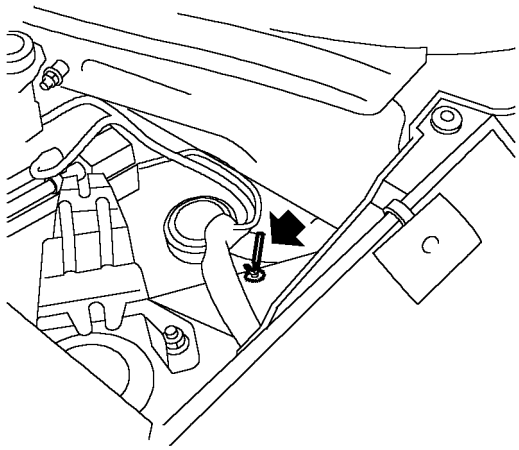
3. Remove nut securing 'E' box to bracket.
4. Release 'E' box from bracket.
5. Release and remove fuse box cover.



6. Remove 3 nuts securing fusebox and position fusebox aside.

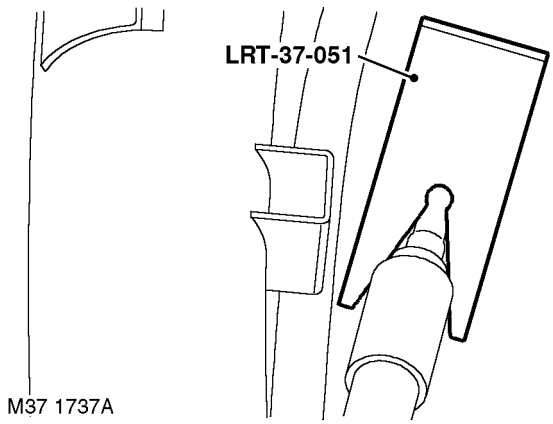


7. Remove bolt securing inertia switch bracket and move inertia switch aside.

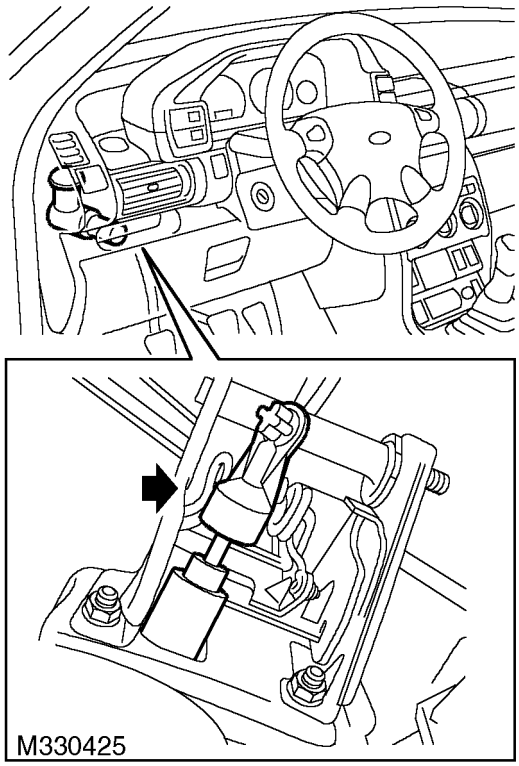


M33 0419

8. Carefully cut cable tie and move main harness aside.



9. Use **LRT-37-051** to release, and disconnect clutch pipe connection.



10. Release clutch master cylinder push rod from clutch pedal.
11. Rotate clutch master cylinder clockwise to release from bulkhead and remove master cylinder from vehicle.

Refit

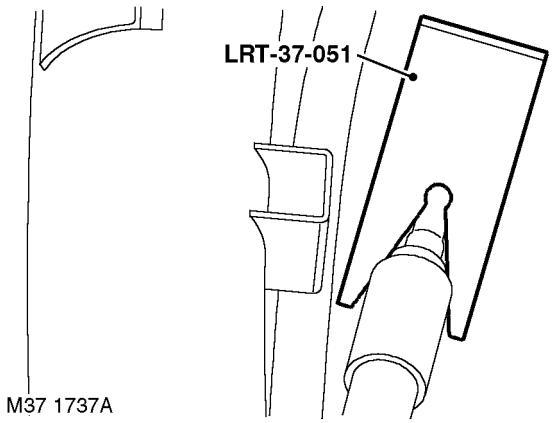
1. Fit clutch master cylinder to bulkhead and rotate anti-clockwise to secure.
2. Connect clutch master cylinder push rod to clutch pedal.
3. Clean fluid pipe connection.
4. Connect clutch fluid pipe.
5. Position harness and secure with new cable tie.
6. Fit inertia switch and tighten bolt to 8 Nm (6 lbf.ft).
7. Position fusebox, fit nuts and tighten to 8 Nm (6 lbf.ft).
8. Fit fuse box cover.
9. Fit 'E' Box to bracket and tighten nut to 8 Nm (6 lbf.ft).
10. Fit ECM.
    ☞ **ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).**
11. Fit battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**

Master cylinder - RHD - Td4

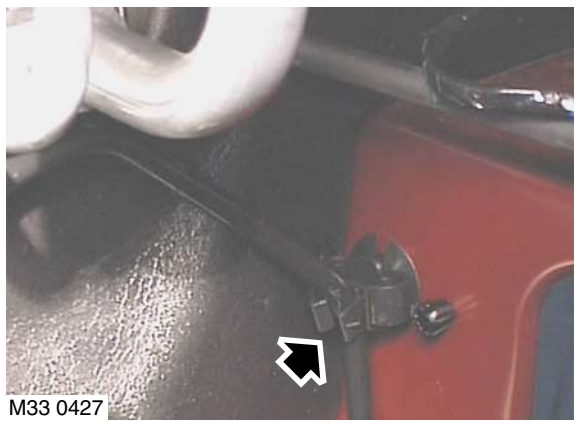
33.20.01

Remove

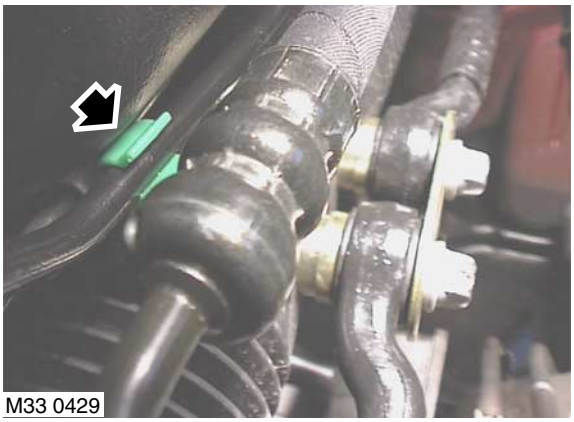
1. Disconnect battery earth lead.
2. Remove air cleaner element.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**



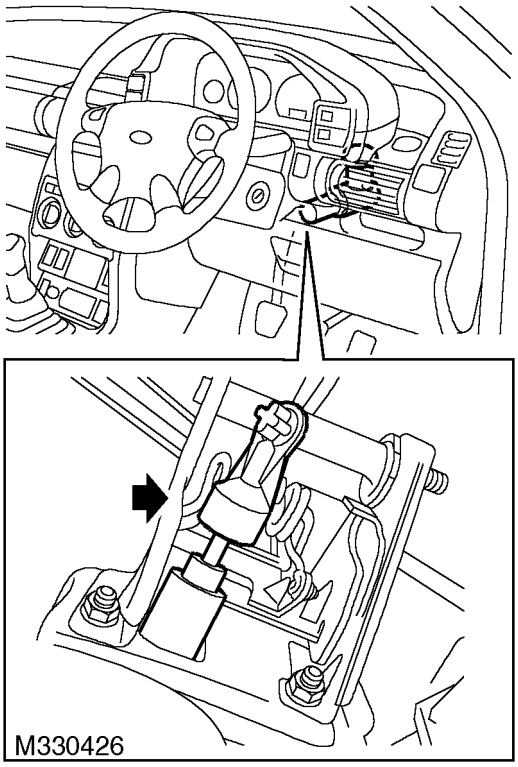
3. Use **LRT-37-051** to release, and disconnect clutch pipe connection.



4. Note fluid pipe run and release from clip at inner wing.


M33 0429

5. Note fluid pipe run and release from clip at bulkhead.


M330426

6. Release clutch master cylinder push rod from clutch pedal.
7. Rotate clutch master cylinder clockwise to release from bulkhead and remove master cylinder from vehicle.

Refit

1. Fit clutch master cylinder to bulkhead and rotate anti-clockwise to secure.
2. Connect clutch master cylinder push rod to clutch pedal.
3. Clean fluid pipe connection.
4. Connect clutch fluid pipe.
5. Fit fluid pipe to clips.
6. Fit air cleaner element.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**
7. Connect battery earth lead.

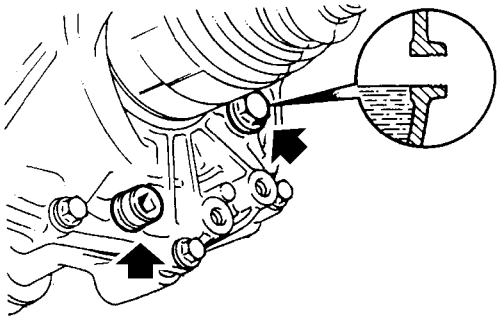
Gearbox oil - drain and refill

37.24.01

Drain

1. Position vehicle on a ramp.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
3. Position suitable container under gearbox.
4. Clean area around filler/level and drain plugs.

   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.



M37 1771

5. Remove filler/level plug.
6. Remove drain plug.
7. Allow gearbox oil to drain.

Refill

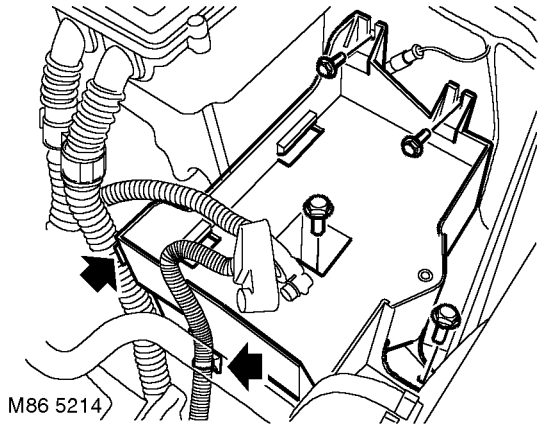
1. Clean filler/level and drain plugs.
2. Fit new sealing washer and tighten gearbox drain plug to 35 Nm (26 lbf.ft).
3. Fill gearbox, with correct grade of fluid, through filler/level plug hole until oil just runs from hole. Allow sufficient time for oil to flow until it reaches a common level in gearbox.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
4. Fit new sealing washer and tighten filler/level plug to 35 Nm (26 lbf.ft).
5. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
6. Lower vehicle.

Gearbox

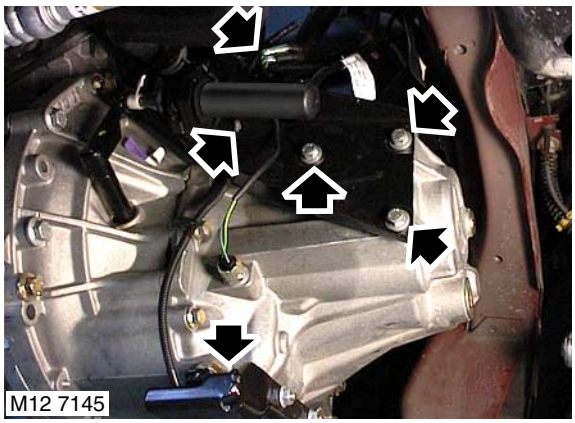
37.20.02.99

Remove

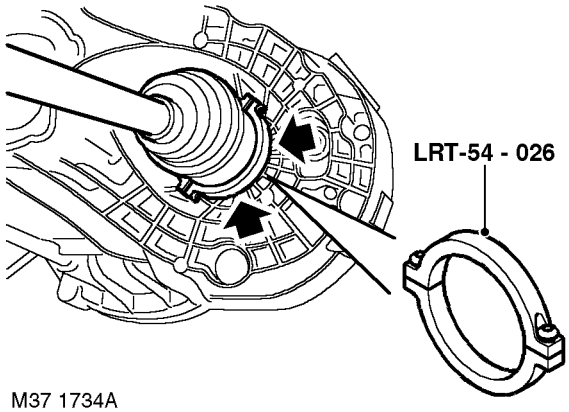
1. Disconnect battery earth lead.
2. Remove battery.
   CHARGING AND STARTING, REPAIRS, Battery.
3. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - K1.8.



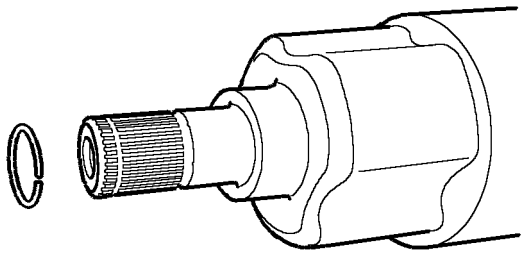
4. Release 2 harness clips from battery carrier.
5. Remove 4 bolts securing battery carrier to body and remove carrier.



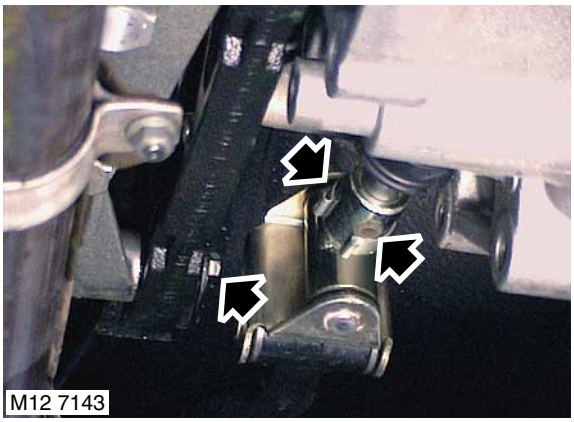
6. Disconnect reverse light switch connectors.
7. Disconnect multiplug from 1st gear switch.
8. Release clip securing 1st gear switch harness to clutch slave cylinder bracket.
9. Remove 3 bolts securing clutch slave cylinder mounting bracket to gearbox and tie bracket assembly aside.
10. Remove IRD.
    INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - K1.8.



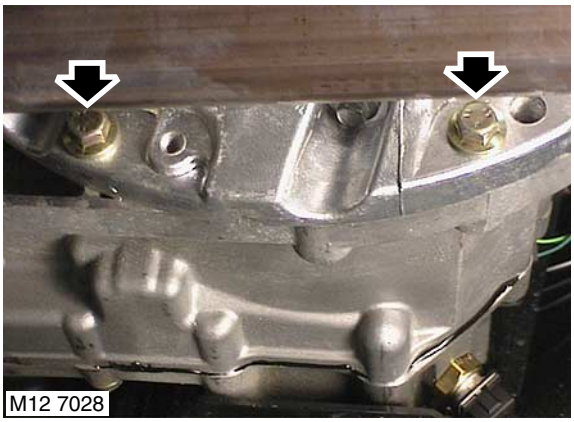
11. Secure **LRT-54-026** to drive shaft inboard joint. Using suitable lever, release LH inboard joint from gearbox.



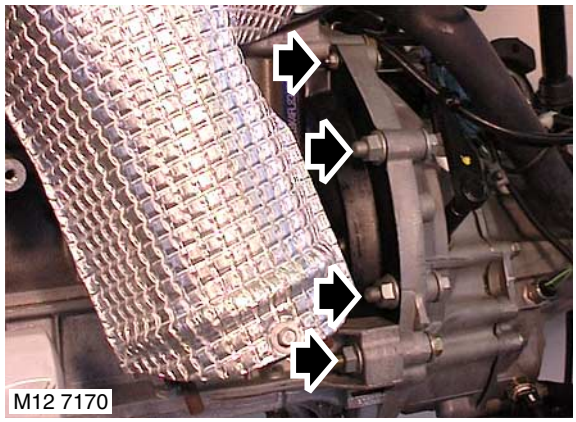
12. Remove and discard circlip from LH drive shaft inner joint.



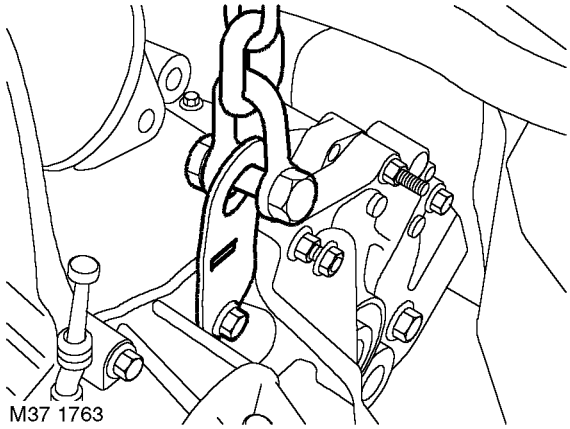
13. Release gear change rod roll pin cover, remove and discard roll pin.
14. Release gear change rod from gearbox selector shaft.
15. Remove bolt securing gear change steady rod to IRD support bracket, release steady from bracket.



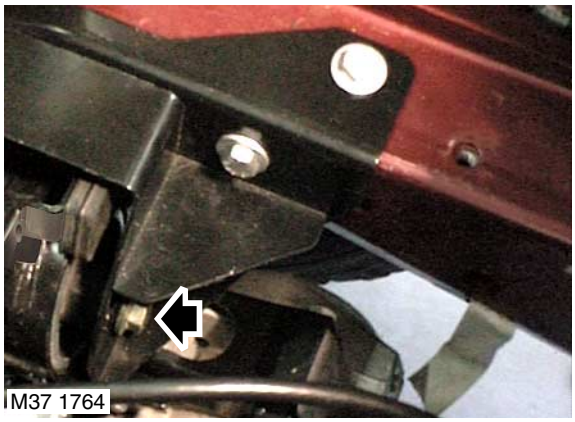
16. Remove 2 bolts securing sump to gearbox.



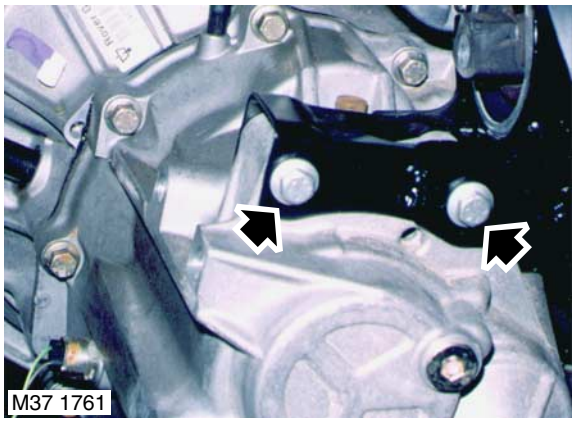
17. Note fitted position of plain washer and remove M6 nut and bolt securing front cover plate to gearbox.
18. Remove front upper nut and bolt securing gearbox to engine.
19. Remove 2 front nuts and bolts securing gearbox to engine, collect front cover plate.



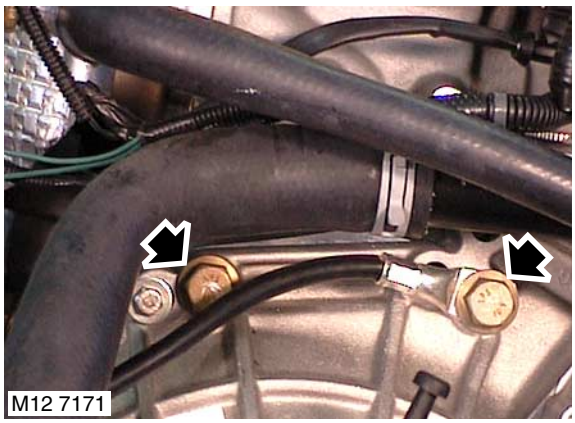
20. Remove gearbox housing bolt as shown, secure suitable lifting bracket to gearbox housing using original bolt.
21. Connect suitable lifting equipment to gearbox lifting bracket.


M37 1764

22. Remove through bolt securing LH engine mounting to gearbox bracket.
23. Lower gearbox for access.


M37 1761

24. Remove 2 bolts securing LH mounting to gearbox and remove mounting.
25. Fit wooden block to jack, position jack under engine sump to support engine.


M12 7171

26. Note fitted position of engine earth lead and remove 2 top bolts securing gearbox to engine.
27. With assistance, release gearbox from 2 locating dowels. Lower gearbox to floor and remove lifting equipment.

Refit

1. Clean mating faces of engine and gearbox, dowel and dowel holes.
2. Inspect drive shaft oil seal, renew if worn or damaged.
3. Lightly grease gearbox splines with molybdenum disulphide grease.
4. Clean and degrease threads of 2 top bolts securing gearbox to engine, Apply Loctite 243 to bolt threads.
5. Position gearbox underneath vehicle and connect lifting equipment.
6. With assistance, raise gearbox and align to dowels.
7. Correctly position engine earth lead, fit top 2 bolts securing gearbox to engine.
8. Position front cover plate and fit nuts and bolts.
9. Tighten top bolts and front nuts and bolts to 80 Nm (59 lbf.ft) and gearbox to sump to 45 Nm (33 lbf.ft).
10. Position plain washer to M6 bolt, fit bolt and nut and tighten to 9 Nm (7 lbf.ft).
11. Disconnect lifting equipment from gearbox lifting bracket.
12. Remove bolt securing lifting bracket to gearbox, remove bracket, refit bolt and tighten to 45 Nm (33 lbf.ft).
13. Position LH engine mounting to gearbox, fit and tighten bolts to 65 Nm (48 lbf.ft).
14. Raise gearbox and align LH engine mounting to mounting bracket. Fit through bolt and tighten to 80 Nm (59 lbf.ft).
15. Remove jack supporting engine.
16. Position gear change steady rod, fit and tighten bolt to 25 Nm (18 lbf.ft).
17. Position gear change rod to selector shaft, fit NEW roll pin and secure cover.
18. Clean end of drive shaft and mating splines in gearbox.
19. Fit new circlip to LH drive shaft.
20. Fit LH drive shaft to gearbox, keep drive shaft square to prevent damage to oil seal in gearbox.

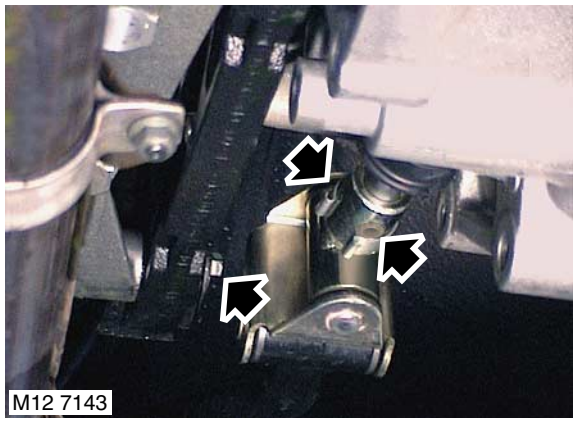
21. Fit IRD.
    ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - K1.8.**
22. Position clutch slave cylinder mounting bracket to gearbox, fit and tighten bolts to 25 Nm (18 lbf.ft).
23. Connect multiplug to 1st gear switch and secure harness with clip to clutch slave cylinder bracket.
24. Connect reverse light switch connectors.
25. Fit battery carrier and tighten bolts to 10 Nm (7.5 lbf.ft).
26. Position harness to battery carrier and secure clips.
27. Fit starter motor.
    ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - K1.8.**
28. Fit battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
29. Connect battery earth lead.

Oil seal - selector shaft

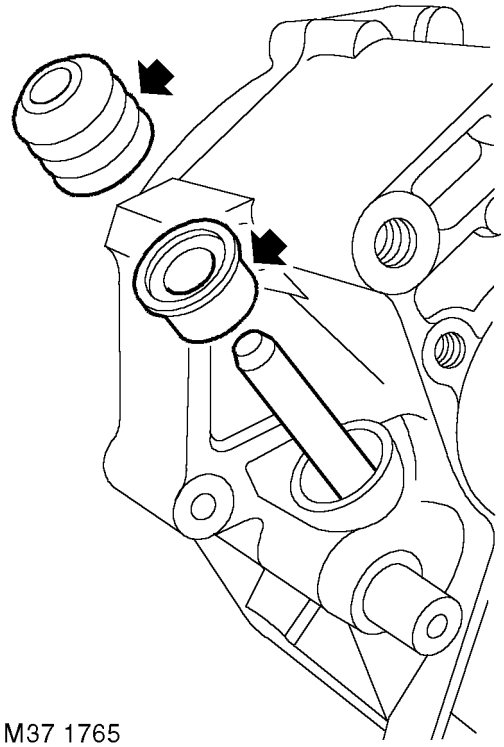
⊸ ***37.23.10***

Remove

1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**



2. Remove bolt securing gear change steady to IRD support bracket, release steady from bracket and collect 2 washers.
3. Release gear change rod roll pin cover, remove and discard roll pin.
4. Release gear change rod from gearbox selector shaft.
5. Position container beneath gearbox to catch fluid loss.



M37 1765

6. Carefully remove gaiter from selector shaft.
7. Remove and discard selector shaft oil seal.

Refit

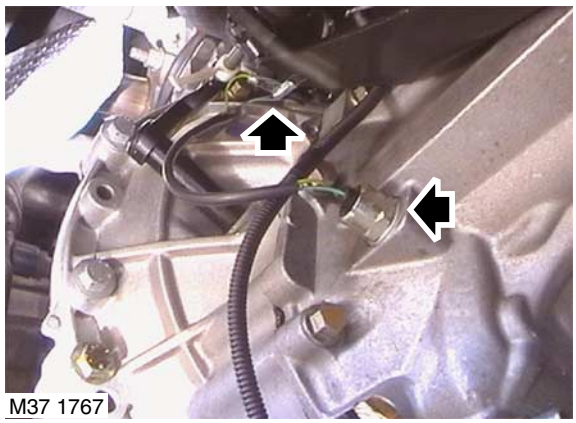
1. Clean selector shaft.
2. Position new oil seal to selector shaft and drift into position using a suitable piece of tubing.
3. Fit gaiter to selector shaft and ensure that lip on gaiter is located over lip on seal.
4. Remove container from underneath gearbox.
5. Position gear change rod to selector shaft, fit new roll pin and secure cover.
6. Fit washers to gear change steady and position steady to mounting bracket.
7. Fit bolt securing gear change steady to mounting bracket and tighten to 25 Nm (18 lbf.ft).
8. Top-up gearbox fluid level.
   ☞ **MAINTENANCE, MAINTENANCE, Manual Gearbox – PG1.**
9. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Switch - reverse light

37.27.01

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**



M37 1767

3. Disconnect reverse light switch connectors.
4. Remove reverse light switch and discard sealing washer.

Refit

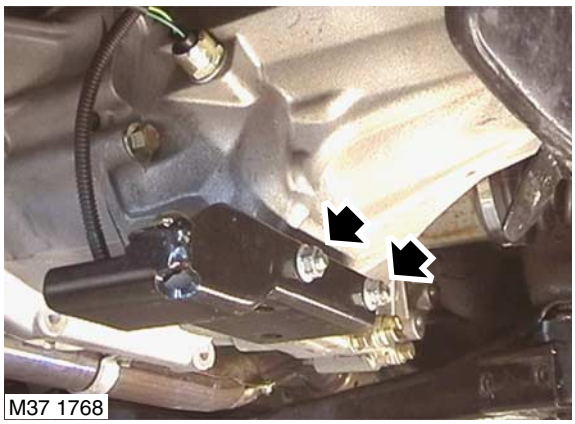
1. Clean reverse lamp switch and mating face on gearbox.
2. Fit new sealing washer to reverse light switch, fit and tighten switch to 24 Nm (18 lbf.ft).
3. Connect reverse light switch connectors.
4. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
5. Connect battery earth lead.

Switch - first gear

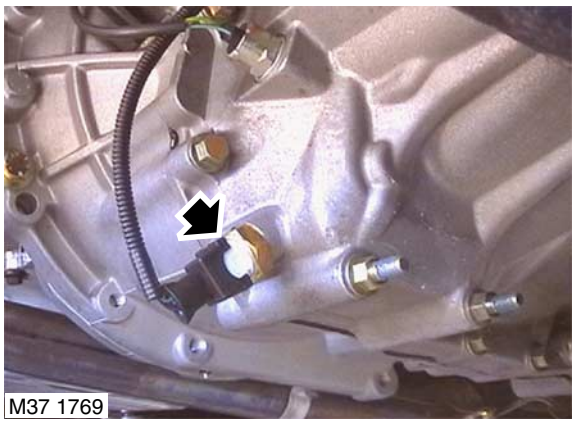
37.27.11

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Position container to catch oil spillage.


M37 1768

4. Remove nuts securing 1st gear switch cover to gearbox housing and remove cover.


M37 1769

5. Disconnect multiplug from 1st gear switch.
6. Remove 1st gear switch.

Refit

1. Clean mating faces of 1st gear switch, fit and tighten switch to 24 Nm (18 lbf.ft).
2. Remove container from underneath gearbox.
3. Connect multiplug to 1st gear switch.
4. Check and top up gearbox oil.
   MAINTENANCE, MAINTENANCE, Manual Gearbox – PG1.
5. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Connect battery earth lead.

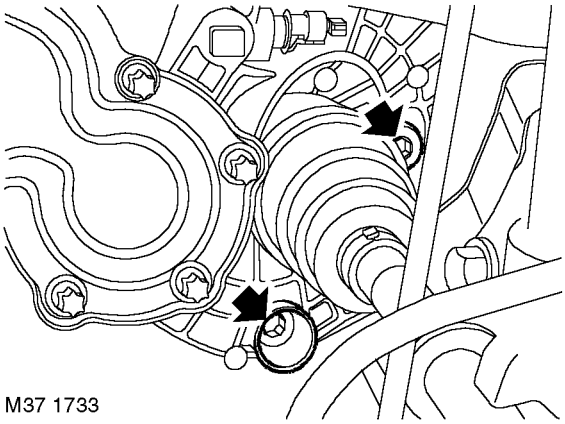
Gearbox oil - drain and refill

37.24.01

Drain

1. Position vehicle on a ramp.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Position suitable container under gearbox.
4. Clean area around filler/level and drain plugs.

   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.



M37 1733

5. Remove filler/level plug.
6. Remove drain plug.
7. Allow gearbox oil to drain.

Refill

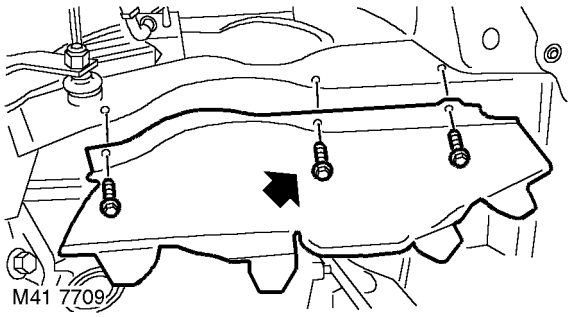
1. Clean filler/level and drain plugs.
2. Fit gearbox drain plug and tighten to 35 Nm (26 lbf.ft)
3. Fill gearbox through filler/level hole, until oil is level with bottom of hole.
   CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.
4. Fit gearbox filler/level plug and tighten plug to 35 Nm (26 lbf.ft).
5. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Lower vehicle.

Cover - rear

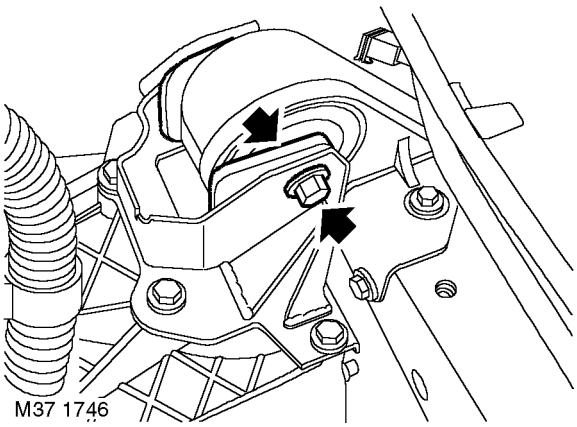
37.12.17

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove LH front road wheel.



4. Remove 3 bolts and remove splash shield.
5. Remove battery tray.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
6. Support gearbox on a jack.



7. Remove through bolt securing LH engine mounting to gearbox bracket.
8. Lower gearbox for access.
9. Remove snubber from mounting.
10. Position container to catch oil spillage.

11. Remove and discard 8 Torx bolts securing rear cover to gearbox casing.
12. Carefully break sealant joint to release rear cover from gearbox casing. Discard rear cover.

Refit

1. Clean gearbox casing face and face of cover.
2. Ensure oil gallery is located in position.
3. Apply a 1 mm bead of sealant to cover mating face of gearbox casing.
4. Position new rear cover, fit new Torx bolts and tighten to 25 Nm (18 lbf.ft).
5. Fit snubber to mounting.
6. Fit through bolt securing LH engine mounting to gearbox bracket and tighten to 100 Nm (74 lbf.ft).
7. Fit battery tray.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
8. Top up gearbox oil.
   MAINTENANCE, MAINTENANCE, Manual Gearbox – GETRAG.
9. Fit splash shield and tighten bolts to 10 Nm (7.5 lbf.ft).
10. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
11. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
12. Connect battery earth lead.

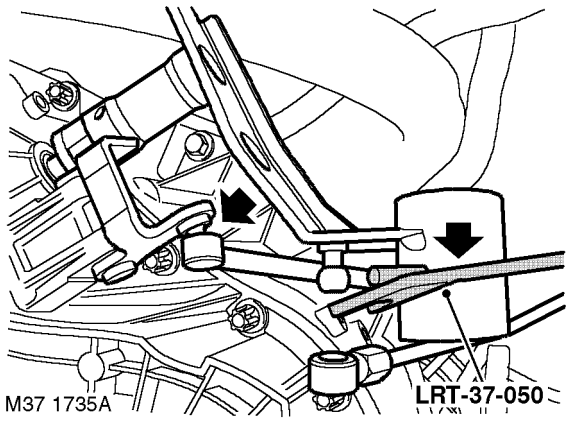
Selector - upper rod & ball joints

37.16.71

The following procedure is also applicable for renewing the selector lower rod and ball joints.

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove LH front road wheel.



4. Use **LRT-37-050**, release gearchange rod ball joint from gearbox.
5. Use **LRT-37-050**, release gearchange rod ball joint from bulkhead mounting. Remove rod from vehicle.

Refit

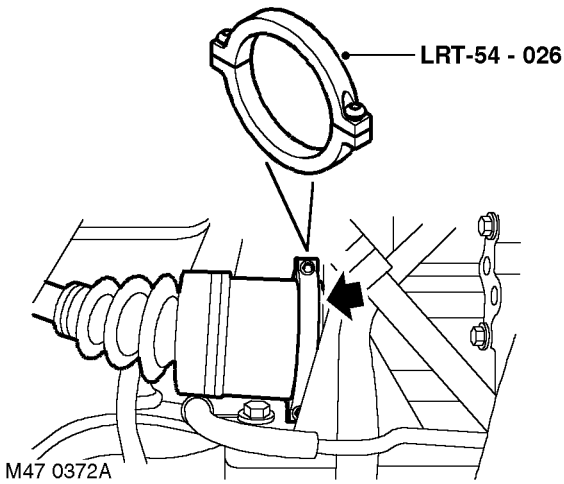
1. Clean and inspect gear change pivot balls.
2. Clean gear change operating rod and sockets.
3. Lubricate new ball sockets, fit gearchange operating arm to vehicle.
   CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.
4. Fit LH front road wheel and tighten nuts to 115 Nm (85 lbf.ft).
5. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Connect battery earth lead.

Gearbox

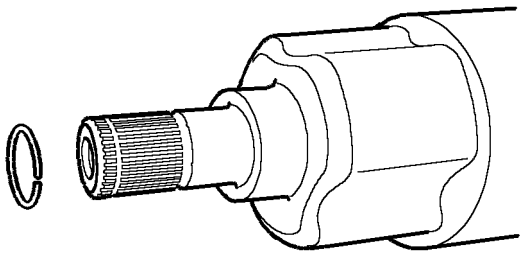
37.20.02.99

Remove

1. Disconnect battery earth lead.
2. Tie bonnet back in upright position.
3. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
4. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
5. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.
6. Remove IRD.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.

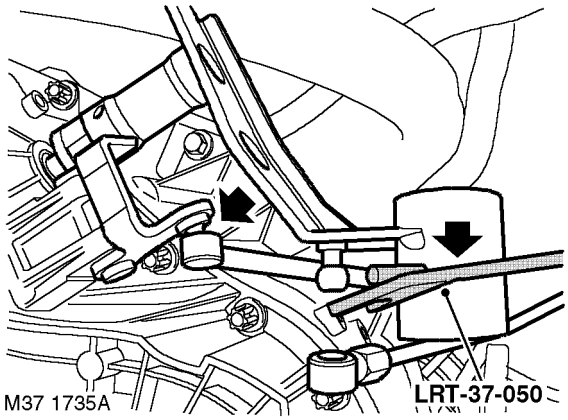


7. Secure **LRT-54-026** to drive shaft inner joint. Using a suitable lever, release LH inboard joint from gearbox.
8. With assistance, pull hub outwards and remove LH drive shaft from gearbox.
   CAUTION: Pull the drive shaft horizontally to avoid damaging the differential oil seal.



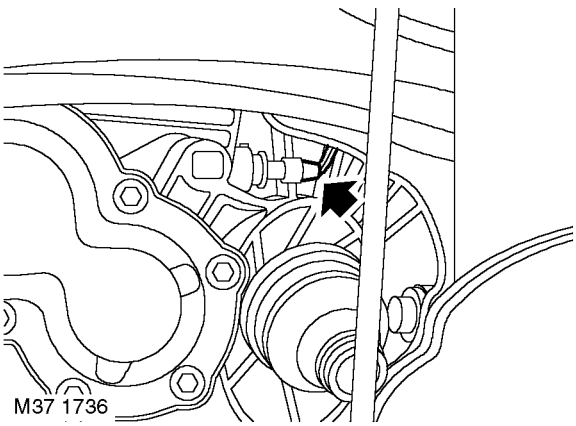
M41 7695

9. Remove and discard circlip from LH drive shaft.



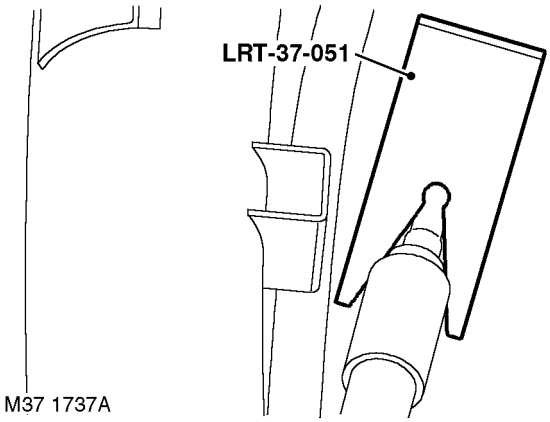
M37 1735A

10. Use **LRT-37-050** and release gear change rods from quadrant.



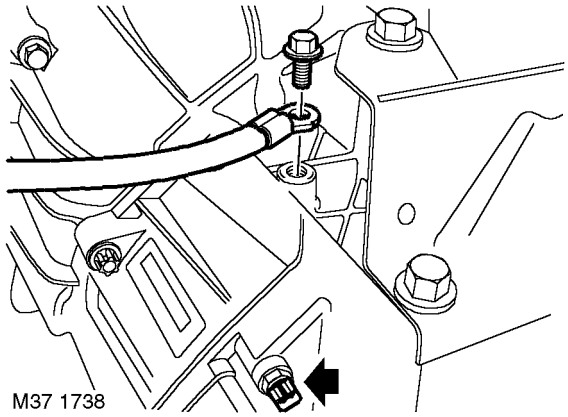
M37 1736

11. Disconnect reverse lamp switch multiplug.



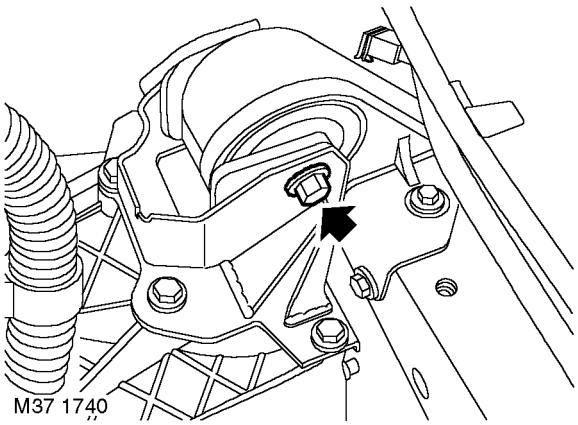
M37 1737A

12. Use **LRT-37-051** to release and disconnect clutch pipe connection.

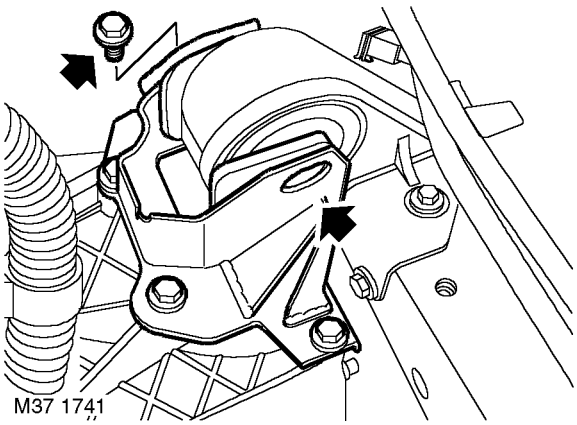


M37 1738

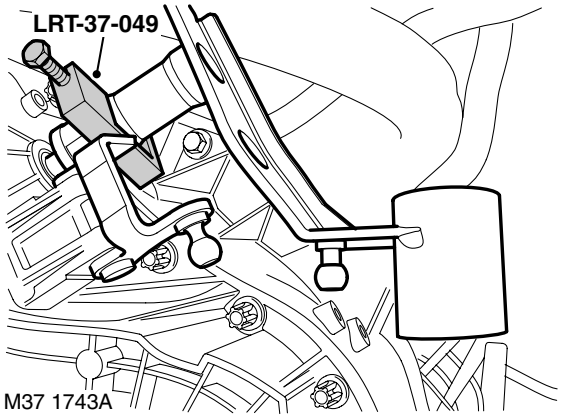
13. Remove bolt and release earth lead from gearbox.
14. Disconnect multiplug from 1st gear switch.
15. Fit lifting chains to lifting eye and take weight of engine.



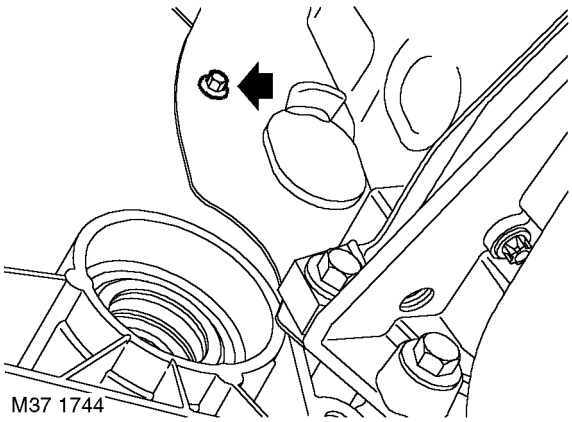
16. Remove through bolt gearbox bracket to LH mounting.
17. Lower gearbox to clear mounting.



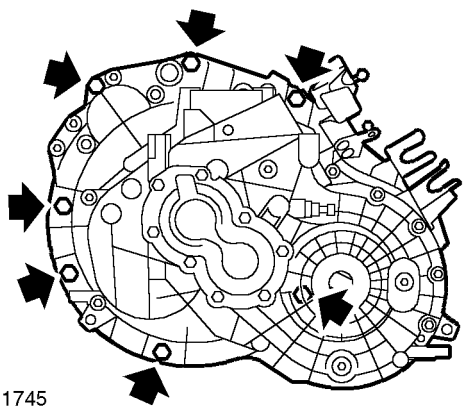
18. Remove 4 bolts securing LH mounting bracket to gearbox and remove bracket.
19. Mark gearchange quadrant and selector shaft relationship to aid refit.



20. Using **LRT-37-049**, carefully extract roll pin from gearchange selector shaft quadrant.
21. Remove selector quadrant from selector shaft.
22. Fit suitable lifting eye to gearbox casing and secure with bolt.
23. Fit lifting chains to eye and take weight of gearbox.



24. Remove bolt securing closing plate to gearbox.



25. Remove 7 bolts securing gearbox to engine.

26. Release gearbox from 2 dowels.
27. Manoeuvre and lower gearbox to floor.
28. If necessary remove displaced gearbox closing panel.

Refit

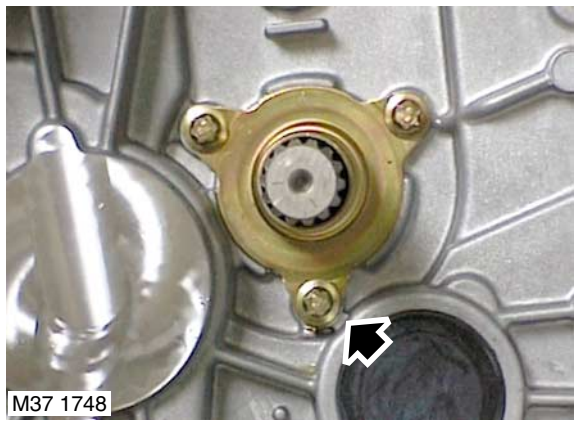
1. Clean gearbox closing panel.
2. Ensure closing plate is in position on engine and located on dowels.
3. Clean gearbox to engine mating faces, dowels and dowel holes.
4. Fit lifting chains to eye and take weight of gearbox.
5. Raise gearbox and engage with dowels. Fit bolts securing gearbox to engine and tighten to 85 Nm (63 lbf.ft).
6. Fit bolt securing closing plate to gearbox and tighten to 10 Nm (7.5 lbf.ft).
7. Clean selector shaft and quadrant.
8. Fit gear selector quadrant to selector shaft and align roll pin hole.
9. Fit **LRT-37-049** to gearchange quadrant, press new roll pin through selector shaft and remove tool. Check operation of selector mechanism.
10. Position gearbox mounting bracket to gearbox, fit bolts and tighten to 85 Nm (63 lbf.ft).
11. Raise engine and gearbox, align gearbox mounting bracket.
12. Fit through bolt securing LH engine mounting to gearbox bracket and tighten to 100 Nm(74 lbf.ft).
13. Remove lifting chains from gearbox.
14. Remove engine support chains.
15. Connect multiplug to 1st gear switch.
16. Connect multiplug to reverse lamp switch.
17. Position earth lead to gearbox and tighten bolt to 25 Nm (18 lbf.ft).
18. Connect clutch pipe quick release connection.
19. Fit new circlip to LH drive shaft.
20. With assistance, fit LH drive shaft to gearbox, keep shaft square to prevent damage to oil seal in gearbox.
21. Fit IRD.
    ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.**
22. Fit starter motor.
    ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
23. Fit battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
24. Fit intake ducting assembly.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.**
25. Connect battery earth lead.
26. Untie and close bonnet.

Oil seal - input shaft

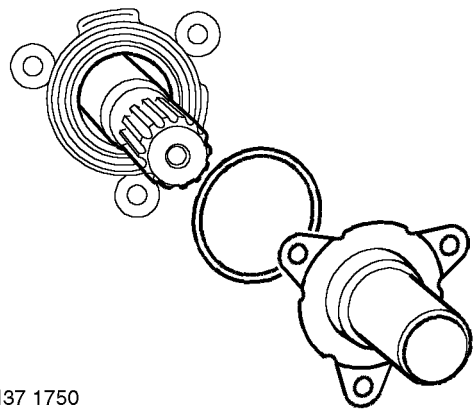
37.23.06

Remove

1. Disconnect battery earth lead.
2. Remove release bearing.
   ☞ **CLUTCH, REPAIRS, Clutch assembly/drive plate & release bearing - Td4.**


M37 1748

3. Remove 3 bolts securing release bearing sleeve.


M37 1750

4. Remove release bearing sleeve and discard 'O' ring.

Refit

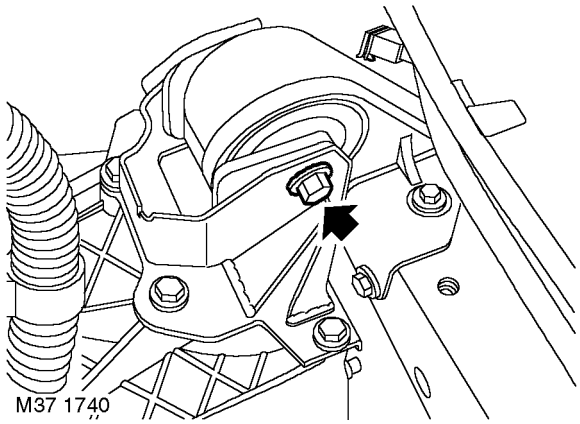
1. Clean release bearing sleeve and mating face.
2. Use a new 'O' ring, fit bearing sleeve and tighten bolts to 12 Nm (9 lbf.ft).
3. Fit release bearing.
   ☞ **CLUTCH, REPAIRS, Clutch assembly/drive plate & release bearing - Td4.**
4. Connect battery earth lead.

Oil seal - selector shaft

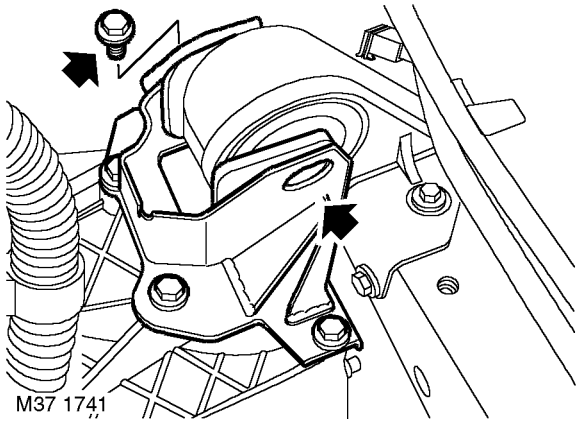
⊸ ***37.23.10***

Remove

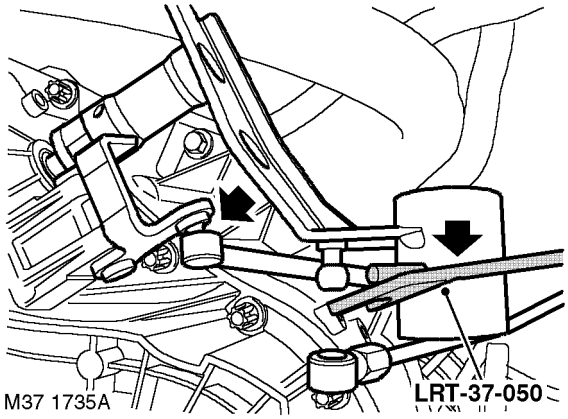
1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Remove battery carrier.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
3. Position jack to support gearbox.



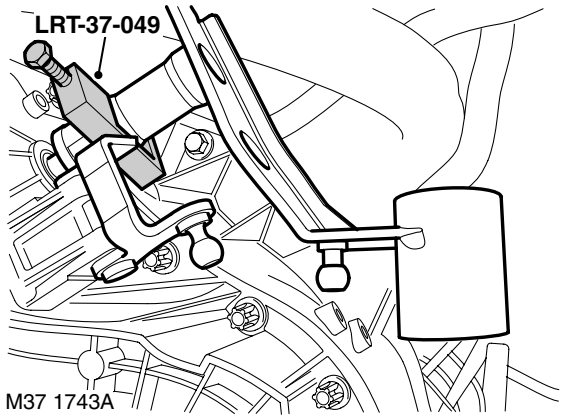
4. Remove through bolt securing gearbox bracket to LH mounting.
5. Lower gearbox to clear mounting.



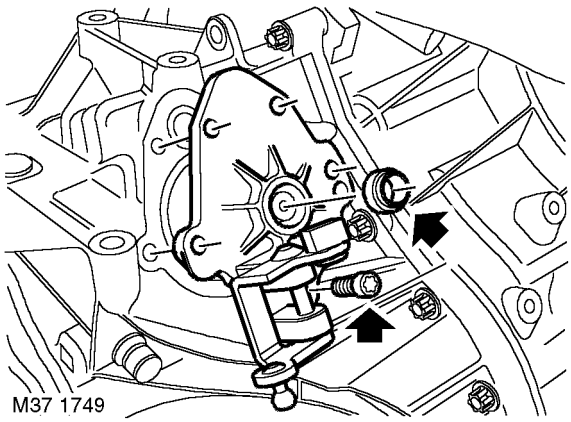
6. Remove 4 bolts securing LH mounting bracket to gearbox and remove bracket.



7. Use**LRT-37-050** and release gear change rods from quadrant.



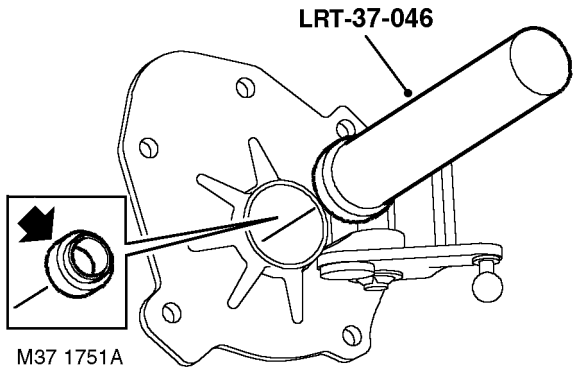
8. Using **LRT-37-049**, carefully extract roll pin from gearchange selector shaft quadrant.
9. Remove selector quadrant from selector shaft.



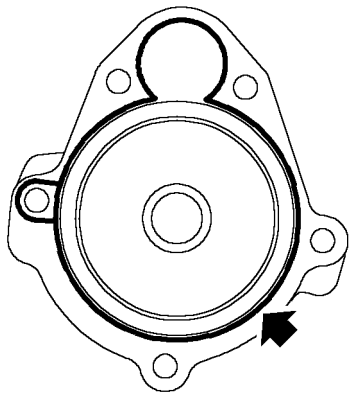
10. Remove and discard 5 Torx bolts securing gear change cover and remove cover.
11. Remove and discard oil seal from selector cover.

Refit

1. Clean gear change oil seal recess, gear change cover and gearbox mating faces.



2. Using **LRT-37-046** fit new seal to gear change cover.
3. Lubricate gear change cover bearing with clean gearbox oil.



4. Apply a 1 mm bead of sealant to gearshift cover as illustrated.
5. Align gear change cover to selector shaft, fit new Torx bolts, evenly and progressively tighten to 25 Nm (18 lbf.ft).
6. Fit quadrant to selector shaft, fit nylon block to slot in quadrant and align roll pin hole.
7. Fit **LRT-37-049** to gearchange quadrant, press new roll pin through selector shaft and remove tool. Check operation of selector mechanism.

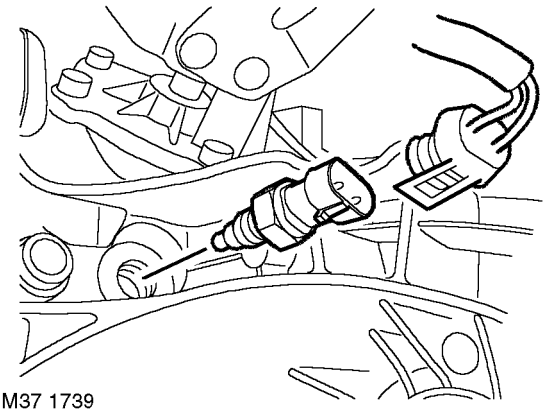
8. Position gearbox mounting bracket to gearbox, fit bolts and tighten to 85 Nm (63 lbf.ft).
9. Adjust height of engine, fit through bolt securing gearbox mounting bracket to gearbox mounting on body and tighten bolt to 100 Nm (74 lbf.ft).
10. Fit battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
11. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Switch - reverse lamp

⊸ ***37.27.01***

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**



M37 1739

3. Disconnect multiplug from reverse lamp switch.
4. Remove reverse lamp switch from gearbox.

Refit

1. Clean reverse lamp switch and mating face on gearbox.
2. Fit and tighten reverse lamp switch to gearbox to 24 Nm (18 lbf.ft).
3. Connect multiplug.
4. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
5. Connect battery earth lead.

Switch - first gear

37.27.11

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M37 1770

3. Disconnect multiplug from 1st gear switch.
4. Position container to catch oil spillage.
5. Remove 1st gear switch.

Refit

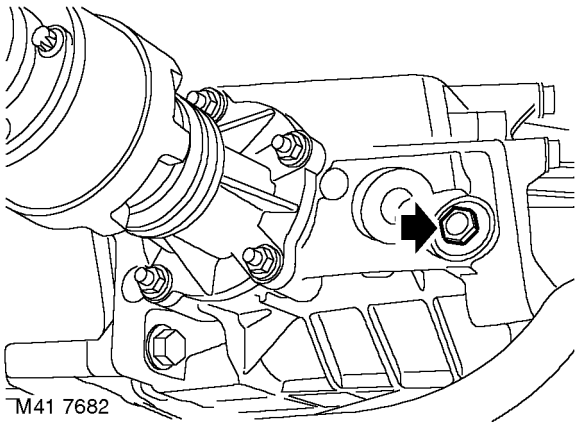
1. Clean mating faces of 1st gear switch, fit and tighten switch to 24 Nm (18 lbf.ft).
2. Remove container from underneath gearbox.
3. Connect multiplug to 1st gear switch.
4. Check and top up gearbox oil.
   ☞ **MAINTENANCE, MAINTENANCE, Manual Gearbox – GETRAG.**
5. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
6. Connect battery earth lead.

Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS

41.25.06

Drain

1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Place container beneath IRD unit.
   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.



3. Clean area around filler/level and drain plugs.
4. Remove filler/drain plugs and discard sealing washers. Allow fluid to drain.
   NOTE: The fluid should be drained with the transmission at normal operating temperature.
5. Fit new sealing washer and tighten drain plug to 35 Nm (26 lbf.ft).

Refill

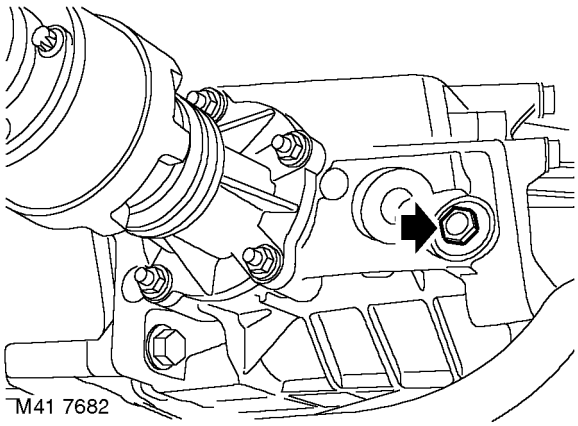
1. Fill with correct fluid until it just runs from filler/level hole. Allow sufficient time for fluid to flow and reach a common level in unit.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
2. Fit new sealing washer and tighten filler/level plug to 35 Nm (26 lbf.ft).
3. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS

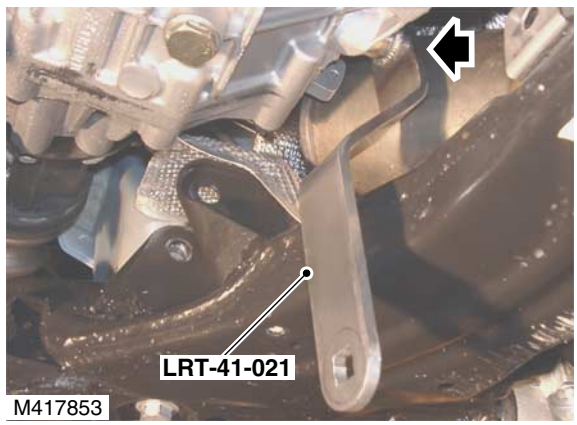
41.25.06

Drain

1. Remove underbelly panel
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Place container beneath IRD unit.
   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.



3. Clean area around filler/level and drain plugs.



4. Using **LRT-41-021** remove filler plug and discard sealing washer.


M41 7687

5. Remove drain plug, discard sealing washer and allow oil to drain.
   NOTE: The fluid should be drained with the transmission at normal operating temperature.

6. Fit new sealing washer and tighten drain plug to 35 Nm (26 lbf.ft).

Refill

1. Fill with fluid until it just runs from filler/level hole. Allow sufficient time for fluid to flow and reach a common level in unit.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
2. Fit new sealing washer and tighten filler/level plug to 35 Nm (26 lbf.ft).
3. Fit underbelly panel
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Intermediate reduction drive (IRD) unit - Td4

41.25.01.99

Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove rear beam.

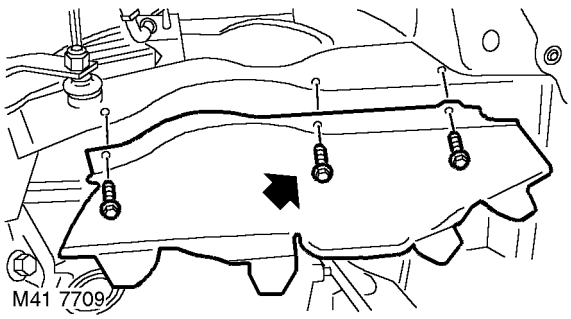
   FRONT SUSPENSION, REPAIRS, Rear beam.
4. Remove exhaust front pipe.

   MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - front.
5. Drain fluid from IRD.

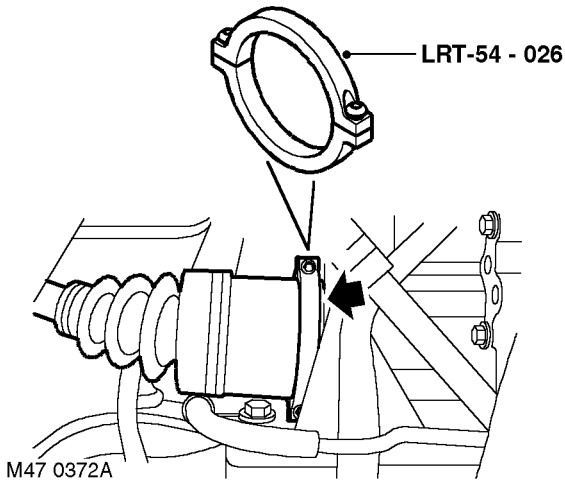
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
6. Drain gearbox fluid.

   MANUAL GEARBOX - GETRAG, ADJUSTMENTS, Gearbox oil - drain and refill.

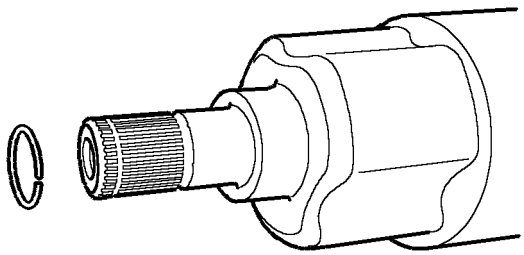
   AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.



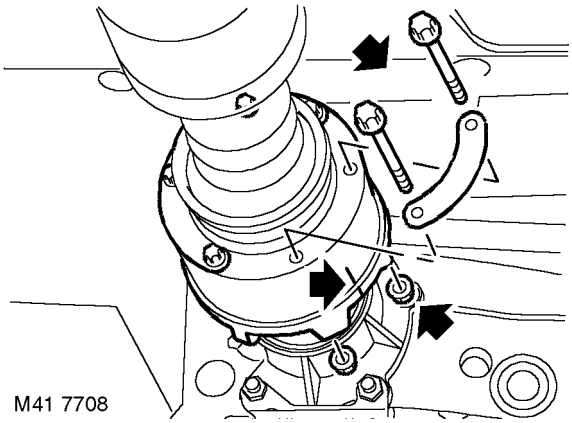
7. Remove 3 bolts securing RH splash shield to body and remove shield.



8. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release drive shaft from IRD.
9. With assistance, pull hub outwards and release drive shaft from IRD.

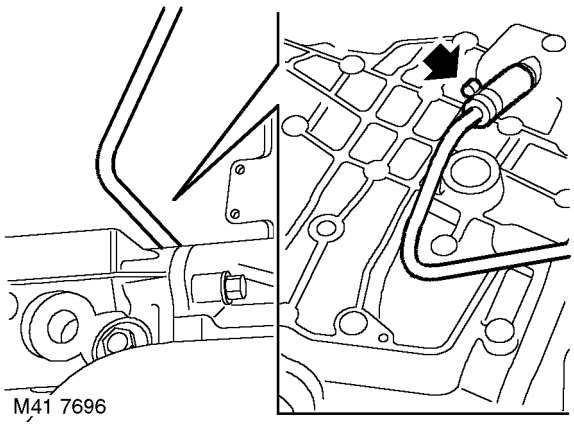


10. Remove and discard drive shaft circlip.
11. Reference mark front propeller shaft for reassembly.
12. Raise one rear wheel for rotation of propeller shaft to access bolts.

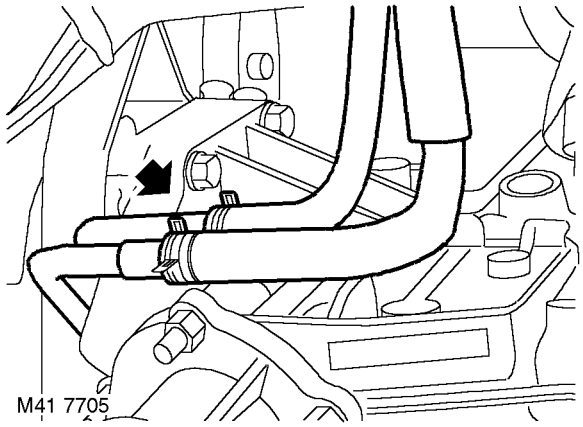


13. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
14. Release propeller shaft from IRD drive flange and tie shaft aside.

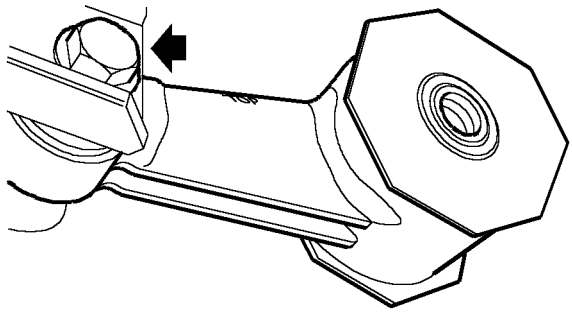
CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.



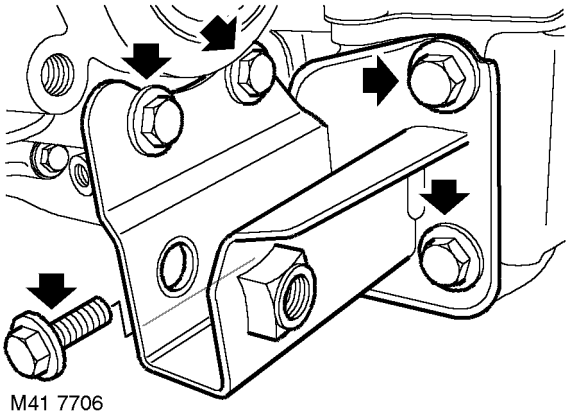
15. Disconnect breather hose from IRD housing.
16. Position container to collect coolant spillage.



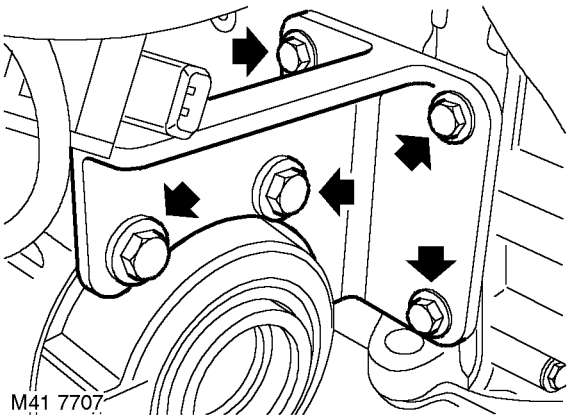
17. Release clips and disconnect coolant hoses from IRD.



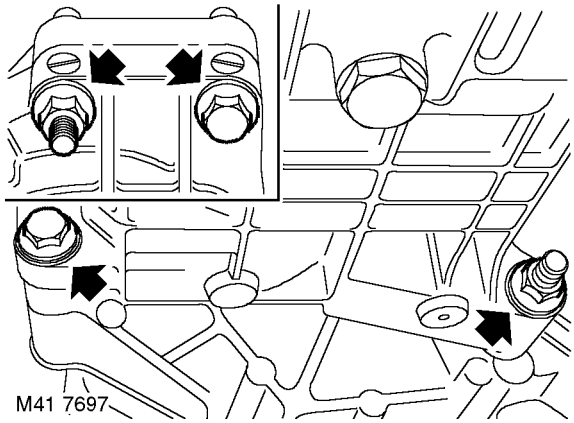
18. Remove bolt securing engine lower steady to IRD support bracket.
19. Remove lower engine steady noting that 'TOP' mark on engine steady faces uppermost.


M41 7706

20. Remove 3 bolts securing IRD support bracket to sump.
21. Remove 2 bolts securing support bracket to IRD.
22. Remove support bracket.


M41 7707

23. Remove 3 bolts, securing IRD upper support bracket to cylinder block.
24. Remove 2 bolts securing upper support bracket to IRD.
25. Remove IRD upper support bracket.


M41 7697

26. Remove 4 bolts securing IRD.
27. With assistance, release IRD from gearbox and remove.


M41 7698

28. Remove and discard 'O' ring from IRD.

Refit

1. Clean mating faces of IRD and gearbox.
2. Lubricate and fit new 'O' ring
3. With assistance, fit IRD.
4. Fit bolts securing IRD to gearbox and tighten sufficiently only to pull mating faces of IRD and gearbox together at this stage.
5. Fit IRD support brackets, tighten sufficiently to pull mating faces together.
6. Final tighten bolts securing IRD to gearbox to 90 Nm (66 lbf.ft).
7. Final tighten bolts securing IRD support brackets in the following sequence:
- M8 bolts securing support brackets to IRD 37 Nm (22 lbf.ft)
- M10 bolts securing support brackets to IRD 50 Nm (22 lbf.ft)
- 3 bolts securing support bracket to cylinder block 25 Nm (18 lbf.ft)
- 3 bolts securing support bracket to sump at 45 Nm (33 lbf.ft).

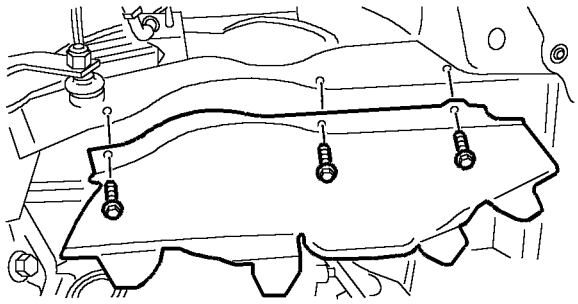
8. Position lower engine steady, 'TOP' mark uppermost. Fit bolt but do not tighten at this stage.
9. Connect coolant hoses and secure with clips.
10. Connect breather hose to IRD housing.
11. Clean propeller shaft flange and mating face.
12. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
13. Inspect drive shaft oil seal, renew if worn or damaged.
14. Clean drive shaft and flange splines.
15. Fit new circlip to drive shaft.
16. With assistance, pull hub outwards, align drive shaft and fit to IRD taking care not to damage oil seal.
17. Fit splash shield and secure with bolts.
18. Fit exhaust front pipe.
    ☞ MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - front.
19. Fit rear beam.
    ☞ FRONT SUSPENSION, REPAIRS, Rear beam.
20. Final tighten bolt securing lower engine steady to IRD support bracket to 100 Nm (74 lbf.ft).
21. Remove stand(s) and lower vehicle.
22. Fill IRD to correct level with fluid.
    ☞ INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
23. Fill gearbox with fluid.
    ☞ MANUAL GEARBOX - GETRAG, ADJUSTMENTS, Gearbox oil - drain and refill.
    ☞ AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.
24. Connect battery earth lead.
25. Refill cooling system.
    ☞ COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.

Intermediate reduction drive (IRD) unit - K1.8

41.25.01.99

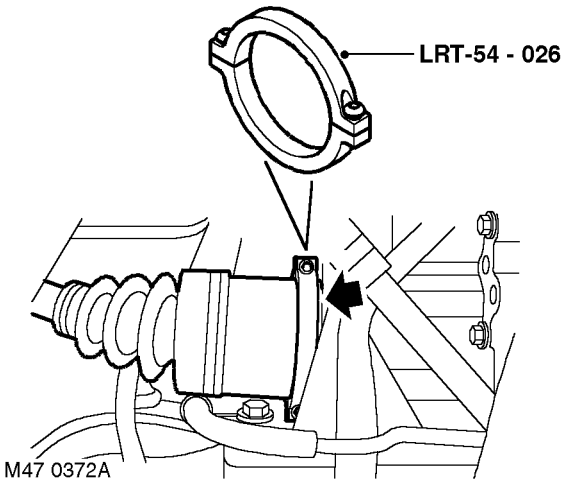
Remove

1. Disconnect battery earth lead.
2. Remove rear beam.
   ☞ FRONT SUSPENSION, REPAIRS, Rear beam.
3. Remove exhaust front pipe.
   ☞ MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - front.
4. Drain fluid from IRD.
   ☞ INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
5. Drain gearbox oil.
   ☞ MANUAL GEARBOX - PG1, ADJUSTMENTS, Gearbox oil - drain and refill.



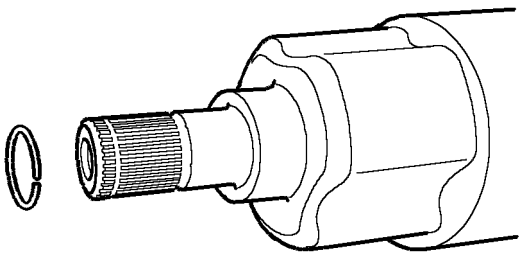
M12 6977

6. Remove 3 bolts securing RH splash shield to body and remove shield.

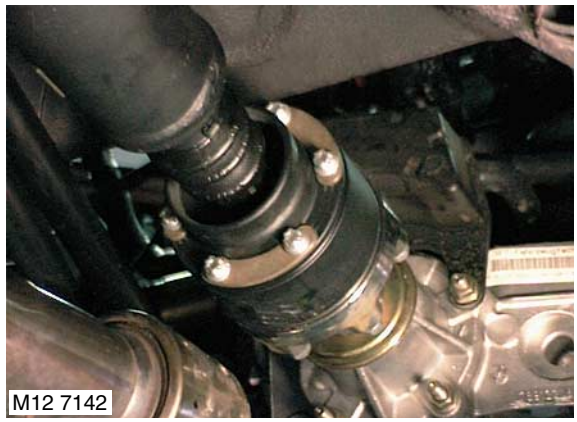


7. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release drive shaft from IRD.
8. With assistance, pull hub outwards and release drive shaft from IRD.

   CAUTION: Care must be taken not to damage oil seal when removing drive shaft from IRD.

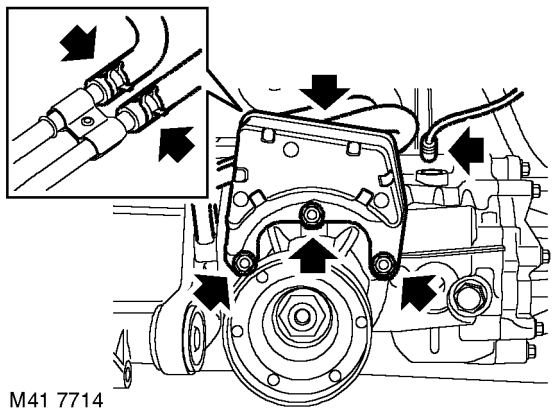


9. Remove and discard drive shaft circlip.

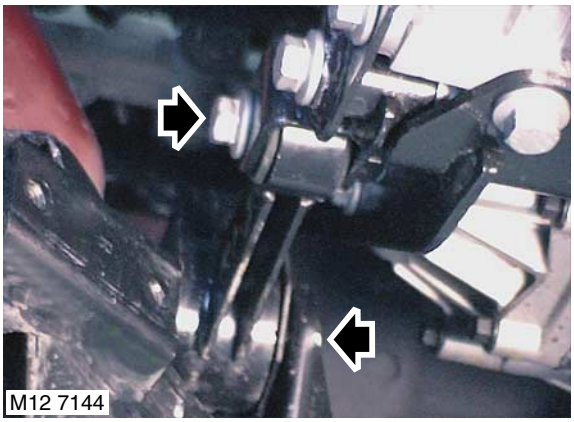


10. Reference mark front propeller shaft for reassembly.
11. Raise one rear wheel for rotation of propeller shaft to access bolts.
12. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
13. Release propeller shaft from IRD drive flange and tie shaft aside.

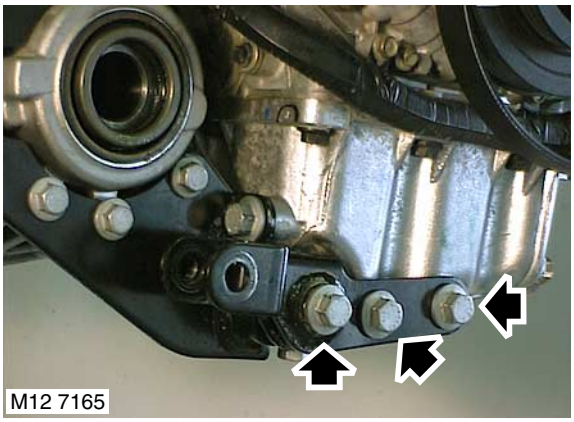
    CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.



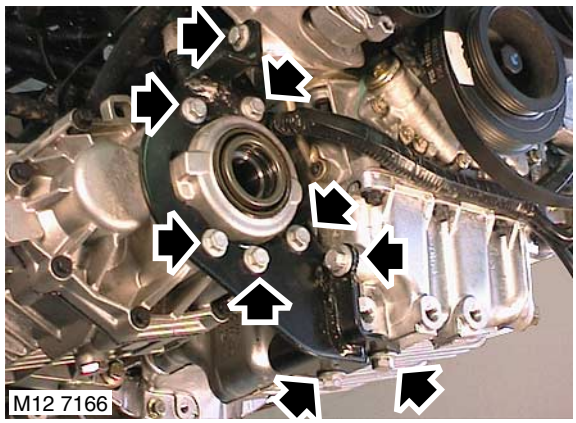
14. Remove 3 nuts securing mass damper to pinion housing.
15. Remove mass damper.
16. Disconnect breather hose from IRD housing.
17. Position container to collect coolant spillage.
18. Release clips and disconnect coolant hoses from IRD.



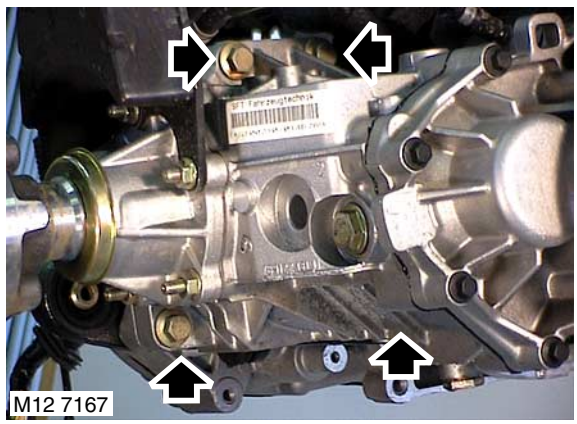
19. Remove bolt securing engine lower steady to bracket on sump.
20. Remove engine lower steady.



21. Remove 3 bolts securing lower engine steady bracket to sump and remove bracket.



22. Remove upper bolt securing IRD support bracket to cylinder block.
23. Remove 5 bolts securing support bracket to IRD.
24. Remove 3 bolts securing IRD support bracket to sump and remove bracket.



25. Remove 4 bolts securing IRD.
26. With assistance, release IRD from gearbox and remove.

27. Remove and discard 'O' ring from IRD.

Refit

1. Clean mating faces of IRD and gearbox.
2. Lubricate and fit new 'O' ring
3. With assistance, fit IRD.
4. Fit bolts securing IRD to gearbox and tighten sufficiently only to pull mating faces of IRD and gearbox together at this stage.
5. Fit IRD support bracket and tighten bolts sufficiently only to pull mating faces together.
6. Final tighten bolts securing IRD to gearbox to 90 Nm (66 lbf.ft).
7. Final tighten bolts securing IRD support bracket in following sequence:
   - 5 bolts securing IRD support bracket to IRD 50 Nm (37 lbf.ft)
   - 1 bolt securing support bracket to cylinder block to 45 Nm (33 lbf.ft)
   - 3 bolts securing support bracket to sump 45 Nm (33 lbf.ft).
8. Position engine lower steady bracket to sump, fit and tighten bolts to 100 Nm (74 lbf.ft).
9. Fit engine lower steady, fit bolt securing steady to gearbox bracket but do not tighten at this stage.
10. Connect coolant hoses and secure with clips.
11. Connect breather hose to IRD housing.
12. Fit mass damper to pinion housing, fit nuts and tighten to 25 Nm (18 lbf.ft).
13. Clean propeller shaft flange and mating face.
14. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
15. Inspect drive shaft oil seal, renew if worn or damaged.
16. Clean drive shaft and flange splines.
17. Fit new circlip to drive shaft.
18. With assistance, pull hub outwards, align drive shaft and fit to IRD taking care not to damage oil seal.

    CAUTION: Pull the drive shaft to ensure the circlip is fully engaged and retains the shaft.

19. Fit splash shield and secure with bolts.
20. Fit exhaust front pipe.

    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - front.**
21. Fit rear beam.

    ☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**
22. Final tighten bolt securing lower engine steady to sump bracket to 80 Nm (59 lbf.ft).
23. Fill IRD to correct level with fluid.

    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
24. Refill gearbox with oil.

    ☞ **MANUAL GEARBOX - PG1, ADJUSTMENTS, Gearbox oil - drain and refill.**
25. Connect battery earth lead.
26. Refill cooling system.

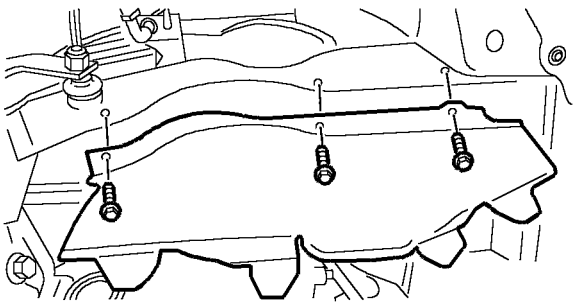
    ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - refill system.**

Intermediate reduction drive (IRD) unit - KV6

41.25.01.99

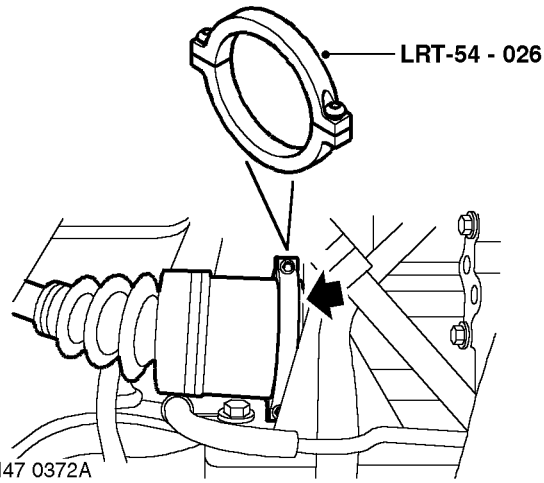
Remove

1. Disconnect battery earth lead.
2. Remove rear beam.
   FRONT SUSPENSION, REPAIRS, Rear beam.
3. Remove exhaust front pipe.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - Non NAS.
4. **NAS models:** Remove RH catalytic converter.
   EMISSION CONTROL, REPAIRS, Catalytic converter - RH - KV6 - NAS.
5. **NAS models:**Remove LH exhaust manifold gasket.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket(s) - exhaust manifold - LH - NAS.
6. Drain fluid from IRD.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.
7. Drain gearbox fluid.
   AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.



M12 6977

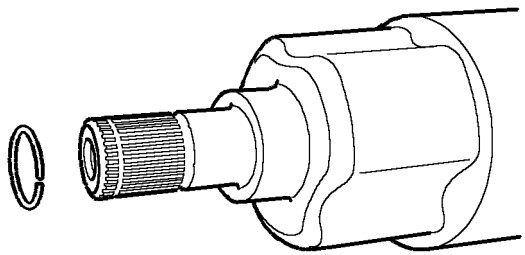
8. Remove 3 bolts securing RH splash shield to body and remove shield.



M47 0372A

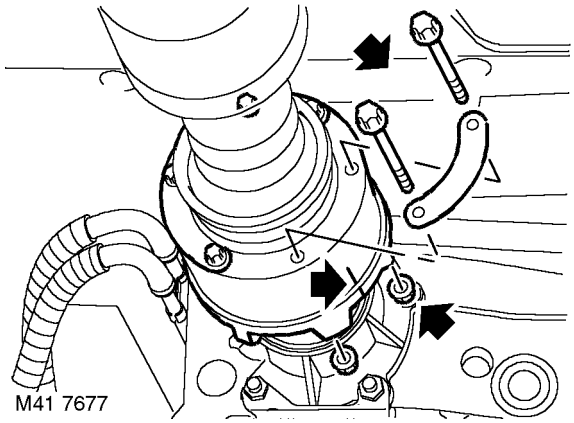
9. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release drive shaft from IRD.
10. With assistance, pull hub outwards and release drive shaft from IRD.

    CAUTION: Care must be taken not to damage oil seal when removing drive shaft from IRD.



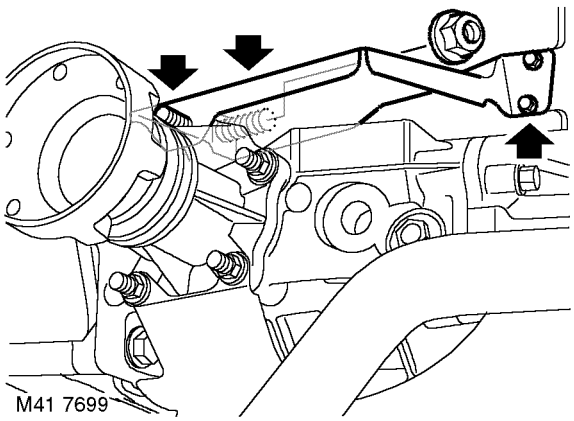
M41 7695

11. Remove and discard drive shaft circlip.

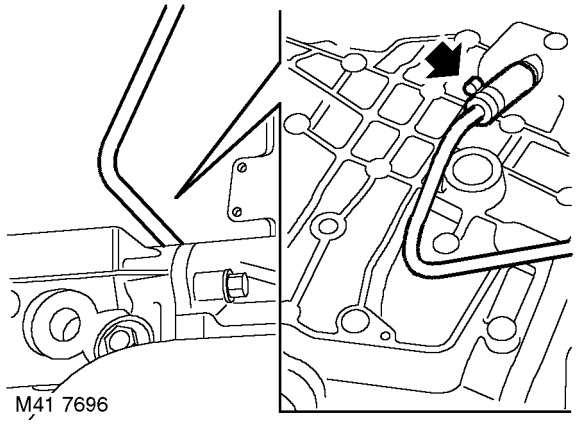


12. Reference mark front propeller shaft for reassembly.
13. Raise one rear wheel for rotation of propeller shaft to access bolts.
14. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
15. Release propeller shaft from IRD drive flange and tie shaft aside.

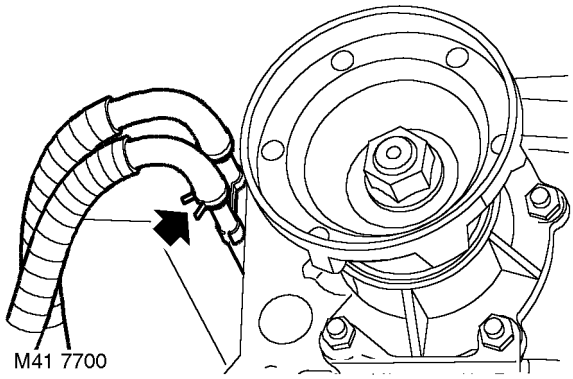
    CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.



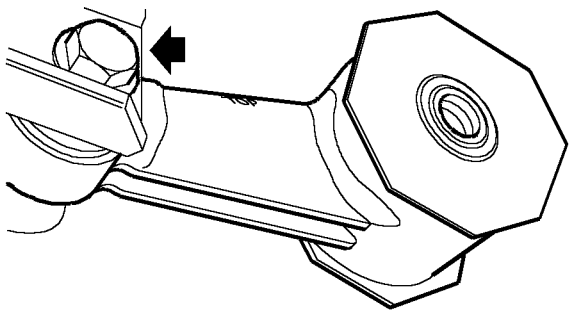
16. Remove nut securing manifold heat shield to IRD unit.
17. Remove nut securing heat shield to IRD pinion housing.
18. Remove 2 bolts securing heat shield and remove heat shield.



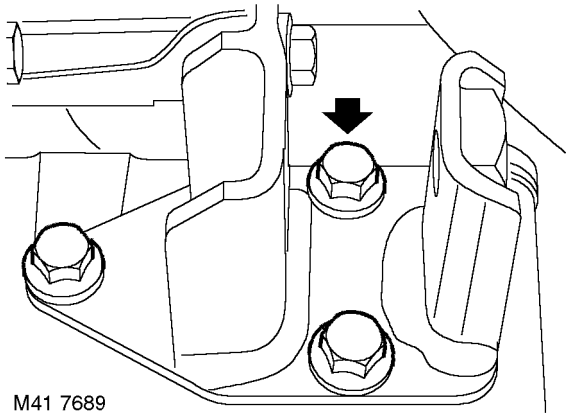
19. Disconnect breather hose from IRD housing.
20. Position container to collect coolant spillage.



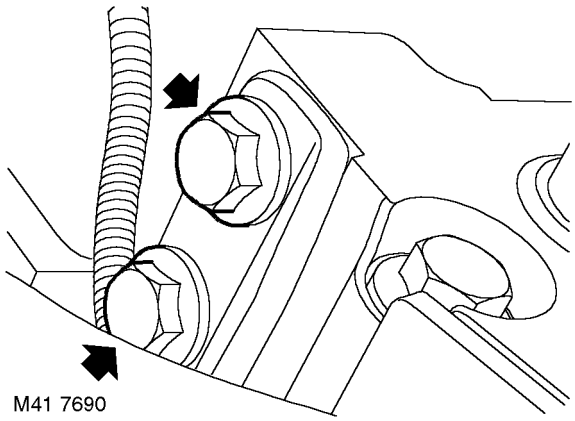
21. Release clips and disconnect coolant hoses from IRD.



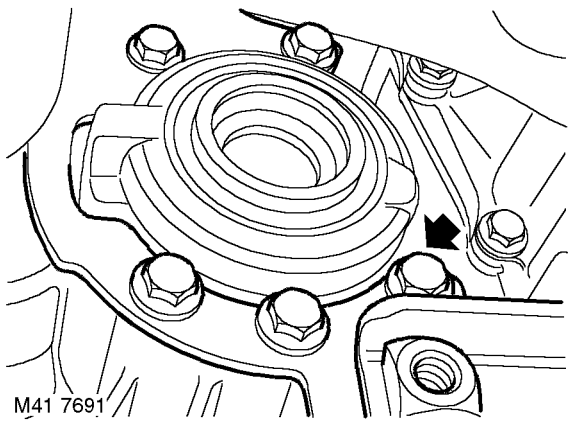
22. Remove bolt securing engine lower steady to IRD support bracket.
23. Remove lower engine steady noting that 'TOP' mark on engine steady faces uppermost.



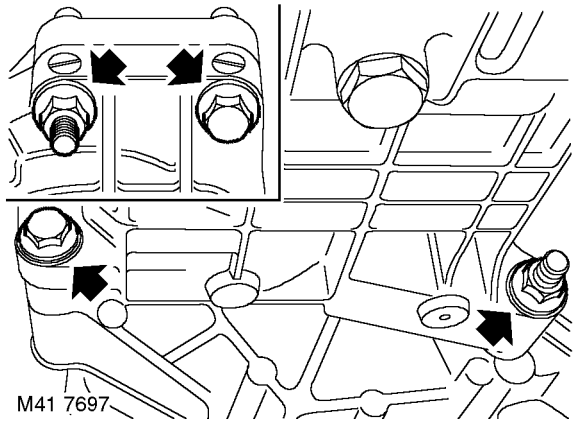
24. Remove 3 bolts securing IRD support bracket to sump.



25. Remove 2 bolts securing IRD support bracket to engine front mounting plate.



26. Remove 5 bolts securing support bracket to IRD.
27. Remove support bracket.



28. Remove 4 bolts securing IRD.
29. With assistance, release IRD from gearbox and remove.

30. Remove and discard 'O' ring from IRD.

Refit

1. Clean mating faces of IRD and gearbox.
2. Lubricate and fit new 'O' ring
3. With assistance, fit IRD.
4. Fit bolts securing IRD to gearbox and tighten sufficiently only to pull mating faces of IRD and gearbox together at this stage.
5. Fit IRD support bracket and tighten bolts sufficiently only to pull mating faces together.
6. Final tighten bolts securing IRD to gearbox to 90 Nm (66 lbf.ft).
7. Final tighten bolts securing IRD support bracket in following sequence:
   - 5 bolts securing support bracket to IRD 50 Nm (37 lbf.ft)
   - 2 bolts securing support bracket to engine front mounting bracket 50 Nm (37 lbf.ft)
   - 3 bolts securing support bracket to sump 45 Nm (33 lbf.ft).

8. Position lower engine steady, 'TOP' mark uppermost. Fit bolt but do not tighten at this stage.
9. Connect coolant hoses and secure with clips.
10. Connect breather hose to IRD housing.
11. Fit manifold heat shield and fit nut securing heat shield to pinion housing finger tight.
12. Fit bolts securing manifold heat shield to IRD support bracket and tighten to 9 Nm (7 lbf.ft).
13. Fit nut securing heat shield to IRD and tighten to 45 Nm (33 lbf.ft).
14. Final tighten nut securing manifold heat shield to IRD pinion housing to 25 Nm (18 lbf.ft).
15. Clean propeller shaft flange and mating face.
16. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
17. Inspect drive shaft oil seal, renew if worn or damaged.
18. Clean drive shaft and flange splines.
19. Fit new circlip to drive shaft.
20. With assistance, pull hub outwards, align drive shaft and fit to IRD taking care not to damage oil seal.

    CAUTION: Pull the drive shaft to ensure the circlip is fully engaged and retains the shaft.

21. Fit splash shield and secure with bolts.
22. Fit exhaust front pipe.

    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - Non NAS.**
23. Fit rear beam.

    ☞ **FRONT SUSPENSION, REPAIRS, Rear beam.**
24. Final tighten bolt securing lower engine steady to IRD support bracket to 100 Nm (74 lbf.ft).
25. Fill IRD to correct level with fluid.

    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**

    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.**
26. **NAS models:** Fit RH catalytic converter.

    ☞ **EMISSION CONTROL, REPAIRS, Catalytic converter - RH - KV6 - NAS.**
27. **NAS models:** Fit LH exhaust manifold gasket.

    ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Gasket(s) - exhaust manifold - LH - NAS.**
28. Fill gearbox with fluid.

    ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.**
29. Connect battery earth lead.
30. Refill cooling system.

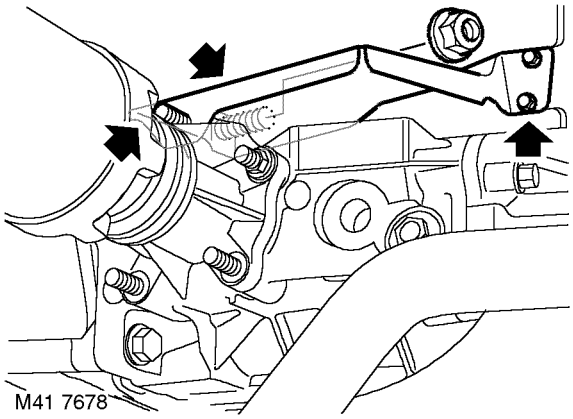
    ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**

Gasket - end cover - IRD housing - Td4

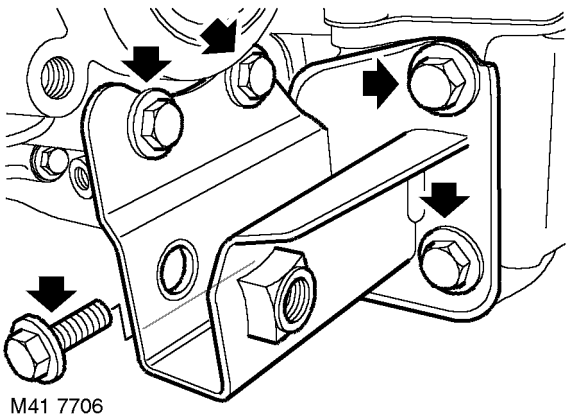
41.27.05

Remove

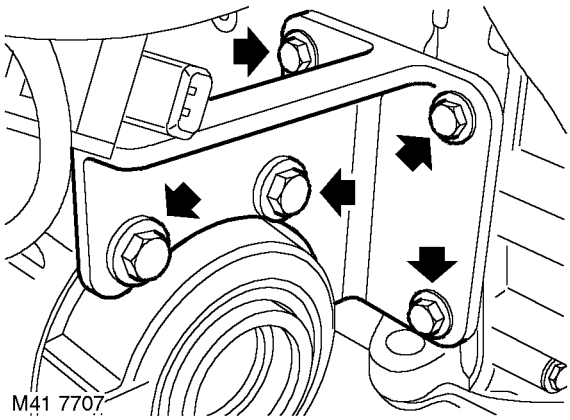
1. Drain fluid from IRD.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
2. Remove drive shaft RH seal.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - driveshaft - RH.


M41 7678

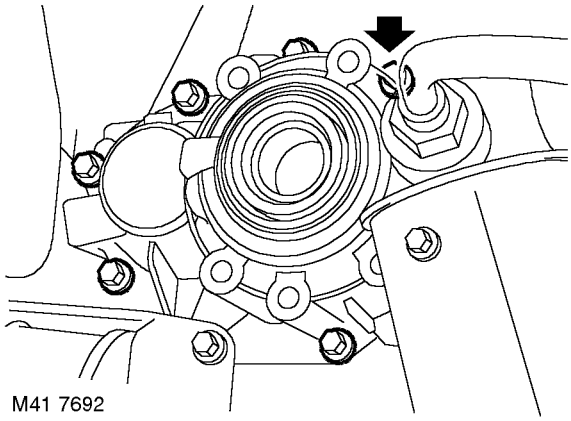
3. Remove nut securing manifold heat shield to IRD unit.
4. Remove nut securing heat shield to IRD pinion housing.
5. Remove 2 bolts securing heat shield and remove heat shield.
6. Remove lower engine steady.
   ENGINE - Td4, REPAIRS, Engine steady - lower.


M41 7706

7. Remove 3 bolts securing IRD support bracket to sump.
8. Remove 2 bolts securing support bracket to IRD and remove bracket.


M41 7707

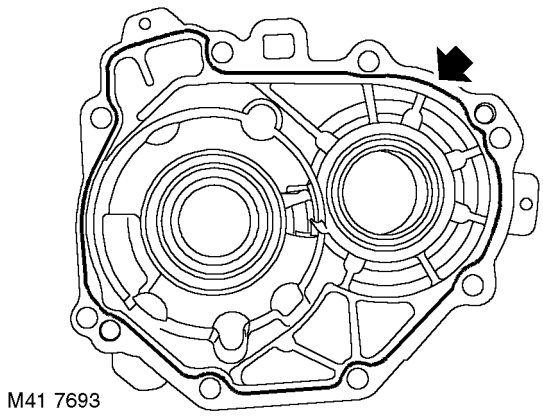
9. Remove 3 bolts, securing IRD upper support bracket to cylinder block.
10. Remove 2 bolts securing upper support bracket to IRD and remove bracket.


M41 7692

11. Remove 8 bolts securing end cover to main case of IRD.
12. Remove end cover.

Refit

1. Clean remains of old sealant from mating faces of end cover and IRD main case.


M41 7693

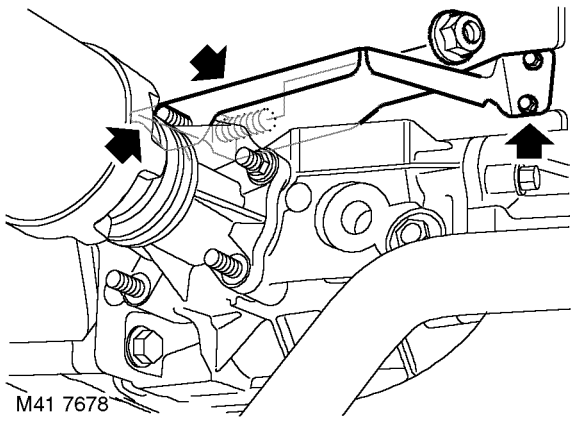
2. Apply a narrow bead of sealant, Part No. STC 3254 to mating face of end cover.
3. Fit end cover to IRD and tighten bolts progressively to 30 Nm (22 lbf.ft).
4. Fit IRD support bracket and tighten bolts sufficiently only to pull mating faces together.
5. Final tighten bolts securing IRD support brackets in the following sequence:
   - M10 bolts securing support brackets to IRD 50 Nm (37 lbf.ft)
   - 3 bolts securing support bracket to cylinder block 25 Nm (18 lbf.ft)
   - 3 bolts securing support bracket to sump at 45 Nm (33 lbf.ft).
6. Fit lower engine steady.
   ☞ ENGINE - Td4, REPAIRS, Engine steady - lower.
7. Fit heat shield.
8. Fit nut securing heat shield to IRD and tighten to 45 Nm (33 lbf.ft).
9. Fit bolts securing manifold heat shield to IRD support bracket and tighten to 9 Nm (7 lbf.ft).
10. Fit nut securing heat shield to IRD pinion housing and tighten to 30 Nm (22 lbf.ft).
11. Fit drive shaft RH seal.
    ☞ INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - driveshaft - RH.
12. Fill IRD to correct level with fluid.
    ☞ INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.

Gasket - end cover - IRD housing - KV6

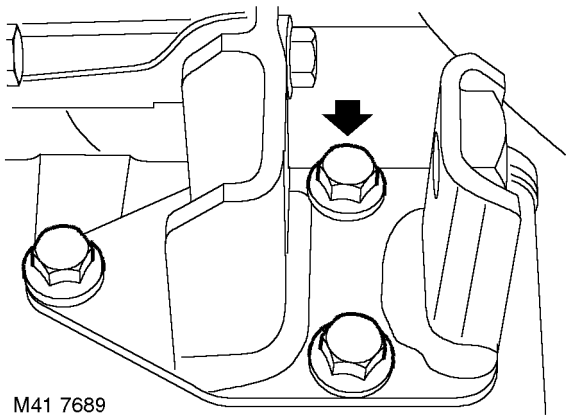
41.27.05

Remove

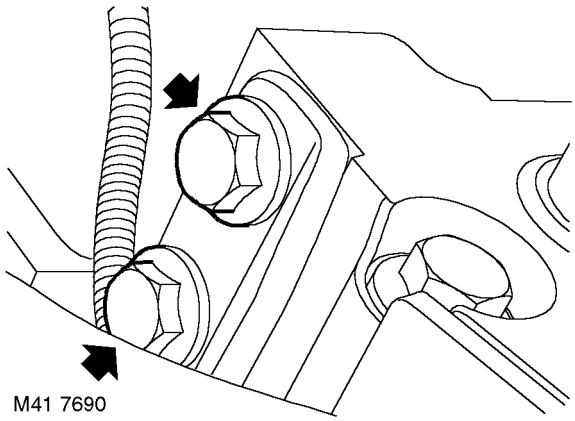
1. Drain fluid from IRD.
   ☞ INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
   ☞ INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.
2. **NAS models:** Remove RH catalytic converter.
   ☞ EMISSION CONTROL, REPAIRS, Catalytic converter - RH - KV6 - NAS.
3. Remove drive shaft RH seal.
   ☞ INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - driveshaft - RH.


M41 7678

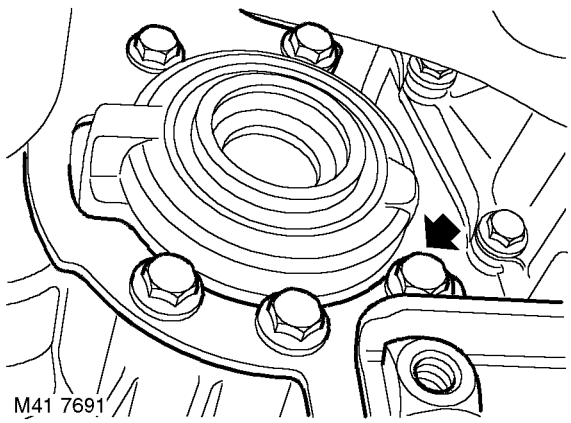
4. **Non NAS models:**Remove nut securing manifold heat shield to IRD unit.
5. **Non NAS models:**Remove nut securing heat shield to IRD pinion housing.
6. **Non NAS models:**Remove 2 bolts securing heat shield and remove heat shield.
7. Remove lower engine steady.
   ☞ ENGINE - K SERIES KV6, REPAIRS, Engine steady - lower.


M41 7689

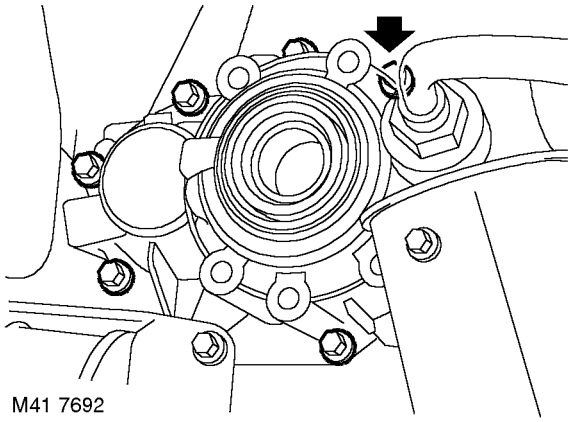
8. Remove 3 bolts securing IRD support bracket to sump.


M41 7690

9. Remove 2 bolts securing IRD support bracket to engine front mounting plate.


M41 7691

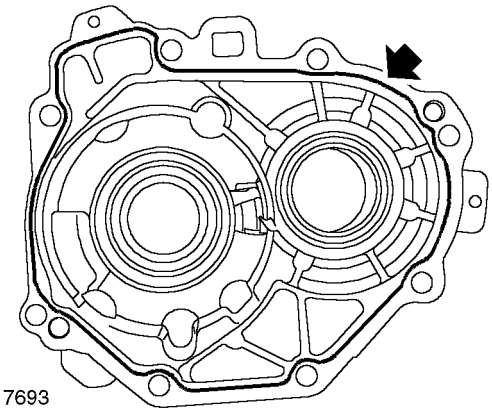
10. Remove 5 bolts securing support bracket to IRD and remove bracket.


M41 7692

11. Remove 8 bolts securing end cover to main case of IRD.
12. Remove end cover.

Refit

1. Clean remains of old sealant from mating faces of end cover and IRD main case.


M41 7693

2. Apply a narrow bead of sealant, Part No. STC 3254 to mating face of end cover.
3. Fit end cover to IRD and tighten bolts progressively to 30 Nm (22 lbf.ft).
4. Fit IRD support bracket and tighten bolts sufficiently only to pull mating faces together.
5. Final tighten all bolts in following sequence:
- 5 bolts securing support bracket to IRD 50 Nm (37 lbf.ft)
- 2 bolts securing support bracket to engine front mounting bracket 50 Nm (37 lbf.ft)
- 3 bolts securing support bracket to sump 45 Nm (33 lbf.ft).

6. Fit lower engine steady.
☞ **ENGINE - K SERIES KV6, REPAIRS, Engine steady - lower.**
7. Non NAS models: Fit heat shield.

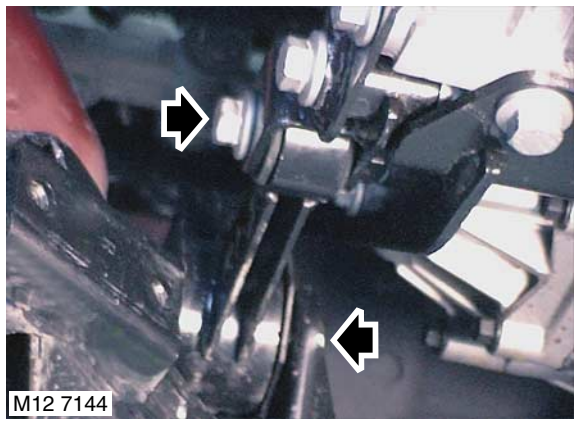
8. **Non NAS models:** Fit nut securing heat shield to IRD and tighten to 45 Nm (33 lbf.ft).
9. **Non NAS models:** Fit bolts securing manifold heat shield to IRD support bracket and tighten to 9 Nm (7 lbf.ft).
10. **Non NAS models:** Fit nut securing heat shield to IRD pinion housing and tighten to 25 Nm (18 lbf.ft).
11. Fit drive shaft RH seal.
    ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - driveshaft - RH.**
12. Fill IRD to correct level with fluid.
    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.**
13. **NAS models:** Fit RH catalytic converter.
    ☞ **EMISSION CONTROL, REPAIRS, Catalytic converter - RH - KV6 - NAS.**

Gasket - end cover - IRD housing - K1.8

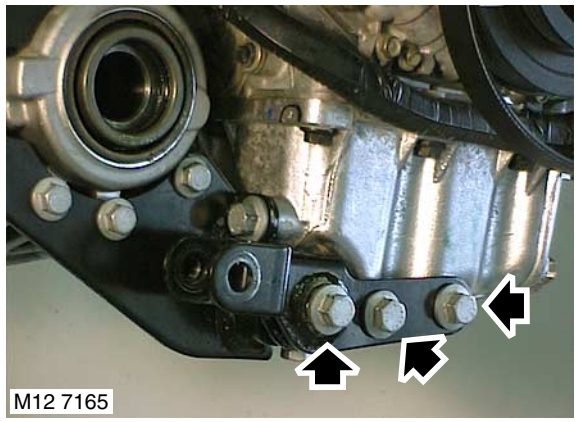
41.27.05

Remove

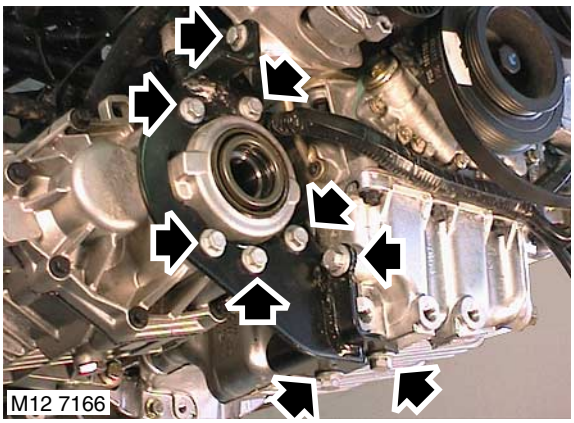
1. Drain fluid from IRD.
   ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
2. Remove drive shaft RH seal.
   ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - driveshaft - RH.**



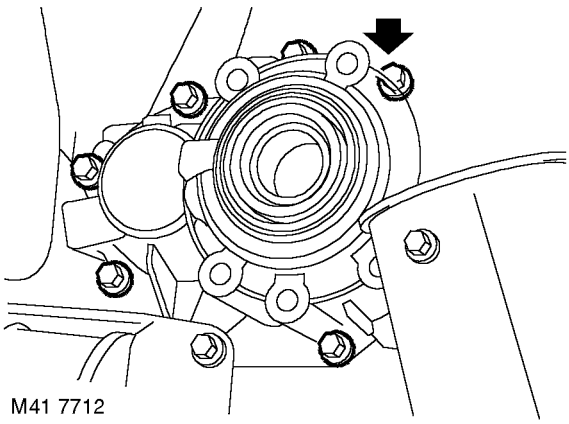
3. Remove bolt securing engine lower steady to beam.
4. Remove bolt securing engine lower steady to bracket on sump.
5. Remove engine lower steady.



6. Remove 3 bolts securing lower engine steady bracket to sump and remove bracket.



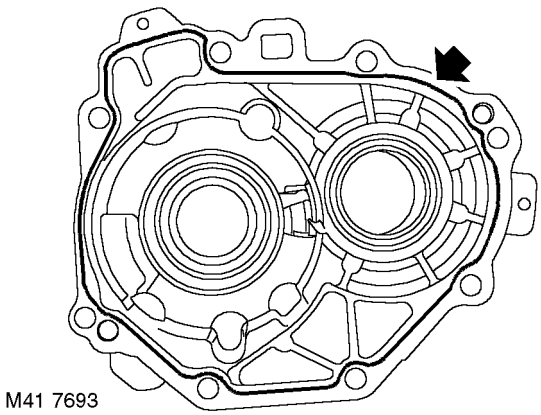
7. Remove upper bolt securing IRD support bracket to cylinder block.
8. Remove 5 bolts securing support bracket to IRD.
9. Remove 3 bolts securing IRD support bracket to sump and remove bracket.



10. Remove 8 bolts securing end cover to main case of IRD.
11. Remove end cover.
12. Remove bolt securing engine lower steady to bracket on sump.

Refit

1. Clean remains of old sealant from mating faces of end cover and IRD main case.



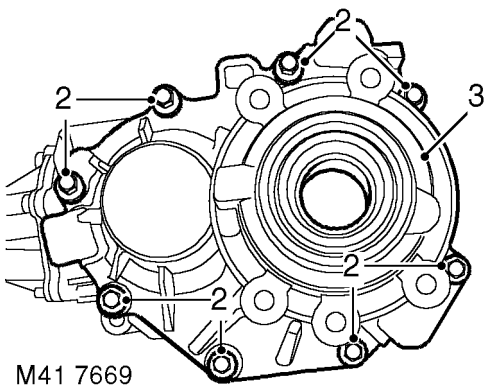
2. Apply a narrow bead of sealant, Part No. STC 3254 to mating face of end cover.
3. Fit end cover to IRD and tighten bolts progressively to 30 Nm (22 lbf.ft).
4. Fit IRD support bracket and tighten bolts sufficiently only to pull mating faces together.
5. Final tighten bolts securing IRD support bracket in following sequence: 5 bolts securing IRD support bracket to IRD 50 Nm (37 lbf.ft), bolt securing support bracket to cylinder block 45 Nm (33 lbf.ft), 3 bolts securing support bracket to sump 45 Nm (33 lbf.ft).
6. Position engine lower steady bracket to sump, fit and tighten bolts to 100 Nm (74 lbf.ft).
7. Fit engine lower steady, fit bolts and tighten to 80 Nm (59 lbf.ft).
8. Fit drive shaft RH seal.
   ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - driveshaft - RH.**
9. Fill IRD to correct level with fluid.
   ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**

Seals - primary gear shaft

41.29.02

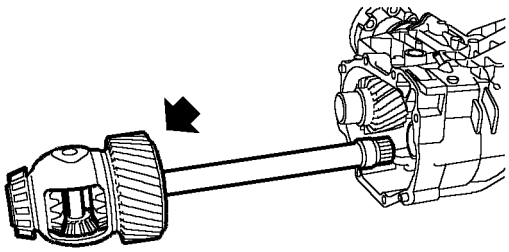
Remove

1. Remove IRD.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - K1.8.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - KV6.

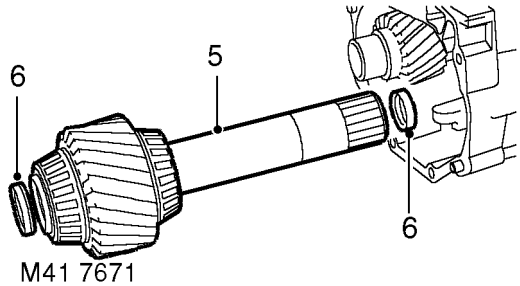


M41 7669

2. Remove 8 bolts securing end cover to main case of IRD.
3. Remove end cover.

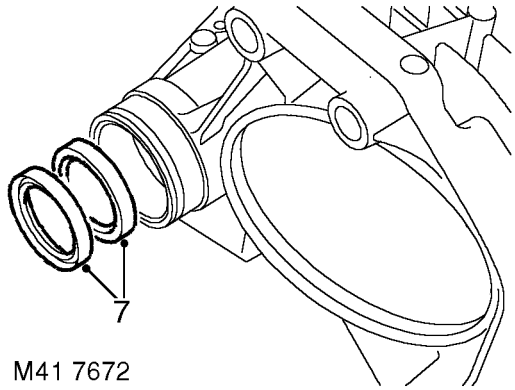

M41 7670

4. Remove intermediate shaft and differential from primary shaft.



M41 7671

5. Remove primary shaft from main case.
6. Remove 2 seals from primary shaft.

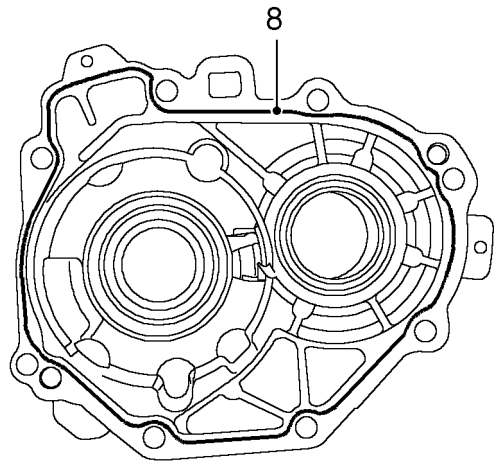


M41 7672

7. Remove 2 seals from main case.

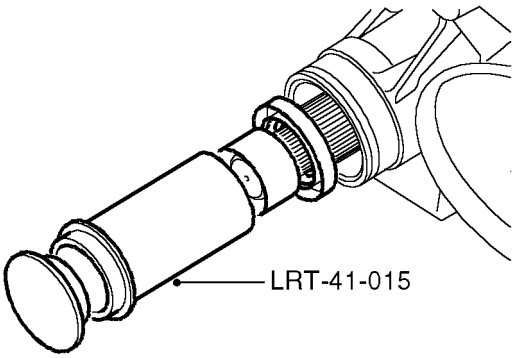
Refit

1. Clean primary gear shaft and intermediate shaft and differential.
2. Clean seal locations.
3. Fit seal to each end of primary gear shaft with seal lips facing outwards.
4. Fit primary gear shaft to main case.
5. Fit suitable protection over splines on intermediate shaft.
6. Carefully fit intermediate shaft to primary shaft.
7. Clean remains of old sealant from mating faces of end cover and IRD main case.



M41 7673

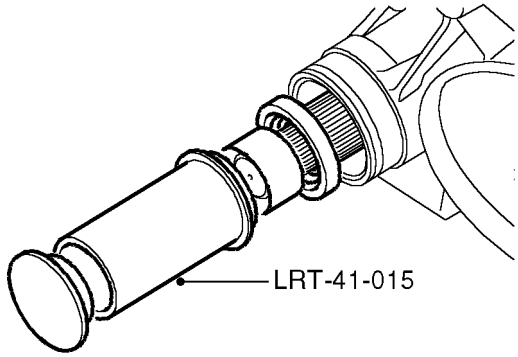
8. Apply a narrow bead of RTV sealant, to mating face of end cover.
9. Fit end cover to IRD and tighten bolts progressively to 30 Nm (22 lbf.ft).



M41 7674

10. Fit seal protector, part of **LRT-41-015** to IRD splines.
11. Using plain end of **LRT-41-015,** fit inner seal into main case until it contacts shoulder.

CAUTION: The seals are fitted with the main sealing lips facing away from each other.



M41 7675

12. Using flanged end of **LRT-41-015** fit outer seal to depth dictated by tool flange.

CAUTION: Use end protector of LRT-41-015 to avoid damage to the working surfaces of the tool.

13. Remove oil seal protector.
14. Fit IRD.

☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - K1.8.**

☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.**

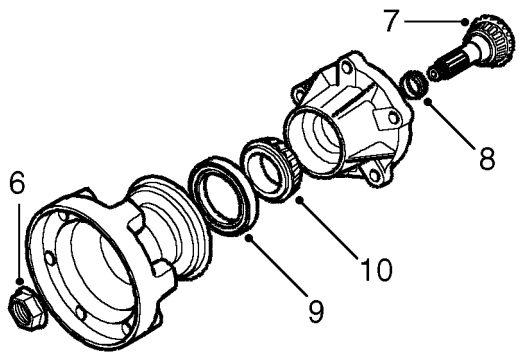
☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - KV6.**

Seal - pinion gear

41.29.04

Remove

1. Remove pinion housing.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - Td4.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - K1.8.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - KV6 - Non NAS.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - KV6 - NAS.
   CAUTION: Before dismantling the pinion housing, measure the turning torque on existing bearings.
2. Attach pinion housing to suitable mounting plate and secure mounting plate in vice.
3. Check pinion torque to turn figure.



M41 7676

4. Reference mark pinion flange and pinion shaft for assembly purposes.
5. Restrain pinion flange using **LRT-51-003.**
6. Remove and discard nut.
7. Position pinion housing onto press, fit suitable adaptor on end of pinion shaft, press pinion shaft from drive flange and housing.
8. Remove and discard collapsible spacer.
9. Using a suitable lever, remove pinion oil seal.
   CAUTION: Take care to avoid damage to oil seal recess.
10. Remove pinion bearing inner race.

Refit

1. Clean pinion shaft, drive flange and housing.
2. Clean oil seal recess.
3. Lubricate and fit bearing to pinion housing.
4. Lubricate new seal.
5. Using a suitable adapter, press seal into housing.
   CAUTION: Oil seal must be flush with end of pinion housing.
6. Assemble pinion to housing using new collapsible spacer.
7. Lightly lubricate drive flange splines with Molybdenum Disulphide grease.
8. Align pinion to drive flange reference marks and press flange onto pinion shaft until a 2 mm clearance exists in bearings.
9. Fit pinion assembly to mounting plate and secure in vice.
10. Fit new pinion nut, hold pinion drive flange using **LRT-51-003** and tighten pinion nut to 150 Nm (111 lbf.ft).
11. Check pinion torque to turn figure.
    NOTE: Figure for new bearings is 180 to 200 Ncm.
    If original bearing figure is above 20 to 30 Ncm and below new bearing figure, set to figure recorded.
    If original bearing is below 20 Ncm set to 20 to 30 Ncm.
12. If turning torque is too low, carefully tighten nut and recheck reading. If turning torque is too high, pinion assembly will have to be dismantled and a new collapsible spacer fitted. Reassemble using new nut and recheck turning torque.
13. Check drive flange run-out using a Dial Test Indicator (DTI).
    CAUTION: The drive flange run-out should not exceed 0.05 mm.
14. Remove pinion housing from vice and mounting plate.

15. Fit pinion housing.
☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - Td4.**
☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - K1.8.**
☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - KV6 - Non NAS.**
☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Seal - pinion gear housing - KV6 - NAS.**

Seal - driveshaft - LH - Td4 & KV6 models

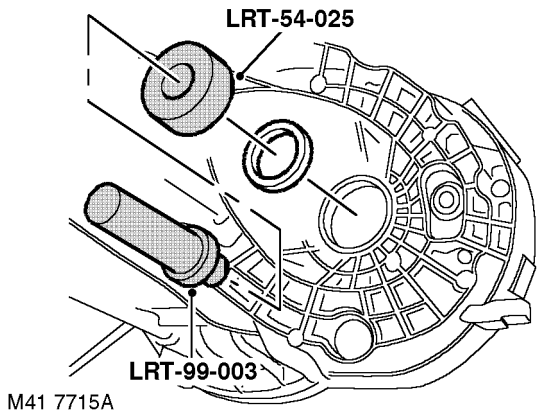
⊸ ***41.29.08***

Remove

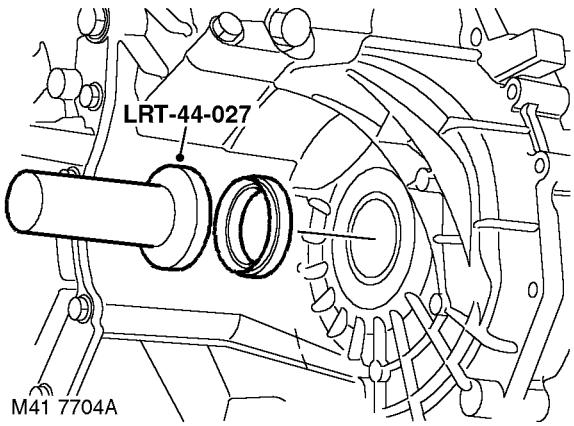
1. Remove LH drive shaft.
☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
2. Carefully remove and discard oil seal, take care not to damage oil seal recess.

Refit

1. Clean oil seal recess.
CAUTION: Oil seal is waxed on outer diameter and must not be lubricated before fitting.



2. Models with manual gearbox: Using **LRT-54-025** and **LRT-99-003**, fit new oil seal.



3. Models with automatic gearbox: Using **LRT-44-027**, fit new oil seal.

4. Fit LH drive shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
5. Top-up gearbox fluid level.
   ☞ **MAINTENANCE, MAINTENANCE, Automatic Gearbox – JATCO.**

Seal - drive shaft - LH - K1.8

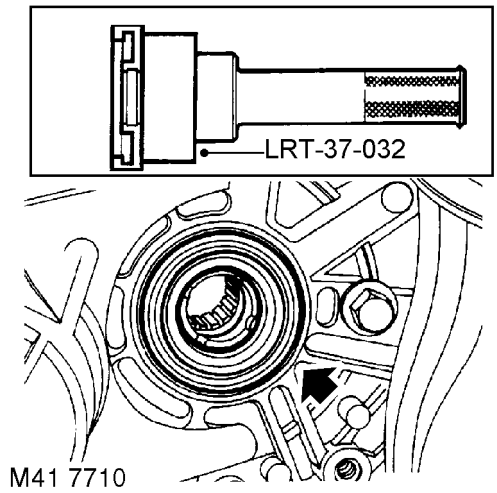
🔧 ***41.29.08***

Remove

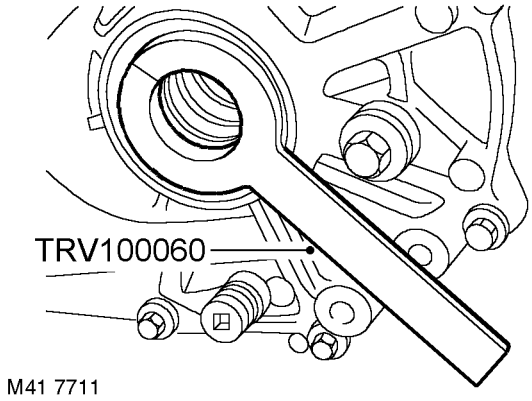
1. Remove LH drive shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
2. Carefully remove oil seal from differential housing, discard oil seal.

Refit

1. Thoroughly clean oil seal recess in differential housing, splines and oil seal running surface on drive shaft.



2. Fit handle **LRT-37-027** into seal replacer adaptor, **LRT-37-032**.
3. Position new oil seal onto **LRT-37-032** with sealing lip facing towards differential housing.
4. Carefully drift oil seal into housing until fully seated in recess.



5. Fully insert oil seal protector tool, **Unipart TRV 100060,** into differential oil seal so that oil seal lip is protected and that the split end of tool is butted correctly.
6. Fit LH drive shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**

Seal - driveshaft - RH

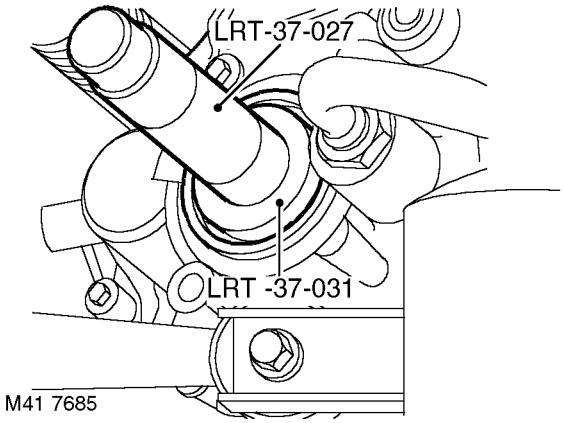
⊸ ***41.29.09***

Remove

1. Remove RH drive shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - RH.**
2. Carefully remove and discard oil seal, take care not to damage oil seal recess.

Refit

1. Clean oil seal recess.



2. Locate seal on tool **LRT-37-031** and replacer **LRT-37-027** with sealing lip facing towards housing.
3. Carefully drift oil seal into housing until fully seated in recess.
4. Fit RH drive shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - RH.**

Seal - pinion gear housing - Td4

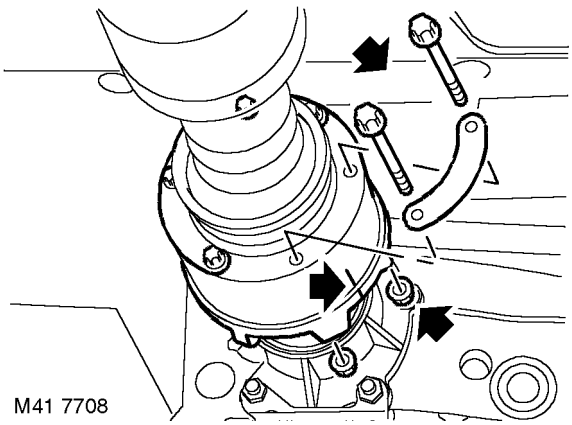
41.29.11

Remove

1. Raise front of vehicle.

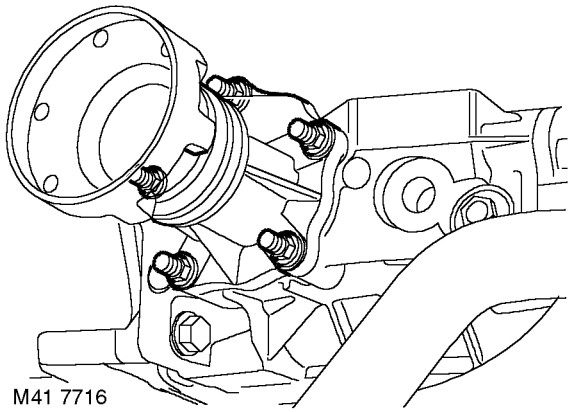
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Drain fluid from IRD.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
4. Raise one rear wheel for rotation of propeller shaft to access bolts.

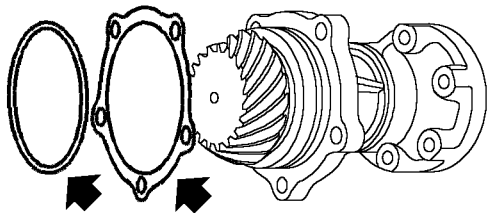

M41 7708

5. Reference mark front propeller shaft for reassembly.
6. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
7. Release propeller shaft from IRD drive flange and tie shaft aside.

   CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.


M41 7716

8. Remove 5 nuts securing pinion housing.
9. Remove pinion housing.


M41 7681

10. Remove and discard 'O' ring.
11. Remove and retain spacing washer.

Refit

1. Clean pinion housing and mating face on IRD casing.
2. Clean spacing washer.
3. Fit spacing washer to IRD.
4. Lubricate new 'O' ring with IRD fluid and fit to groove in pinion housing.
5. Fit pinion housing.
6. Fit nuts securing pinion housing and tighten to 25 Nm (18 lbf.ft).
7. Ensure mating face of propeller shaft and IRD drive flange are clean.
8. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
9. Fill IRD to correct level with fluid.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.

10. Lower axle and remove jack.
11. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
12. Remove stands and lower vehicle.

Seal - pinion gear housing - K1.8

41.29.11

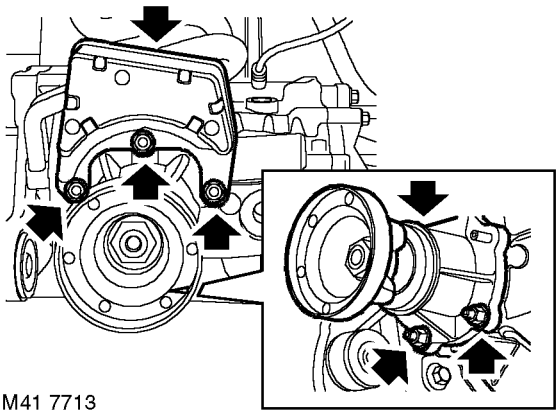
Remove

1. Remove underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Drain fluid from IRD.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
3. Raise one rear wheel for rotation of propeller shaft to access bolts.


M12 7142

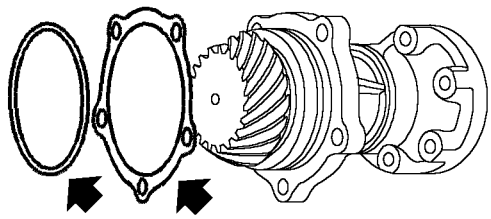
4. Reference mark front propeller shaft for reassembly.
5. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
6. Release propeller shaft from IRD drive flange and tie shaft aside.

CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.



M41 7713

7. Remove 3 nuts securing mass damper to pinion housing.
8. Remove mass damper.
9. Remove 2 remaining nuts securing pinion housing.
10. Remove pinion housing.



M41 7681

11. Remove and discard 'O' ring.
12. Remove and retain spacing washer.

Refit

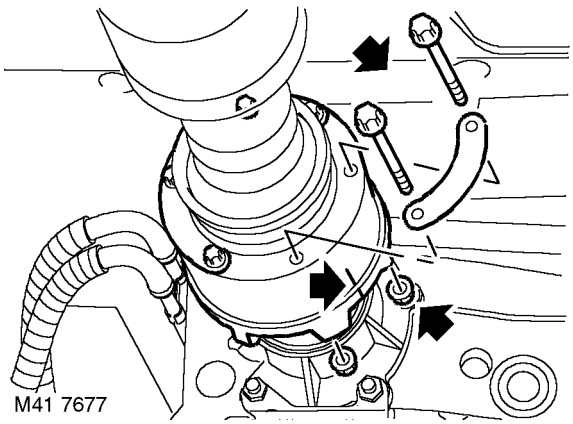
1. Clean pinion housing and mating face on IRD casing.
2. Clean spacing washer.
3. Fit spacing washer to IRD.
4. Lubricate new 'O' ring with IRD fluid and fit to groove in pinion housing.
5. Fit pinion housing.
6. Fit mass damper and fit nuts finger tight.
7. Fit remaining nuts securing pinion housing and tighten all nuts to 25 Nm (18 lbf.ft).
8. Ensure mating face of propeller shaft and IRD drive flange are clean.
9. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
10. Fill IRD to correct level with fluid.
    ☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
11. Lower axle and remove jack.
12. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Seal - pinion gear housing - KV6 - Non NAS

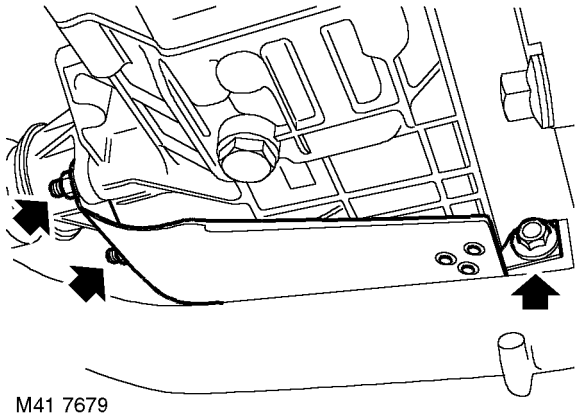
41.29.11

Remove

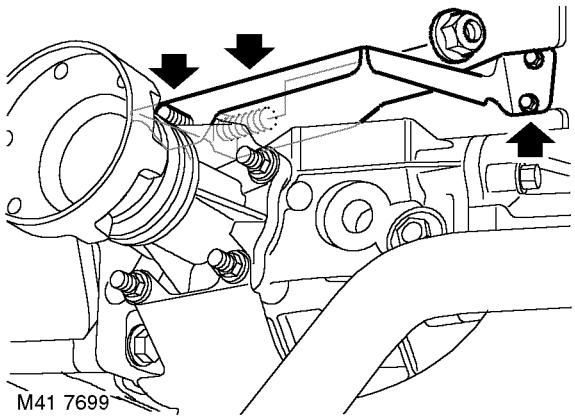
1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Drain fluid from IRD.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.
4. Raise one rear wheel for rotation of propeller shaft to access bolts.


M41 7677

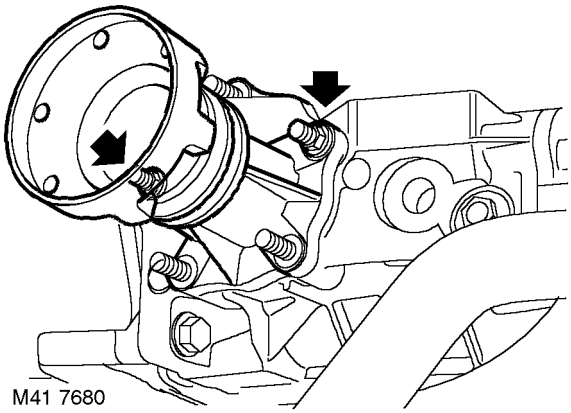
5. Reference mark front propeller shaft for reassembly.
6. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
7. Release propeller shaft from IRD drive flange and tie shaft aside.
   CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.


M41 7679

8. Remove nut securing exhaust heat shield to mounting bracket.
9. Remove 2 nuts securing heat shield to IRD pinion housing.
10. Remove heat shield.

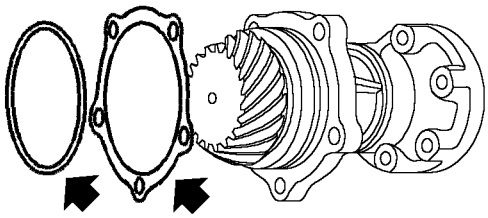

M41 7699

11. Remove nut securing manifold heat shield to IRD unit.
12. Remove nut securing heat shield to IRD pinion housing.
13. Remove 2 bolts securing heat shield and remove heat shield.



M41 7680

14. Remove 2 remaining nuts securing pinion housing.
15. Remove pinion housing.



M41 7681

16. Remove and discard 'O' ring.
17. Remove and retain spacing washer.

Refit

1. Clean pinion housing and mating face on IRD casing.
2. Clean spacing washer.
3. Fit spacing washer to IRD.
4. Lubricate new 'O' ring with IRD fluid and fit to groove in pinion housing.
5. Fit pinion housing.
6. Fit exhaust heat shield and fit nuts finger tight.
7. Fit manifold heat shield and fit nut securing heat shield to pinion housing finger tight.
8. Fit nut securing heat shield to IRD and tighten to 45 Nm (33 lbf.ft).
9. Fit bolts securing manifold heat shield to IRD support bracket and tighten to 9 Nm (7 lbf.ft).
10. Fit remaining nuts securing pinion housing and tighten all nuts to 25 Nm (18 lbf.ft).
11. Tighten nut securing exhaust heat shield to exhaust mounting bracket to 45 Nm (33 lbf.ft).
12. Ensure mating face of propeller shaft and IRD drive flange are clean.
13. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 40 Nm (30 lbf.ft).
14. Fill IRD to correct level with fluid.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) fluid - drain & refill - Non NAS.**
15. Lower axle and remove jack.
16. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
17. Remove stands and lower vehicle.

Seal - pinion gear housing - KV6 - NAS

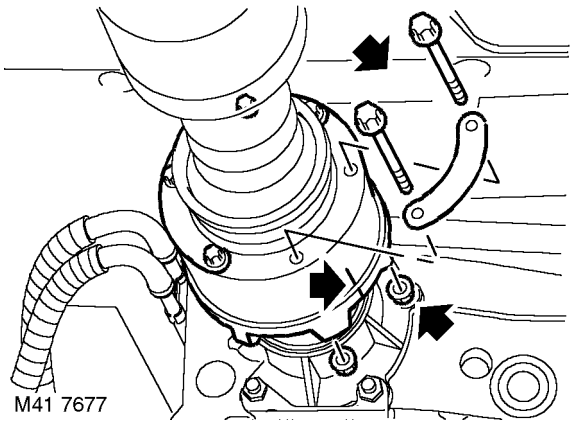
41.29.11

Remove

1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

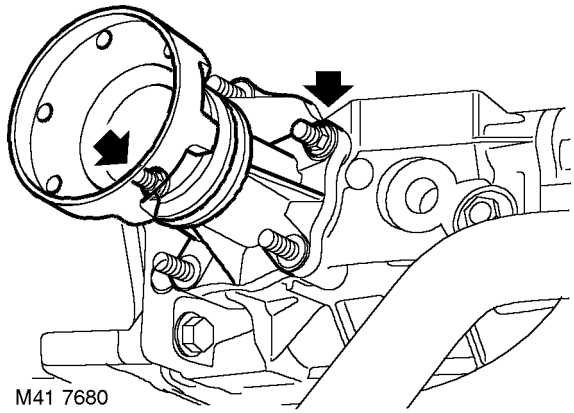
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Remove front exhaust pipe.
   MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - NAS.
4. Drain fluid from IRD.
   INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.
5. Raise one rear wheel for rotation of propeller shaft to access bolts.


M41 7677

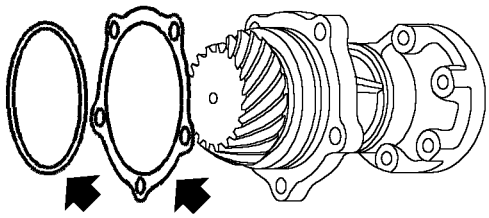
6. Reference mark front propeller shaft for reassembly.
7. Remove 6 nuts and bolts securing propeller shaft to IRD drive flange.
8. Release propeller shaft from IRD drive flange and tie shaft aside.

   CAUTION: Care must be taken to support the Tripode joint when removed from the IRD unit. To avoid damage to gaiter or steel can, the joint should not be allowed to fully extend or be dropped.

9. Remove 2 nuts from pinion housing securing front exhaust pipe bracket, remove bracket.
10. Remove nut securing heat shield to IRD unit, remove shield.


M41 7680

11. Remove 2 remaining nuts securing pinion housing.
12. Remove pinion housing.


M41 7681

13. Remove and discard 'O' ring.
14. Remove and retain spacing washer.

Refit

1. Clean pinion housing and mating face on IRD casing.
2. Clean spacing washer.
3. Fit spacing washer to IRD.
4. Lubricate new 'O' ring with IRD fluid and fit to groove in pinion housing.
5. Fit pinion housing.
6. Fit exhaust bracket and heat shield, secure with nuts and tighten to 10 Nm (7 lbf.ft).
7. Fit nut securing heat shield to IRD and tighten to 45 Nm (33 lbf.ft).
8. Fit remaining nuts securing pinion housing and tighten all nuts to 25 Nm.
9. Ensure mating face of propeller shaft and IRD drive flange are clean.
10. Fit propeller shaft to IRD flange and align marks. Tighten nuts and bolts to 42 Nm (31 lbf.ft).

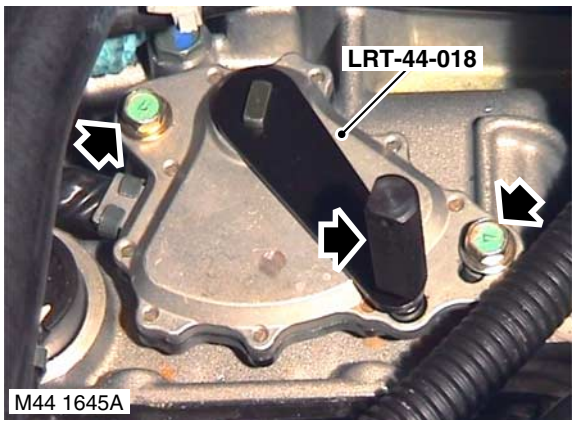
11. Fit front exhaust pipe.
☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Front pipe - NAS.**
12. Lower axle and remove jack.
13. Fill IRD to correct level with fluid.
☞ **INTERMEDIATE REDUCTION DRIVE, ADJUSTMENTS, Intermediate reduction drive (IRD) lubrication system - drain & refill - NAS.**
14. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
15. Remove stands and lower vehicle.

Inhibitor switch - adjust

44.15.18

Adjust

1. Set gear selector lever to 'N' position.



2. Loosen 2 bolts securing inhibitor switch to gearbox casing.
3. Fit tool **LRT-44-018** to selector lever on gearbox, rotate inhibitor switch sufficient to insert tool alignment pin through tool lever into inhibitor switch.
4. Tighten inhibitor switch bolts to 3 Nm (2.2 lbf.ft)and remove **LRT-44-018.**
5. Check that the engine will start in 'P' and 'N' positions and is inhibited when drive positions are selected.

Gearbox fluid - drain & refill

44.24.02

Drain

1. Position vehicle on ramp.

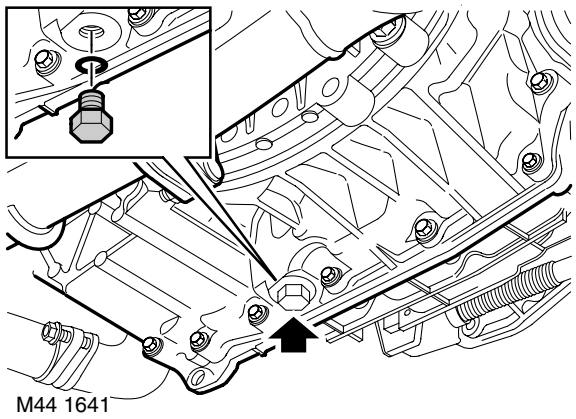
   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.

2. Apply handbrake and position chocks under front and rear wheels.
3. Remove underbelly panel.

   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
4. Position container under gearbox.

   NOTE: The fluid should be drained with the transmission at normal operating temperature.

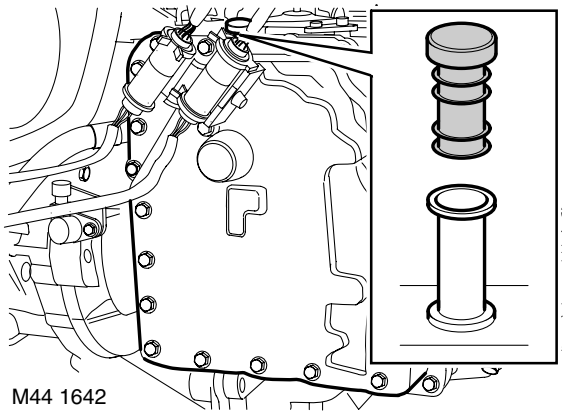
5. Clean area around drain plug.



6. Remove drain plug and discard sealing washer.
7. Allow fluid to drain.
8. Clean drain plug and fit new sealing washer.
9. Fit drain plug and tighten to 45 Nm (33 lbf.ft).

Refill

1. Clean area around filler plug.


M44 1642

2. Remove filler plug.
3. Add 3.5 to 4 litres of the correct fluid through gearbox filler.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
4. Clean and fit filler plug.
5. Check and top-up fluid level.
   ☞ **MAINTENANCE, MAINTENANCE, Automatic Gearbox – JATCO.**
6. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Selector cable - adjust

44.30.04

Adjust

1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**


M44 1640

2. Loosen trunnion nut securing inner cable to selector lever.
3. Move gear change lever into 'P' position.
4. Move selector lever on gearbox fully clockwise to engage 'P' position.
5. Pull inner cable as far forward as possible, then release. This will remove any backlash from the cable.
6. Tighten trunnion nut to 6 Nm (4 lbf.ft).
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
8. Move selector lever through its working arc; from 'P' to '2' and back to 'P', checking that all gear positions are correctly selected.
9. Check that the engine will start in 'P' and 'N' positions and is inhibited when drive positions are selected.

Selector housing

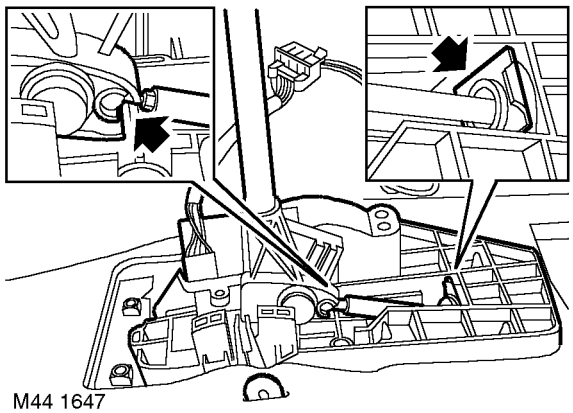
44.15.04

Remove

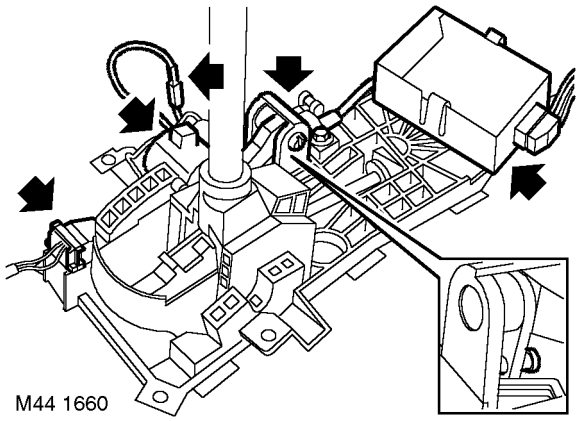
1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

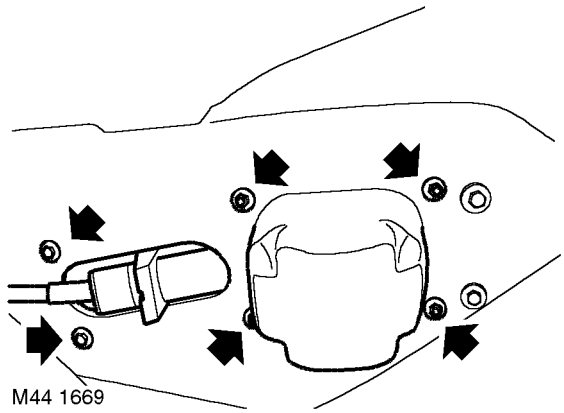
2. Remove front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.


M44 1647

3. Release inner cable from selector lever.
4. Remove 'C' clip securing outer cable to selector housing.
5. If fitted, release mirror fold ECU and place aside.


M44 1660

6. Disconnect shift interlock solenoid connector.
7. Disconnect multiplug from sport/manual switch.
8. If fitted, remove bolt and disconnect cable from key interlock mechanism.


M44 1669

9. Remove 6 nuts securing selector housing.
10. Remove selector housing.
11. Remove screw and remove mirror fold ECU housing.

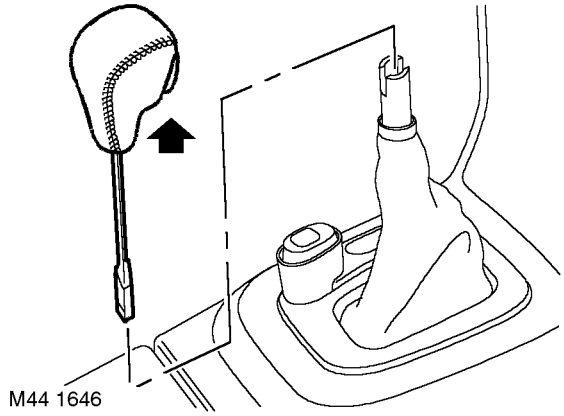
Refit

1. Position mirror fold ECU housing and secure with screw.
2. Fit selector housing, fit nuts and tighten to 10 Nm (7.5 lbf.ft).
3. Connect key interlock mechanism inner cable. Locate outer cable, fit clamp and clamp bolt but do not tighten clamp bolt at this stage.
4. Connect multiplug to sport/manual switch.
5. Connect shift interlock solenoid connector.
6. Secure inner cable to selector lever.
7. Secure outer cable to selector housing with 'C' clip.
8. Check key interlock cable adjustment.
   STEERING, ADJUSTMENTS, Cable - key interlock - adjust.
9. Fit front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.
10. Remove stand(s) and lower vehicle.

Gear knob

44.15.07

Remove



1. Pull gear knob upwards to disengage locating tang from gear selector lever.
   WARNING: Gear knob will be released suddenly, keep face clear of gear knob during removal.

Refit

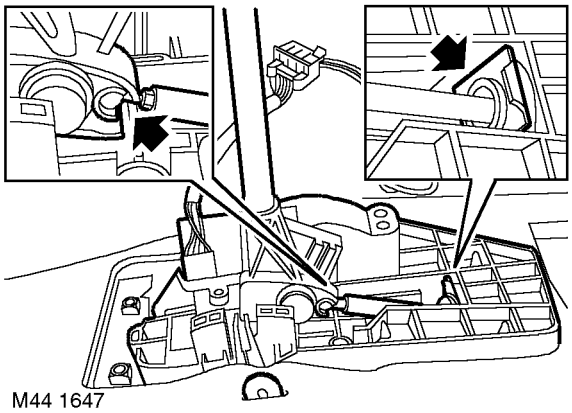
1. Position gear knob to gear selector lever engaging locating tang on knob with slot in selector lever.
2. Push gear knob fully on to gear selector lever.

Selector cable

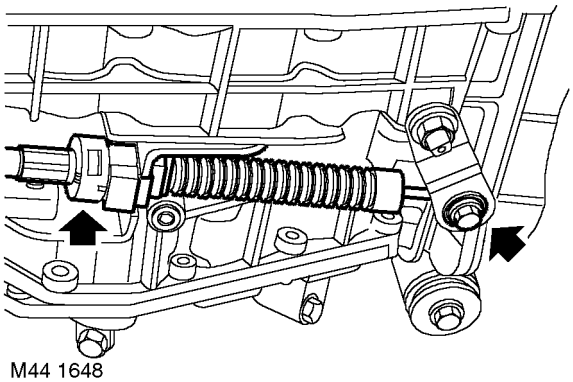
44.15.08

Remove

1. Remove front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.



2. Release inner cable from selector lever.
3. Remove 'C' clip securing outer cable to selector housing.
4. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
5. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
6. Remove cable tie and release gear selector cable from clip on body.


M44 1648

7. Loosen selector cable trunnion nut.
8. Release clip securing selector cable to gearbox bracket, remove selector cable and collect trunnion from selector lever.

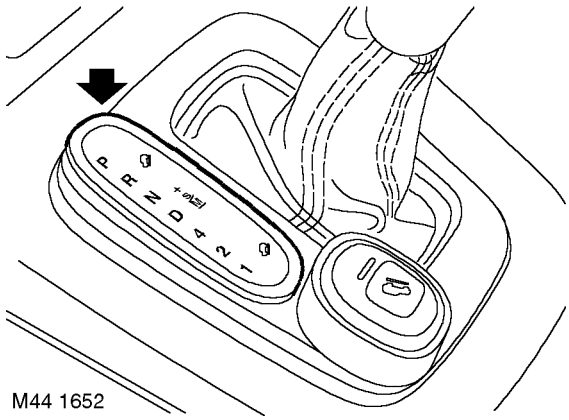
Refit

1. Position trunnion to selector lever, locate inner cable through trunnion, do not tighten nut at this stage.
2. Position selector cable to gearbox bracket and secure with clip.
3. Locate cable in selector housing and secure outer cable in clip.
4. Secure outer cable to selector housing with 'C' clip.
5. Secure inner cable to selector lever.
6. Fit front console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**
7. Check and adjust selector cable.
   ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Selector cable - adjust.**
8. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
9. Remove stands and lower vehicle.

Selector indicator

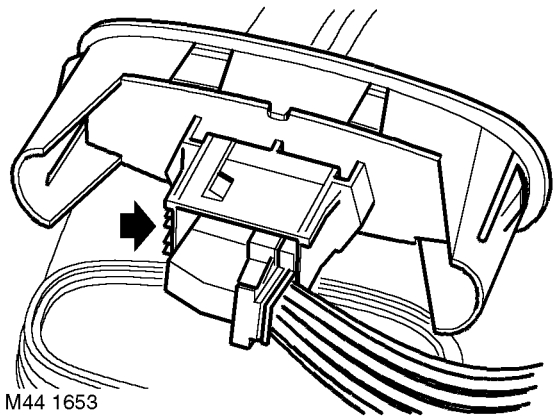
44.15.10

Remove



M44 1652

1. Release selector indicator from selector lever trim panel.


M44 1653

2. Disconnect multiplug from selector indicator and remove indicator.

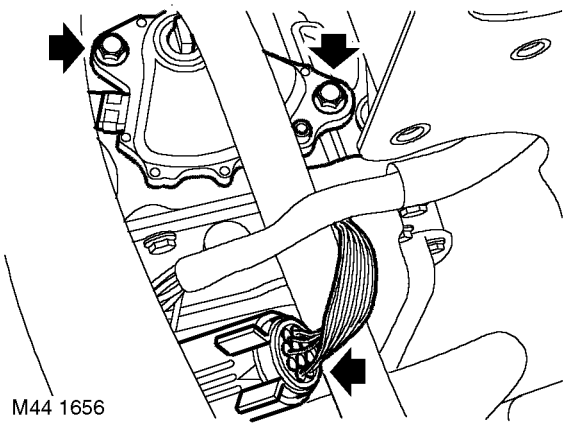
Refit

1. Connect multiplug to selector indicator.
2. Position selector indicator to selector lever trim panel.

Inhibitor switch

44.15.19

Remove



1. Release inhibitor switch harness multiplug from clip on fluid pan and disconnect multiplug.
2. Set selector lever to 'N' position.
3. Remove 2 bolts securing inhibitor switch to gearbox and remove inhibitor switch.

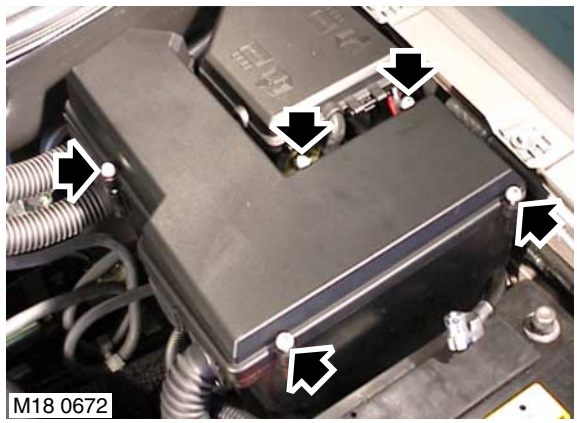
Refit

1. Clean inhibitor switch and mating face on gearbox.
2. Align the internal lugs with the mark on the inhibitor switch.
3. Position inhibitor switch, aligning the 2 lugs with the machined grooves in the selector lever shaft.
4. Fit bolts securing inhibitor switch but do not tighten at this stage.
5. Connect inhibitor switch multiplug and secure to mounting bracket with clip.
6. Adjust inhibitor switch.
   ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Inhibitor switch - adjust.**

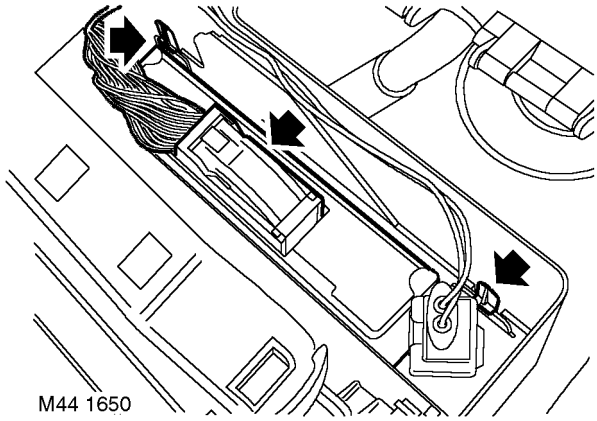
ECU

44.15.46

Remove



1. Loosen 5 screws and remove 'E' - box lid.



2. Release 2 retainers and withdraw ECU.
3. Disconnect multiplug from ECU and remove ECU.

Refit

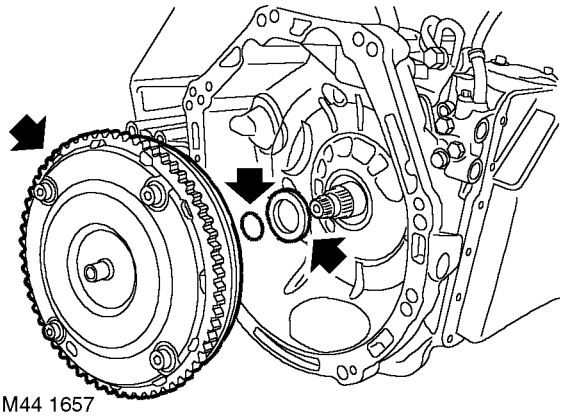
1. Connect multiplug to ECU.
2. Locate and secure ECU.
3. Fit 'E' - box lid and tighten screws.

Oil seal - torque converter

44.17.11

Remove

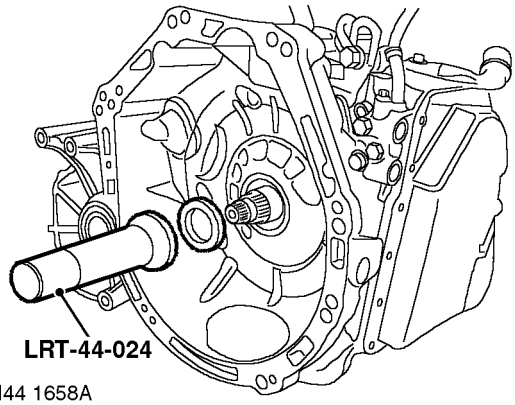
1. Remove gearbox assembly.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - KV6.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - Td4.


M44 1657

2. Remove torque converter from gearbox. Discard 'O' ring from gearbox input shaft.
3. Remove torque converter oil seal from gearbox. Discard torque converter oil seal.
   CAUTION: When removing torque converter oil seal take care not to damage oil pump housing.

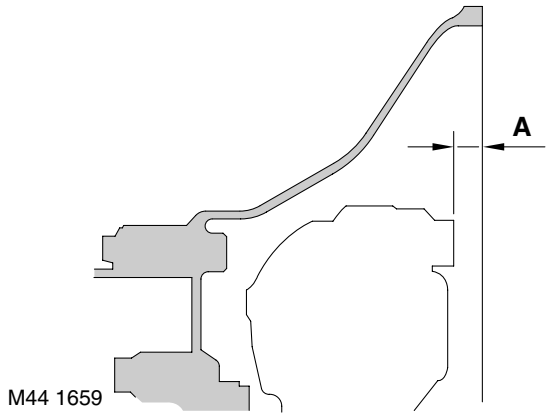
Refit

1. Clean torque converter spigot.
2. Clean torque converter oil seal recess in gearbox. Lubricate torque converter oil seal with clean transmission fluid.
   CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.



M44 1658A

3. Fit new torque converter oil seal using **LRT-44-024.**
4. Lubricate and fit new 'O' ring to input shaft.
5. Fit torque converter.



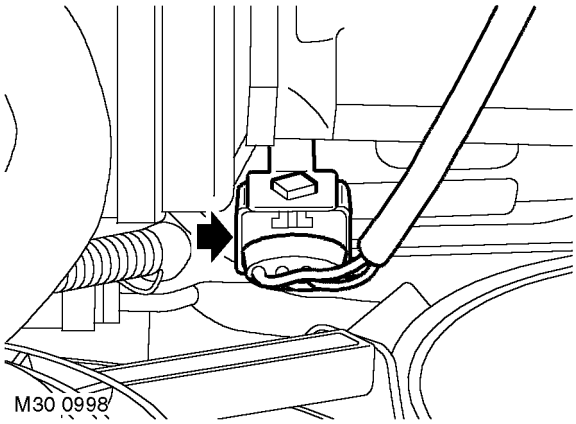
M44 1659

6. Ensure converter is fully located in oil pump drive by checking depth 'A' as illustrated.
   - **KV6 models:** Depth A = 4 mm.
   - **Td4 models:** Depth A = 27 mm.
7. Fit gearbox assembly.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - KV6.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Gearbox - Td4.

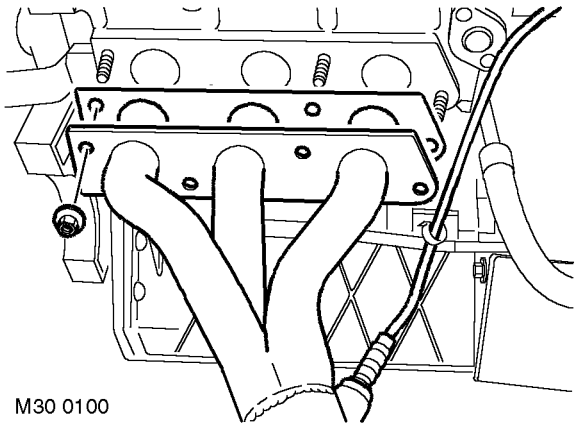
Gearbox - KV6 - with engine and gearbox removed

44.20.01.99

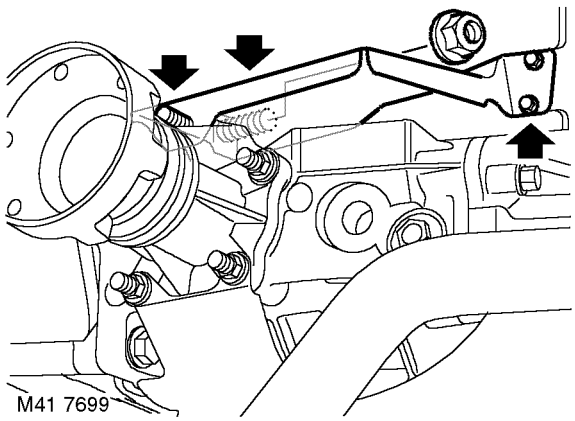
Remove



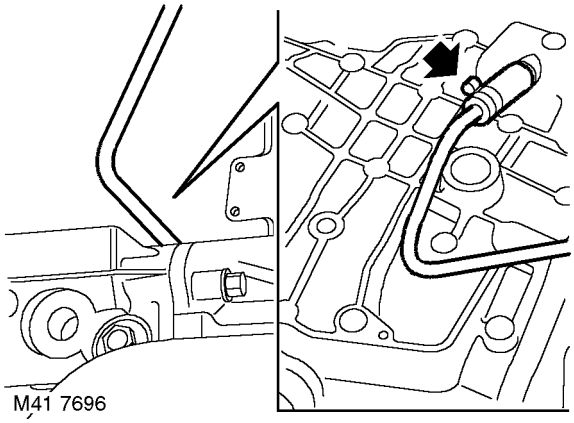
1. Release HO2S multiplug from support bracket on LH camshaft cover, disconnect multiplug.



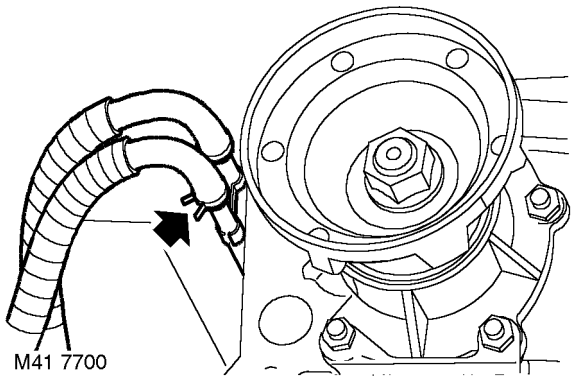
2. Remove 4 nuts securing LH exhaust manifold to cylinder head.
3. Remove exhaust manifold, remove and discard gasket.



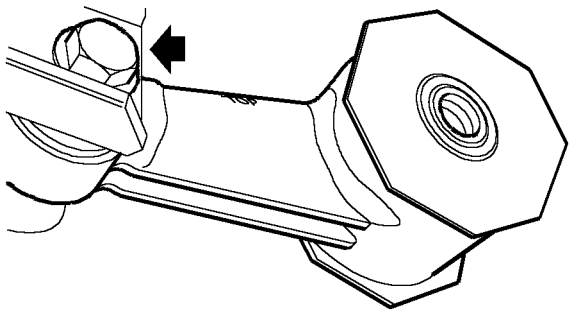
4. Remove nut securing manifold heat shield to IRD unit.
5. Remove nut securing heat shield to IRD pinion housing.
6. Remove 2 bolts securing heat shield and remove heat shield.



7. Disconnect breather hose from IRD housing.

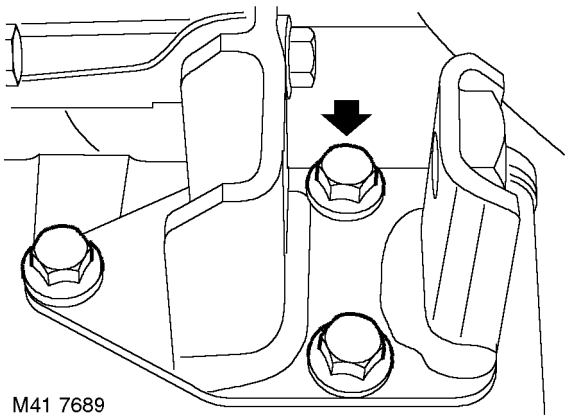


8. Release clips and disconnect coolant hoses from IRD.



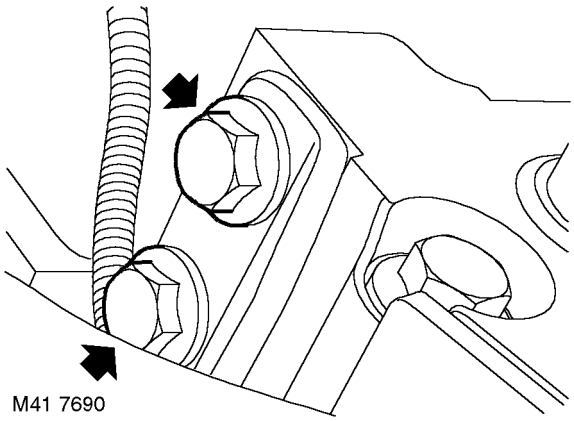
M41 7688

9. Remove bolt securing engine lower steady to IRD support bracket.
10. Remove lower engine steady noting that 'TOP' mark on engine steady faces uppermost.



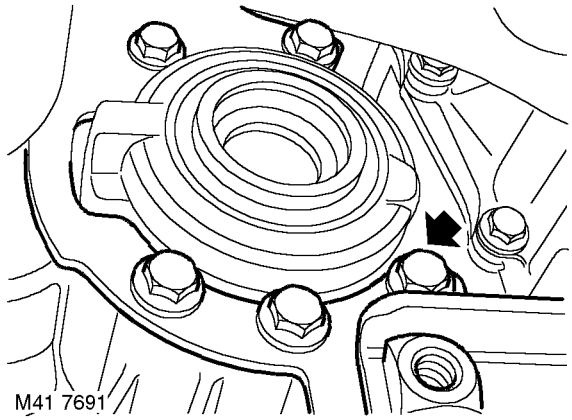
M41 7689

11. Remove 3 bolts securing IRD support bracket to sump.



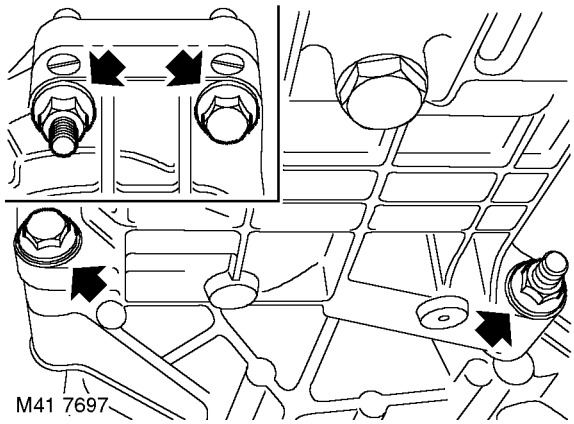
M41 7690

12. Remove 2 bolts securing IRD support bracket to engine front mounting plate.



M41 7691

13. Remove 5 bolts securing support bracket to IRD.
14. Remove support bracket.

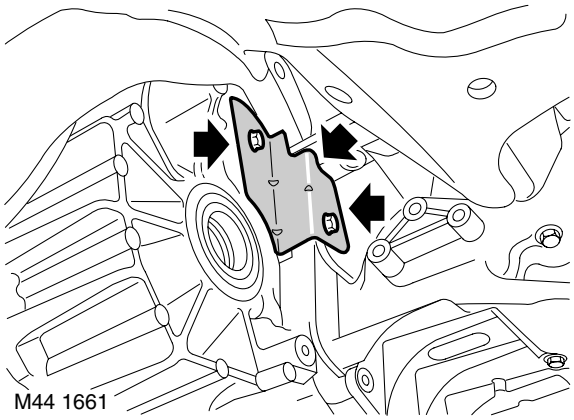


M41 7697

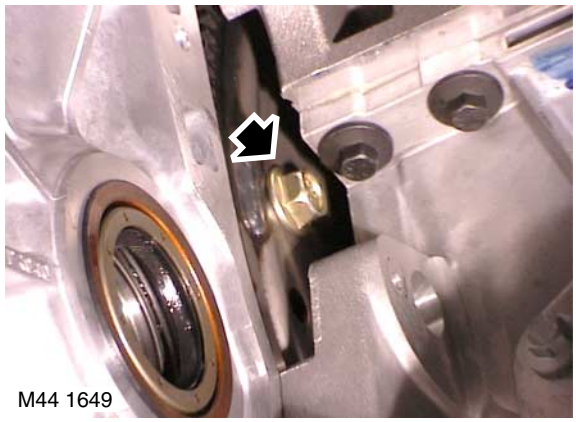
15. Remove 4 bolts securing IRD.
16. With assistance, release IRD from gearbox and remove.

M41 7698

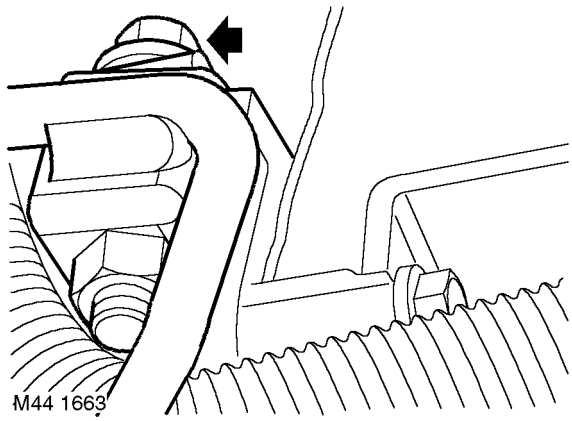
17. Remove and discard 'O' ring from IRD.


M44 1661

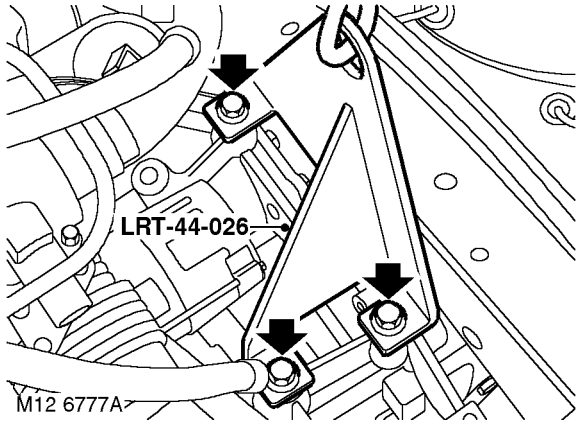
18. Remove 2 bolts securing torque converter access plate.
19. Remove access plate.
20. Mark drive plate to torque converter, for refit purposes.


M44 1649

21. Remove 4 bolts securing drive plate to converter.

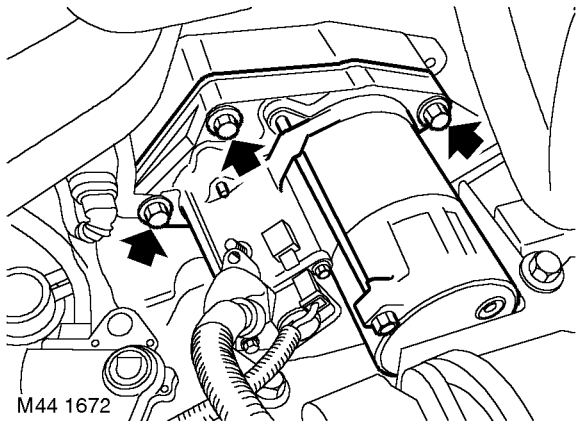

M44 1663

22. Remove bolt securing IRD cooling hose retainer. Remove retainer.

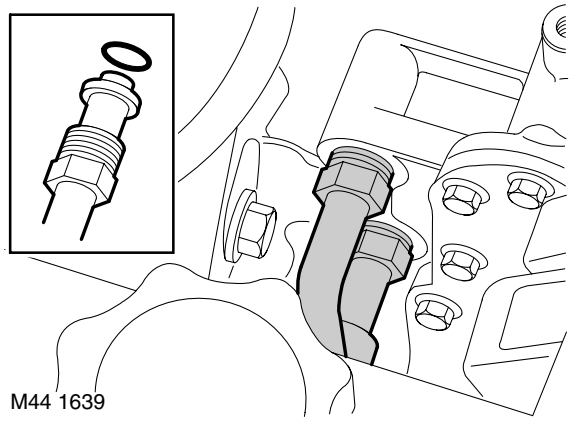


M12 6777A

23. Remove bolts securing **LRT-44-026** lifting bracket to gearbox and remove bracket.

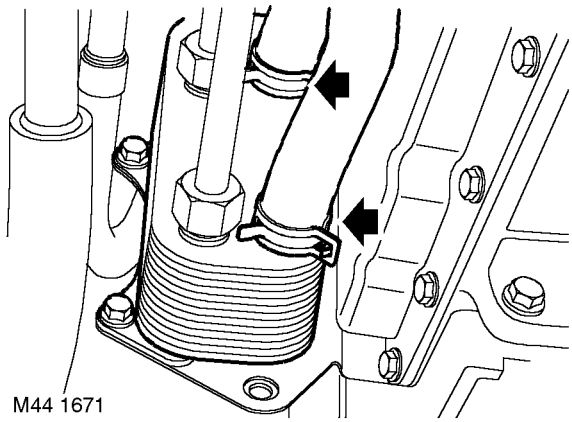

M44 1672

24. Remove 3 bolts securing starter motor to gearbox noting that the LH bolt also secures the mounting bracket for the CKP sensor multiplug.
25. Remove starter motor.

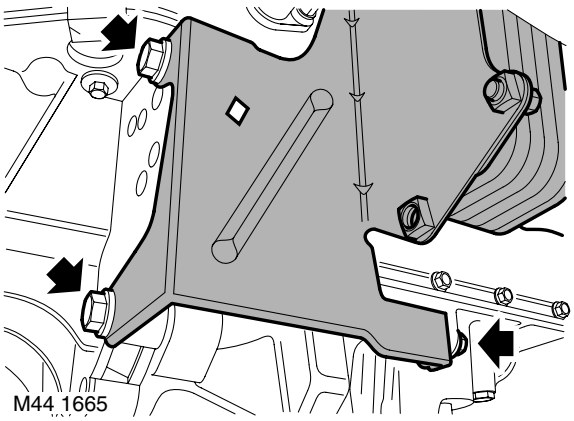


26. Disconnect 2 fluid cooler hose unions and discard 'O' rings.

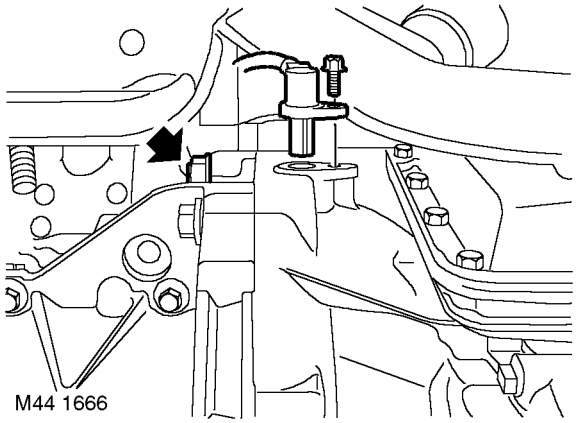
CAUTION: Always fit plugs to open connections to prevent contamination.



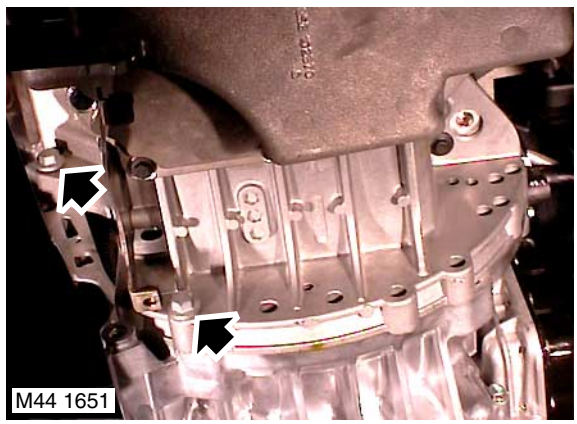
27. Release 2 clips and disconnect coolant hoses from fluid cooler.



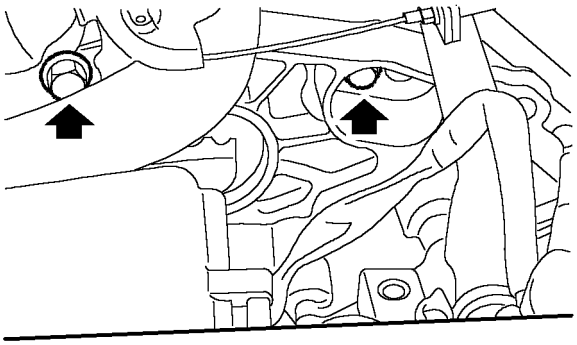
28. Remove bolts securing fluid cooler.
29. Remove fluid cooler.



30. Remove bolt securing CKP sensor to gearbox, release sensor and position aside.
31. Remove nut and bolt, adjacent to CKP sensor, securing gearbox to engine.
32. Fit suitable lifting brackets to gearbox and secure with nuts and bolts.
33. Connect lifting equipment to brackets.

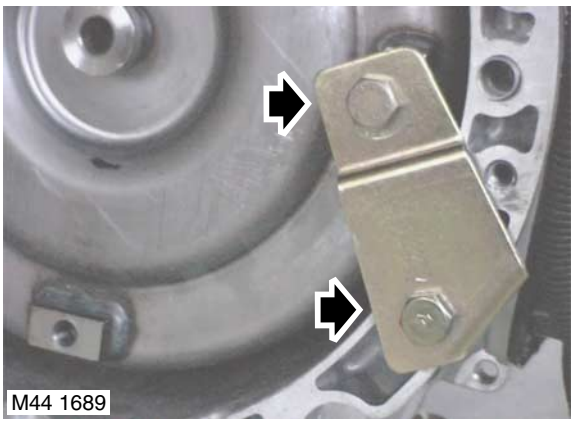


34. Remove 2 bolts securing gearbox to engine.



M44 1667

35. Remove 2 top bolts securing gearbox to engine.
36. Release gearbox from 2 dowels.
37. Remove gearbox assembly.

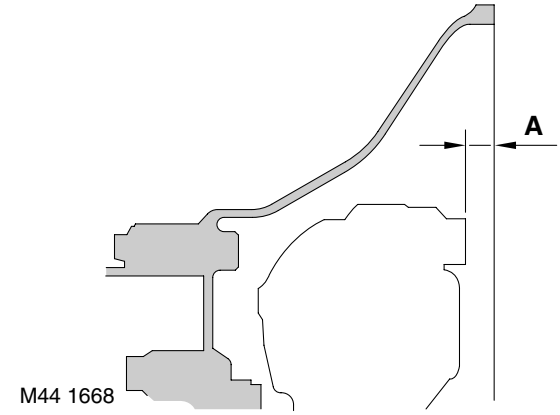


M44 1689

38. Fit converter retaining plate and secure with bolts.

Refit

1. Remove torque converter retaining plate.



M44 1668

2. Ensure converter is fully located in oil pump drive by checking depth 'A' as illustrated. Depth A = 4 mm.
3. Clean gearbox to engine mating faces, dowels and dowel holes.
4. Fit gearbox assembly.
5. Fit bolts securing gearbox and tighten to 85 Nm (63 lbf.ft).
6. Disconnect lifting equipment.
7. Clean CKP sensor and mating face.
8. Fit CKP sensor, fit bolt and tighten to 9 Nm (7 lbf.ft).
9. Position fluid cooler, tighten M12 bolts to 85 Nm (63 lbf.ft) and M8 bolt to 25 Nm (18 lbf.ft).
10. Connect hoses to fluid cooler.
11. Clean fluid cooler unions.
12. Lubricate new 'O' rings with clean transmission fluid and fit 'O' rings to fluid cooler hoses.
    ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
13. Connect fluid cooler hoses to gearbox and tighten unions to 18 Nm (13 lbf.ft).
14. Clean starter motor mating faces.
15. Position starter motor to gearbox, align CKP sensor multiplug bracket, fit and tighten bolts to 45 Nm (33 lbf.ft).
16. Using gearbox bracket bolts, secure **LRT-44-026** lifting bracket to gearbox.
17. Position IRD cooling hose retainer, fit bolt and tighten to 25 Nm (18 lbf.ft).
18. Align marks on drive plate to torque converter.
19. Fit bolts securing drive plate to torque converter and tighten bolts to 45 Nm (33 lbf.ft).
20. Clean torque converter access plate.
21. Position access plate, fit bolts and tighten to 9 Nm (7 lbf.ft).
22. Clean mating faces of IRD and gearbox.
23. Lubricate and fit new 'O' ring.
24. With assistance, fit IRD.
25. Fit bolts securing IRD to gearbox and tighten sufficiently only to pull mating faces of IRD and gearbox together at this stage.

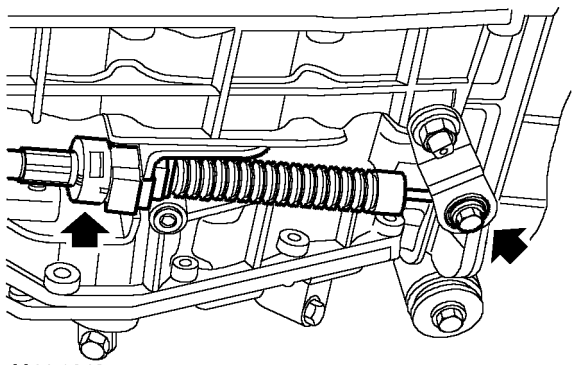
26. Fit IRD support bracket and tighten bolts sufficiently only to pull mating faces together.
27. Final tighten bolts securing IRD to gearbox to 80 Nm (59 lbf.ft).
28. Final tighten bolts securing IRD support bracket in following sequence:5 bolts securing support bracket to IRD 50 Nm (37 lbf.ft), 2 bolts securing support bracket to engine front mounting bracket 50 Nm (37 lbf.ft), 3 bolts securing support bracket to sump 45 Nm (33 lbf.ft).
29. Position lower engine steady, 'TOP' mark uppermost. Fit bolt but do not tighten at this stage.
30. Connect coolant hoses and secure with clips.
31. Connect breather hose to IRD housing.
32. Fit manifold heat shield and fit nut securing heat shield to pinion housing finger tight.
33. Fit bolts securing manifold heat shield to IRD support bracket and tighten to 9 Nm (7 lbf.ft).
34. Fit nut securing heat shield to IRD and tighten to 45 Nm (33 lbf.ft).
35. Final tighten nut securing manifold heat shield to IRD pinion housing to 25 Nm (18 lbf.ft).
36. Clean exhaust manifold and mating face on cylinder head.
37. Fit exhaust manifold gasket.
38. Position exhaust manifold, fit nuts and progressively tighten, from centre outwards to 45 Nm (33 lbf.ft).
39. Connect HO2S multiplug and secure to support bracket.

Gearbox - KV6

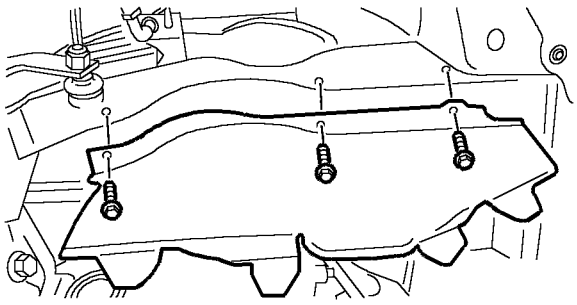
44.20.02.99

Remove

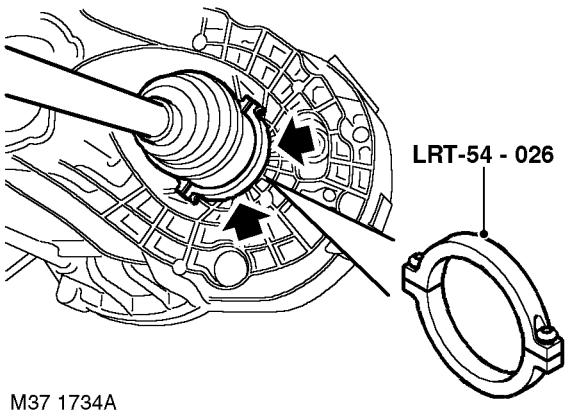
1. Tie bonnet back in upright position.
2. Disconnect battery earth lead.
3. Remove engine acoustic cover.
ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.
4. Remove IRD.
INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - KV6.
INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - KV6.


M44 1648

5. Loosen selector cable trunnion nut.
6. Release clip securing selector cable to gearbox bracket, remove selector cable and collect trunnion from selector lever.


M12 6977

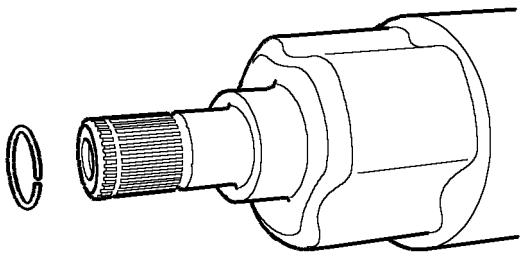
7. Remove 3 screws securing LH splash shield and remove shield.



M37 1734A

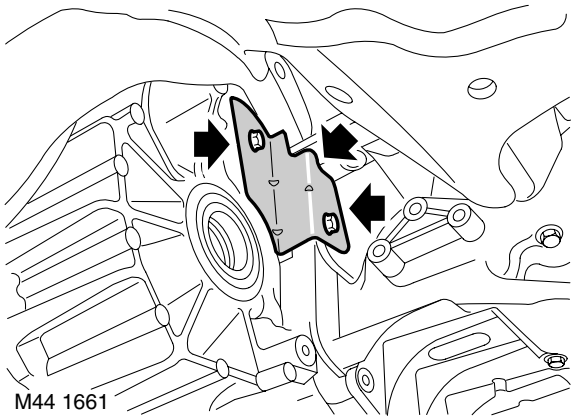
8. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release inboard joint from gearbox.
9. With assistance pull hub outwards and release drive shaft from gearbox.

   CAUTION: Care must be taken not to damage oil seal when removing drive shaft from gearbox



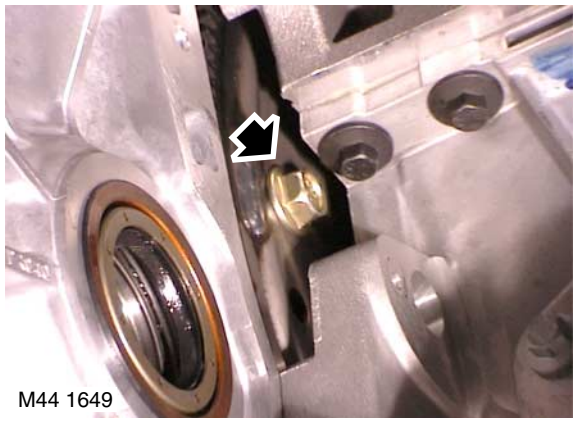
M41 7695

10. Remove and discard circlip from drive shaft.



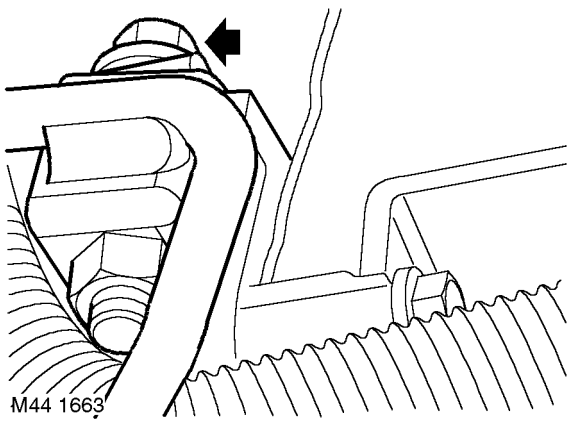
M44 1661

11. Remove 2 bolts securing torque converter access plate.
12. Remove access plate.
13. Mark drive plate to torque converter, for refit purposes.



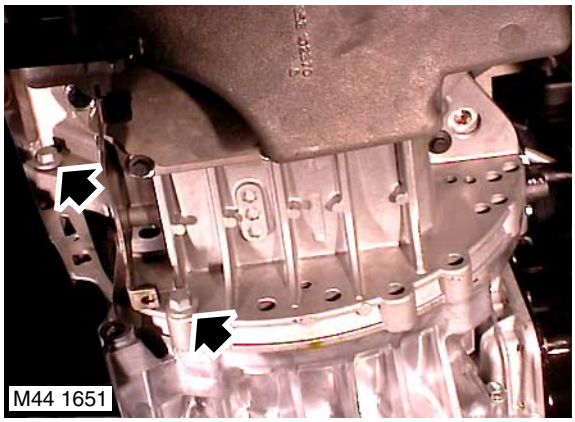
M44 1649

14. Remove 4 bolts securing drive plate to converter.

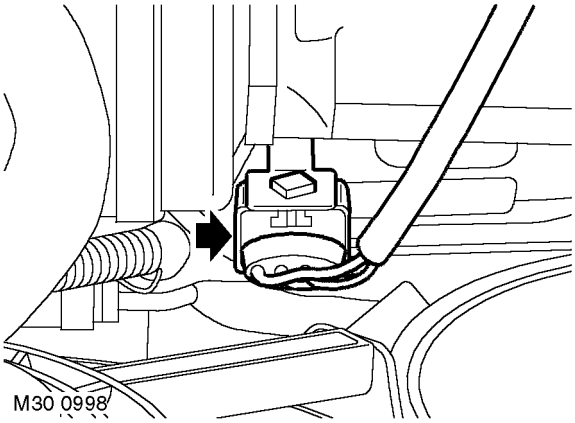


M44 1663

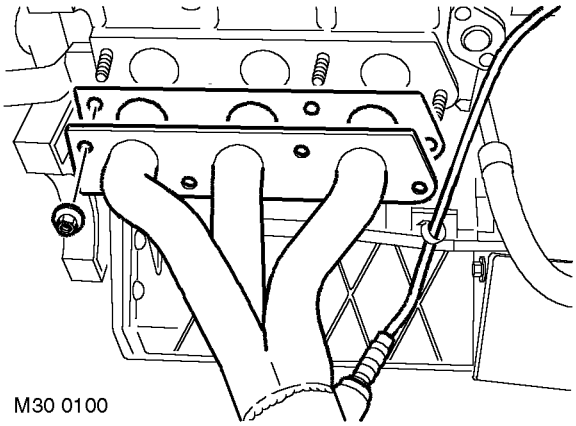
15. Remove bolt securing IRD cooling hose retainer. Remove retainer.



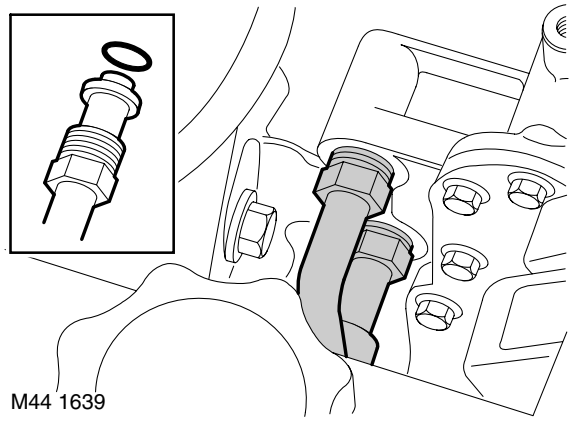
16. Remove 2 bolts securing gearbox to engine.



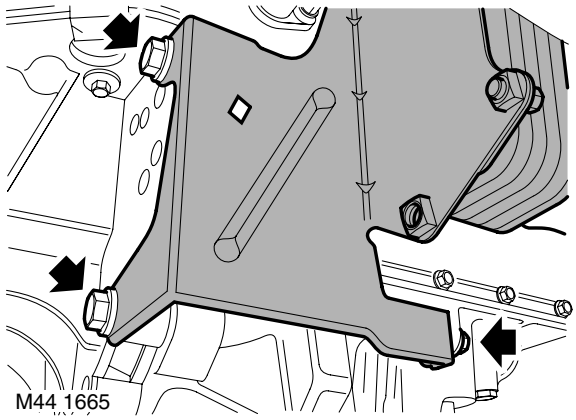
17. Release HO2S multiplug from support bracket on LH camshaft cover, disconnect multiplug.



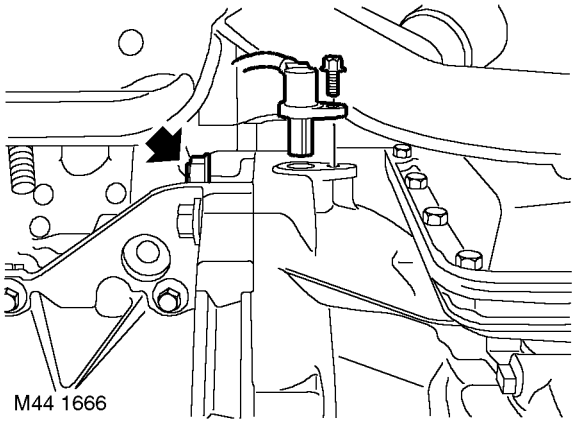
18. Remove 4 nuts securing LH exhaust manifold to cylinder head.
19. Remove exhaust manifold, remove and discard gasket.
20. Position container to collect fluid spillage.



21. Disconnect 2 fluid cooler hose unions and discard 'O' rings.
CAUTION: Always fit plugs to open connections to prevent contamination.

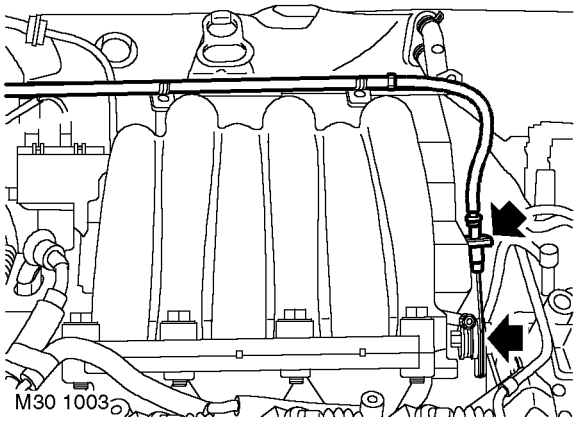


22. Remove 3 bolts securing fluid cooler bracket.
23. Move fluid cooler aside.

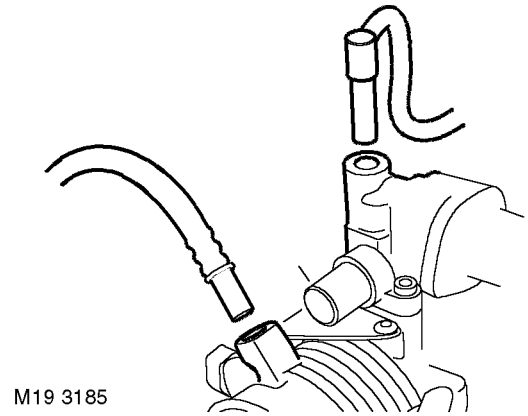


24. Remove bolt securing CKP sensor to gearbox, release sensor and position aside.

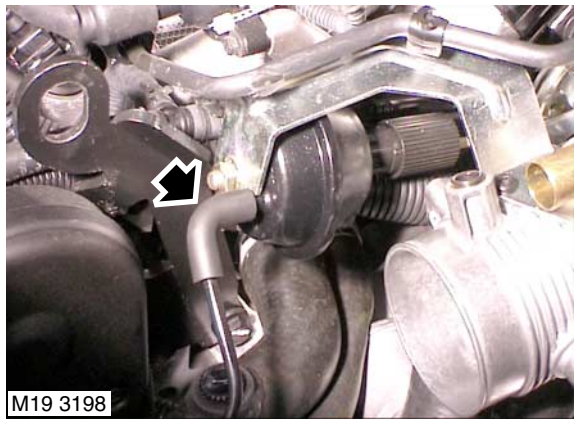
25. Remove nut and bolt, adjacent to CKP sensor, securing gearbox to engine.



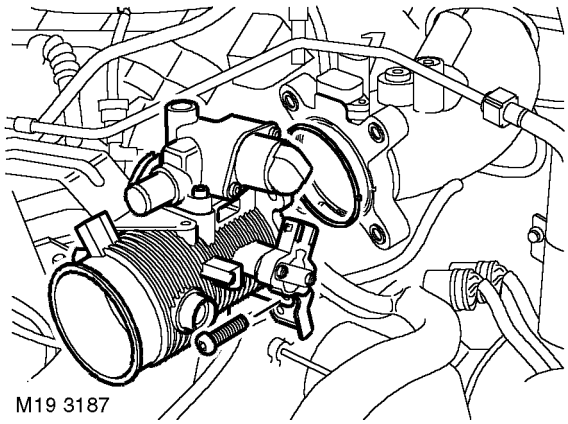
26. Release throttle cable from abutment bracket and disconnect cable from throttle body cam, if fitted.



27. Depress collars and release 2 breather pipes from throttle housing, if fitted.

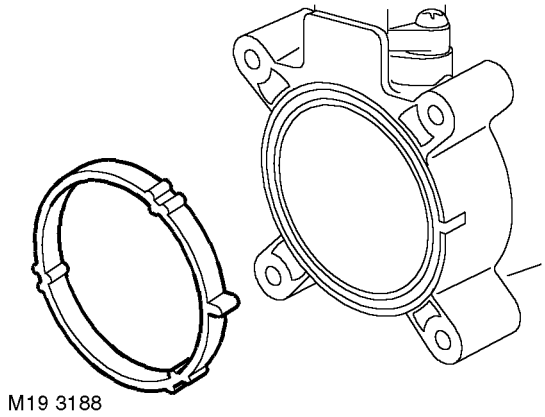


28. **Vehicles with cruise control:** Disconnect vacuum hose from cruise control actuator.



29. Remove 4 Torx screws securing throttle housing, release throttle housing and position aside.

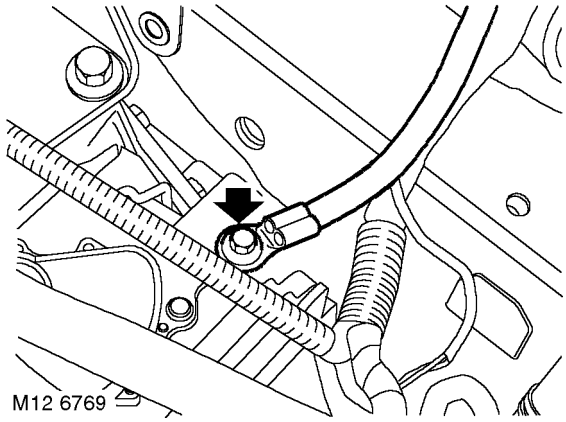
Non NAS throttle housing shown.


M19 3188

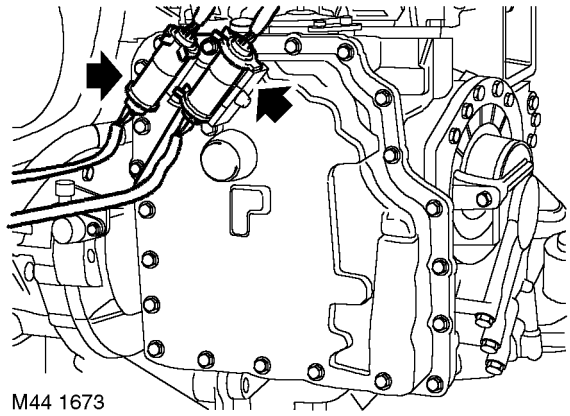
30. Remove and discard 'O' ring from throttle housing.

31. Remove starter motor.

☞ **CHARGING AND STARTING, REPAIRS, Starter motor - KV6.**

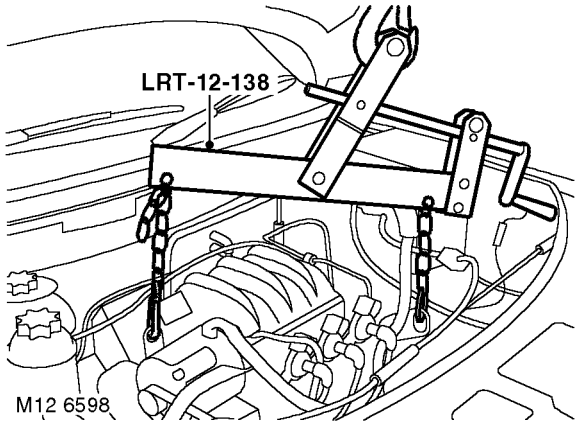

M12 6769

32. Remove bolt securing engine earth lead.


M44 1673

33. Release multiplugs from clips attached to fluid pan.

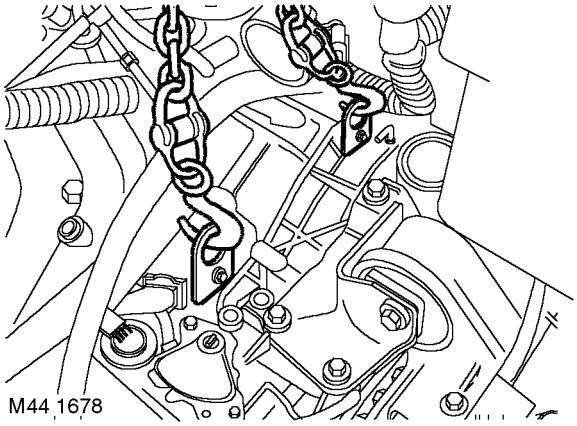
34. Disconnect 2 gearbox harness to main harness multiplugs.



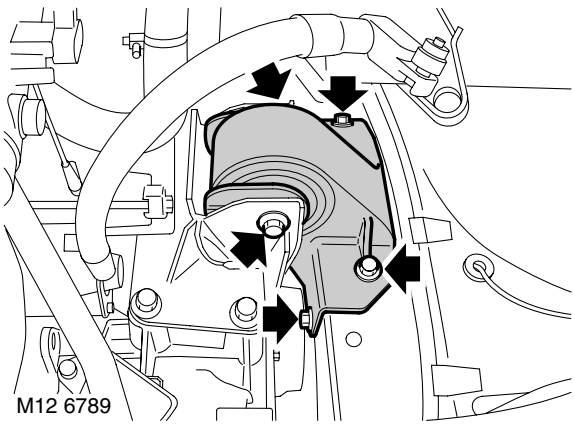
M12 6598

35. Using a hoist, connect adjustable lifting bracket, **LRT-12-138** to engine.

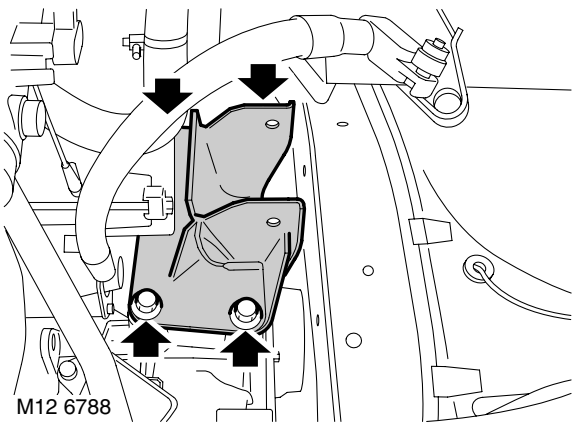
36. Raise hoist to take weight without exerting any load on the engine mountings.


M44 1678

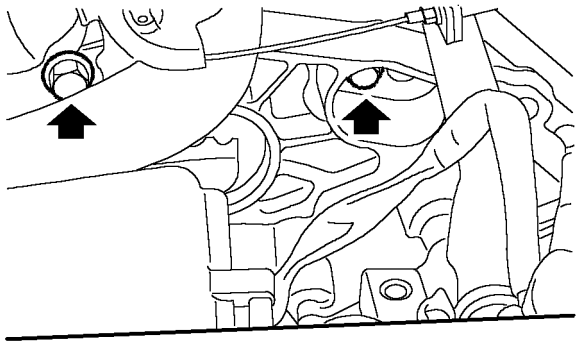
37. Fit suitable lifting brackets to gearbox and secure with nuts and bolts.
38. Connect lifting equipment to brackets.


M12 6789

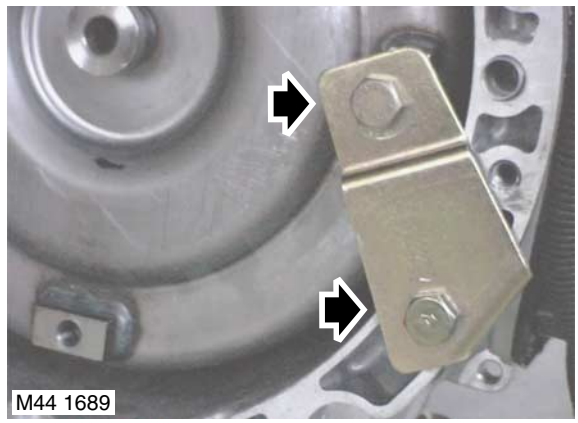
39. Remove through bolt securing LH engine mounting to gearbox bracket.
40. Remove 4 bolts securing LH mounting to body and remove mounting.


M12 6788

41. Remove 4 bolts securing LH mounting bracket to gearbox and remove bracket.


M44 1667

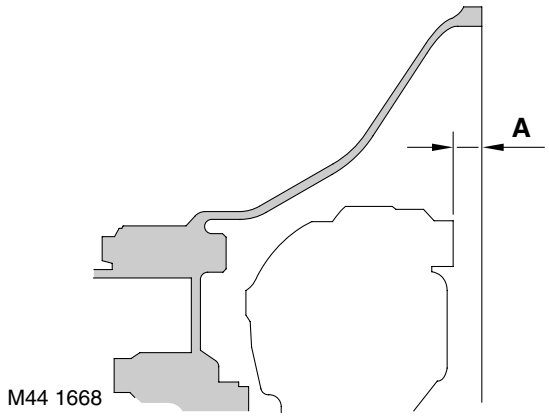
42. Remove 2 top bolts securing gearbox to engine.
43. Release gearbox from 2 dowels.
44. Manoeuvre and lower gearbox to floor.


M44 1689

45. Fit converter retaining plate and secure with bolts.

Refit

1. Remove torque converter retaining plate.



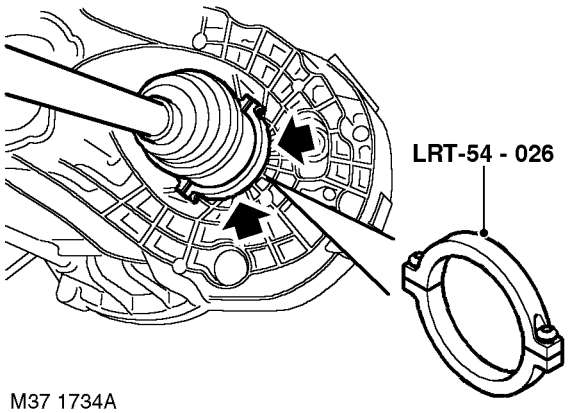
2. Ensure converter is fully located in oil pump drive by checking depth 'A' as illustrated. Depth A = 4 mm.
3. Clean gearbox to engine mating faces, dowels and dowel holes.
4. Fit gearbox assembly.
5. Fit bolts securing gearbox and tighten to 85 Nm (63 lbf.ft).
6. Position LH mounting bracket to gearbox, fit and tighten bolts to 85 Nm (63 lbf.ft).
7. Position LH mounting to body, fit and tighten bolts to 48 Nm (35 lbf.ft).
8. Align gearbox bracket to LH body mounting, fit and tighten through bolt to 100 Nm (74 lbf.ft).
9. Disconnect lifting equipment.
10. Remove nuts and bolts securing lifting brackets to gearbox and remove brackets.
11. Connect engine and gearbox harness multiplugs to main harness.
12. Secure multiplugs to clips.
13. Position engine earth lead and secure with bolt.
14. Fit starter motor.
    ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - KV6.**
15. Clean throttle housing and manifold chamber mating faces.
16. Fit new seal to inlet manifold chamber.
17. Position throttle housing to manifold chamber, fit Torx screws and tighten to 7 Nm (7 lbf.ft).
18. Connect throttle inner cable to throttle cam and secure outer cable in abutment bracket, if fitted.
19. Connect hose to cruise control actuator.
20. Secure breather hoses to throttle housing, if fitted.
21. Adjust throttle cable, if fitted.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, ADJUSTMENTS, Throttle cable - check and adjust - KV6.**
22. Clean CKP sensor and mating face.
23. Fit CKP sensor, fit bolt and tighten to 9 Nm (7 lbf.ft).
24. Position fluid cooler, tighten M12 bolts to 85 Nm (63 lbf.ft) and M8 bolt to 25 Nm (18 lbf.ft).
25. Clean fluid cooler unions.
26. Lubricate new 'O' rings with clean transmission fluid and fit 'O' rings to fluid cooler hoses.
    ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
27. Connect fluid cooler hoses to gearbox and tighten unions to 18 Nm (13 lbf.ft).
28. Clean exhaust manifold and mating face on cylinder head.
29. Fit exhaust manifold gasket.
30. Position exhaust manifold, fit nuts and progressively tighten, from centre outwards to 45 Nm (33 lbf.ft).
31. Connect HO2S multiplug and secure to support bracket.
32. Position IRD cooling hose retainer, fit bolt and tighten to 25 Nm (18 lbf.ft).
33. Align marks on drive plate to torque converter.
34. Fit bolts securing drive plate to torque converter and tighten bolts to 45 Nm (33 lbf.ft).
35. Clean torque converter access plate.
36. Position access plate, fit bolts and tighten to 9 Nm (7 lbf.ft).
37. Clean end of drive shaft and mating splines in gearbox.
38. Fit new circlip to LH drive shaft.
39. With assistance pull hub outwards, align drive shaft and fit to gearbox, taking care not to damage drive shaft oil seal.
    CAUTION: Pull the drive shaft to ensure the circlip is fully engaged and retains the shaft.
40. Fit splash shield and secure with bolts.
41. Position trunnion to selector lever, locate inner cable through trunnion, do not tighten nut at this stage.
42. Position selector cable to gearbox bracket and secure with clip.
43. Adjust selector cable.
    ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Selector cable - adjust.**
44. Fit IRD.
    ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - KV6.**
45. Connect battery earth lead.
46. Fit engine acoustic cover.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
47. Untie and close bonnet.

Gearbox - Td4

44.20.02.99

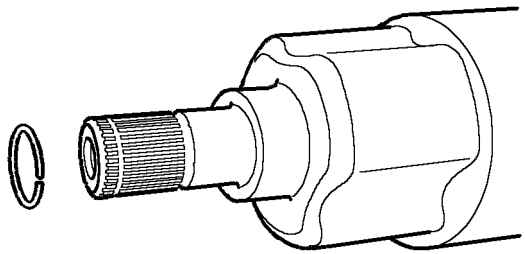
Remove

1. Disconnect battery earth lead.
2. Tie bonnet back in upright position.
3. Remove intake ducting assembly.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.
4. Remove fluid cooler.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Fluid cooler - Td4.
5. Remove starter motor.
   CHARGING AND STARTING, REPAIRS, Starter motor - Td4.
6. Remove IRD.
   INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.



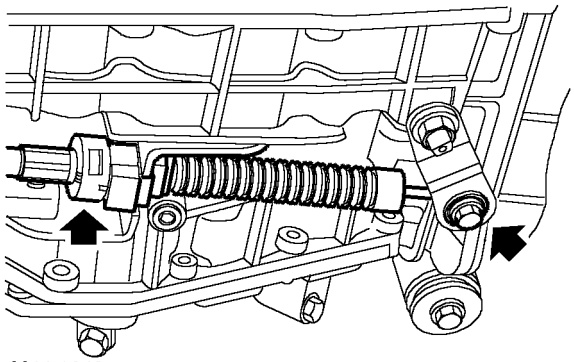
M37 1734A

7. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release inboard joint from gearbox.
8. With assistance, pull hub outwards and remove LH drive shaft from gearbox.
   CAUTION: Pull the drive shaft horizontally to avoid damaging the differential oil seal.



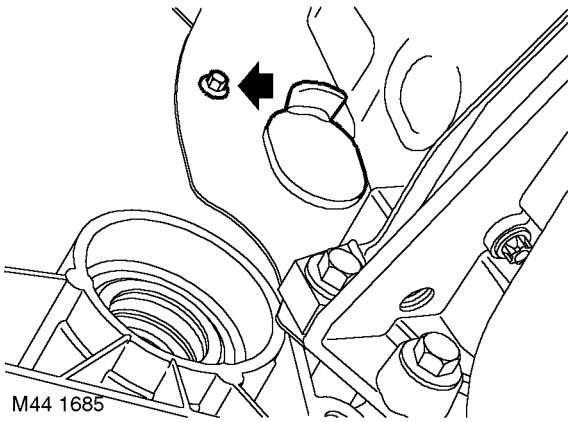
M41 7695

9. Remove and discard circlip from LH drive shaft.



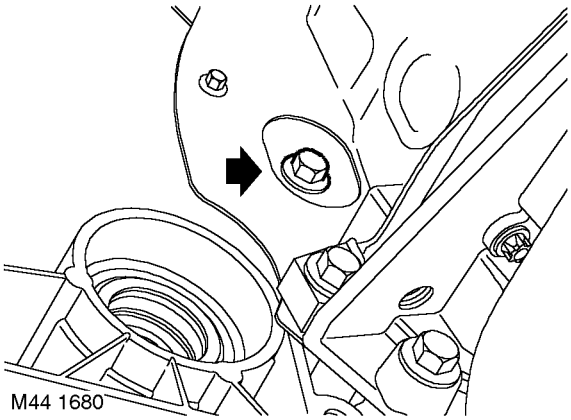
M44 1648

10. Loosen selector cable trunnion nut.
11. Release clip, disconnect selector cable and remove trunnion.

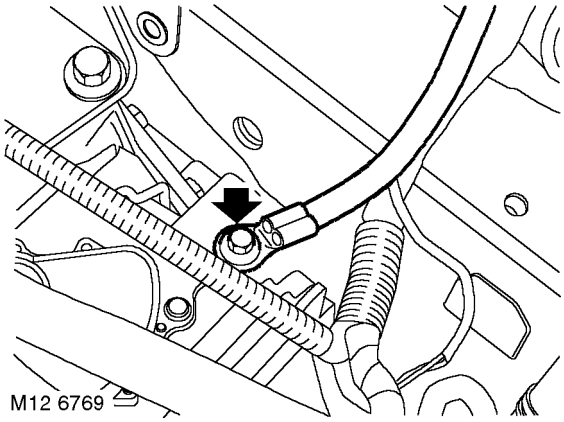


M44 1685

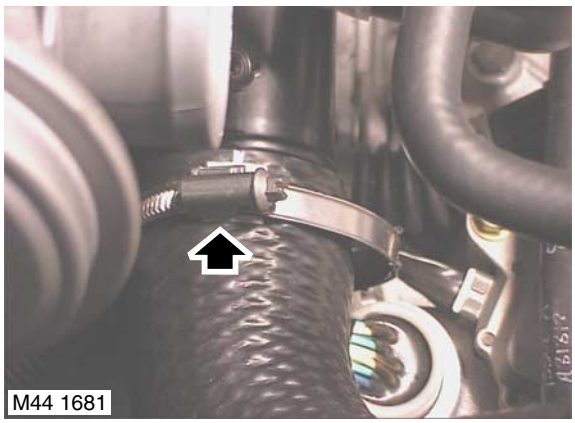
12. Remove bolt securing closing plate to gearbox.
13. Remove grommet from closing plate to gain access to torque converter retaining bolts.



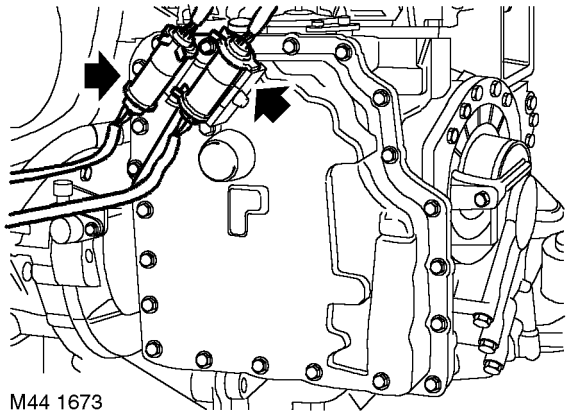
14. Mark drive plate to torque converter, for refit purposes.
15. Rotate crankshaft for access and remove 4 bolts securing drive plate to torque converter.



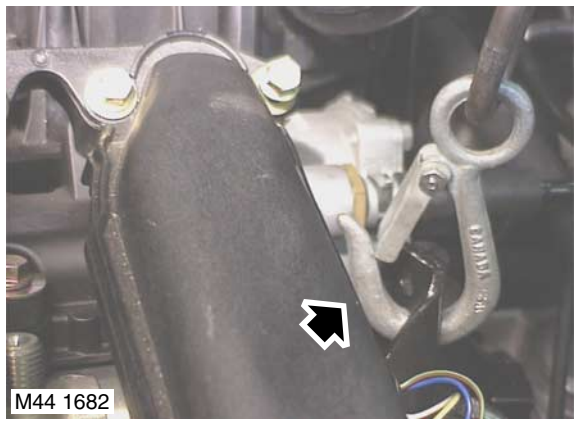
16. Remove bolt and release earth lead from gearbox.



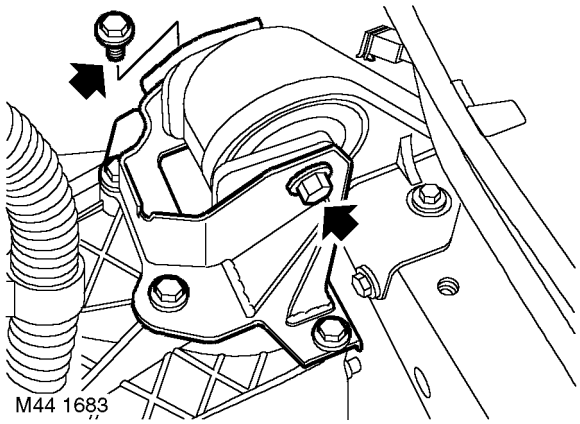
17. Loosen clip and disconnect hose from turbocharger outlet pipe.



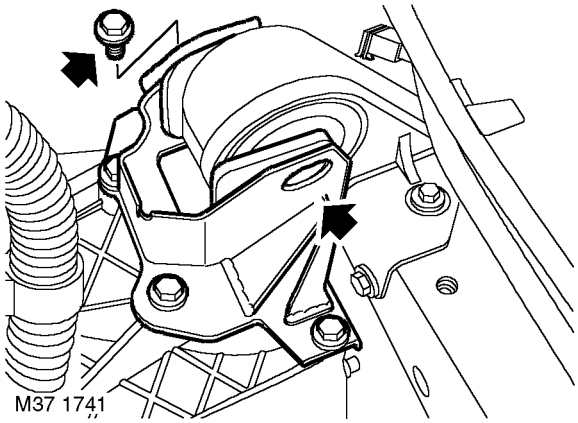
18. Release 2 gearbox multiplugs from clips and disconnect from main harness.



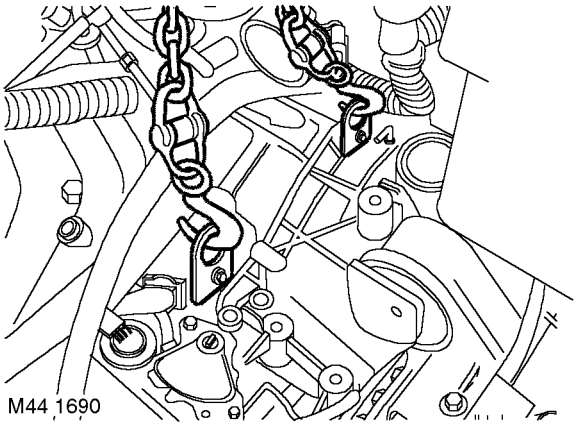
19. Fit lifting chains to lifting eye and take weight of engine.



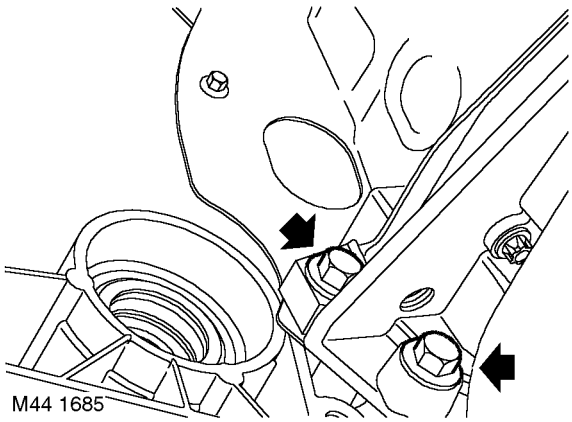
20. Remove through bolt, gearbox bracket to LH mounting.
21. Lower gearbox to clear mounting.



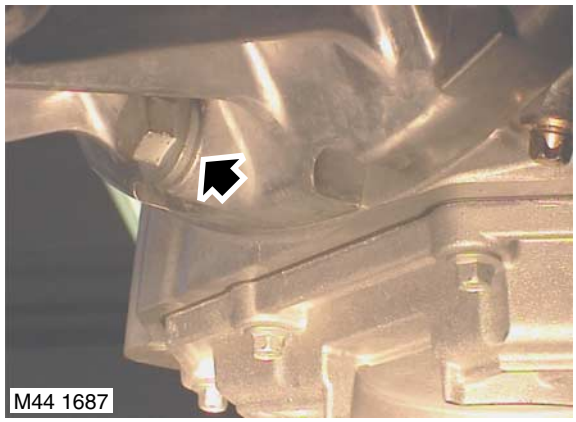
22. Remove 4 bolts securing LH mounting bracket to gearbox and remove bracket.



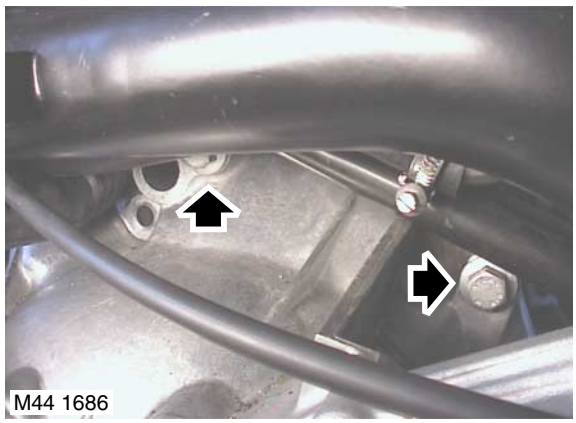
23. Fit lifting eyes to gearbox and secure with bolts.
24. Fit lifting chains to eye and take weight of gearbox.



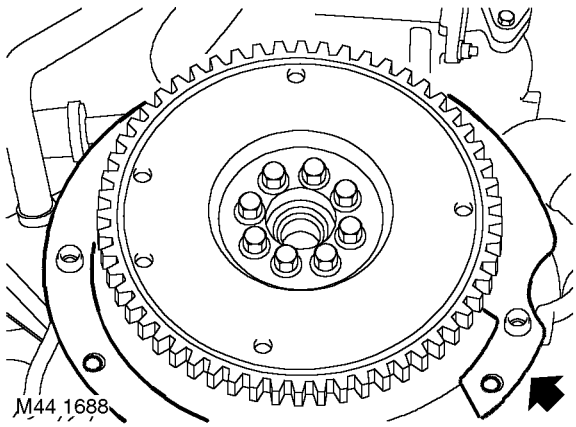
25. Remove 2 bolts securing gearbox to engine.



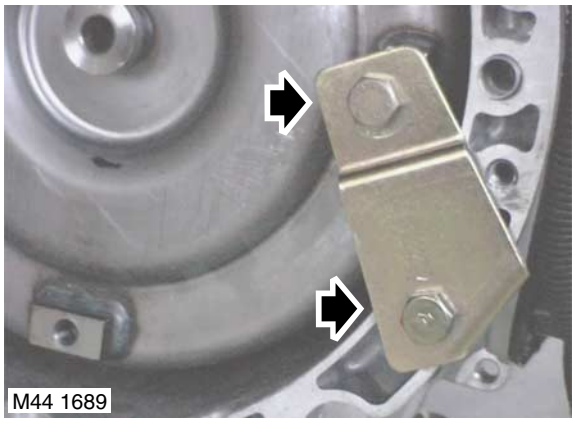
26. Remove lower bolt securing gearbox.



27. Remove 2 upper bolts securing gearbox to engine.
28. Release gearbox from 2 dowels.
29. Manoeuvre and lower gearbox to floor.



30. If necessary remove displaced gearbox closing panel.



31. Fit converter retaining plate and secure with bolts.

Refit

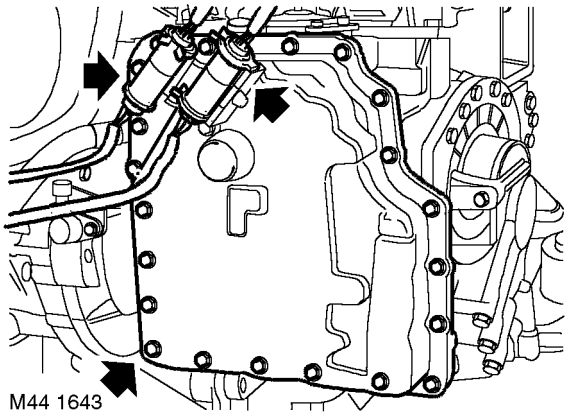
1. Clean gearbox closing panel.
2. Ensure closing plate is in position on engine and located on dowels.
3. Clean drive plate and ensure free from cracks and distortion.
4. Clean gearbox to engine mating faces, dowels and dowel holes.
5. Remove torque converter retaining plate.
6. Ensure torque converter is fully located in oil pump drive by checking depth 'A' as illustrated. Depth A = 27 mm.
7. Fit lifting chains to eyes and take weight of gearbox.
8. Raise gearbox and engage with dowels. Fit bolts securing gearbox to engine and tighten to 85 Nm (63 lbf.ft).
9. Fit bolt securing closing plate to gearbox and tighten to 10 Nm (7.5 lbf.ft).
10. Remove lifting chains from gearbox.
11. Fit mounting bracket to gearbox and tighten bolts to 85 Nm (63 lbf.ft).
12. Raise engine, align bracket to mounting and tighten through bolt to 100 Nm (74 lbf.ft).
13. Remove engine support chains.
14. Align torque converter to drive plate and tighten bolts to 45 Nm (33 lbf.ft).
15. Fit grommet to access plate.
16. Fit trunnion to selector lever, fit inner cable to trunnion and secure outer cable to abutment bracket.
17. Adjust selector cable.
    ☞ **AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Selector cable - adjust.**
18. Connect gearbox harness multiplugs and fit to clips.
19. Position earth lead to gearbox and tighten bolt to 25 Nm (18 lbf.ft).
20. Connect intercooler hose and tighten clip.
21. Fit new circlip to LH drive shaft.
22. With assistance, fit LH drive shaft to gearbox, keep shaft square to prevent damage to oil seal in gearbox.
23. Fit IRD.
    ☞ **INTERMEDIATE REDUCTION DRIVE, REPAIRS, Intermediate reduction drive (IRD) unit - Td4.**
24. Fit starter motor.
    ☞ **CHARGING AND STARTING, REPAIRS, Starter motor - Td4.**
25. Fit fluid cooler.
    ☞ **AUTOMATIC GEARBOX - JATCO, REPAIRS, Fluid cooler - Td4.**
26. Fit intake ducting assembly.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.**
27. Connect battery earth lead.
28. Untie and close bonnet.

Fluid pan - reseal

44.24.05

Remove

1. Drain gearbox fluid.
   AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.
2. Remove fluid cooler.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Fluid cooler - KV6.


M44 1643

3. Release multiplugs from clips attached to fluid pan.
4. Remove 21 bolts securing fluid pan to gearbox.
5. Remove fluid pan.

Refit

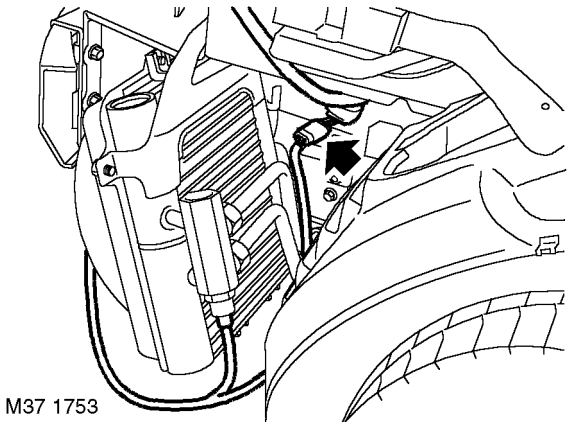
1. Clean fluid pan and mating face on gearbox.
2. Apply liquid gasketto contact faces of fluid pan and gearbox.
3. Position fluid pan, fit bolts and tighten progressively to 7 Nm (5 lbf.ft).
4. Secure multiplugs to clips.
5. Fit fluid cooler.
   AUTOMATIC GEARBOX - JATCO, REPAIRS, Fluid cooler - KV6.
6. Fill gearbox with fluid.
   AUTOMATIC GEARBOX - JATCO, ADJUSTMENTS, Gearbox fluid - drain & refill.

Fluid cooler - air blast - Td4 (hot climates)

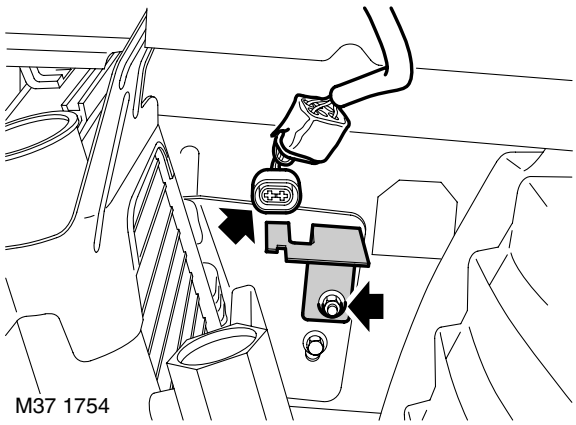
44.24.09

Remove

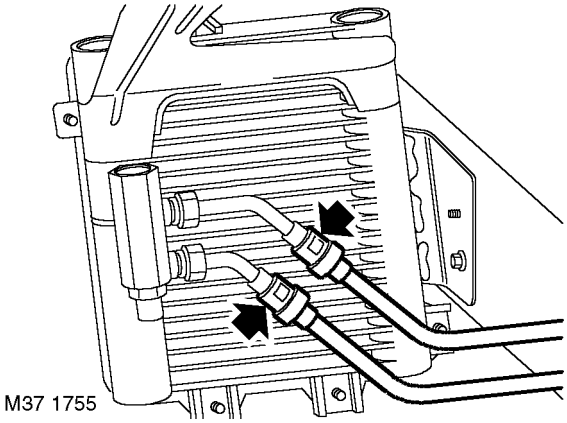
1. Disconnect battery earth lead.
2. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.


M37 1753

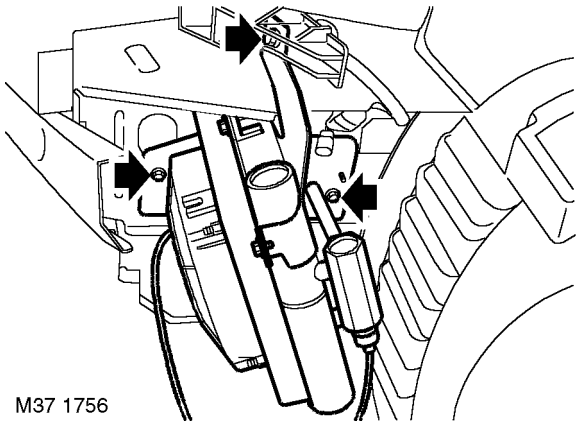
3. Remove combined fan and thermostat multiplug from harness.


M37 1754

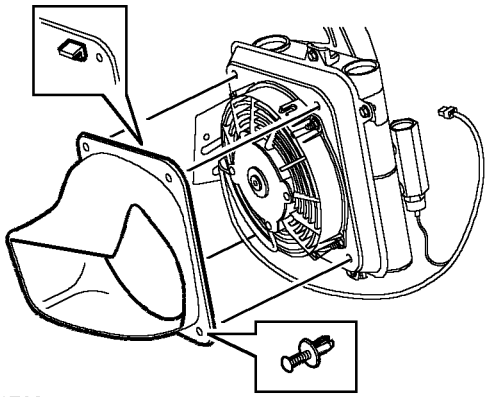
4. Remove harness multiplug from mounting bracket.
5. Remove nut securing multiplug mounting bracket, move bracket aside.
6. Position container beneath gearbox cooler hoses to contain fluid spillage.


M37 1755

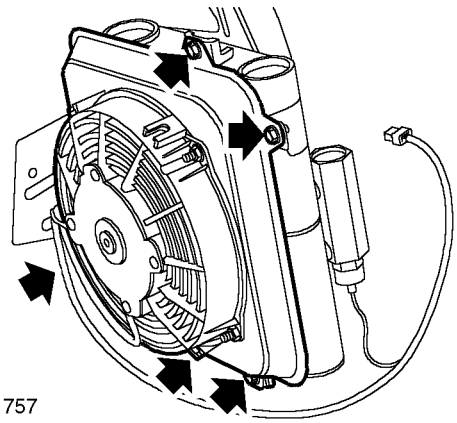
7. Disconnect cooler quick release hoses.
CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.


M37 1756

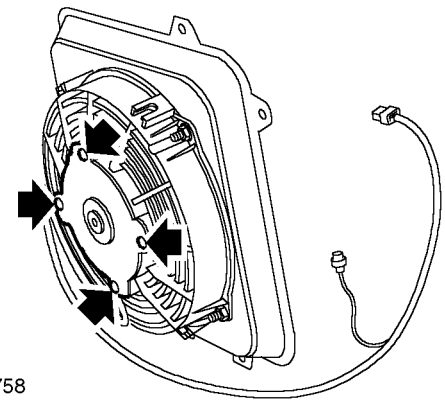
8. Remove 3 bolts securing air blast cooler assembly to chassis and move aside.


M37 1760

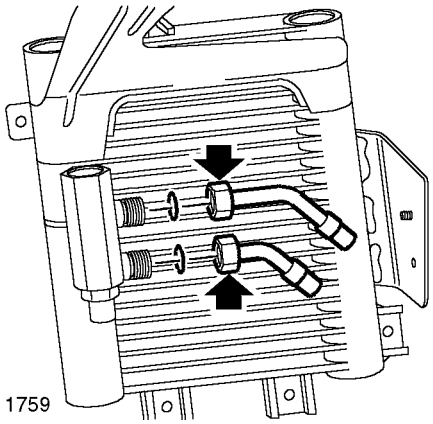
9. Remove 2 scrivets, release cooler ducting from hooks and move aside.


M37 1757

10. Remove 5 bolts securing fan cowl to cooler matrix and move aside.


M37 1758

11. Remove 4 nuts securing fan motor to cowl and move aside.
NOTE: Do not carry out further dismantling if component is removed for access only.


M37 1759

12. Remove cooler pipe union nuts and move pipes aside.

CAUTION: To prevent damage to components, use two spanners when loosening or tightening unions.

13. Remove and discard 'O' rings.

Refit

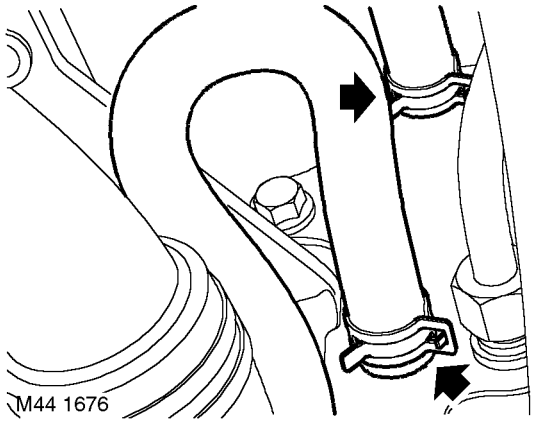
1. Fit new 'O' rings to oil cooler pipes.
2. Fit pipes to cooler matrix, align and tighten union nuts to 25 Nm (18 lbf.ft).
3. Position fan cowl to cooler matrix, fit bolts and tighten to 5 Nm (3.5 lbf.ft).
4. Position fan motor to cowl, fit nuts and tighten to 5 Nm (3.5 lbf.ft).
5. Fit cooler duct and secure with scrivets.
6. Fit air blast cooler assembly, fit bolts and tighten upper bolt to 5 Nm (3.5 lbf.ft). Lower bolts should be tightened to 10 Nm (7.5 lbf.ft).
7. Ensure connections are clean, then fit and secure flexible hoses.
8. Fit multiplug mounting bracket and tighten nut to 10 Nm (7.5 lbf.ft).
9. Connect harness multiplug, fit multiplug to mounting bracket.
10. Fit front bumper.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
11. Connect battery earth lead.

Fluid cooler - Td4

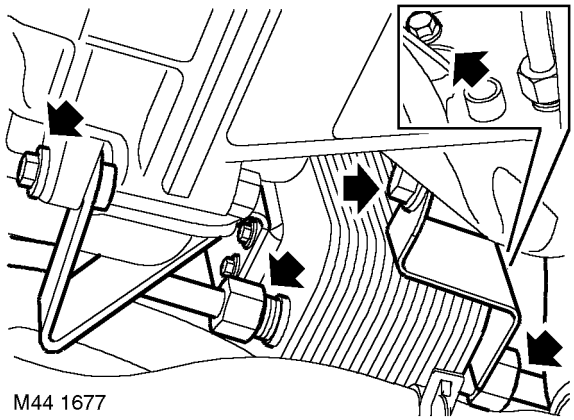
⊸ ***44.24.10***

Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
3. Position container to collect coolant spillage.


M44 1676

4. Release 2 clips and disconnect coolant hoses from fluid cooler.
5. Position container to collect fluid spillage.


M44 1677

6. Disconnect 2 fluid cooler hose unions and discard 'O' rings.
7. Remove 3 bolts securing fluid cooler bracket.
8. Remove fluid cooler.

Refit

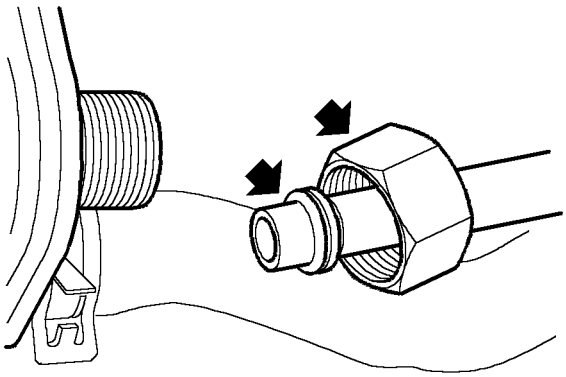
1. Clean cooler mounting points.
2. Position fluid cooler to mounting, fit bolts, tighten 2 bolts to 45 Nm (33 lbf.ft) and remaining bolt to 25 Nm (18 lbf.ft).
3. Connect coolant hoses and secure with clips.
4. Lubricate new 'O' rings with clean transmission fluid and fit to fluid cooler hoses.
5. Connect hoses to fluid cooler and tighten unions to 18 Nm (13 lbf.ft).
6. Top-up gearbox fluid level.
   ☞ **MAINTENANCE, MAINTENANCE, Automatic Gearbox – JATCO.**
7. Connect battery earth lead.
8. Refill cooling system.
   ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
9. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Fluid cooler - KV6

44.24.10

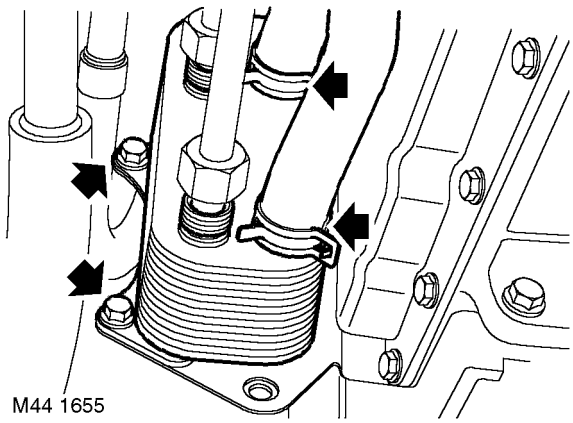
Remove

1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Position container to collect fluid spillage.
   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.



M44 1654

3. Disconnect 2 fluid cooler hose unions and discard 'O' rings.
   CAUTION: Always fit plugs to open connections to prevent contamination.
4. Position container to collect coolant spillage.



M44 1655

5. Release 2 clips and disconnect coolant hoses from fluid cooler.
   CAUTION: Always fit plugs to open connections to prevent contamination.
6. Remove 2 bolts securing fluid cooler.

7. Remove fluid cooler.

Refit

1. Position fluid cooler to mounting bracket, fit bolts and tighten to 25 Nm (18 lbf.ft).
2. Connect coolant hoses and secure with clips.
3. Lubricate new 'O' rings with clean transmission fluid and fit 'O' rings to fluid cooler hoses.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
4. Connect hoses to fluid cooler and tighten unions to 18 Nm (13 lbf.ft).
5. Refill cooling system.
   ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**
6. Top-up gearbox fluid level.
   ☞ **MAINTENANCE, MAINTENANCE, Automatic Gearbox – JATCO.**
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

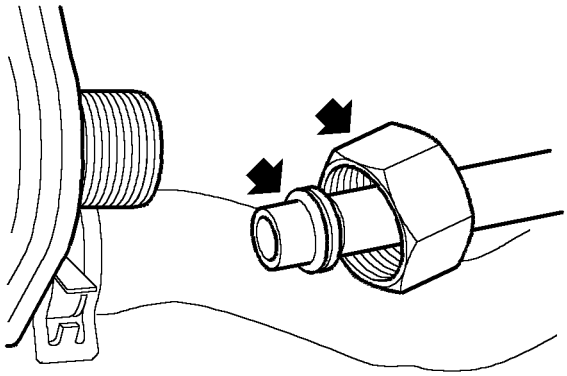
Hose - fluid cooler

44.24.13

This procedure is identical for both feed and return hoses.

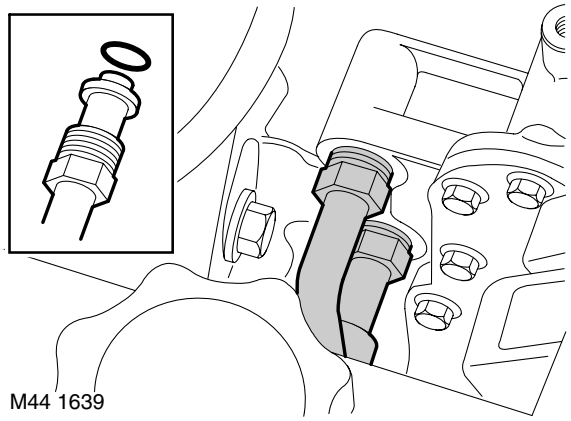
Remove

1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Position container to collect fluid spillage.
   WARNING: Observe due care when draining gearbox fluid as the fluid can be very hot.



M44 1654

3. Disconnect hose from fluid cooler and discard 'O' ring.
   CAUTION: Always fit plugs to open connections to prevent contamination.



M44 1639

4. Loosen union and remove hose from gearbox.
5. Remove and discard 'O' ring.

Refit

1. Wipe union and pipe ends using a lint free cloth.
2. Lubricate new 'O' ring with clean transmission fluid and fit 'O' ring to hose.
   ☞ **CAPACITIES, FLUIDS AND LUBRICANTS, Lubrication.**
3. Position hose to fluid cooler but do not fully tighten union.
4. Position hose to gearbox and tighten union to 18 Nm (13 lbf.ft).
5. Tighten fluid cooler hose union to 18 Nm (13 lbf.ft).
6. Top-up gearbox fluid level.
   ☞ **MAINTENANCE, MAINTENANCE, Automatic Gearbox – JATCO.**
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
8. Remove container.

Shaft with both joints - LH

47.10.01

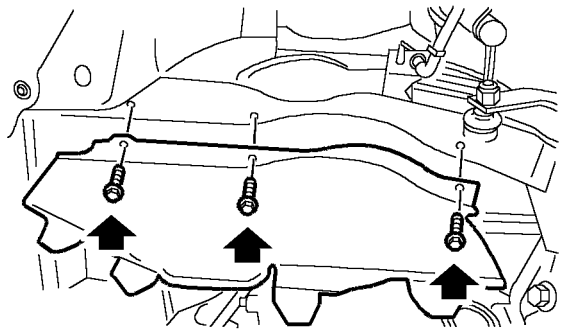
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

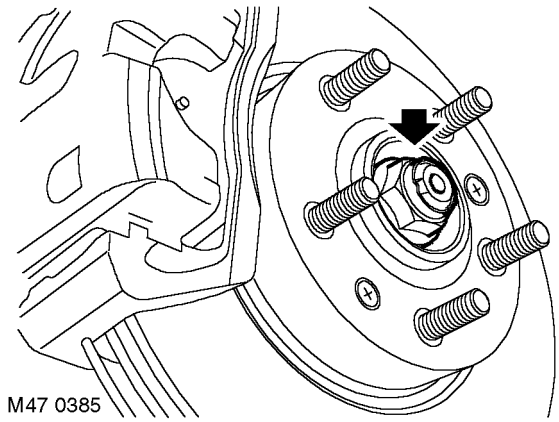
3. Remove road wheel.
4. Remove underbelly panel.

   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



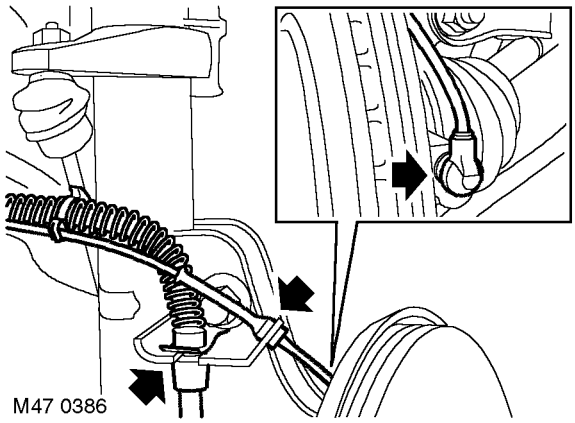
M47 0382

5. Remove 3 bolts and remove splash shield.



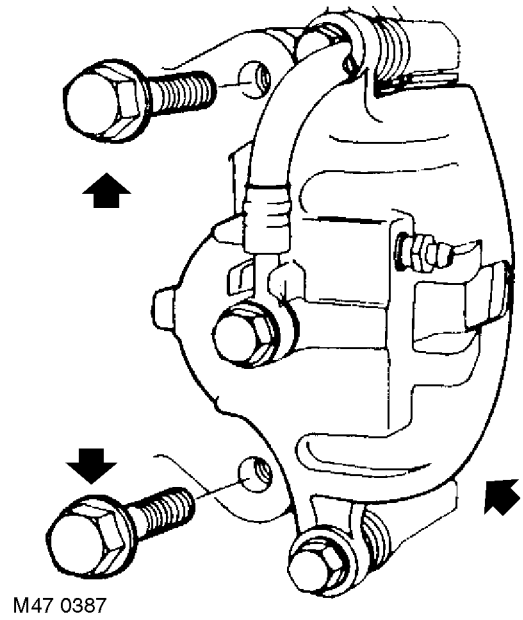
M47 0385

6. Release stake from drive shaft nut.
7. With assistant depressing the brake pedal, remove and discard the drive shaft nut.



M47 0386

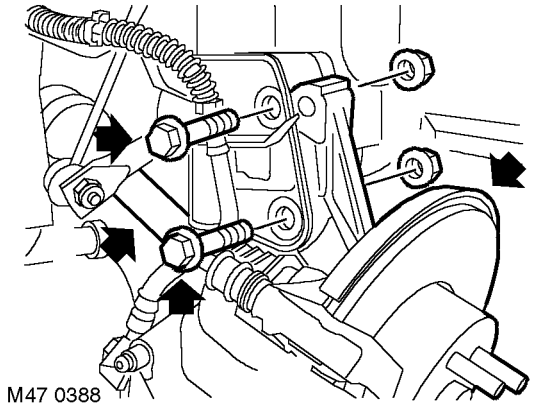
8. Remove clip securing brake hose and release hose from damper bracket.
9. Release ABS sensor harness and brake hose from damper.
10. Release ABS sensor from hub.



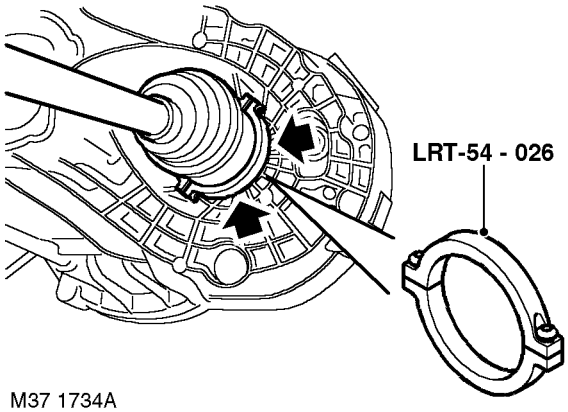
M47 0387

11. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.

    CAUTION: Do not allow caliper to hang on brake hose.

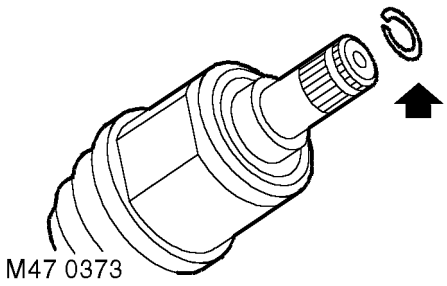

M47 0388

12. Remove 2 bolts securing damper to hub.
13. Release hub from damper.
14. Release drive shaft from hub.
15. Position container to catch oil spillage



M37 1734A

16. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release drive shaft from gearbox.
17. Remove drive shaft.
CAUTION: Care must be taken not to damage oil seal when removing drive shaft from gearbox


M47 0373

18. Remove and discard circlip from drive shaft.

Refit

1. Inspect gearbox seal for signs of wear or damage.
2. Wipe drive shaft ends, gearbox oil seal and hub.
3. Lubricate oil seal running surfaces.
4. Fit new circlip to drive shaft.
5. Fit drive shaft ensuring circlip is fully engaged.
CAUTION: Drive shaft must be fitted with care to prevent damage to gearbox oil seal.
6. Position drive shaft in hub.
7. Fit new hub nut but do not tighten at this stage.
8. Fit hub to damper, fit nuts and bolts and tighten to 205 Nm (150 lbf.ft).
9. Position caliper to brake disc fit bolts and tighten to 100 Nm (74 lbf.ft).
10. Clean ABS sensor and mating face.
11. Lubricate ABS sensor with anti-seize grease.
12. Fit ABS sensor .
CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches reluctor ring.
13. Position ABS harness and brake hose in bracket and secure with clip.
14. Fit splash shield and secure with bolts.
15. Tighten front hub nut to 400 Nm (295 lbf.ft).
16. Stake front hub nut.
17. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
18. Check and top up oil level as required.
☞ **MAINTENANCE, MAINTENANCE, Manual Gearbox – PG1.**
☞ **MAINTENANCE, MAINTENANCE, Manual Gearbox – GETRAG.**
☞ **MAINTENANCE, MAINTENANCE, Automatic Gearbox – JATCO.**
19. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
20. Remove stands and lower vehicle.
21. Connect battery earth lead.

Shaft with both joints - RH

47.10.02

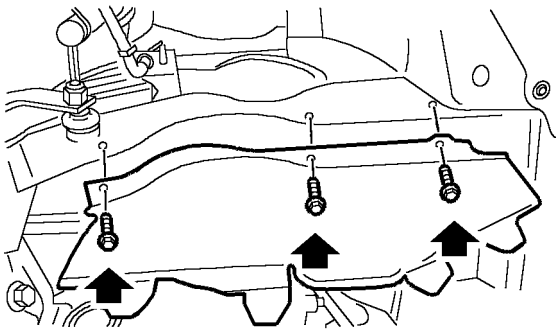
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

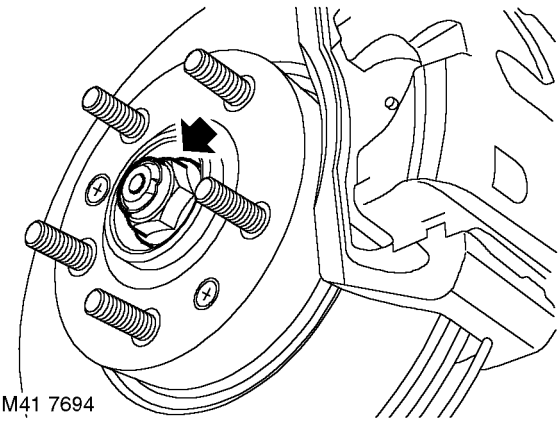
3. Remove road wheel.
4. Remove underbelly panel.

   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



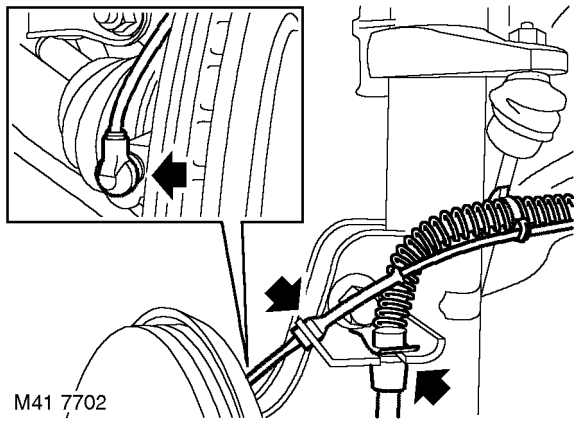
M47 0384

5. Remove 3 bolts securing RH splash shield to body and remove shield.



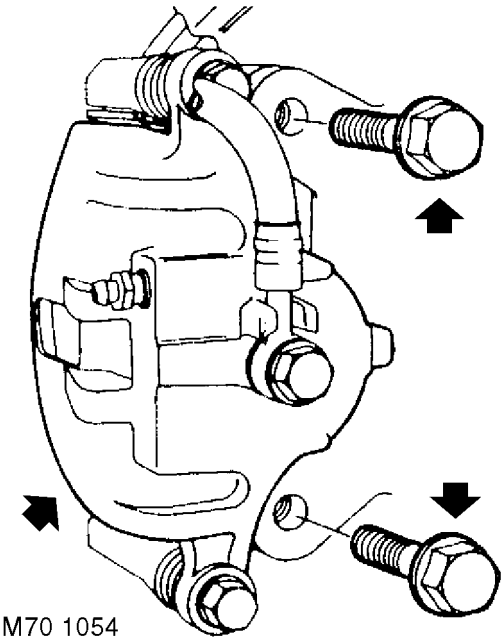
M41 7694

6. Release stake from drive shaft nut.
7. With assistant depressing the brake pedal, remove and discard the drive shaft nut.



M41 7702

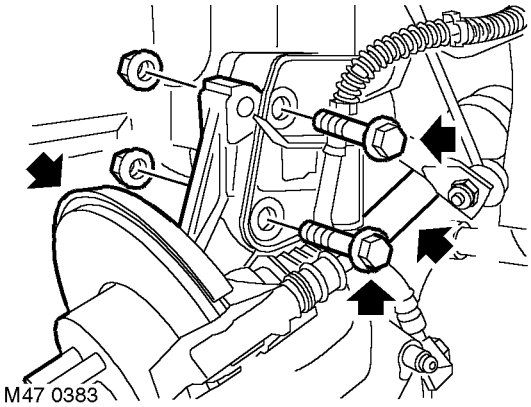
8. Remove clip securing brake hose and release hose from damper bracket.
9. Release ABS sensor harness and brake hose from damper.
10. Release ABS sensor from hub.



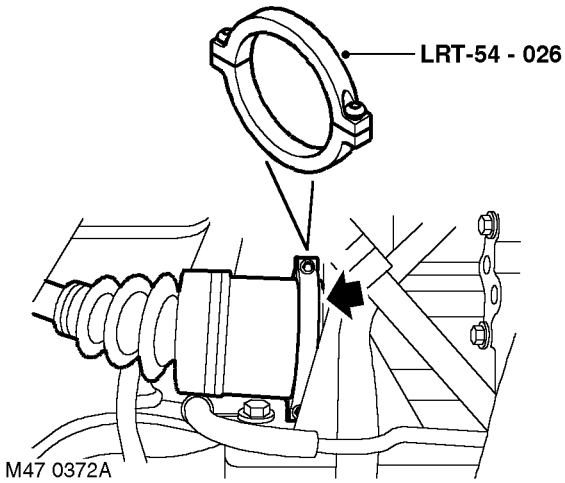
M70 1054

11. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.

    CAUTION: Do not allow caliper to hang on brake hose.


M47 0383

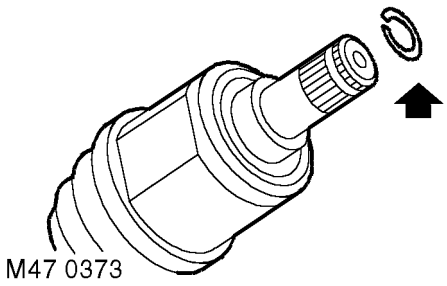
12. Remove 2 bolts securing damper to hub.
13. Release hub from damper.
14. Release drive shaft from hub.
15. Position container to catch oil spillage.



M47 0372A

16. Secure **LRT-54-026** to drive shaft inboard joint. Using a suitable lever, release drive shaft from gearbox.
17. Remove drive shaft.

CAUTION: Care must be taken not to damage oil seal when removing drive shaft from gearbox


M47 0373

18. Remove and discard circlip from drive shaft.

Refit

1. Inspect gearbox seal for signs of wear or damage.
2. Wipe drive shaft ends, gearbox oil seal and hub.
3. Lubricate oil seal running surfaces.
4. Fit new circlip to drive shaft.
5. Fit drive shaft ensuring circlip is fully engaged.

CAUTION: Drive shaft must be fitted with care to prevent damage to gearbox oil seal.

6. Position drive shaft in hub.
7. Fit new hub nut but do not tighten at this stage.
8. Fit hub to damper, fit nuts and bolts and tighten to 205 Nm (150 lbf.ft).
9. Position caliper to brake disc fit bolts and tighten to 100 Nm (74 lbf.ft).
10. Clean ABS sensor and mating face.
11. Lubricate ABS sensor with anti-seize grease.
12. Fit ABS sensor .

CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches reluctor ring.

13. Position ABS harness and brake hose in bracket and secure with clip.
14. Fit splash shield and secure with bolts.
15. Tighten front hub nut to 400 Nm (295 lbf.ft).
16. Stake front hub nut.
17. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
18. Check and top up oil level as required.

☞ **MAINTENANCE, MAINTENANCE, Intermediate Reduction Drive - Non NAS models.**

19. Fit underbelly panel.

☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

20. Remove stands and lower vehicle.
21. Connect battery earth lead.

Gaiter - bell & joint - outer - front

47.10.03

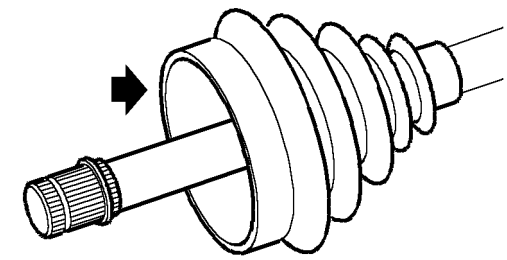
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove drive shaft outer joint.

   ☞ **DRIVESHAFTS, REPAIRS, Bell & joint - outer - LH - front.**



M47 0349

5. Slide gaiter from shaft.

Refit

1. Clean drive shaft.
2. Fit new gaiter to shaft.
3. Fit drive shaft outer joint.

   ☞ **DRIVESHAFTS, REPAIRS, Bell & joint - outer - LH - front.**
4. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
5. Remove stands and lower vehicle.
6. Connect battery earth lead.

Bell & joint - outer - LH - front

47.10.04

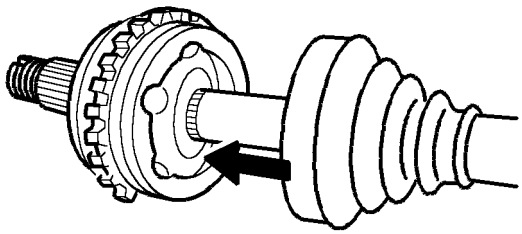
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove drive shaft.

   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
5. Place drive shaft in vice.
6. Release both gaiter clips and discard.
7. Slide gaiter along shaft to gain access to outer joint.



M47 0350

8. Using a suitable drift against the inner part of the joint, remove joint from shaft.
9. Inspect gaiter for damage and renew if necessary.

Refit

1. Clean drive shaft and gaiter.
2. Fit new circlip to drive shaft.
3. Position outer joint to shaft, use a screwdriver to press circlip into its groove and push joint fully onto shaft.
4. Apply grease from the sachet to the joint.
5. Position gaiter to joint and use a 'Band-it thriftool' **LRT-99-019** to secure the 2 new clips.
6. Fit drive shaft.

   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
7. Fit front road wheels, fit and tighten nuts to 115 Nm (85 lbf.ft).
8. Remove stands and lower vehicle.
9. Connect battery earth lead.

Gaiter - inner joint

47.10.16

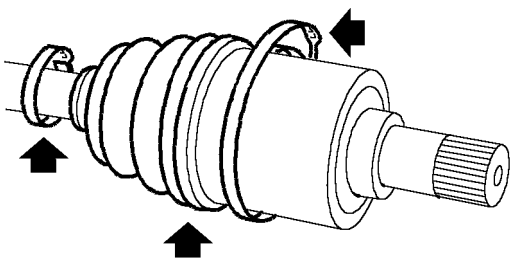
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove outer gaiter.

   DRIVESHAFTS, REPAIRS, Gaiter - bell & joint - outer - front.



M47 0351

5. Release both gaiter clips and discard.
6. Slide gaiter from shaft.

Refit

1. Clean drive shaft and gaiter.
2. Apply grease from the sachet to the joint.
3. Fit new gaiter to shaft.
4. Position gaiter to joint and use a 'Band-it thriftool' **LRT-99-019** to secure the 2 new clips.
5. Fit outer gaiter.

   DRIVESHAFTS, REPAIRS, Gaiter - bell & joint - outer - front.
6. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
7. Remove stands and lower vehicle.
8. Connect battery earth lead.

Shaft with both joints - rear

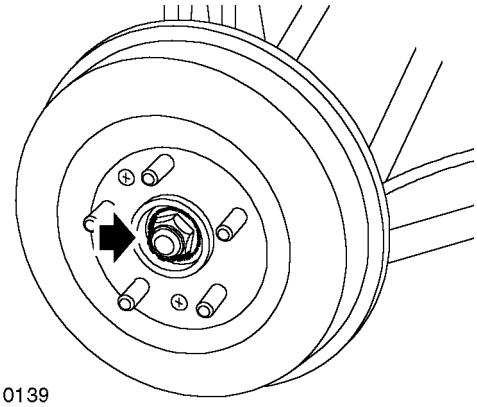
47.11.01

Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

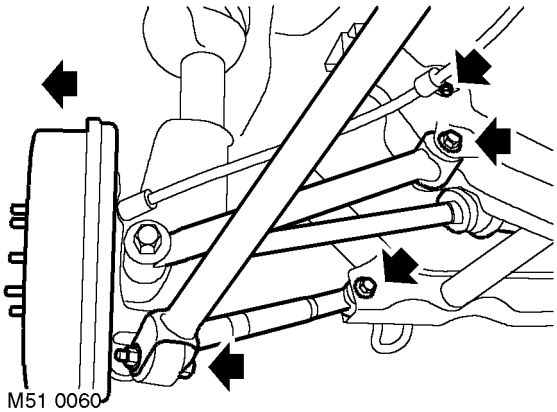
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.



M64 0139

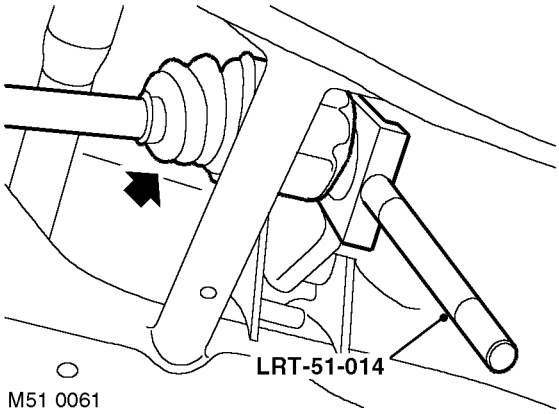
4. Release stake from drive shaft nut.
5. With assistant depressing the brake pedal, remove and discard drive shaft nut.



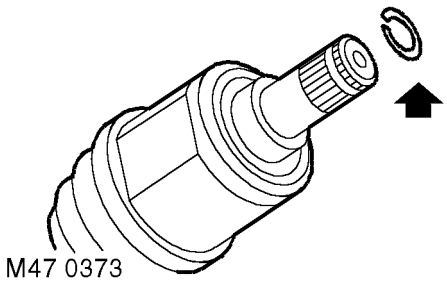
M51 0060

6. Remove nut and bolt securing trailing link to rear hub, collect spacer from under bolt head.
7. Remove nut and bolt securing fixed transverse link to subframe. Collect dynamic damper.
8. Remove nut and bolt securing adjustable transverse link to subframe.
9. Position container to catch oil spillage

10. With assistance pull hub assembly outwards and release drive shaft outer joint from hub assembly.



11. Taking care not to damage 'Flinger', release drive shaft inner joint from differential using **LRT-51-014** and remove drive shaft.



12. Remove and discard drive shaft circlip.

Refit

1. Inspect differential seal, renew if worn or damaged.
2. Clean ends of drive shaft and locations in hub and differential.
3. Lubricate oil seal running surface with transmission oil.
4. Fit new circlip to drive shaft.
5. Fit drive shaft to differential and push fully home.

CAUTION: Pull the drive shaft to ensure the circlip is fully engaged and retains the shaft.

6. With assistance fit drive shaft to hub.
7. Fit new drive shaft nut but do not tighten at this stage.
8. Fit nut, bolt and dynamic damper to adjustable transverse link and tighten to 120 Nm (89 lbf.ft).

CAUTION: Nuts and bolts must be tightened with the weight of the vehicle on the suspension.

9. Fit nut and bolt to fixed transverse link and tighten to 120 Nm (89 lbf.ft).
10. Fit spacer, nut and bolt to trailing link and tighten to 120 Nm (89 lbf.ft).
11. Fit new drive shaft nut and tighten to 400 Nm (295 lbf.ft). Stake nut to shaft.
12. Check and top up oil level.
☞ **MAINTENANCE, MAINTENANCE, Rear Axle.**
13. Fit road wheel(s) and tighten nuts to 115 Nm 85 lbf.ft).
14. Remove stands and lower vehicle.
15. Connect battery earth lead.

Gaiter - outer - rear

47.11.03

Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove drive shaft outer joint.

   DRIVESHAFTS, REPAIRS, Bell & joint - outer - rear.
5. Slide gaiter from shaft.

Refit

1. Clean drive shaft and gaiter.
2. Apply grease from the sachet to the joint.
3. Fit new gaiter to shaft.
4. Fit drive shaft outer joint.

   DRIVESHAFTS, REPAIRS, Bell & joint - outer - rear.
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stands and lower vehicle.
7. Connect battery earth lead.

Bell & joint - outer - rear

47.11.04

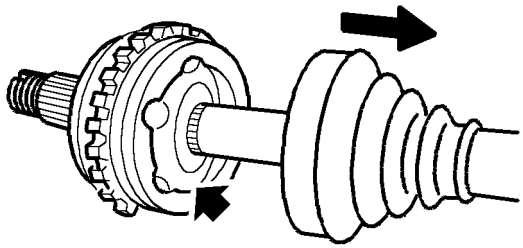
Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove drive shaft.

   DRIVESHAFTS, REPAIRS, Shaft with both joints - rear.
5. Place drive shaft in vice.
6. Release both gaiter clips and discard.



M47 0354

7. Slide gaiter along shaft to gain access to outer joint.
8. Using a suitable drift against the inner part of the joint, remove joint from shaft.
9. Inspect gaiter for damage and renew if necessary.
10. Remove and discard circlip from drive shaft.

Refit

1. Clean drive shaft and gaiter.
2. Fit new circlip to drive shaft.
3. Position outer joint to shaft, use a screwdriver to press circlip into its groove and push joint fully onto shaft.
4. Apply grease from the sachet to the joint.
5. Position gaiter to joint and use a 'Band-it thriftool' **LRT-99-019** to secure the 2 new clips.
6. Fit drive shaft.

   DRIVESHAFTS, REPAIRS, Shaft with both joints - rear.
7. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
8. Remove stands and lower vehicle.
9. Connect battery earth lead.

Gaiter - inner joint - rear

47.11.16

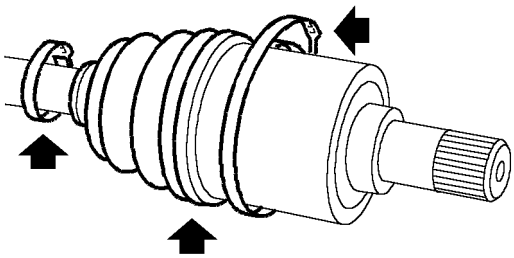
Remove

1. Disconnect battery earth lead.
2. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.
4. Remove outer gaiter.

   DRIVESHAFTS, REPAIRS, Gaiter - outer - rear.



M47 0352

5. Release both gaiter clips and discard.
6. Slide gaiter from shaft.

Refit

1. Clean drive shaft and gaiter.
2. Apply grease from the sachet to the joint.
3. Fit new gaiter to shaft.
4. Apply grease from the sachet to the joint.
5. Position gaiter to joint and use a 'Band-it thriftool' **LRT-99-019** to secure the 2 new clips.
6. Fit outer gaiter.

   DRIVESHAFTS, REPAIRS, Gaiter - outer - rear.
7. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
8. Remove stands and lower vehicle.
9. Connect battery earth lead.

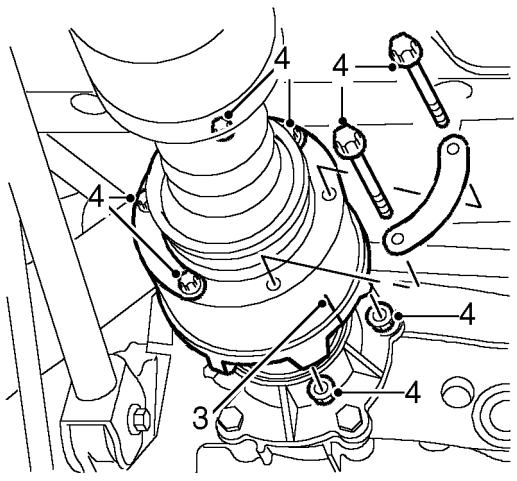
Propeller shaft assembly

47.15.01

Remove

1. Raise vehicle on a 4 post ramp.
2. Raise one wheel on each axle for rotation of propeller shaft as necessary to access fixings.

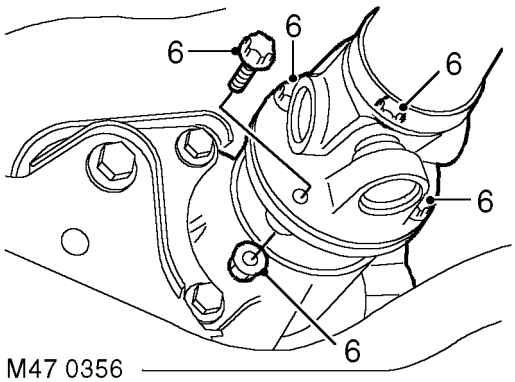
   CAUTION: When working on the propeller shafts:
   - **Always remove the propeller shafts and viscous coupling as an assembly. Dismantling the individual units on the vehicle may cause damage to the components.**
   - **Never unbolt the viscous coupling support bearings from the body without first detaching the propeller shafts at the differential and IRD. The weight of the centre section will pull the CV joint apart, causing irreparable damage.**
   - **Never allow the CV joint to be manipulated to an acute angle. This will cause the internal roller bearings to break up, leading to excessive backlash and CV joint failure.**



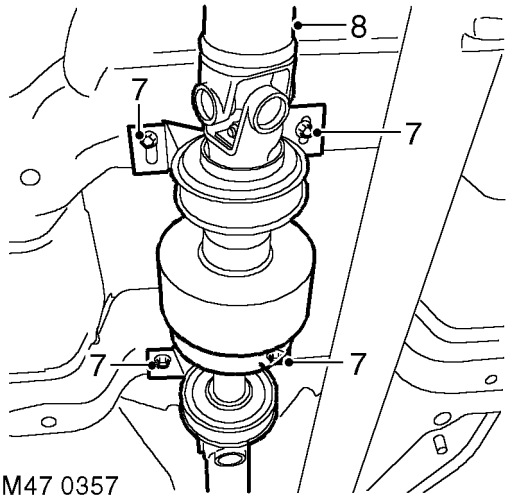
M47 0355

3. Reference mark the position of propeller shaft flanges to IRD and rear axle flanges to aid reassembly.
4. Remove 6 nuts, bolts and link washers securing CV joint to IRD flange.

5. Release the CV joint from IRD flange by pulling on the main casing of the CV joint . If necessary, position a suitable clamp around the CV joint main body, release the CV joint by levering between the clamp and the IRD flange. Support the front of propeller shaft.



6. Remove 4 nuts and bolts securing propeller shaft to rear axle flange, release and support propeller shaft from rear axle flange.



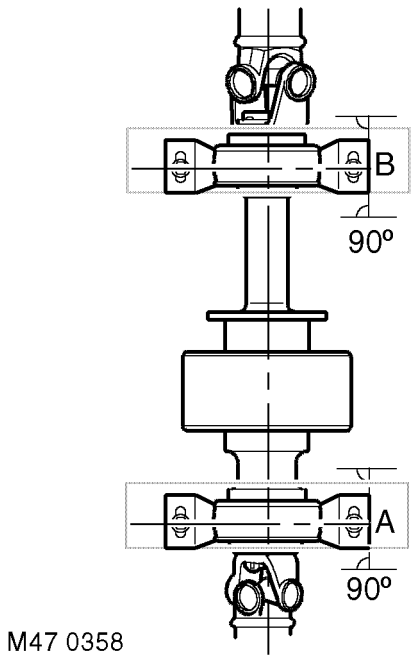
7. Remove 4 bolts securing viscous coupling support bearings.

   CAUTION: Support the weight of viscous coupling and propeller shaft.

8. With assistance remove complete propeller shaft assembly.

Refit

1. Clean propeller shaft flanges and mating faces.
2. With assistance, fit propeller shaft assembly in position, support front and rear propeller shafts at each end.
3. Align viscous coupling support bearings, fit bolts but do not tighten at this stage.
4. Position propeller shaft to rear axle and align reference marks.
5. Fit and tighten nuts and bolt securing propeller shaft to rear axle to 65 Nm (48 lbf.ft).
6. Position propeller shaft to IRD flange, align flange reference marks.
7. Fit nuts and bolts securing front propeller shaft to IRD flange and tighten to 40 Nm (30 lbf.ft).



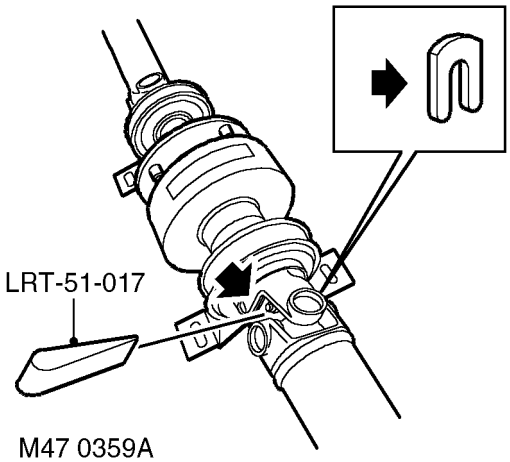
8. Correctly position support bearings at 90° to the centre line as shown at points 'A' and 'B' , tighten rear then front bolts to 28 Nm (21 lbf.ft).
9. Lower wheels.
10. Lower vehicle.

Propeller shaft - front

47.15.02

Remove

1. With assistance remove complete propeller shaft assembly.
   DRIVESHAFTS, REPAIRS, Propeller shaft assembly.
2. Knock back locktab from bolt securing propeller shaft to viscous coupling.



3. Loosen bolt securing propeller shaft to viscous coupling and slide out 'U' washer.
4. To disengage the splines, insert wedge **LRT-51-017** between the bolt head and the universal joint yoke. Screw the bolt in or out to correctly position the wedge between the yoke and the bolt head. Drive the wedge in squarely to separate the components.
5. Adjust bolt engagement as necessary to maintain contact between the wedge and the bolt head.
6. Remove bolt and tab washer, pull propeller shaft from viscous coupling. Discard tab washer and bolt if damaged.

Refit

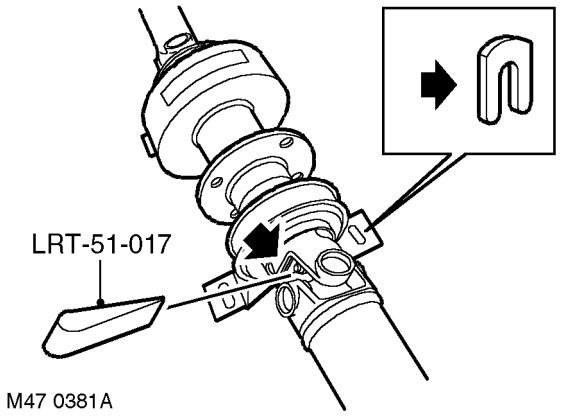
1. Clean mating faces and splines on propeller shaft and viscous coupling.
2. Engage splines between propeller shaft and viscous coupling shaft assembly and push home propeller shaft as far as possible.
3. Partially fit bolt and new tab washer, position 'U' washer between tab washer and spline yoke.
4. Tighten bolt to 65 Nm (48 lbf.ft)to fully seat splines and secure with tab washer.
5. Fit propeller shaft assembly.
   DRIVESHAFTS, REPAIRS, Propeller shaft assembly.

Propeller shaft - rear

47.15.03

Remove

1. With assistance remove complete propeller shaft assembly.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft assembly.**
2. Knock back locktab from bolt securing propeller shaft to viscous coupling.



3. Loosen bolt securing propeller shaft to viscous coupling and slide out 'U' washer.
4. To disengage the splines, insert wedge **LRT-51-017** between the bolt head and the universal joint yoke. Screw the bolt in or out to correctly position the wedge between the yoke and the bolt head. Drive the wedge in squarely to separate the components.
5. Adjust bolt engagement as necessary to maintain contact between the wedge and the bolt head.
6. Remove bolt and tab washer, pull propeller shaft from viscous coupling. Discard tab washer and bolt if damaged.

Refit

1. Clean mating faces and splines on propeller shaft and viscous coupling.
2. Engage splines between propeller shaft and viscous coupling shaft assembly and push home propeller shaft as far as possible.
3. Partially fit bolt and new tab washer, position 'U' washer between tab washer and spline yoke.
4. Tighten bolt to 65 Nm (48 lbf.ft) to fully seat splines and secure with tab washer.
5. Fit propeller shaft assembly.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft assembly.**

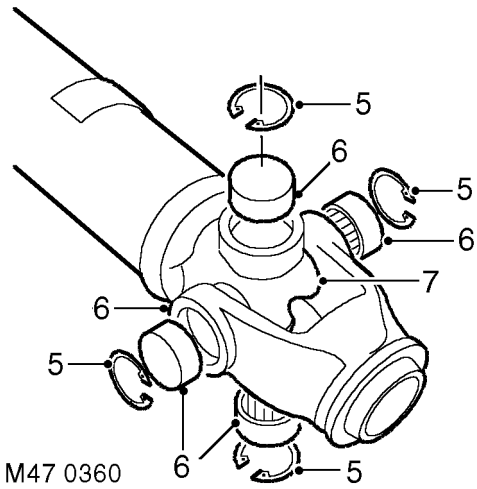
Propeller shaft - front /rear - overhaul

47.15.11

Remove

1. Remove relevant propeller shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft - front.**
2. Examine universal joint for signs of wear or damage.
3. Clean the universal joint bearing cups and circlips.

   CAUTION: Before removal, mark the position of the spider pin relative to the journal yoke ears on the propeller shaft joint. This will ensure correct assembly and reduce the possibility of imbalance.



4. Remove the circlips.
5. Tap the yokes to eject bearing cups. Remove bearing cups.
6. Remove spider from yokes.
7. Clean yokes and bearing cup locations.

Refit

1. Remove bearing cups from new spider.
2. Check all needle rollers are present and correctly positioned in bearing cups.
3. Ensure bearing cups are one-third full of lubricant.
4. Enter new spider, with seals, into one of the yokes.
5. Partially insert one bearing cup into yoke and enter spider trunnion into bearing cup.
6. Insert opposite bearing cup in yoke.
7. Press both cups into place.

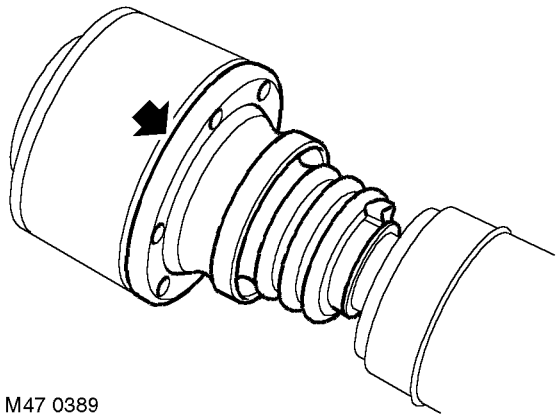
8. Press each cup into its respective location in yoke up to lower land of circlip groove.
   CAUTION: Damage may be caused to cups and seals if cups pass this point.
9. Fit circlips and check no end float exists.
10. Engage spider in second yoke. Fit bearing cups and circlips as described in steps 4 to 8.
11. Fit propeller shaft.
    ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft - front.**

Gaiter - sliding joint - front propeller shaft

47.15.15

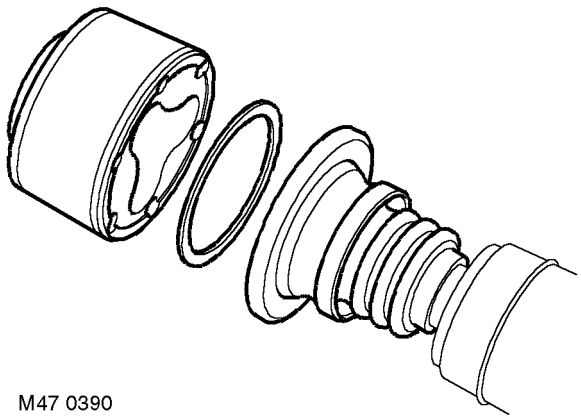
Remove

1. Remove front propeller shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft - front.**



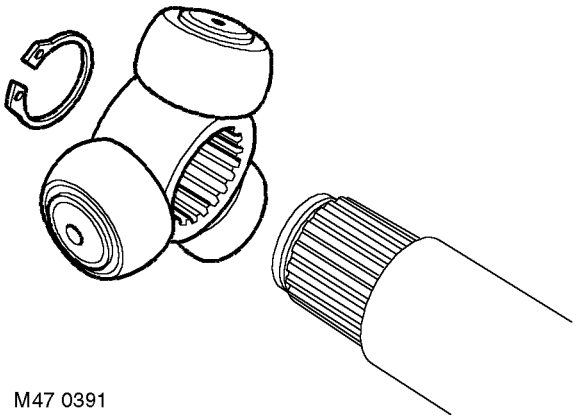
M47 0389

2. Hold joint in vice and carefully release gaiter can from joint body.



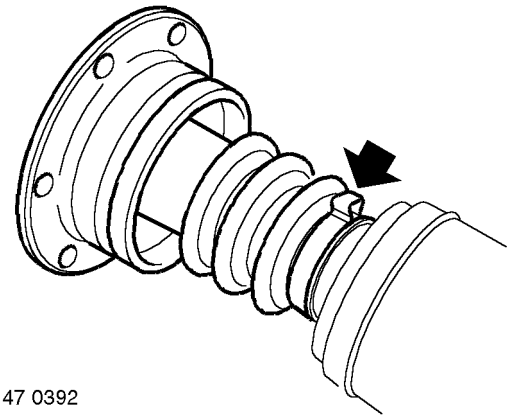
M47 0390

3. Remove joint body and discard seal.



M47 0391

4. With stub of shaft held in vice, remove circlip securing inner part of joint.
5. Remove inner part of joint from shaft.

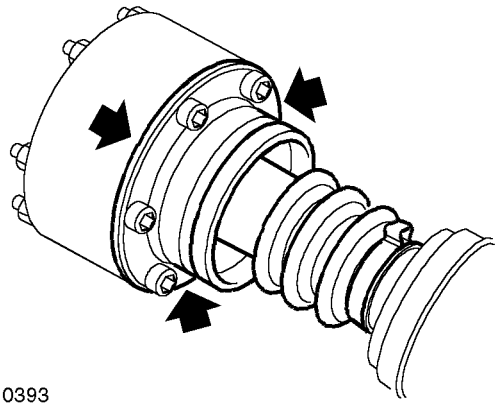


M47 0392

6. Remove clip, remove and discard gaiter.

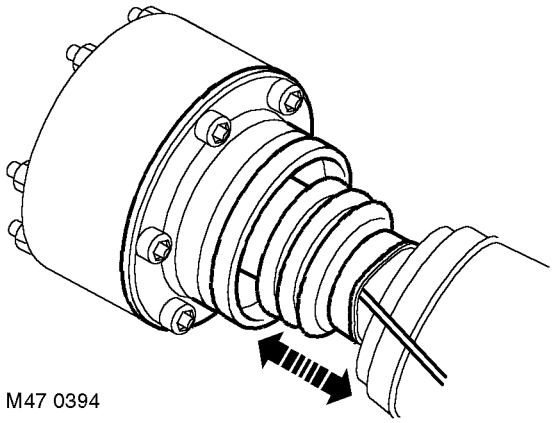
Refit

1. Clean grease from joint body and shaft.
2. Fit new clip and gaiter to shaft. Do not secure clip.
3. With shaft stub held in vice, fit inner part of joint to shaft and fit circlip.
4. Add supplied grease to joint body.
5. Smear grease to recess in joint body and fit new seal ensuring bolt holes are aligned.
6. Fit shaft to joint body, align gaiter can bolt holes and fit 6 nuts and bolts to seal joint.



M47 0393

7. Crimp gaiter can at three points as shown to secure to body.



M47 0394

8. Raise edge of gaiter and plunge joint to expel air.
9. Tighten clip to secure gaiter and remove nuts and bolts from joint body.
10. Fit front propeller shaft.

☞ **DRIVESHAFTS, REPAIRS, Propeller shaft - front.**

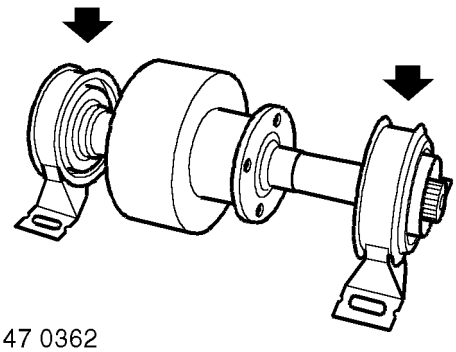
Viscous coupling assembly

47.20.01

Remove

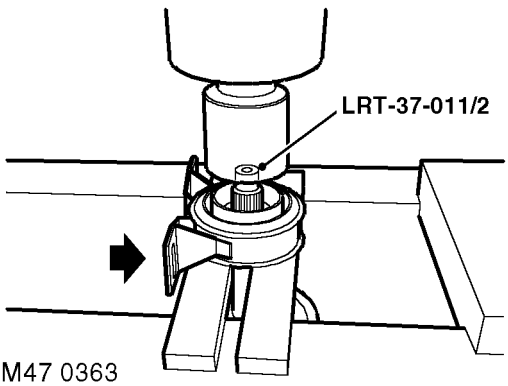
1. Remove front propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft - front.
2. Remove rear propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft - rear.

   CAUTION: When removing and refitting any components to viscous unit, full support must be given using the flange adjacent to the splines. Under no circumstances should any load be applied through the viscous unit bearings.



M47 0362

3. Note the fitted position of the support bearing on the viscous coupling.

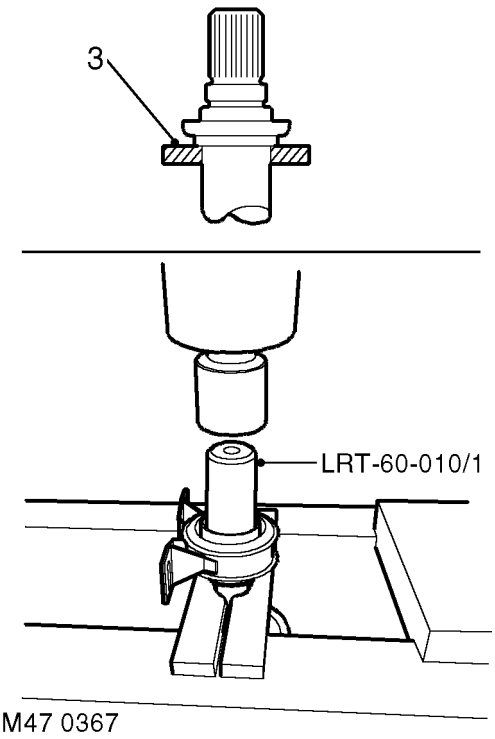


M47 0363

4. Position suitable press bars to support bearing as shown, taking care that the press bars are not positioned on the steel flinger.
5. With assistance, position viscous coupling assembly onto press bed.
6. Position **LRT-37-011/2** thrust button onto viscous coupling splines.
7. With assistance, press the splined end of the viscous coupling unit through the support bearing. Take care that the viscous coupling does not drop when free of the support bearing.
8. Remove viscous coupling assembly from press.

Refit

1. Clean flinger, bearing journal, splines and support bearings.
2. Ensure that cavities between bearing and outer shrouds are packed with Texaco Novatex EP2 grease.



M47 0367

3. With assistance, position viscous coupling assembly onto press bed and locate the press bars onto collar on viscous coupling as shown.
4. Position **LRT- 60-010/1** onto bearing inner race, and with assistance, press support bearing onto viscous coupling.
5. Remove viscous coupling assembly from press.
6. Spin support bearing to confirm true running.
7. Fit front propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft - front.
8. Fit rear propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft - rear.

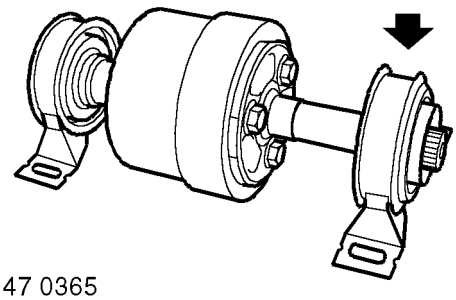
Support bearing - front

47.20.05

The procedure to replace the rear support bearing is identical to that of the front.

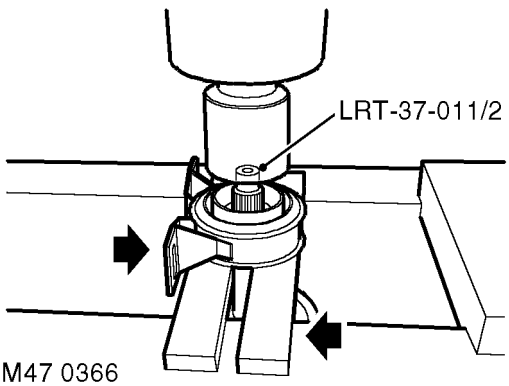
Remove

1. Remove front propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft - front.
2. Remove rear propeller shaft.
   DRIVESHAFTS, REPAIRS, Propeller shaft - rear.



M47 0365

3. Note the fitted position of the support bearing on the viscous coupling.
   CAUTION: When removing and refitting any components to viscous unit, full support must be given using the flange adjacent to the splines. Under no circumstances should any load be applied through the viscous unit bearings.

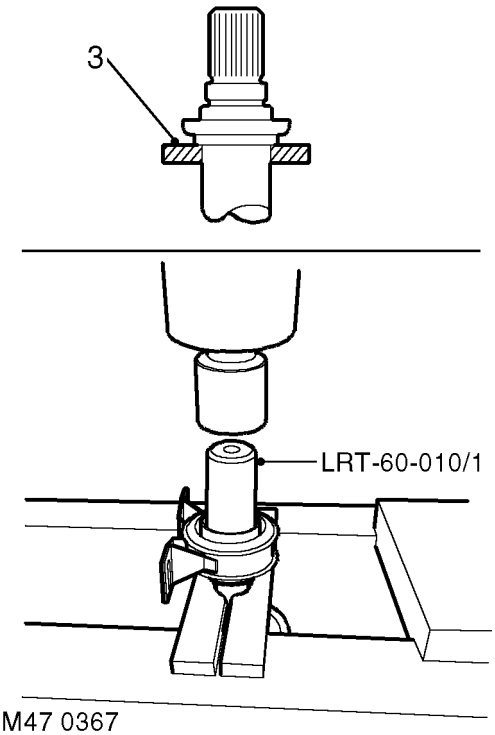


M47 0366

4. Position suitable press bars to support bearing as shown, taking care that the press bars are not positioned on the steel flinger.
5. With assistance, position viscous coupling assembly onto press bed.
6. Position **LRT-37-011/2** thrust button onto viscous coupling splines.
7. With assistance, press the splined end of the viscous coupling unit through the support bearing. Take care that the viscous coupling does not drop when free of the support bearing.
8. Remove viscous coupling assembly from press.

Refit

1. Clean flinger, bearing journal, splines and support bearings.
2. Ensure that cavities between bearing and outer shrouds are packed with Texaco Novatex EP2 grease.



M47 0367

3. With assistance, position viscous coupling assembly onto press bed and locate the press bars onto collar on viscous coupling as shown.

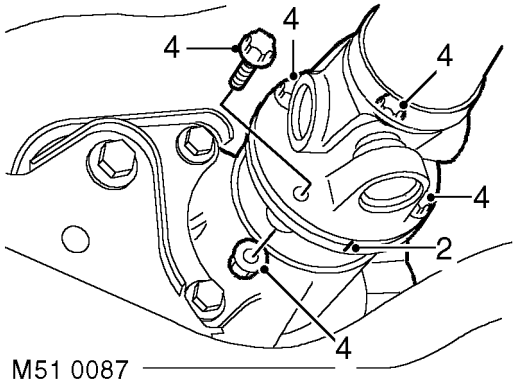
4. Position **LRT- 60-010/1** onto bearing inner race, and with assistance, press support bearing onto viscous coupling.
5. Remove viscous coupling assembly from press.
6. Spin support bearing to confirm true running.
7. Fit front propeller shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft - front.**
8. Fit rear propeller shaft.
   ☞ **DRIVESHAFTS, REPAIRS, Propeller shaft - rear.**

Differential assembly

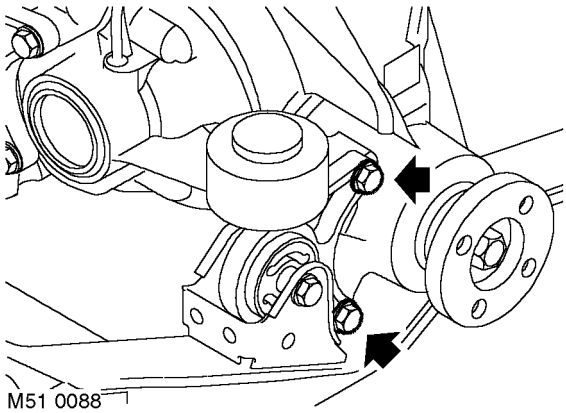
51.15.01

Remove

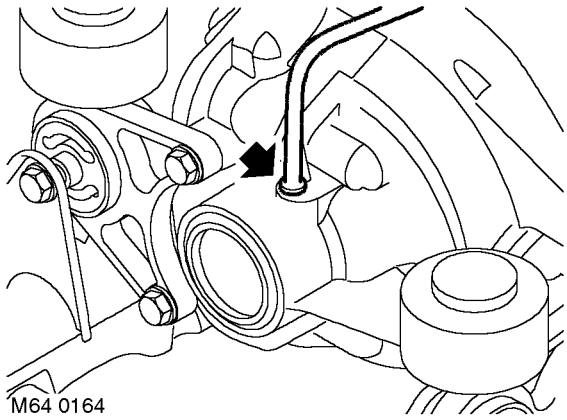
1. Remove both drive shafts.
   DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.
   DRIVESHAFTS, REPAIRS, Shaft with both joints - RH.



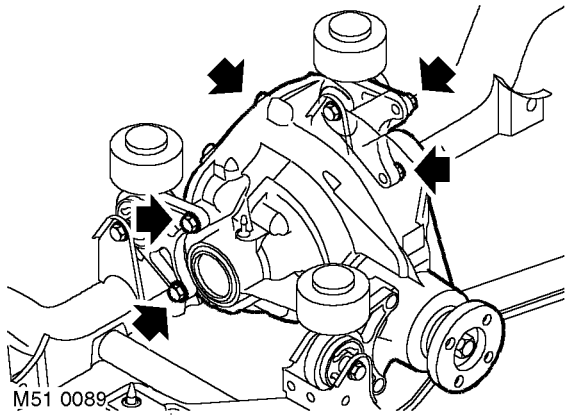
2. Reference mark rear propeller shaft for reassembly.
3. Position container to catch oil spillage
4. Remove 4 nuts and bolts securing propeller shaft to differential. Release propeller shaft and tie aside.
5. Support weight of differential assembly on a jack.



6. Remove 2 bolts securing differential to front mounting.



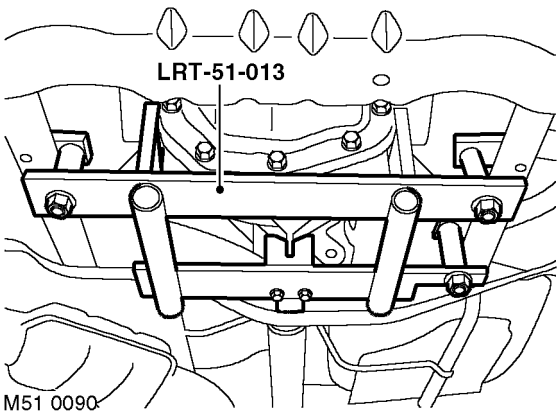
7. Depress red locking collar and disconnect breather pipe from differential casing.



8. Remove 4 bolts securing differential assembly to rear mountings.
9. With assistance, rotate differential assembly through 90° and remove from subframe.

Refit

1. With assistance position differential assembly to subframe and locate in mountings, fit bolts but do not tighten at this stage.



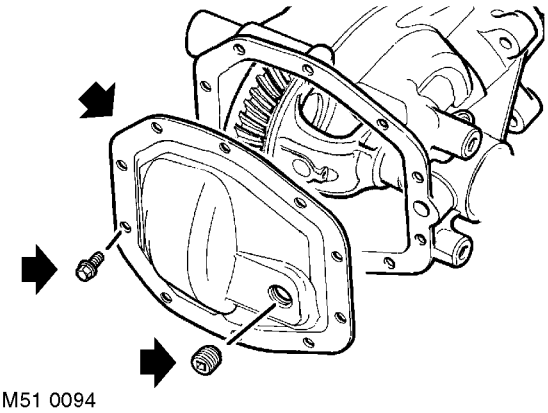
2. Position centralising jig **LRT-51-013** to align differential assembly.
3. Tighten forward bolts to 65 Nm (48 lbf.ft).
4. Tighten rearward bolts to 65 Nm (48 lbf.ft).
5. Remove **LRT-51-013**.
6. Connect breather pipe.
7. Position propeller shaft to rear axle and align reference marks.
8. Fit and tighten nuts and bolt securing propeller shaft to rear axle to 65 Nm (48 lbf.ft).
9. Fit drive shafts.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - RH.**
10. Check differential oil level.
    ☞ **MAINTENANCE, MAINTENANCE, Rear Axle.**

Cover - rear - differential

🔧 ***51.15.04***

Remove

1. Raise rear of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Position container to catch oil spillage.



3. Remove oil level plug.
4. Remove 10 bolts securing rear cover to differential casing.
5. Remove rear cover.

Refit

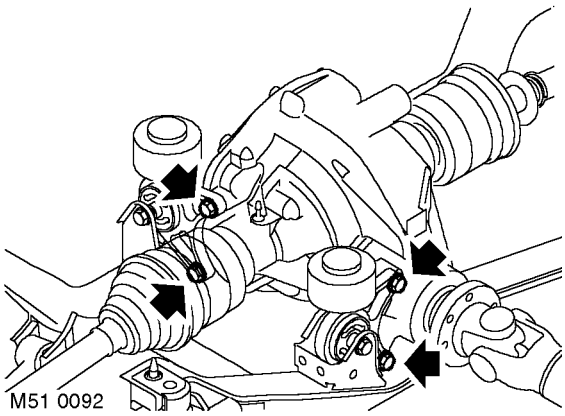
1. Clean rear cover, mating face on differential and sealant from bolts and bolt threads.
2. Apply sealant, Part No. STC 3254 to casing and fit rear cover.
3. Fit bolts and tighten to 25 Nm (18 lbf.ft).
4. Fill differential with oil.
   ☞ **MAINTENANCE, MAINTENANCE, Rear Axle.**
5. Fit and tighten level plug.
6. Remove stands and lower vehicle.

Bush - differential mounting - front

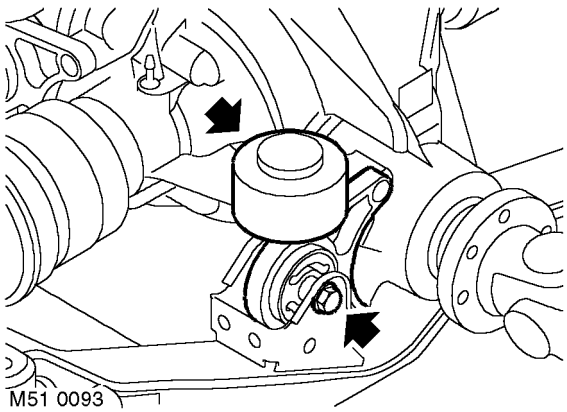
51.15.43

Remove

1. Remove LH mounting.
   REAR AXLE & FINAL DRIVE, REPAIRS, Bush - differential mounting - rear.



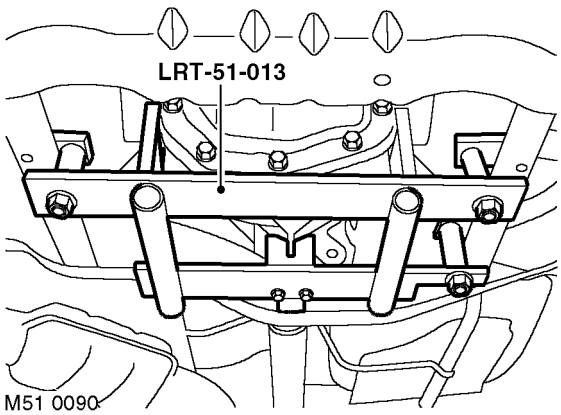
2. Remove 2 bolts securing RH mounting to differential.
3. Remove 2 bolts securing front mounting to differential.



4. Remove bolt securing front mounting subframe.
5. Ease differential away from front mounting and remove front mounting.

Refit

1. Ease differential away from front mounting and fit front mounting.



2. Ensure differential is correctly located in **LRT-51-013**.
3. Fit bolt securing mounting to subframe and tighten to 120 Nm (89 lbf.ft).
4. Fit bolts securing front mounting to differential and tighten to 65 Nm (48 lbf.ft).
5. Tighten RH mounting bolts to 65 Nm (48 lbf.ft).
6. Fit LH mounting.
   REAR AXLE & FINAL DRIVE, REPAIRS, Bush - differential mounting - rear.

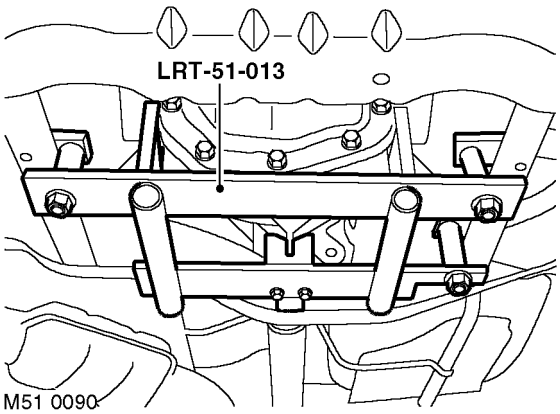
Bush - differential mounting - rear

51.15.44

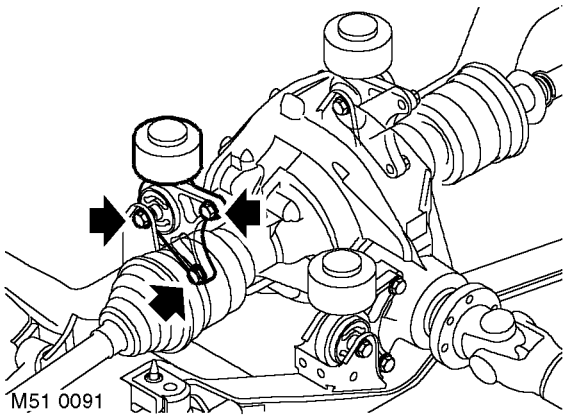
Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



2. Position centralising jig **LRT-51-013** to align differential assembly.



3. Remove bolt securing differential mounting to subframe.
4. Remove 2 bolts securing mounting to differential.
5. Remove mounting.

Refit

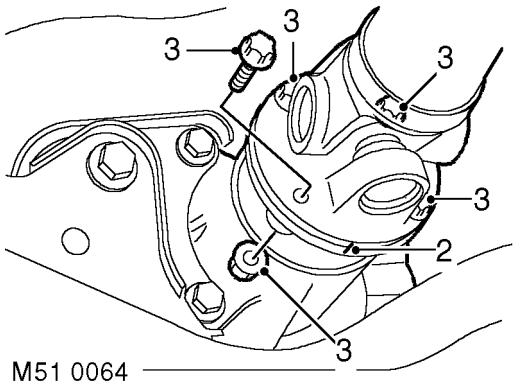
1. Position differential mounting.
2. Fit bolts securing mounting to differential and tighten to 65 Nm (48 lbf.ft).
3. Fit bolt securing mounting to subframe and tighten to 120 Nm (89 lbf.ft).
4. Remove **LRT-51-013**.
5. Remove stands and lower vehicle.

Oil seal - pinion

51.20.01

Remove

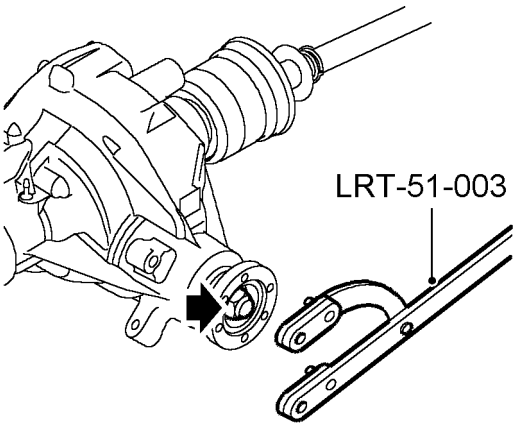
1. Release both drive shafts from differential assembly.
   REAR AXLE & FINAL DRIVE, REPAIRS, Oil seal - differential housing.



M51 0064

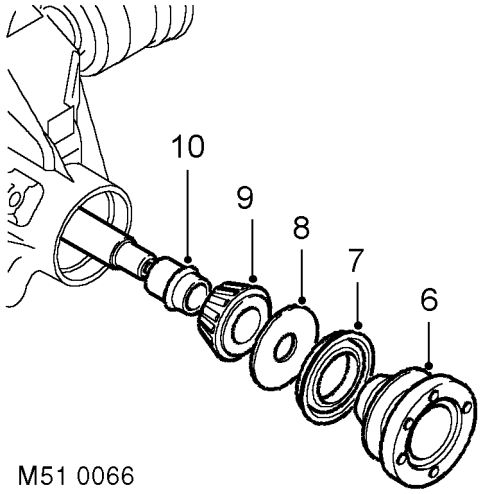
2. Reference mark propeller shaft and pinion flanges to aid reassembly.
3. Remove 4 nuts and bolts securing propeller shaft to differential. Release propeller shaft and tie aside.
4. Check and record the torque required to rotate the pinion and differential.

   CAUTION: Drive shafts must be removed to obtain correct torque to turn figure.



M51 0065

5. Using **LRT-51-003** to restrain differential flange, remove nut and washer securing pinion flange. Discard nut.

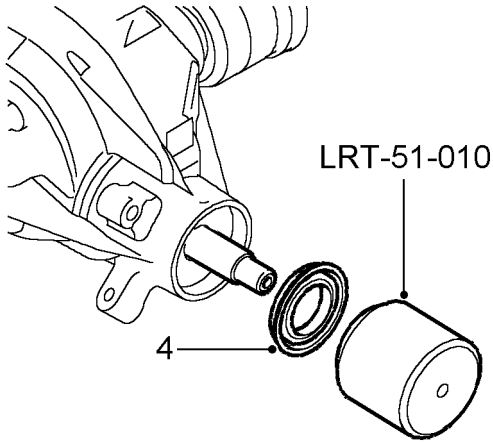


M51 0066

6. Remove pinion flange.
7. Carefully remove and discard oil seal, take care not to damage oil seal recess.
8. Remove oil thrower.
9. Remove pinion bearing inner race.
10. Remove and discard collapsible spacer.

Refit

1. Fit new collapsible spacer.
2. Fit pinion bearing and oil thrower.
3. Clean pinion flange and oil seal recess.



M51 0067

4. Fit new oil seal using **LRT-51-010.**
5. Fit pinion flange and washer.
6. Restrain pinion flange using **LRT- 51-003.**
7. Fit new pinion nut and tighten to 190 Nm (140 lbf.ft).
8. Check for end float on pinion. If end float exists continue to tighten pinion nut until end float is removed.

9. Continue to tighten pinion nut until correct preload is obtained.
10. Pinion preload is 1.7 - 2.8 Nm (1.2 - 2.1 lbf.ft), if higher replace collapsible spacer.

    CAUTION: Do not tighten pinion nut to more than 373 Nm (275 lbf.ft), or the collapsible spacer will compress too far.

11. Clean propeller shaft flange and mating face.
12. Position propeller shaft to rear axle and align reference marks.
13. Tighten propeller shaft nuts and bolts to 65 Nm (48 lbf.ft).
14. Fit drive shafts.

    ☞ **REAR AXLE & FINAL DRIVE, REPAIRS, Oil seal - differential housing.**
15. Check differential oil level.

    ☞ **MAINTENANCE, MAINTENANCE, Rear Axle.**

Oil seal - differential housing

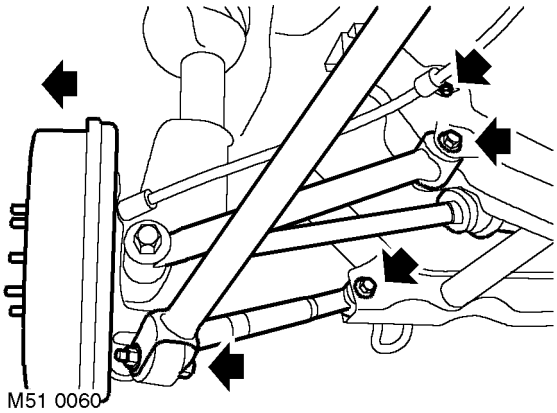
⊸ ***51.20.36***

Remove

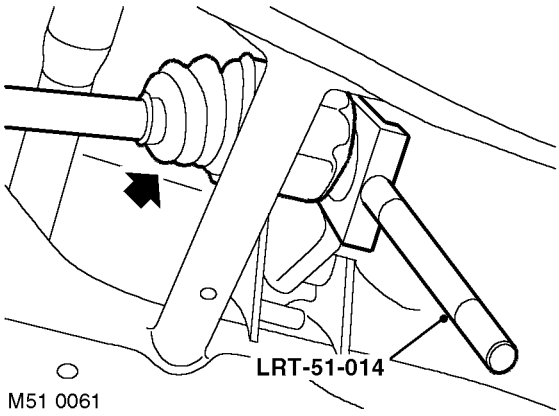
1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

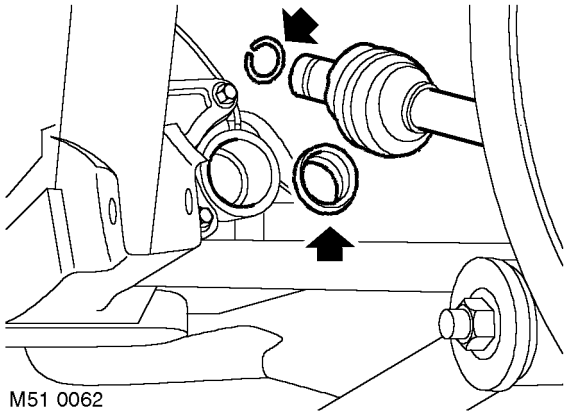
2. Remove road wheel.



3. Remove bolt securing handbrake cable to subframe.
4. Remove nut and bolt securing trailing link to rear hub, collect spacer from under bolt head.
5. Remove nut and bolt securing fixed transverse link to subframe. Collect dynamic damper.
6. Remove nut and bolt securing adjustable transverse link to subframe.
7. Position drain tin to catch oil spillage.
8. With assistance pull hub assembly outwards.



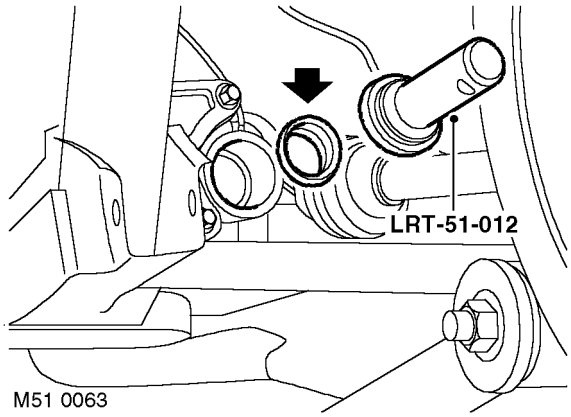
9. Taking care not damage oil seal 'flinger', release drive shaft from differential using **LRT-51-014** and position shaft aside.



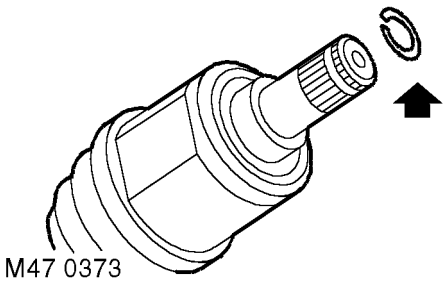
10. Remove and discard circlip from drive shaft.
11. Remove differential oil seal.

Refit

1. Clean drive shaft oil seal recess in axle casing.



2. Fit new oil seal using **LRT-51-012.**
3. Clean end of drive shaft and location in differential.
4. Check condition of oil seal 'Flinger', renew if damaged.



5. Fit new circlip to drive shaft.
6. With assistance fit drive shaft to differential, push drive shaft fully home to engage circlip.
7. Fit nut and bolt to fixed transverse link and tighten to 120 Nm (89 lbf.ft).

   CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.

8. Fit nut, bolt and dynamic damper to adjustable transverse link and tighten to 120 Nm (89 lbf.ft).
9. Fit spacer, nut and bolt to trailing link and tighten to 120 Nm (89 lbf.ft).
10. Fit bolt securing handbrake cable clip and tighten to 22 Nm (16 lbf.ft).
11. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
12. Check differential oil level.

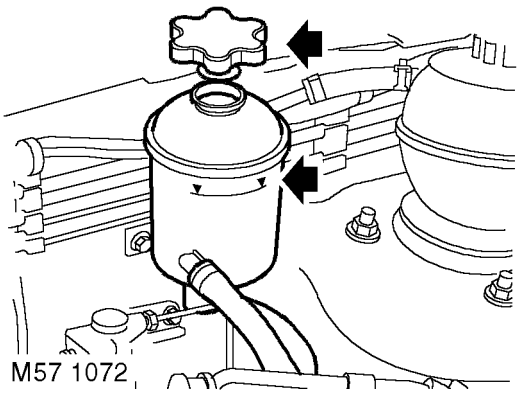
    ☞ **MAINTENANCE, MAINTENANCE, Rear Axle.**
13. Remove stands and lower vehicle.

Power assisted steering (PAS) system - bleed

57.15.02

Check

1. Switch off engine.



2. Check power steering fluid, if aerated, wait until fluid is free from bubbles then top-up reservoir to 'UPPER' level mark.
3. Fit reservoir filler cap.

Adjust

1. Clean PAS fluid reservoir around filler cap and fluid level indicators.
2. Remove filler cap from reservoir and fill reservoir to 'UPPER' mark with Dexron II D power steering fluid. Fluid must always be present in reservoir while bleeding.
3. Start engine and allow to run at idle for 10 seconds. Stop engine.
4. Top-up steering fluid reservoir.
5. Start engine and turn steering fully to LH and RH locks. Stop engine.

   CAUTION: Do not hold steering at full lock for longer than 10 seconds.

6. Top-up steering fluid reservoir.
7. Start and run engine for 2 minutes, turn steering fully to RH and LH locks.

Cable - key interlock - adjust

57.40.52

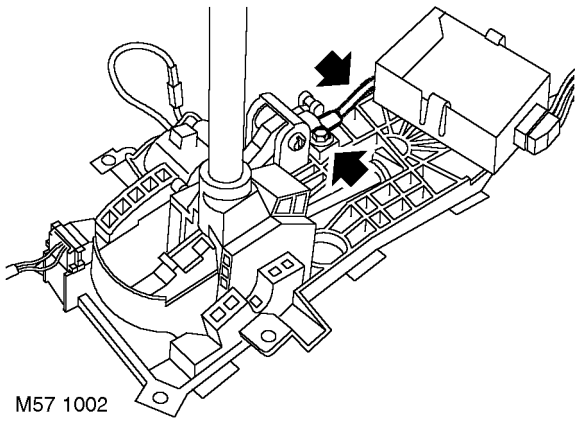
Check

1. Select position 'P'.
2. Remove key from starter switch.
3. Check that selector lever cannot be moved from 'P' position.
4. Insert and turn key to position II.
5. Depress brake pedal and check that selector lever can be moved from 'P' position, and key cannot be removed from starter switch. Key should only rotate back to a position between I and 0.

Adjust

1. Select position 'P'.
2. Remove key from starter switch.
3. Remove front console.

   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.



4. Loosen bolt securing cable clamp.
5. Pull cable away from interlock mechanism until spring pressure is felt. Correct adjustment is cable free play removed without compressing spring. When correct tighten interlock cable clamp screw to 6 Nm (4.5 lbf.ft).
6. Recheck cable operation.
7. Fit front console.

   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.

Front wheel alignment - check & adjust

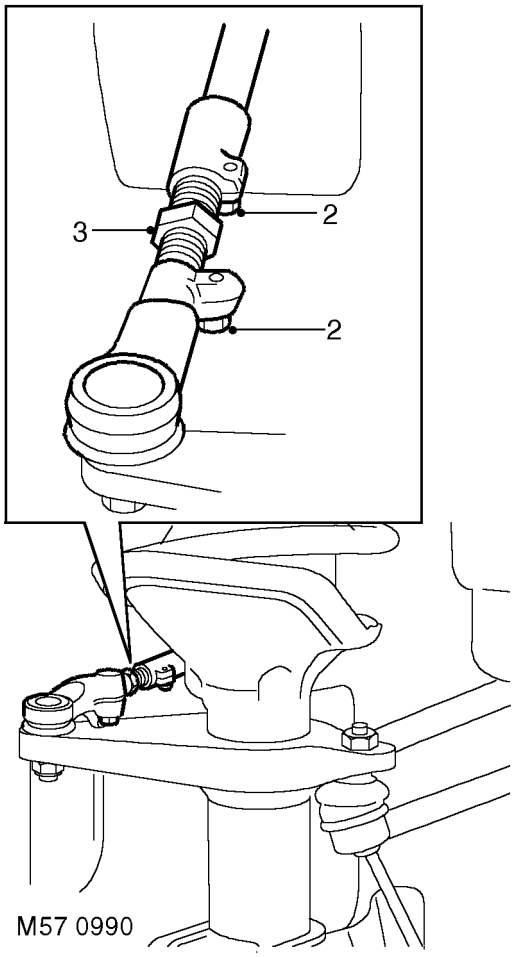
57.65.01

Check

1. Ensure tyre pressures are correct and vehicle is at kerbside weight.
2. Roll vehicle backwards and forwards to relieve stresses in steering and suspension.
3. Ensure that wheel alignment equipment is properly calibrated.
4. Check front wheel alignment is within tolerance.
   GENERAL DATA, Steering.

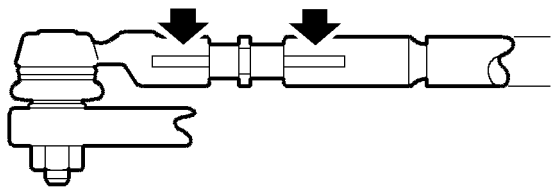
Adjust

1. Mark position of steering ball joints for reference.



M57 0990

2. Loosen track rod and ball joint pinch bolts.
3. Rotate turn buckle to obtain correct alignment. Ensure ball joint is not rotated.
   CAUTION: Both track rods must be rotated an equal amount.
4. Recheck front wheel alignment.


M57 1028

5. Tighten track rod and ball joint pinch bolts to 28 Nm (21 lbf.ft).
   CAUTION: Ensure slots in turn buckle clamps are aligned.

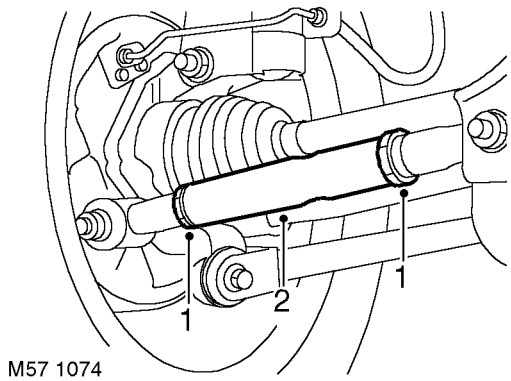
Alignment - rear wheel - check & adjust

57.65.06

Check

1. Ensure tyre pressures are correct and vehicle is at kerbside weight.
2. Roll vehicle backwards and forwards to relieve stresses in steering and suspension.
3. Ensure that wheel alignment equipment is properly calibrated.
4. Check front wheel alignment is within tolerance.
   GENERAL DATA, Steering.
5. Check rear wheel alignment is within tolerance.
   GENERAL DATA, Steering.

Adjust



M57 1074

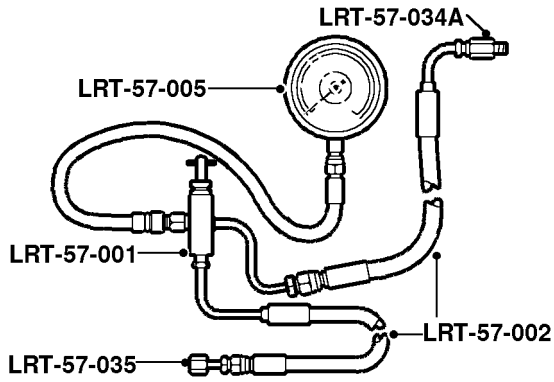
1. Hold turnbuckle on adjustable link and loosen both lock nuts.
2. Rotate turnbuckle to obtain correct alignment.
   GENERAL DATA, Steering.
3. Hold turnbuckle and tighten lock nuts to 90 Nm (66 lbf.ft).
4. Roll vehicle backwards and forwards to relieve stress in suspension.
5. Repeat check and adjust procedure on other side of vehicle.

Power steering - pressure test

57.90.10.01

Check

1. Position absorbent cloth to catch spillage.
2. Remove bolt securing PAS high pressure pipe clip to PAS pump.
3. Loosen union securing high pressure pipe to PAS pump and release pipe.



M57 1073B

4. **K1.8 models:** Fit adaptor **LRT-57-034A** to high pressure port of PAS pump.
5. **KV6 & Td4 models:** Fit adaptor **LRT-57-042** to high pressure port of PAS pump.
6. Fit adaptor **LRT-57-035** to existing high pressure hose.
7. Fit hose **LRT-57-002** to each adaptor.
8. Fit pressure gauge **LRT-57-005** to test valve **LRT-57-001**
9. Connect hoses **LRT-57-002** to **LRT-57-001** and tighten unions.
10. Ensure steering system and test equipment is free from leaks.
11. Maintain maximum fluid level during test.
12. With the test valve open, start the engine.
13. Pressure at idle should be between 5 and 7 bar.
14. With the engine at idle, slowly turn the steering wheel and hold on full lock.
15. Repeat procedure for other side.
16. Test pressure should rise significantly as steering wheel is rotated and continue to rise as full lock is approached, at full lock pressure should be:
    - **K1.8 models:** 90 to 100 bar.
    - **Td4 & KV6 models:** 112 to 120 bar. (maximum pump pressure)
17. With the engine at idle, release steering wheel. Pressure should read below 7 bar.

18. Pressures outside the above tolerance indicates a fault.
19. To determine if fault is in steering pump or steering rack, close the test valve for a maximum of 5 seconds.

    CAUTION: Pump damage will occur if test valve is closed for longer periods.

20. If gauge does not register correct reading, suspect faulty pump.
21. If PAS pump pressure is correct and steering is heavy at idle and becomes light as engine RPM is increased, suspect pump flow rate.
22. If maximum pump pressure is correct, suspect steering rack.
23. On completion stop engine and remove test equipment.
24. Clean PAS pump and pipe union.
25. Fit new 'O' ring to high pressure pipe, align to PAS pump and tighten union to 25 Nm (18 lbf.ft).
26. Fit bolt securing high pressure pipe clip and tighten to 8 Nm (6 lbf.ft).
27. Check and top-up PAS fluid level.

    ☞ **MAINTENANCE, MAINTENANCE, Intermediate Reduction Drive - Non NAS models.**

Power steering rack

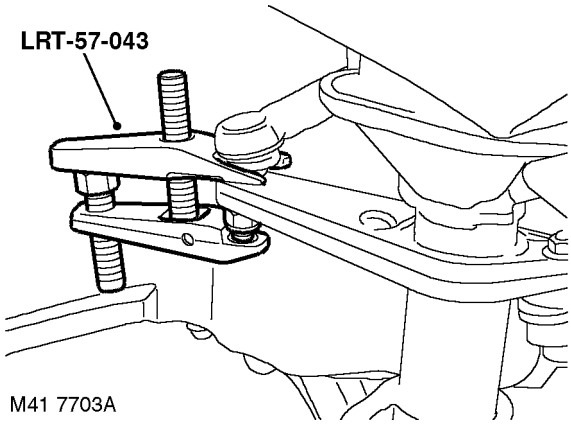
57.10.01

Remove

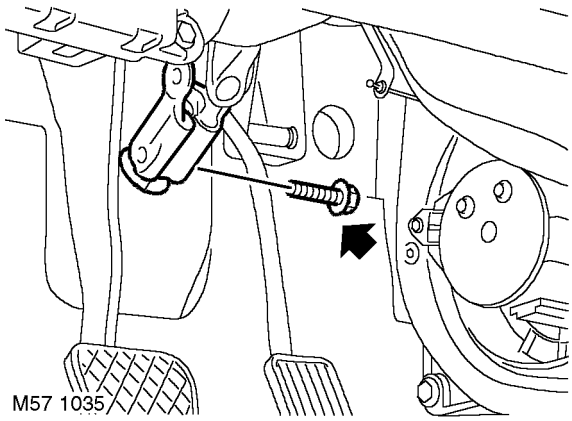
1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

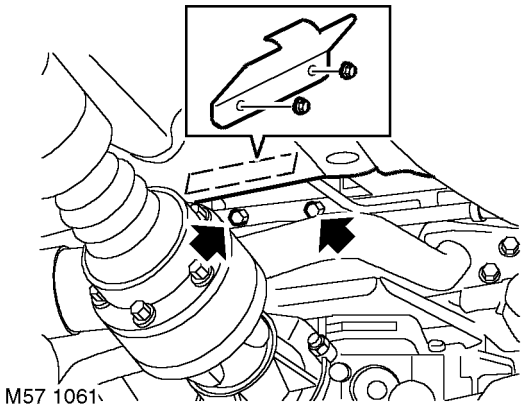
2. Remove front road wheels.



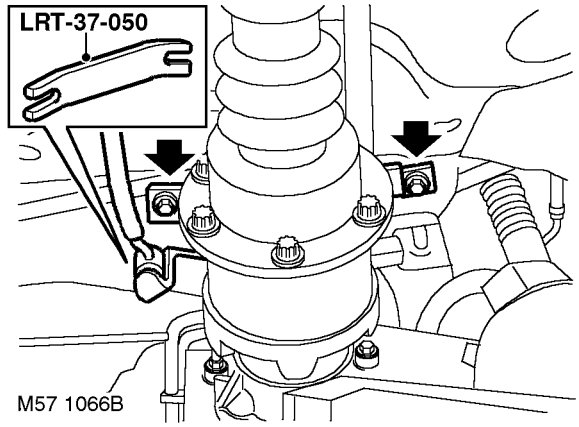
3. Remove and discard nuts securing track rod ball joints to steering arms.
4. Fit an M12 nut to each ball pin, flush with end of each pin.
5. Using **LRT-57-043,** separate ball pins from RH and LH steering arms. Remove M12 nuts and release ball pins from steering arms.



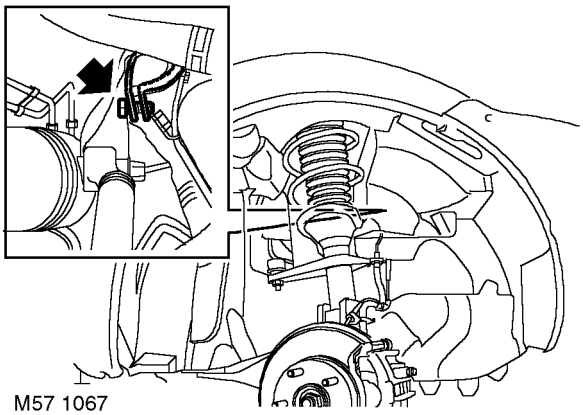
6. Remove pinch bolt securing steering column to PAS rack pinion.



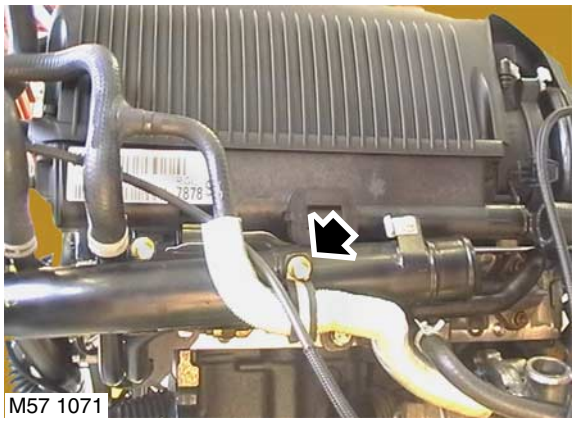
7. **KV6 models:** Remove 2 nuts securing steering rack heat shield and remove heat shield.
8. **KV6 models:** Remove 2 bolts securing coolant rail to cylinder block.



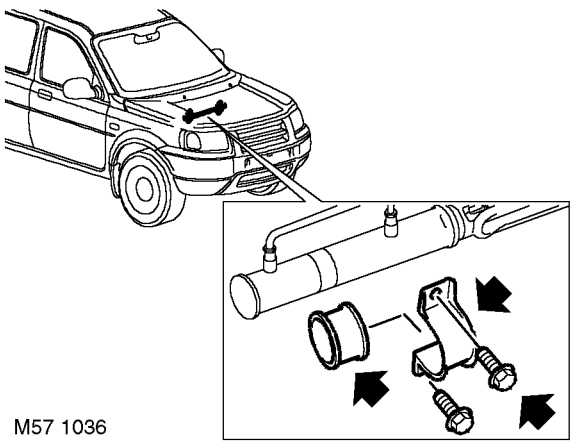
9. **Td4 manual models:** Using tool **LRT-37-050** release gear change rods from gear change linkage.
10. **Td4 manual models:** Remove 2 bolts securing gearchange linkage to bulkhead and tie aside.


M57 1067

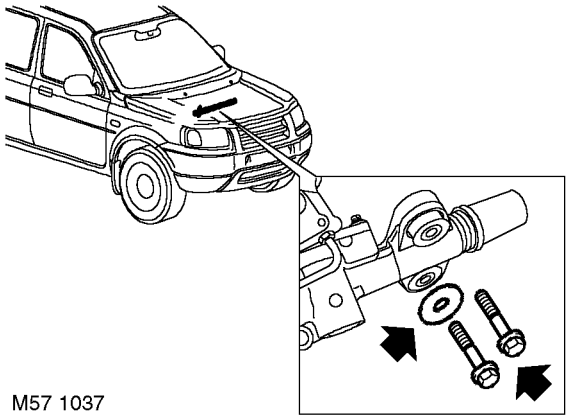
11. **Td4 manual models:** Remove bolt securing IRD coolant hose 'P' clip.


M57 1071

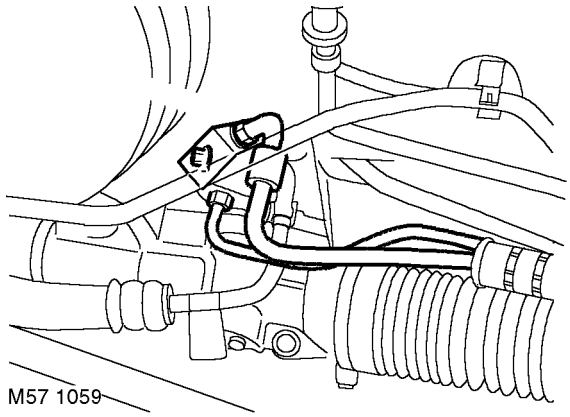
12. **Td4 auto models:** Remove bolt securing IRD coolant hose 'P' clip.


M57 1036

13. Remove 2 bolts and washers securing PAS rack clamp to bulkhead, discard bolts.
14. Remove PAS rack clamp.
15. Remove rubber mount.


M57 1037

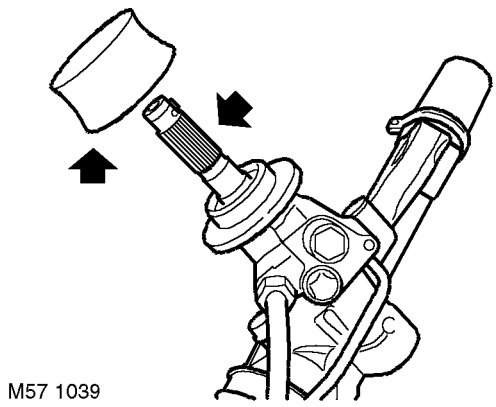
16. Remove and discard 2 bolts securing PAS rack mounting to bulkhead.
17. Release PAS rack pinion from steering column.
18. Position container to collect PAS fluid spillage.


M57 1059

19. Remove bolt securing pipe bracket to PAS rack.
20. Release pipe unions and disconnect fluid pipes from PAS rack.

    CAUTION: Always fit plugs to open connections to prevent contamination.

21. Remove and discard 'O' rings.
22. Remove bolt securing PAS pipes to clamp and loosen clamp bolt.
23. With assistance remove PAS rack from passenger side of vehicle.


M57 1039

24. Remove dust seal from pinion housing.

Refit

1. Fit PAS rack to vehicle from passengers side.
2. Fit dust shield to pinion housing.
3. Ensure pipe unions are clean.
4. Fit new 'O' rings to fluid pipes.
5. Fit fluid pipes to PAS rack but do not tighten at this stage.
6. Align fluid pipe bracket to PAS rack, fit bolt but do not tighten at this stage.
7. With assistance fit PAS rack pinion to steering column, ensuring column coupling is aligned with gear input flag.
8. Fit washers and new bolts securing steering rack mounting to bulkhead, but do not tighten at this stage. Ensure large washer is fitted to lower bolt.
9. Fit rubber mount and clamp to PAS rack.
10. Fit bolts securing clamp to bulkhead but do not tighten at this stage.
11. Tighten PAS rack mounting bolts to 45 Nm (33 lbf.ft).
12. Tighten PAS rack clamp bolts to 45 Nm (33 lbf.ft).
13. Tighten PAS rack fluid feed pipe union to 18 Nm (13 lbf.ft).
14. Tighten PAS rack fluid return pipe union to 22 Nm (16 lbf.ft).
15. Tighten fluid pipe bracket to 10 Nm (7.5 lbf.ft).
16. Align PAS rack clamp and tighten bolt.
17. Align pipes to clamp fit bolt and tighten to 10 Nm (7.5 lbf.ft).
18. Fit pinch bolt to steering column and tighten to 32 Nm (24 lbf.ft).

CAUTION: Nuts and bolts must be tightened with the weight of the vehicle on the suspension.

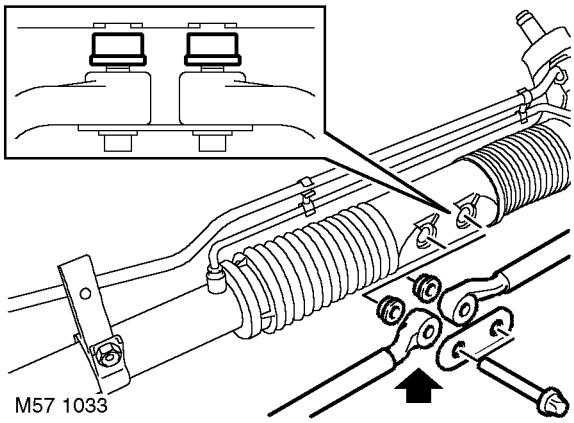
19. Ensure tapers in track rod end and steering arm are clean and rubber boot is not damaged.
20. Fit ball joints to steering arms, fit new nuts and tighten to 55 Nm (41 lbf.ft).
21. **KV6 models:** Align coolant rail to cylinder block, fit bolts and tighten to 9 Nm (7 lbf.ft).
22. **KV6 models:** Position heat shield, fit nuts and tighten to 25 Nm (18 lbf.ft)
23. **Td4 manual models:** Align IRD hose 'P' clip fit bolt and tighten to 25 Nm (18 lbf.ft).
24. **Td4 manual models:** Align gearchange linkage to bulkhead, fit bolts and tighten to 25 Nm (18 lbf.ft).
25. **Td4 manual models:** Connect gear change rods to gear change linkage.
26. **Td4 auto models:**Align IRD hose 'P' clip fit bolt and tighten to 25 Nm (18 lbf.ft).
27. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
28. Remove stands and lower vehicle.
29. Bleed PAS system.
☞ **STEERING, ADJUSTMENTS, Power assisted steering (PAS) system - bleed.**
30. Check and adjust front wheel alignment.
☞ **STEERING, ADJUSTMENTS, Front wheel alignment - check & adjust.**

Gaiter - PAS rack

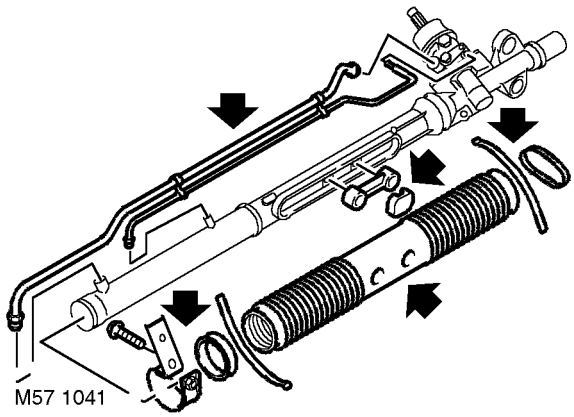
57.10.29

Remove

1. Remove PAS rack.
   STEERING, REPAIRS, Power steering rack.



2. Hold PAS rack securely and remove 2 Torx bolts securing track rods. Discard bolts.
3. Remove support plate.
4. Remove track rods and spacers.
   CAUTION: Note orientation of spacers before dismantling.



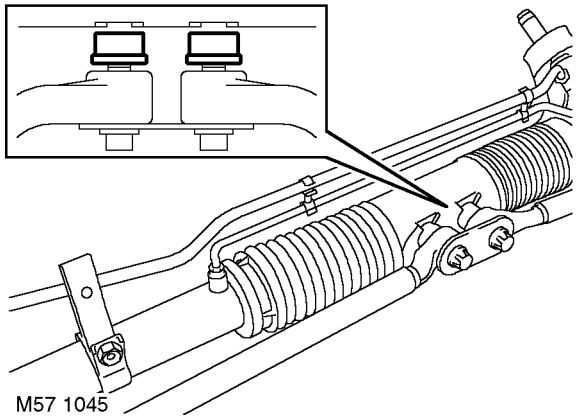
5. Remove clips from PAS rack ram feed pipes.
6. Loosen 4 pipe unions and remove both ram feed pipes.
   CAUTION: Always fit plugs to open connections to prevent contamination.

7. Remove clamp bolt from fluid pipe support bracket and remove bracket.
8. Remove 2 gaiter securing clips.
9. Remove gaiter sealing ring.
10. Remove gaiter.
11. Remove gaiter sealing band.
12. Remove slider and clip assembly.
13. Remove clip from slider.

Refit

1. Clean remains of lubricant from PAS rack slider and clip.
2. Fit clip to slider and fit slider assembly to PAS rack.
3. Apply grease supplied in the gaiter kit to exposed rack shaft, slider and clip.
4. Fit gaiter sealing band.
5. Fit gaiter.
6. Fit gaiter sealing ring.
7. Align gaiter to slider and having ensured slider is correctly located, use track rod securing bolts to hold gaiter in position, without tightening bolts, so to activate Loctite.
   CAUTION: Do not screw bolts in more than 4 or 5 turns.

8. Ensure gaiter is not twisted, and fit gaiter securing clips.
9. Fit fluid pipe support bracket and secure with bolt.
10. Ensure pipe unions and rack ports are clean.
11. Fit both ram feed pipes and tighten small diameter pipe to 18 Nm (13 lbf.ft)and large diameter pipe to 24 Nm (18 lbf.ft).
12. Fit clips to pipes.
13. Remove track rod bolts securing bolts used to align gaiter, fit spacers, track rods and support plate to PAS rack.
    CAUTION: Ensure spacers are aligned and fitted correctly.



14. Hold track rods parallel with PAS rack and tighten new Torx bolts to 100 Nm (74 lbf.ft).

15. Fit PAS rack.
☞ **STEERING, REPAIRS, Power steering rack.**

Oil cooler - Td4 & K1.8 models

57.15.11

Remove

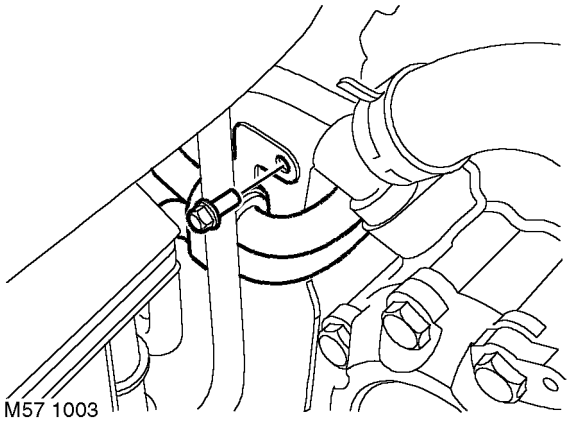
1. Disconnect battery earth lead.

2. **Td4 models:** Remove engine acoustic cover.
☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**

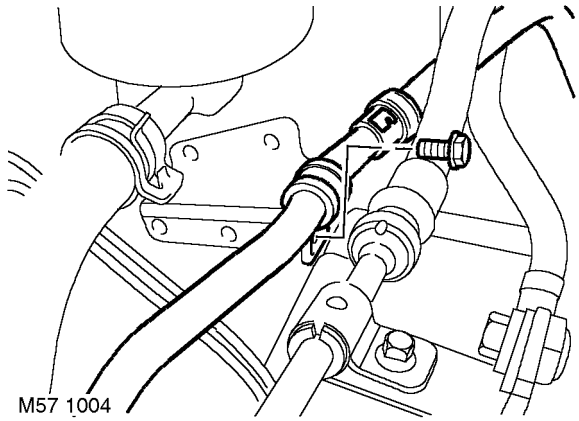
3. **Td4 models:** Release and remove air intake duct.
☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.**

4. **Td4 models:** Loosen 2 clips and remove intercooler outlet hose.

5. **Td4 models:** Remove dipstick for access.
CAUTION: Always fit plugs to open connections to prevent contamination.



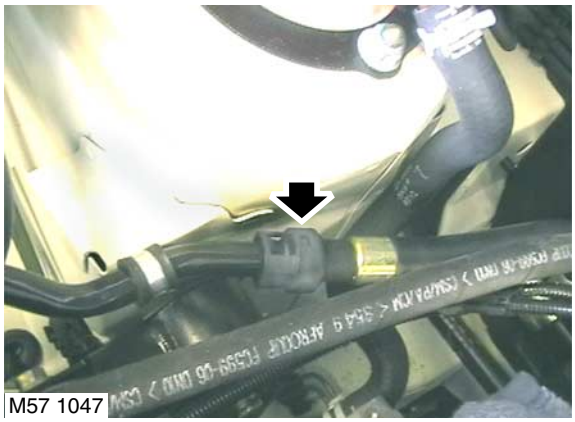
6. Remove bolt securing PAS oil cooler pipe lower mounting bracket to body.



7. Remove bolt securing PAS oil cooler pipe to RH suspension turret.

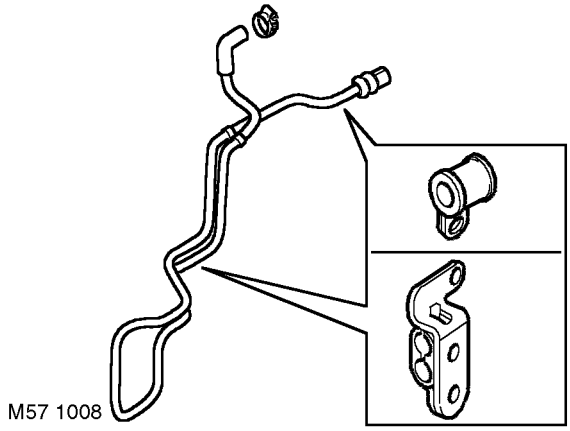

M12 6972

8. Place a suitable container beneath PAS reservoir, release clip and disconnect return hose from mount. Allow fluid to drain.
9. Place container beneath PAS quick release pipe fitting.
10. Clean area surrounding quick release connection.


M57 1047

11. Using **LRT-57-044,** disconnect cooler quick release hose.
12. Release PAS reservoir from mounting bracket and move aside.
13. Remove PAS oil cooler from vehicle.

NOTE: Do not carry out further dismantling if component is removed for access only.


M57 1008

14. Remove clips from PAS oil cooler.

Refit

1. Clean cooler mounting points.
2. Fit clips to PAS cooler.
3. Fit PAS oil cooler to vehicle.
4. Connect quick release pipe fitting.
5. Align PAS pipe bracket, fit bolt and tighten to 10 Nm (7.5 lbf.ft).
6. Fit bolt to clip securing PAS pipe to RH turret, tighten to 10 Nm (7.5 lbf.ft).
7. Fit PAS reservoir to mounting bracket.
8. Clean PAS fluid reservoir around filler cap and fluid level indicators.
9. Fit PAS return hose to reservoir and secure clip.
10. **Td4 models:** Fit intercooler outlet hose and tighten clips.
11. **Td4 models:** Fit intake duct to body and duct assembly.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Ducting - intake assembly.**
12. **Td4 models:** Fit engine oil dipstick.
13. **Td4 models:** Fit acoustic cover.
    ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
14. Connect battery earth lead.
15. Bleed PAS system.
    ☞ **STEERING, ADJUSTMENTS, Power assisted steering (PAS) system - bleed.**

Oil cooler - KV6 models

57.15.11

Remove

1. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
2. Position container below PAS pipes to catch fluid spillage.
3. Release and disconnect PAS hoses from oil cooler.
4. Remove 2 bolts and remove PAS fluid cooler.

Refit

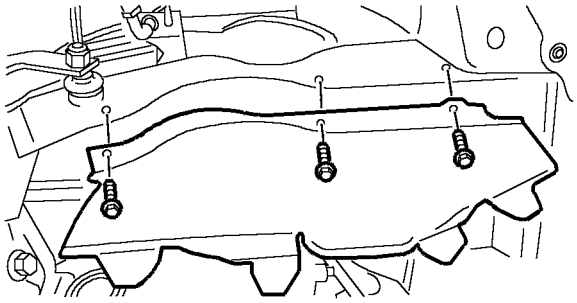
1. Fit fluid cooler and tighten bolts to 10 Nm (7.5 lbf.ft).
2. Clean connections.
3. Connect hoses to fluid cooler.
4. Fit front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
5. Bleed PAS system.
   STEERING, ADJUSTMENTS, Power assisted steering (PAS) system - bleed.

Drive belt - K1.8

57.20.02

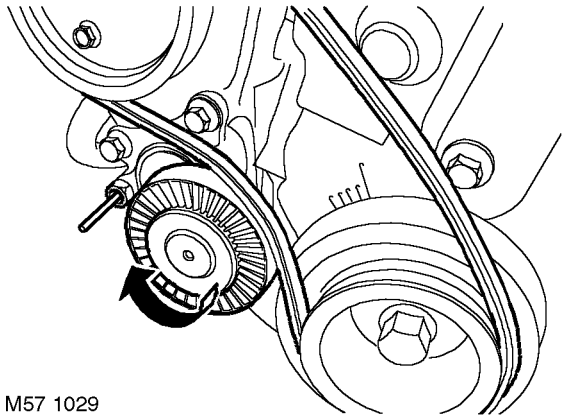
Remove

1. Disconnect battery earth lead.
2. Turn steering on RH lock.



M12 6977

3. Remove 3 bolts securing RH splash shield to body and remove shield.



M57 1029

4. Fit a 13 mm spanner to hexagon on belt tensioner and rotate fully clockwise to release tension on drive belt.
5. To hold tensioner in this position, fit a suitable pin, not exceeding 3 mm diameter, through centre of hexagon into tensioner backplate.
6. Remove and discard drive belt.

Refit

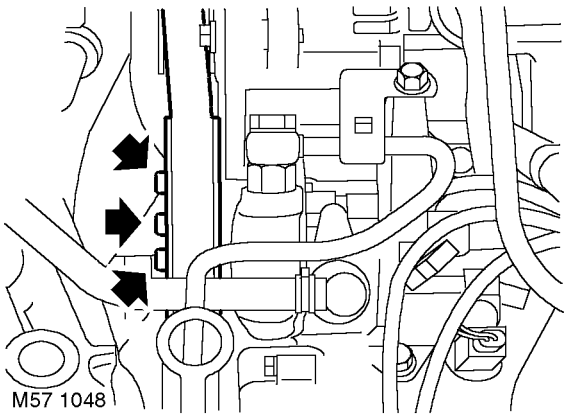
1. Clean drive belt pulley grooves and ensure grooves are not damaged.
2. Fit drive belt. Ensure belt is located correctly in pulley grooves.
3. Release tension, remove retaining pin and lower tensioner pulley onto drive belt.
4. Fit splash shield and secure with bolts.
5. Straighten steering.
6. Connect battery earth lead.

Pump - steering - KV6

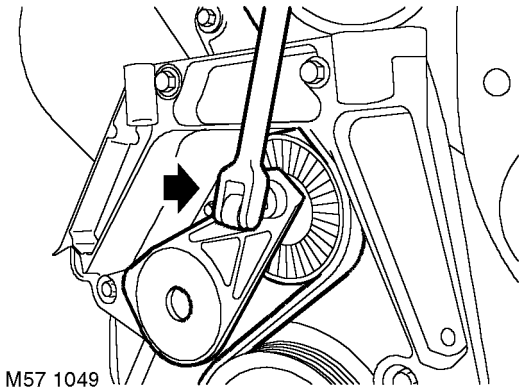
57.20.14

Remove

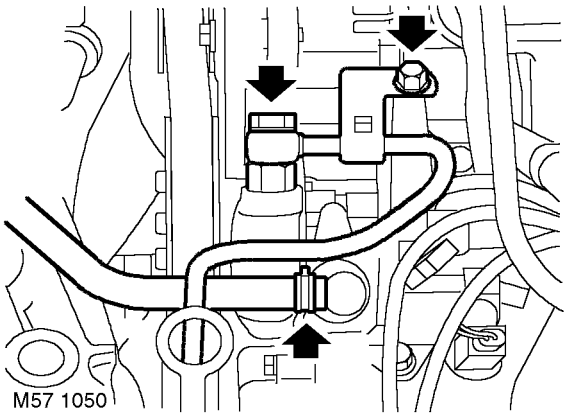
1. Disconnect battery earth lead.
2. Remove engine mounting top arm.
   ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.



3. Loosen PAS pump pulley bolts.



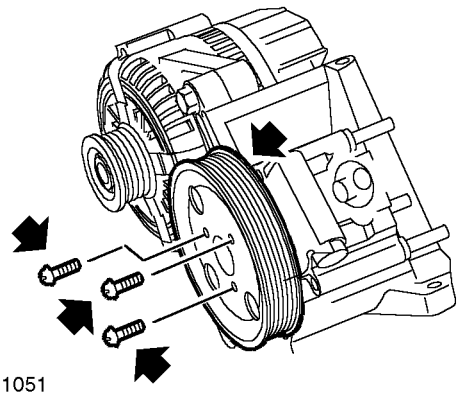
4. Using a 3/8" socket bar, raise ancillary drive belt tensioner and release drive belt from alternator and PAS pump pulleys.
5. Position container to collect PAS fluid spillage.


M57 1050

6. Release clip and disconnect fluid inlet hose from PAS pump.
7. Remove banjo bolt securing fluid outlet hose to PAS pump, release hose, remove and discard sealing washers.

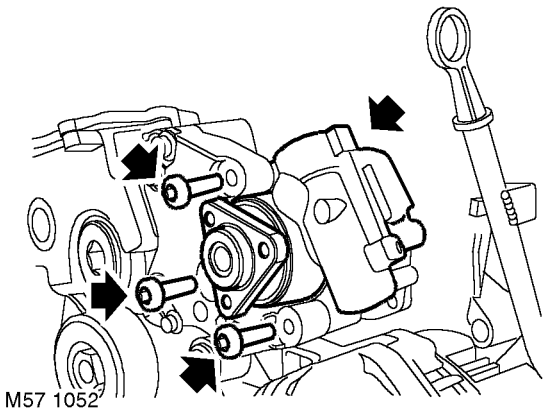
   CAUTION: To prevent damage to components, use two spanners when loosening or tightening unions.

8. Remove bolt securing PAS outlet pipe support bracket to cylinder head and move pipe aside.


M57 1051

9. Remove 3 bolts securing PAS pump pulley to PAS pump and remove pulley.

   CAUTION: Always fit plugs to open connections to prevent contamination.


M57 1052

10. Remove 3 bolts securing PAS pump to mounting bracket.
11. Remove PAS pump.

Refit

1. Position PAS pump and align to mounting bracket.
2. Fit bolts securing PAS pump to mounting bracket and tighten to 25 Nm (18 lbf.ft).
3. Fit PAS pump pulley to PAS pump and tighten bolts to finger tight.
4. Remove plug from fluid outlet hose.
5. Clean banjo bolt and mating faces.
6. Using new sealing washers, fit PAS outlet hose to pump and tighten banjo bolt to 20 Nm (15 lbf.ft).

   CAUTION: To prevent damage to components, use two spanners when loosening or tightening unions.

7. Align outlet pipe clip. Fit bolt and tighten to 22 Nm (16 lbf.ft).
8. Clean elbow on PAS pump.
9. Remove plug from fluid inlet hose, fit new clip and connect hose to PAS pump.
10. Remove container.
11. Clean pulley 'V's and tensioner pulley running surface.
12. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
13. Tighten PAS pump pulley bolts to 10 Nm (7.5 lbf.ft).
14. Fit engine mounting top arm.

    ☞ **ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.**
15. Connect battery earth lead.
16. Bleed PAS system.

    ☞ **STEERING, ADJUSTMENTS, Power assisted steering (PAS) system - bleed.**

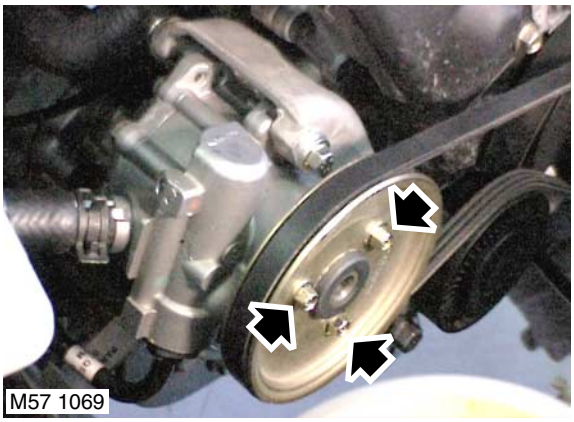
Pump - steering - K1.8

57.20.14

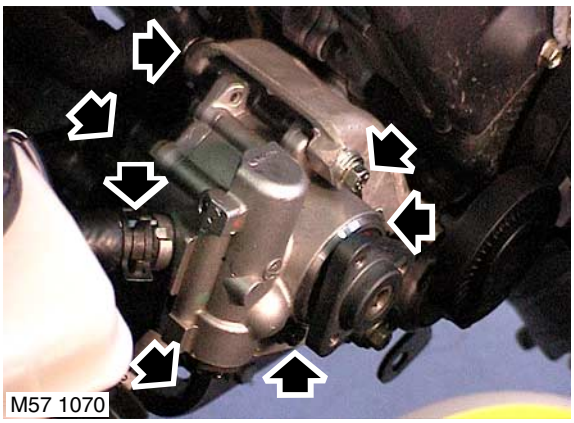
Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



3. Loosen PAS pump pulley bolts.
4. Remove PAS pump drive belt.
   ☞ **STEERING, REPAIRS, Drive belt - K1.8.**
5. Position container to collect PAS fluid spillage.



6. Release clip and disconnect fluid inlet hose from PAS pump.

   CAUTION: Always fit plugs to open connections to prevent contamination.

7. Loosen union securing fluid outlet pipe, release outlet pipe remove and discard 'O' ring.
8. Remove 3 bolts securing PAS pump pulley to PAS pump and remove pulley.
9. Remove 5 bolts securing PAS pump to mounting bracket.
10. Remove PAS pump.

Refit

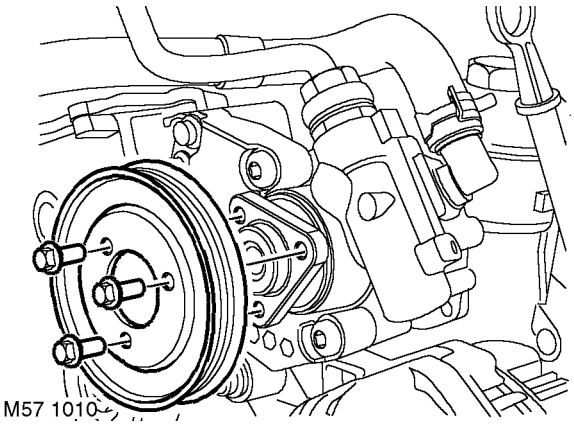
1. Position PAS pump and align to mounting bracket.
2. Fit bolts securing PAS pump to mounting bracket and tighten to 25 Nm (18 lbf.ft).
3. Fit PAS pump pulley and align bolts holes. Ensure FRONT mark is facing outwards. Fit bolts finger tight.
4. Remove plug from fluid outlet hose.
5. Clean PAS pump and pipe union.
6. Using a new 'O' ring, align outlet pipe and tighten union to 20 Nm (15 lbf.ft).
7. Clean elbow on PAS pump.
8. Remove plug from fluid inlet hose, fit new clip and connect hose to PAS pump.
9. Remove container.
10. Clean pulley 'V's and tensioner pulley running surface.
11. Fit PAS pump drive belt.
    ☞ **STEERING, REPAIRS, Drive belt - K1.8.**
12. Tighten PAS pump pulley bolts to 10 Nm (7.5 lbf.ft).
13. Connect battery earth lead.
14. Bleed PAS system.
    ☞ **STEERING, ADJUSTMENTS, Power assisted steering (PAS) system - bleed.**

Pump - steering - Td4

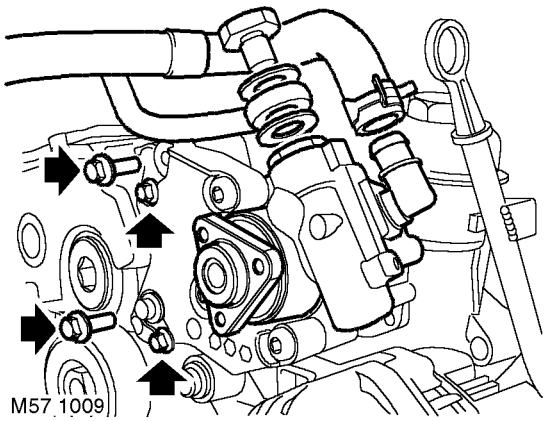
57.20.14

Remove

1. Disconnect battery earth lead.
2. Remove hydramount.
   ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**


M57 1010

3. Loosen 3 PAS pump pulley bolts.
4. Remove ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
5. Raise engine on hoist.
6. Remove bolts and remove PAS pump pulley.
7. Cover alternator to prevent PAS oil contamination.


M57 1009

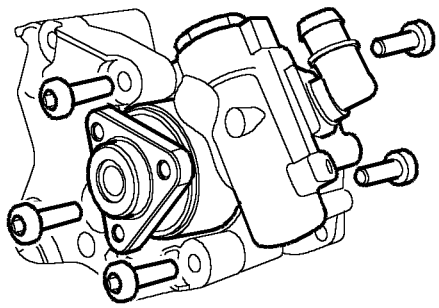
8. Place container beneath PAS pump, release clip and remove feed hose to pump. Allow fluid to drain.

   CAUTION: Care must be taken to ensure that oil or fluid does not enter or contaminate the alternator.

9. Remove banjo bolt securing fluid outlet hose to PAS pump, release hose, remove and discard sealing washers.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

10. Remove 4 bolts and remove PAS pump.


M57 1075

11. Remove 5 Torx bolts securing PAS pump to mounting brackets. Collect mounting brackets.

Refit

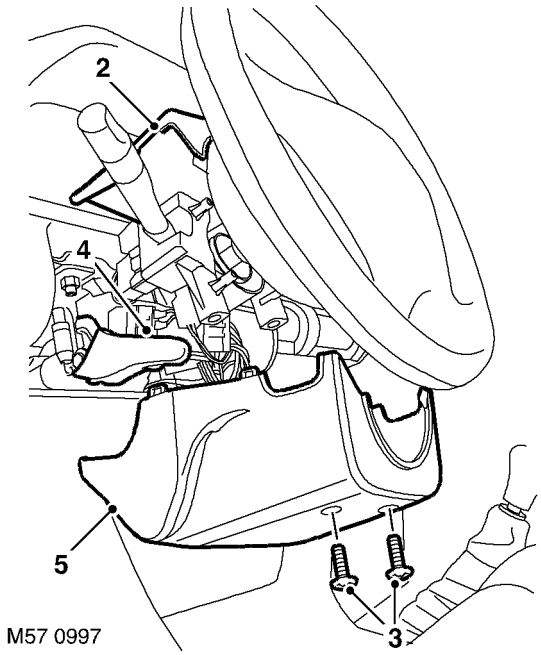
1. Position PAS pump to mounting brackets, fit and tighten Torx bolts to 25 Nm (18 lbf.ft).
2. Position pump to mounting, fit bolts and tighten M8 bolts to 25 Nm (18 lbf.ft) and M6 bolts to 10 Nm (7.5 lbf.ft).
3. Using new sealing washers, fit PAS outlet hose to pump and tighten banjo bolt to 25 Nm (18 lbf.ft).
4. Clean PAS pump and mating faces.
5. Fit inlet hose to PAS pump and secure with new clip.
6. Fit PAS pump pulley to PAS pump and tighten bolts to finger tight.
7. Fit ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
8. Tighten PAS pump pulley bolts to 10 Nm (7.5 lbf.ft).
9. Fit hydramount.
   ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
10. Connect battery earth lead.

Nacelle - column

57.40.29

Remove

1. Remove key from starter switch.



2. Carefully remove upper half of nacelle. Take care when releasing clips from lower half of nacelle.
3. Remove 2 screws securing lower nacelle to steering column.
4. Lower steering column tilt lever.
5. Carefully remove cover from starter switch being careful not to damage the passive coil.
6. Carefully pull lower half of nacelle from retaining clip on column lock

Refit

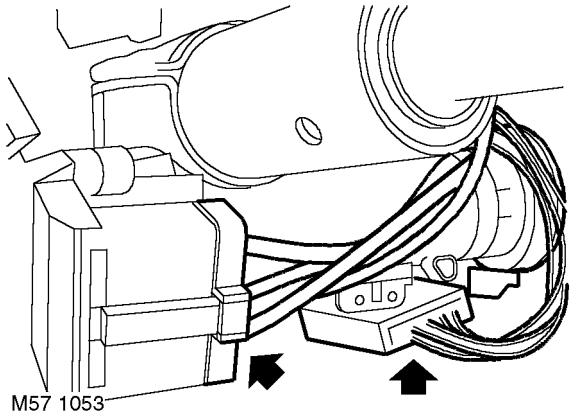
1. Ensure that the steering column tilt lever is lowered.
2. Position lower half of nacelle and engage with clip on column lock.
3. Raise column tilt lever.
4. Fit and tighten 2 screws securing lower half of nacelle to steering column.
5. Fit cover to starter switch.
6. Fit upper half of nacelle and ensure that clips engage with lower half.

Column lock & ignition/starter switch assembly

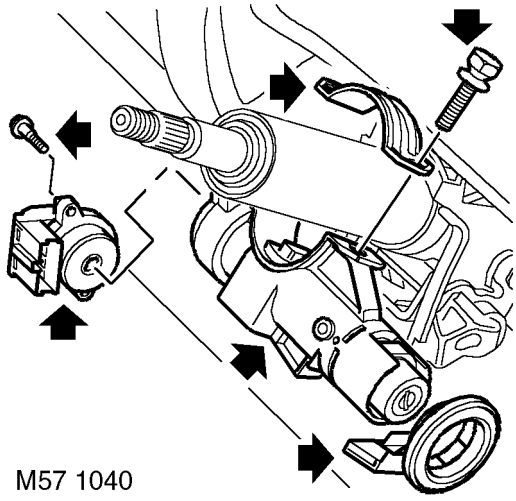
57.40.31

Remove

1. Disconnect battery earth lead.
2. Remove starter key from ignition lock.
3. Remove steering column nacelle.
   STEERING, REPAIRS, Nacelle - column.

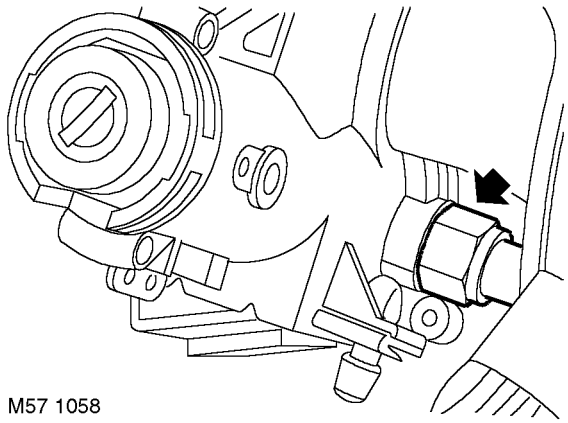


4. Disconnect multiplugs from ignition switch and passive coil.



5. Remove passive coil.
6. Remove 2 screws and remove ignition switch.
7. Move rubber column cover aside to access column lock bolts.
8. Mark both column lock bolts using a centre punch.
9. Drill out both column lock bolts.

10. Remove column lock saddle and remove column lock.



M57 1058

11. **Models with automatic transmission:** Loosen union and release key interlock cable from column lock.

Refit

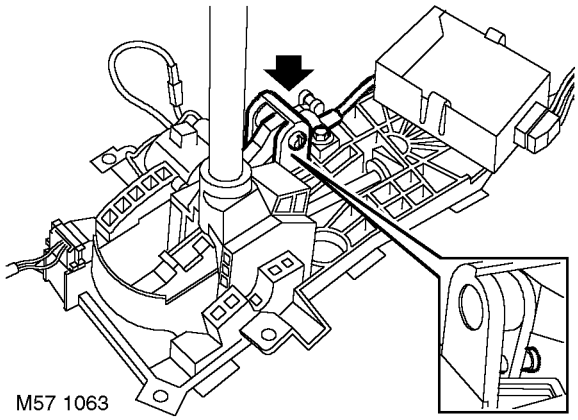
1. **Models with automatic transmission:** Align key interlock cable to column lock and tighten union to 4 Nm (3 lbf.ft).
2. Position lock to steering column assembly and fit shear bolts. Do not tighten shear bolts at this stage.
3. Insert starter key, check operation of steering lock and that key turns freely.
4. Ensure correct operation of key interlock cable.
5. Remove starter key from column lock.
6. Tighten shear bolts fully and shear heads off.
7. Position ignition switch to column, fit and tighten screws.
8. Fit passive coil.
9. Connect multiplugs to ignition switch and passive coil.
10. **Models with automatic transmission:** Ensure correct operation of microswitch.
11. Align column cover.
12. Fit steering column nacelle.
    ☞ **STEERING, REPAIRS, Nacelle - column.**
13. Connect battery earth lead.

Cable - key interlock

🔧 ***57.40.51***

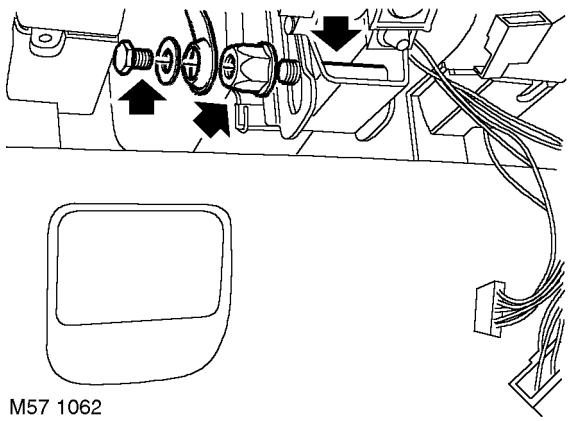
Remove

1. Disconnect battery earth lead.
2. Remove front console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**



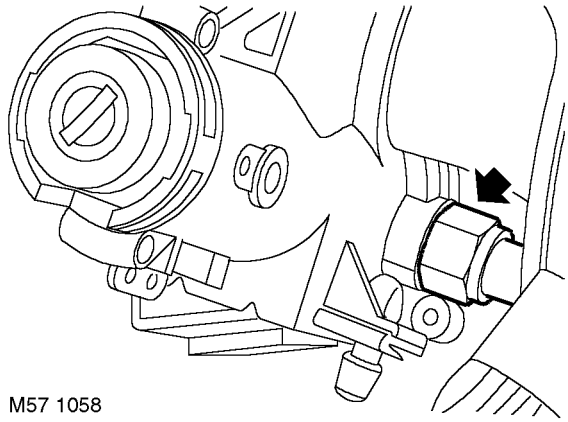
M57 1063

3. Loosen bolt securing cable clamp.
4. Disconnect cable from interlock mechanism.
5. Remove key from starter switch.
6. Remove steering column nacelle.
   ☞ **STEERING, REPAIRS, Nacelle - column.**

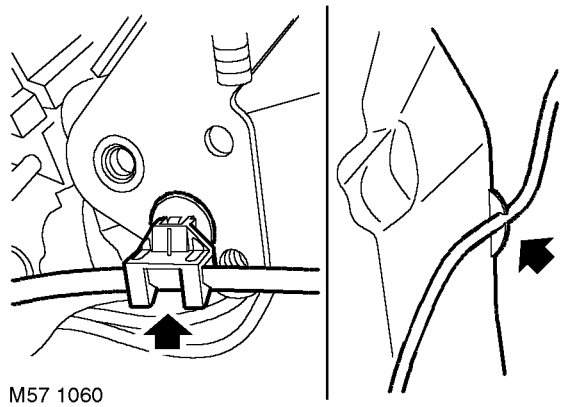


M57 1062

7. Remove bolt securing steering column height adjuster lever and remove lever.
   NOTE: Thread is left handed.
8. Remove nut securing height adjuster clamp bolt and remove bolt.
9. Collect plastic stop.


M57 1058

10. Loosen union and disconnect cable from column lock.


M57 1060

11. Release cable from 2 retaining clips.
12. Note the cable routing, manoeuvre cable from under heater and steering column bracket.
13. Remove cable.

Refit

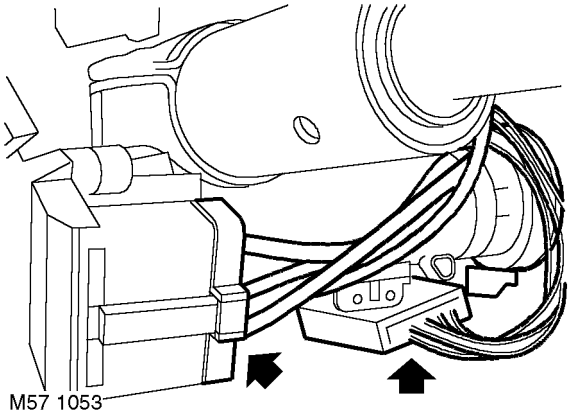
1. Position cable, align to heater and steering column bracket and secure in retaining clips.
2. Align key interlock cable to column lock and tighten union to 4 Nm (3 lbf.ft).
3. Fit height adjuster clamp bolt and tighten nut to 10 Nm (7.5 lbf.ft). Ensure bolt and plastic stop are correctly located in slot in column bracket.
4. Fit height adjuster lever and tighten bolt 12 Nm (9 lbf.ft). Ensure lever is in the fully up position before tightening bolt. Hold clamp bolt nut to prevent nut rotation.
5. Connect cable to interlock mechanism.
6. Check key interlock cable adjustment.
☞ **STEERING, ADJUSTMENTS, Cable - key interlock - adjust.**
7. Fit steering column nacelle.
☞ **STEERING, REPAIRS, Nacelle - column.**
8. Fit front console.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**
9. Connect battery earth lead.

Column assembly - inner & outer

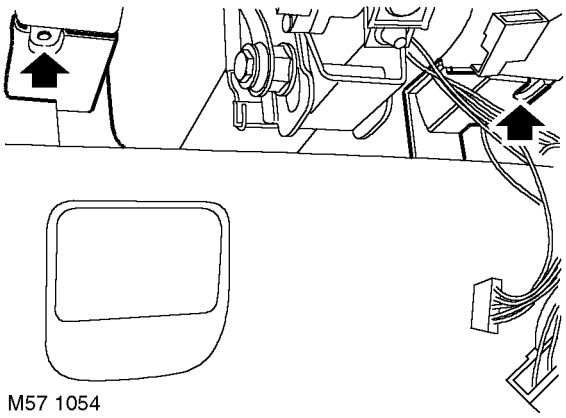
57.41.01

Remove

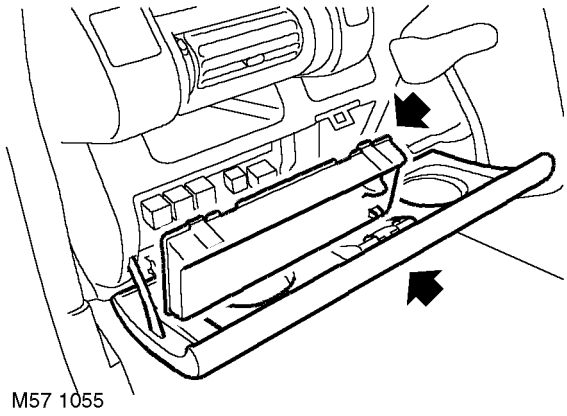
1. Disconnect battery earth lead.
2. Remove steering column multi purpose switch.
   LIGHTING, REPAIRS, Switch - combined direction indicator/headlight/ horn.


M57 1053

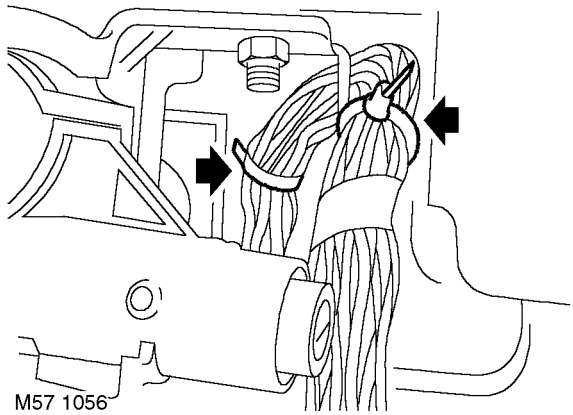
3. Disconnect multiplugs from ignition switch and passive coil.


M57 1054

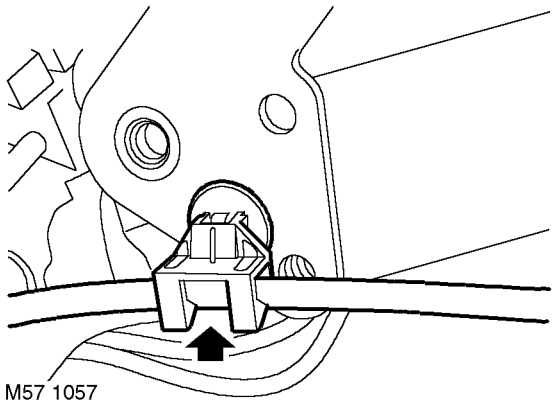
4. Remove 2 screws securing steering column aperture trim and remove trim.


M57 1055

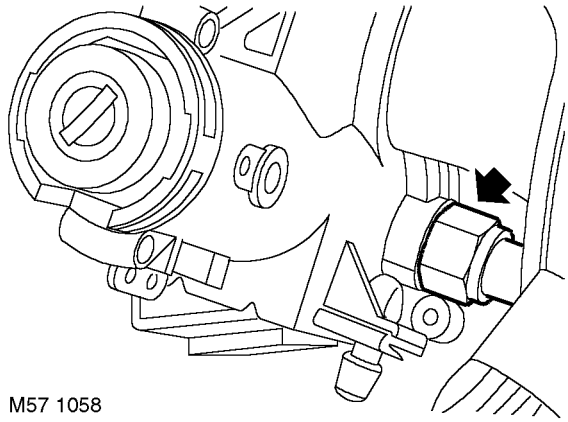
5. Lower glove lid and remove fuse box cover.


M57 1056

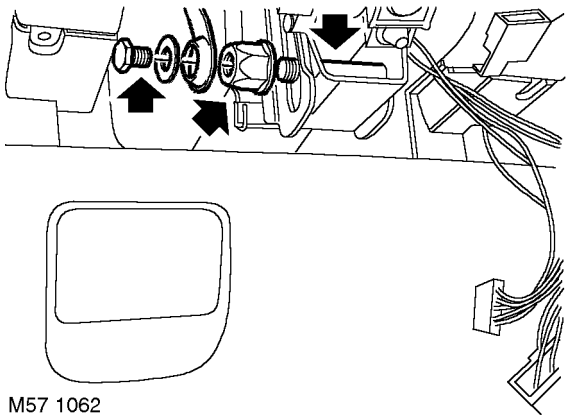
6. Carefully cut 2 harness clips from LH side of column and release harness.
7. Release 2 harness clips from RH side of column and release harness.


M57 1057

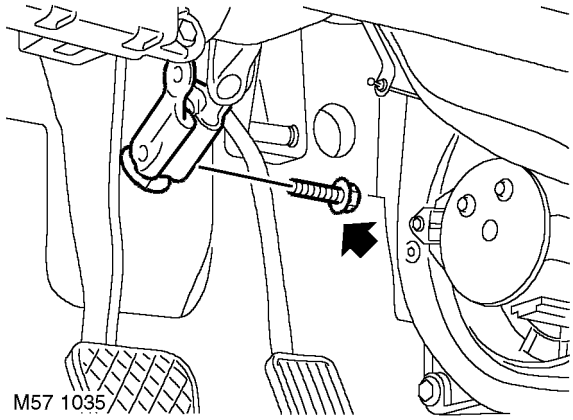
8. **Models with automatic transmission:** Release key interlock cable from column clip.


M57 1058

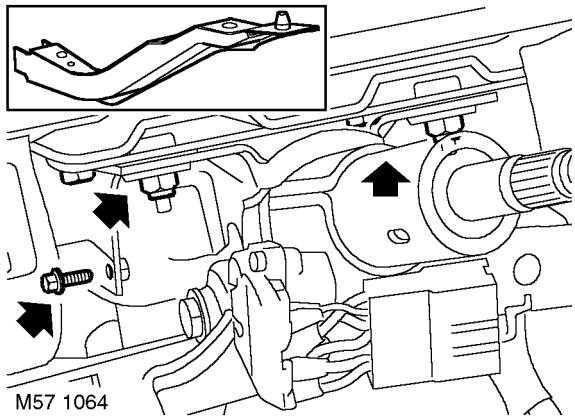
9. **Models with automatic transmission:** Loosen union and release key interlock cable from column lock.


M57 1062

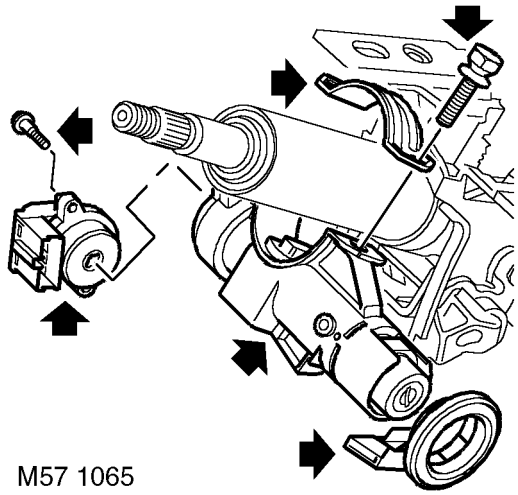
10. **Models with automatic transmission:** Remove bolt securing steering column height adjuster lever and remove lever.
11. **Models with automatic transmission:** Remove nut securing height adjuster clamp bolt and remove bolt.
12. **Models with automatic transmission:** Release key interlock cable from steering column.
13. **Models with automatic transmission:** Fit clamp bolt and nut to retain support bracket in position.


M57 1035

14. Remove pinch bolt securing steering column to PAS rack pinion.


M57 1064

15. Remove bolt securing steering column to fusebox support bracket.
16. Remove 2 nuts and 2 bolts securing steering column to fascia support rail.
17. Collect snubber.
18. Release steering column from support bracket and PAS rack pinion.
19. Remove steering column assembly.
20. Remove 2 cable ties from steering column.
21. Remove key interlock cable clip.



M57 1065

22. Remove 2 screws securing ignition switch and remove ignition switch.
23. Remove passive coil.
24. Position steering column assembly in a vice.
25. Centre punch or drill out steering lock shear bolts.

    CAUTION: If steering column is to be re-used, take care not to deform or damage column in vice.

26. Remove steering column lock.

    CAUTION: Take care not to damage steering lock body if the lock is to be refitted.

Refit

1. Remove column from vice.
2. Fit new cable ties to steering column.
3. **Models with automatic transmission:** Fit key interlock cable clip.
4. Position steering column to vehicle, locate steering column on PAS rack, aligning column coupling with PAS rack input flag.
5. Locate steering column on studs fit nuts but do not tighten at this stage.
6. Fit bolts and snubber to pivot mountings and tighten bolts to 14 Nm (10 lbf.ft).
7. Tighten nuts to 14 Nm (10 lbf.ft).
8. Fit and tighten PAS rack pinion clamp bolt to 32 Nm (24 lbf.ft).

   CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.

9. **Models with automatic transmission:** Remove clamp bolt from height adjuster and position key interlock cable.
10. **Models with automatic transmission:** Fit height adjuster clamp bolt and tighten nut to 10 Nm (7.5 lbf.ft). Ensure bolt and plastic stop are correctly located in slot in column bracket.
11. **Models with automatic transmission:** Fit height adjuster lever and tighten bolt 12 Nm (9 lbf.ft). Ensure lever is in the fully up position before tightening bolt. Hold clamp bolt nut to prevent nut rotation.
12. **Models with automatic transmission:** Remove starter key from column lock.
13. **Models with automatic transmission:** Align key interlock cable to column lock and tighten union to 4 Nm (3 lbf.ft).
14. **Models with automatic transmission:**Position lock to steering column assembly and fit shear bolts. Do not tighten shear bolts at this stage.
15. **Models with automatic transmission:** Insert starter key, check operation of steering lock and that key turns freely.
16. **Models with automatic transmission:** Ensure correct operation of key interlock cable.
17. **Models with automatic transmission:** Remove starter key from column lock.
18. **Models with automatic transmission:** Tighten shear bolts fully and shear heads off.
19. **Models with automatic transmission:** Fit passive coil.
20. **Models with automatic transmission:** Position ignition switch to column, fit and tighten screws.
21. **Models with automatic transmission:** Secure key interlock cable in clip.
22. **Models with automatic transmission:** Ensure key interlock cable is correctly fitted.
23. Fit side support bolt and tighten to 10 Nm (7.5 lbf.ft).
24. Position harness and secure cable ties.
25. Fit fusebox cover and close glove box lid.
26. Connect multiplugs to column switch and passive coil.
27. Fit aperture trim and secure with screws.
28. Fit steering column multi purpose switch.

    ☞ **LIGHTING, REPAIRS, Switch - combined direction indicator/headlight/ horn.**
29. Connect battery earth lead.

Ball joint - track rod

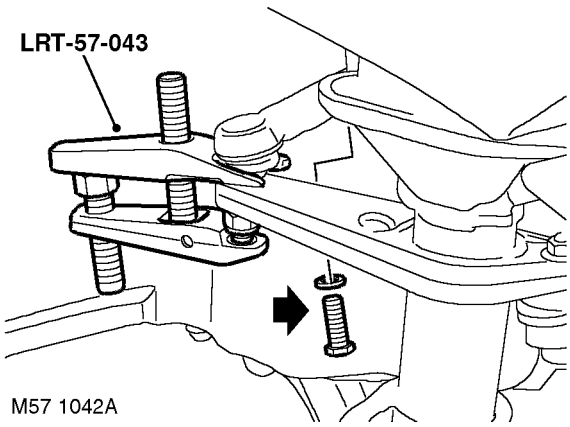
57.55.07

Remove

1. Raise front of vehicle.

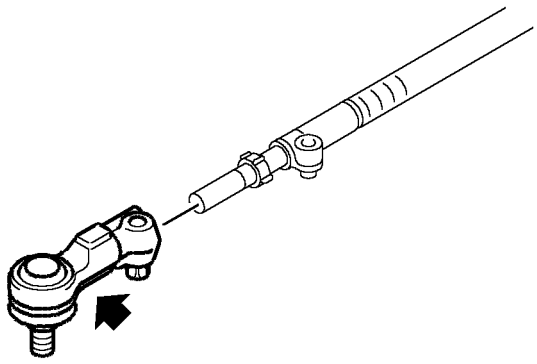
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove front road wheel.



M57 1042A

3. Remove pinch bolt securing ball joint to turnbuckle.
4. Remove nut from ball joint and discard.
5. Fit an M12 nut to ball joint, flush with end of pin.
6. Using tool **LRT-57-043,** separate ball joint from steering arm. Remove M12 nut and release ball joint from steering arm.

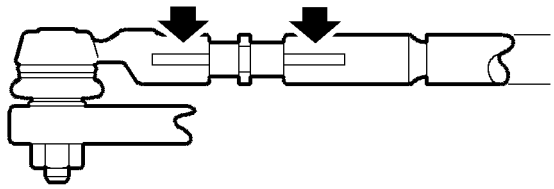


M57 1044

7. Remove ball joint, note the number of turns for refit.

Refit

1. Fit ball joint to turnbuckle to number of turns noted in remove.
2. Fit pinch bolt but do not tighten at this stage.
3. Clean ball joint taper and taper seat.



M57 1028

4. Fit ball joint to steering arm, fit new nut and tighten to 55 Nm (41 lbf.ft).

   CAUTION: Ensure slots in turn buckle clamps are aligned.

5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stands and lower vehicle.
7. Check and adjust front wheel alignment.

   ☞ **STEERING, ADJUSTMENTS, Front wheel alignment - check & adjust.**

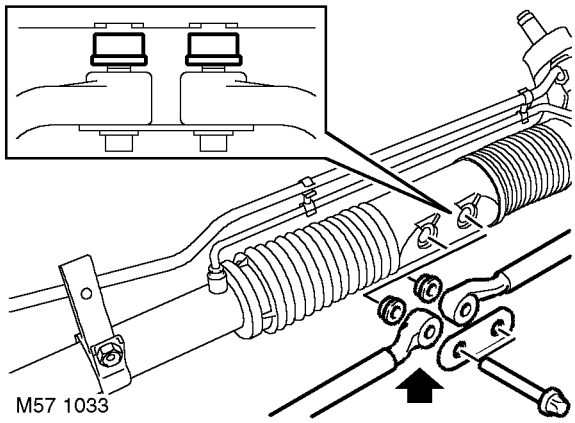
   WARNING: Ensure all track rod pinch bolts are tightened to the correct torque on completion of the front wheel alignment check.

Track rod

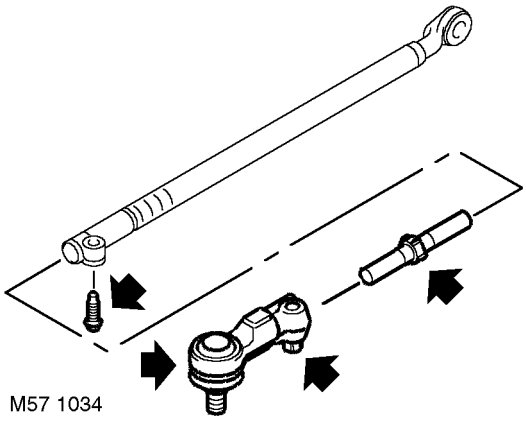
57.55.09

Remove

1. **Td4 & KV6 models:** Remove steering rack. ☞ **STEERING, REPAIRS, Power steering rack.**



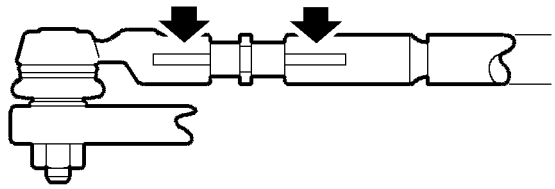
2. Remove Torx bolt securing track rod to PAS rack. Discard Torx bolt.
3. Remove track rod and spacer.
   CAUTION: Note orientation of spacers before dismantling.



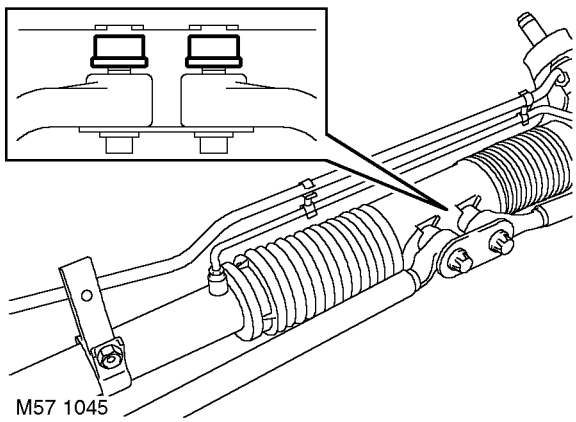
4. Hold track rod securely and loosen pinch bolt in track rod end.
   NOTE: Do not carry out further dismantling if component is removed for access only.
5. Remove ball joint, note the number of turns for refit.
6. Remove pinch bolt from track rod.
7. Remove turnbuckle and note the number of turns for refit.
   NOTE: Thread is left handed.

Refit

1. Fit turnbuckle to track rod to number of turns on remove.
2. Fit pinch bolt but do not tighten at this stage.
3. Fit ball joint to turnbuckle to number of turns noted in remove.



4. Fit pinch bolt but do not tighten at this stage.
   CAUTION: Ensure slots in turn buckle clamps are aligned.
5. Clean spacer, support plate and track rod ball joint.



6. Fit spacer to rack.
   CAUTION: Ensure spacers are aligned and fitted correctly.
7. Fit track rod to PAS rack.
8. Hold track rod parallel to PAS rack, fit new Torx bolt and tighten to 100 Nm (74 lbf.ft).

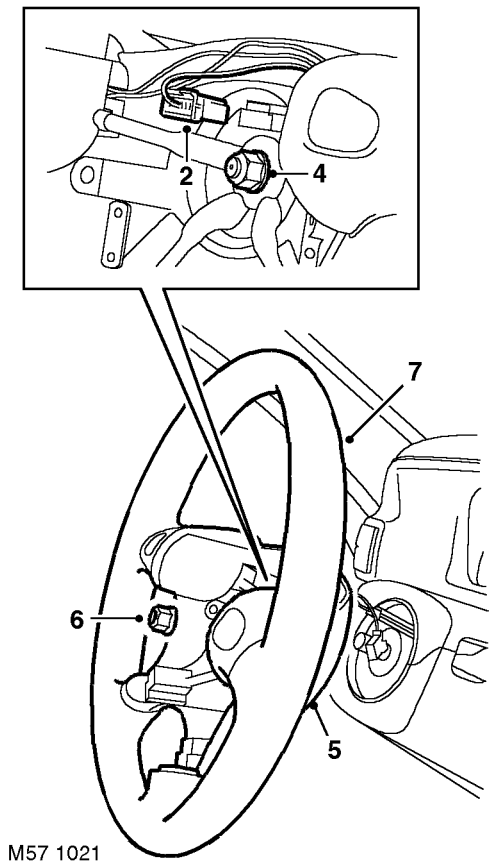
9. **Td4 & KV6 models:** Fit steering rack.
☞ **STEERING, REPAIRS, Power steering rack.**
10. Check and adjust front wheel alignment.
☞ **STEERING, ADJUSTMENTS, Front wheel alignment - check & adjust.**
WARNING: Ensure all track rod pinch bolts are tightened to the correct torque on completion of the front wheel alignment check.

Steering wheel

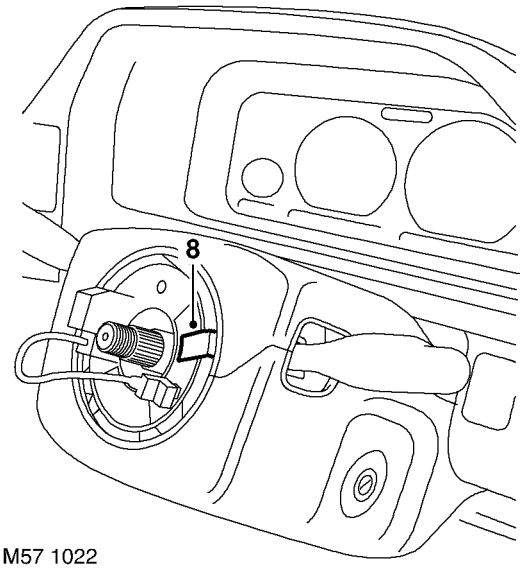
57.60.01

Remove

1. Remove airbag module from steering wheel.
☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.**

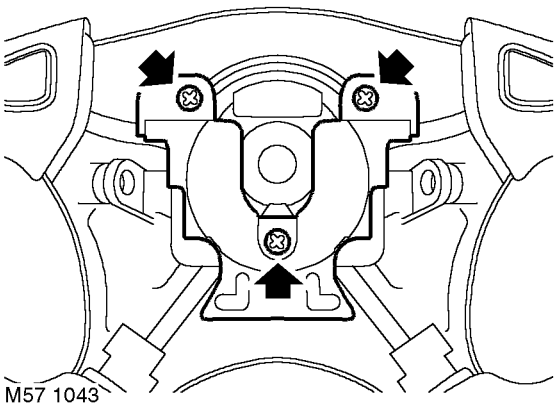


2. Disconnect multiplug from rotary coupler.
3. Centralise steering wheel with road wheels in straight ahead position.
4. Restrain steering wheel and loosen self locking nut securing steering wheel to column.
5. Pull steering wheel from column splines.
6. Remove and discard self-locking nut.
7. Remove steering wheel.



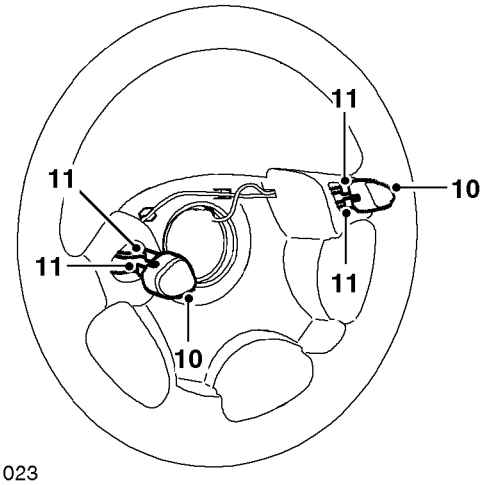
M57 1022

8. Attach tape across edge of rotary coupler to retain correct setting.



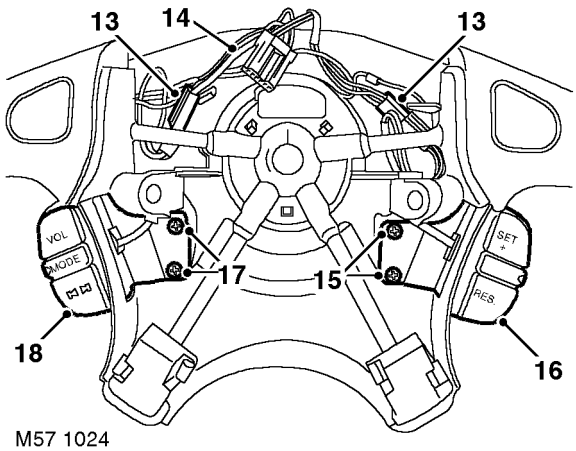
M57 1043

9. **Td4 models:** Remove 3 screws securing damper and remove damper.



M57 1023

10. Using a broad round edged tool, carefully prise horn switches from steering wheel.
11. Noting fitted position, disconnect 2 Lucars and remove horn switch.
12. Repeat for other horn switch.



M57 1024

13. Disconnect multiplugs from cruise control (if fitted) and radio control switches.
14. Release harness from clips and remove harness.
15. **Models with cruise control:** Remove 2 screws securing cruise control switches to steering wheel.
16. **Models with cruise control:** Remove cruise control switches from steering wheel.
17. Remove 2 screws securing radio switches to steering wheel.
18. Remove radio switches from steering wheel.

Refit

1. Fit radio switches to steering wheel and secure with screws.
2. **Models with cruise control:** Fit cruise control switches to steering wheel and secure with screws.
3. Position harness to horn, cruise control (if fitted) and radio switches and secure in clips.
4. Position horn switch and connect Lucars.
5. Repeat for other horn switch.
6. Connect multiplugs to cruise control and radio control switches.
7. **Td4 models:** Position damper, fit and tighten screws.
8. Remove tape from rotary coupler.
9. Ensure road wheels are in straight ahead position and indicator cancelling cam is aligned horizontally.
10. Fit steering wheel to column and ensure spokes are horizontal.
11. Fit new self locking nut and tighten to 45 Nm (33 lbf.ft).
12. Connect multiplug to rotary coupler.
13. Fit drivers airbag.
    ☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.**

Anti roll bar

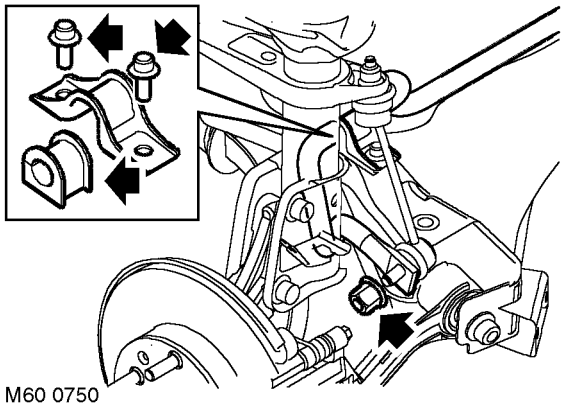
60.10.01

Remove

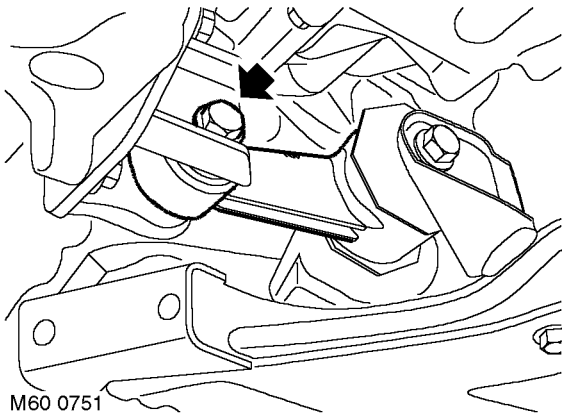
1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

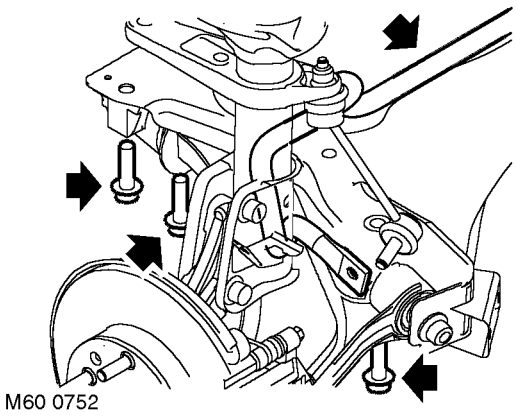
2. Remove road wheel(s).
3. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M60 0750

4. Using a backing spanner, remove 2 nuts release anti-roll bar links from anti-roll bar.
5. Remove 4 bolts securing anti-roll bar saddle clamps to subframe, collect saddle clamps and rubber bushes.


M60 0751

6. Remove bolt securing engine tie bar to sump.
7. Support the weight of front subframe.


M60 0752

8. Remove 4 bolts securing both lower arm rear bush housings.
9. Remove and discard 2 bolts securing front subframe to body.
10. Lower front subframe to release anti-roll bar.
11. Remove anti-roll bar.

Refit

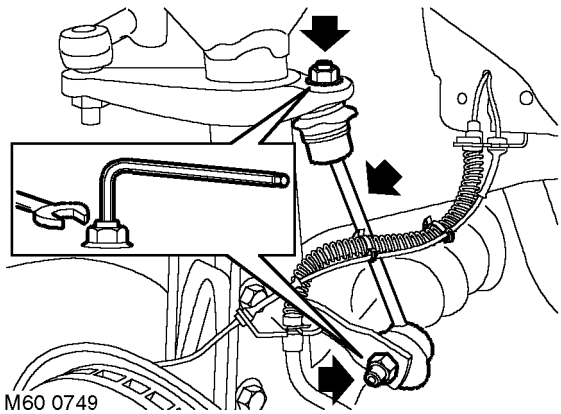
1. Position anti-roll bar.
2. Raise front subframe and align to body.
3. Fit new bolts securing front subframe to body and tighten to 190 Nm (140 lbf.ft).
4. Fit bolts securing lower arm rear bush housings and tighten to 105 Nm (77 lbf.ft).
5. Align engine tie bar and tighten bolts to 100 Nm (74 lbf.ft).
6. Position anti-roll bar rubbers and saddle clamps.
7. Fit saddle clamp bolts and tighten to 23 Nm (17 lbf.ft).
8. Align anti-roll bar links to anti-roll bar, fit new nuts and tighten using a backing spanner to 45 Nm (33 lbf.ft).
9. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
10. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
11. Remove stands and lower vehicle.

Ball joint link - anti roll bar

60.10.04

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.


M60 0749

3. Remove nut securing anti-roll bar link to damper.
   CAUTION: Use a spanner and an Allen key to prevent ball joint rotating when undoing link.
4. Discard nut.
5. Use an open ended spanner on the flats provided to prevent ball stud from turning. Remove nut securing anti-roll bar link to anti-roll bar.
6. Discard nut.
7. Noting the fitted position, remove anti-roll bar link.

Refit

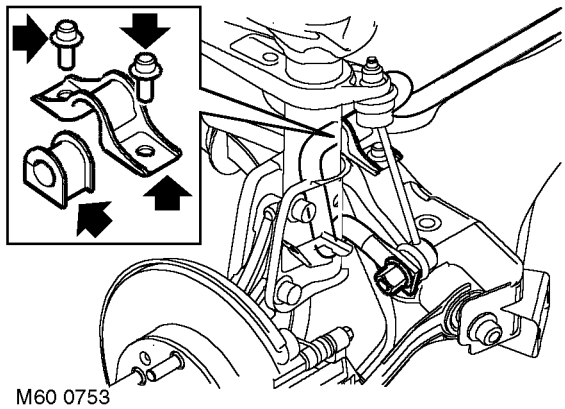
1. Clean anti-roll bar link tapers and mating faces.
2. Position anti-roll bar link to anti-roll bar, fit new nut and tighten to 55 Nm (41 lbf.ft).
3. Align anti-roll bar link to damper, fit new nut and tighten to 45 Nm (33 lbf.ft).
4. Ensure correct orientation of anti-roll bar links.
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stand and lower vehicle.

Mounting rubbers - anti roll bar - set

60.10.05

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.


M60 0753

2. Remove 4 bolts securing anti-roll bar saddle clamps to rear beam and collect saddle clamps.
3. Remove anti-roll bar rubbers.

Refit

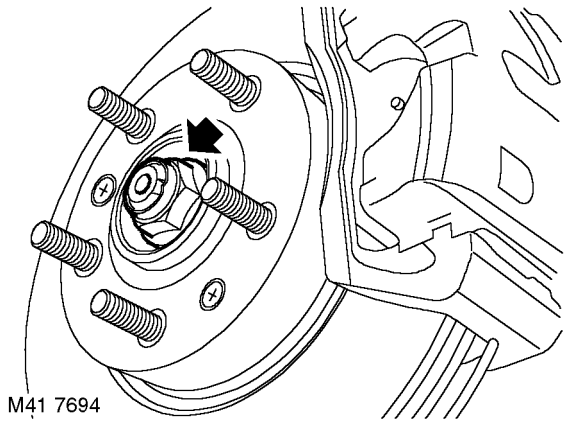
1. Clean anti-roll bar, saddle clamps and mating faces.
2. Fit anti-roll bar rubbers.
3. Fit saddle clamps, fit bolts and tighten to 23 Nm (17 lbf.ft).
4. Remove stands and lower vehicle.

Bearing - hub

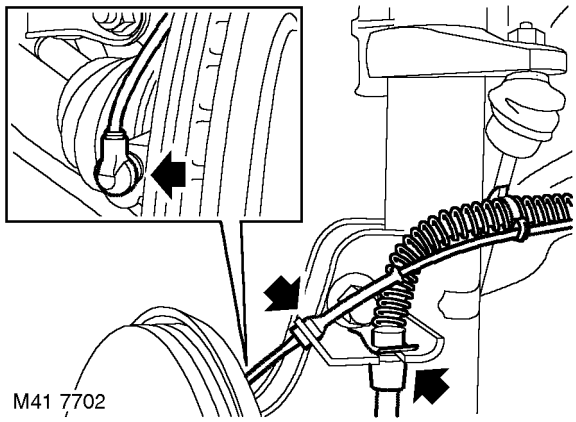
60.25.14

Remove

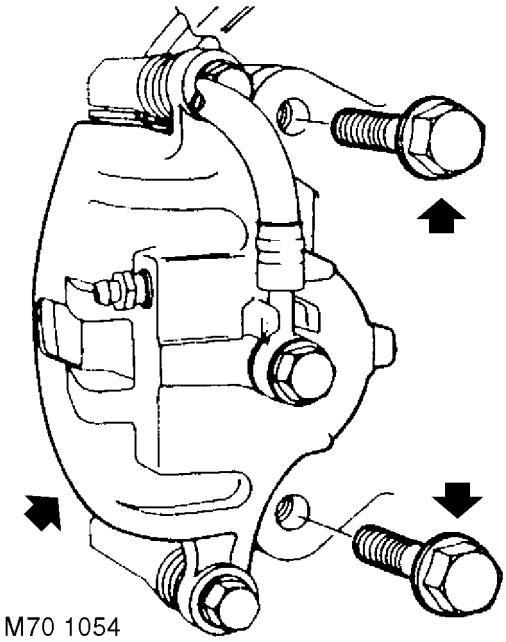
1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.


M41 7694

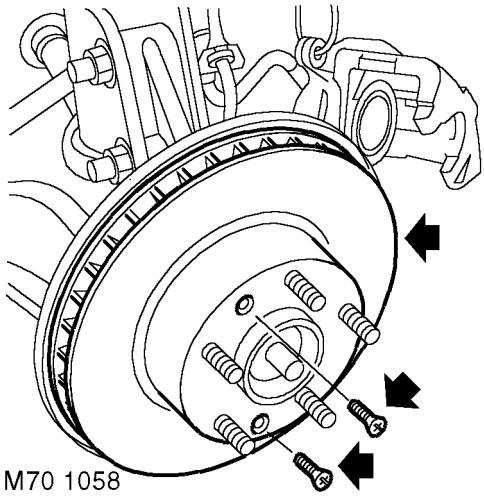
3. Release stake in drive shaft nut.
4. With an assistant applying brakes, remove and discard drive shaft hub nut.


M41 7702

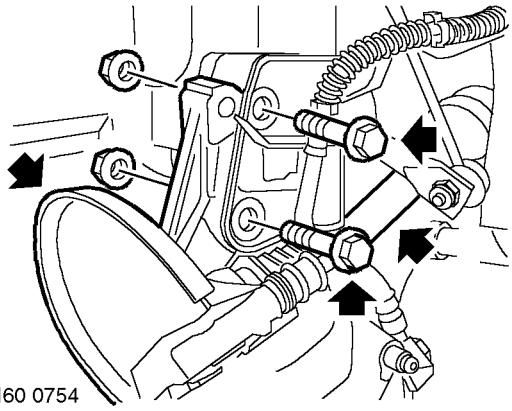
5. Remove clip securing RH brake hose to support bracket, release hose from bracket. Release ABS sensor and pad wear sensor harnesses from bracket.


M70 1054

6. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.
   CAUTION: Do not allow caliper to hang on brake hose.

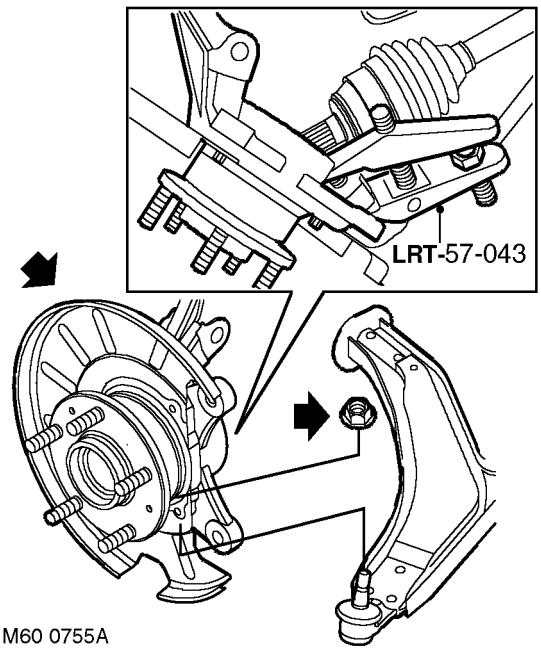

M70 1058

7. Mark brake disc to hub relationship.
8. Remove 2 screws securing brake disc and remove brake disc.



M60 0754

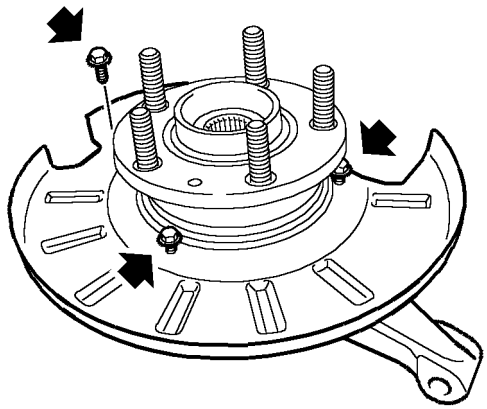
9. Remove 2 nuts and bolts securing hub to damper.
10. Release hub from damper.
11. Release drive shaft from hub.



M60 0755A

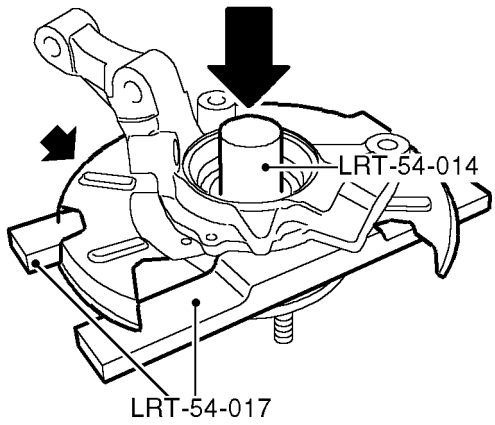
12. Restrain hub from rotating and remove nut from lower swivel joint.
13. Break taper joint using **LRT-57-043.**
14. Remove swivel hub.

NOTE: Do not carry out further dismantling if component is removed for access only.



M60 0756

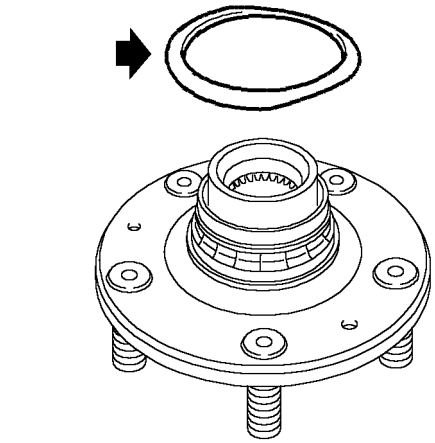
15. Remove 3 bolts securing brake disc shield.



M60 0757

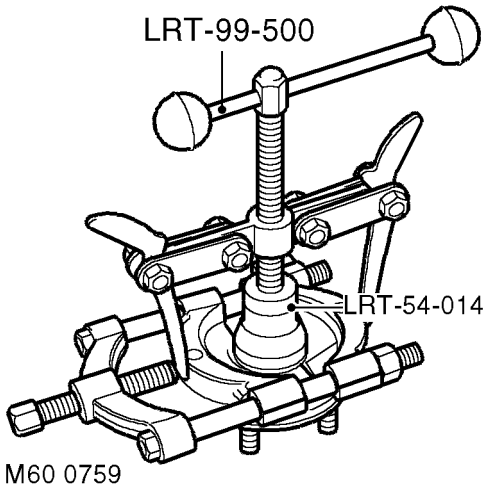
16. Position hub assembly to press, support on tools **LRT-54-017** and press out drive flange using tool **LRT-54-014**.
17. Remove brake disc shield.

NOTE: Outer bearing track will remain on drive flange.



M60 0758

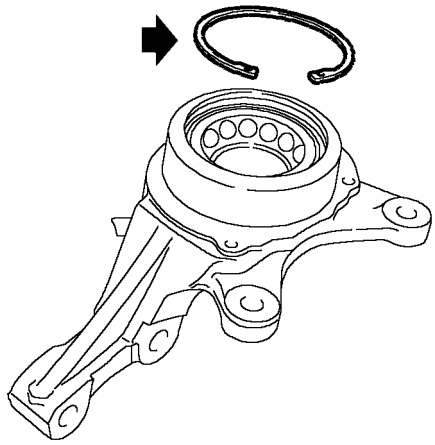
18. Remove bearing sealing plate from inner track.
19. Position drive flange in a vice.



M60 0759

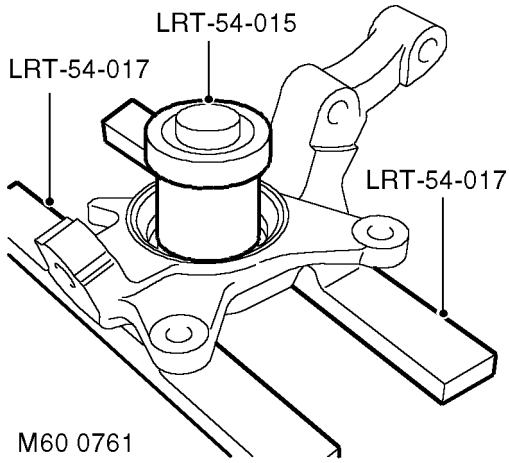
20. Clamp both halves of a suitable bearing separator around inner track ensuring that inner lip fits in groove on inner track.
From 2002MY the groove in the inner track was deleted. To remove the inner track, clamp the separator around the bearing inner track surface.

21. Using tool **LRT-99-500** and thrust pad **LRT-54-014** withdraw inner track from drive flange.



M60 0760

22. Remove circlip from bearing.

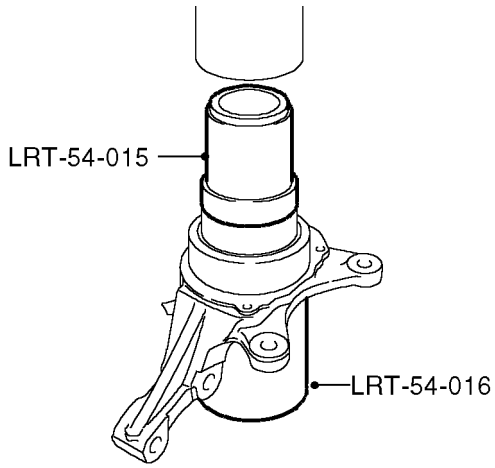


M60 0761

23. Position hub to press and press out bearing using tool **LRT-54-015** and **LRT-54-017**, discard bearing.
CAUTION: Never re-use existing bearing.

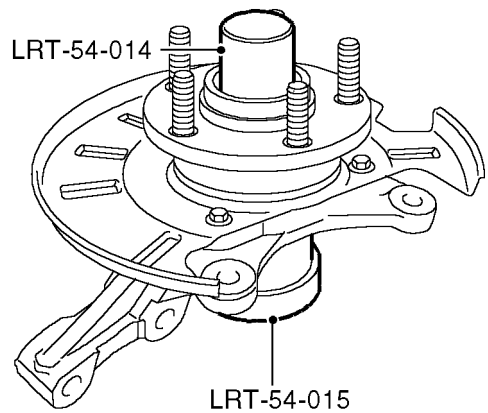
Refit

1. Clean hub and drive flange.



M60 0762

2. Support hub on tool **LRT-54-016** and press in new bearing using **LRT-54-015.**
3. Fit circlip to hub.
4. Fit brake disc shield, fit bolts and tighten to 8.5 Nm (6.5 lbf.ft).



M60 0763

5. Support bearing on tool **LRT-54-015** and press drive flange into bearing using **LRT-54-014.**
6. Clean drive shaft.
7. Fit hub assembly to lower joint, fit new nut and tighten to 65 Nm (48 lbf.ft).
8. Fit drive shaft to hub.
9. Fit hub to damper, fit nuts and bolts and tighten to 205 Nm (151 lbf.ft).
10. Clean brake disc to drive flange mating faces.
11. Fit disc to drive flange, align reference marks, fit screws and tighten to 5 Nm (4 lbf.ft).
12. Clean mating faces of caliper and hub.
13. Position caliper to brake disc fit bolts and tighten to 100 Nm (74 lbf.ft).
14. Fit brake hose to abutment bracket and fit clip.
15. Clean ABS sensor, smear sensor with an anti-seize grease and fit sensor to hub.

    CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

16. Fit ABS sensor lead to bracket.
17. Fit new drive shaft nut and tighten to 400 Nm (295 lbf.ft). Stake nut to shaft.
18. Stake drive shaft hub nut.
19. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
20. Remove stands and lower vehicle.

Damper

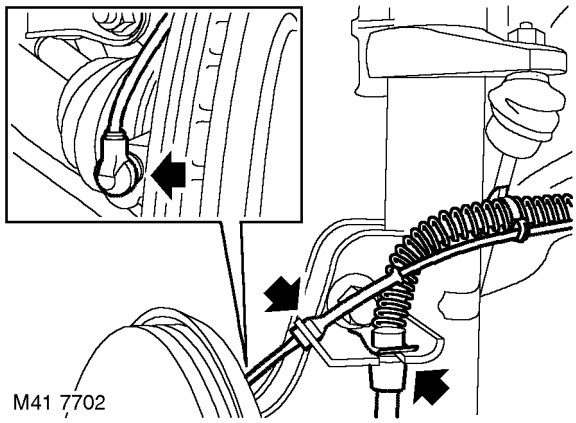
60.30.02

Remove

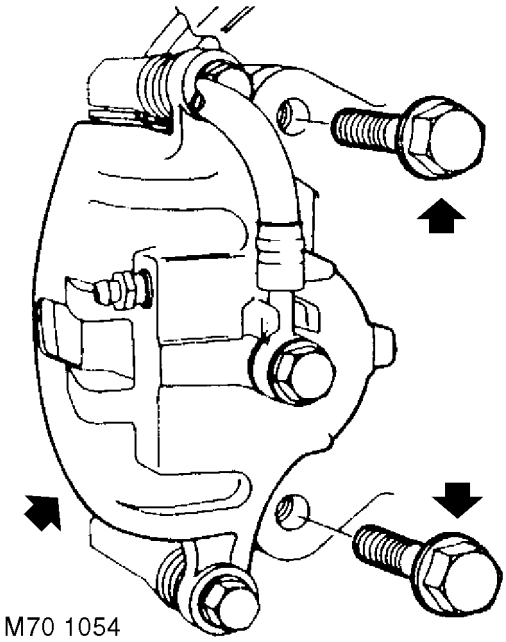
1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

3. Remove road wheel.

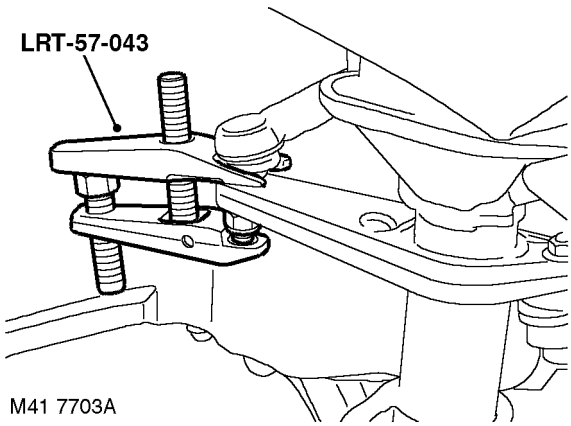


4. Remove clip securing brake hose to bracket on damper.
5. Release ABS sensor harness and brake hose from damper.
6. Release ABS sensor from hub.

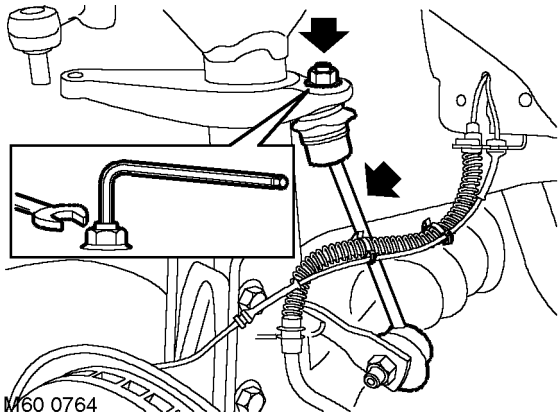


7. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.

   CAUTION: Do not allow caliper to hang on brake hose.

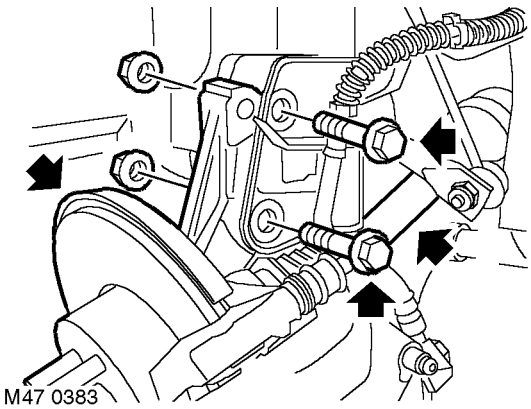


8. Remove nut securing track rod to steering arm and break taper joint using **LRT-57-043.**

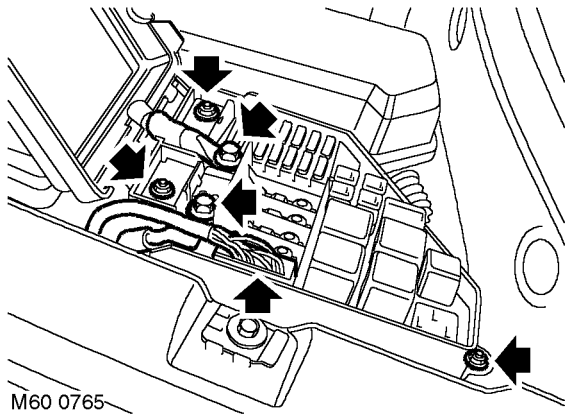

M60 0764

9. Remove upper nut from anti-roll bar link, release link and position aside.

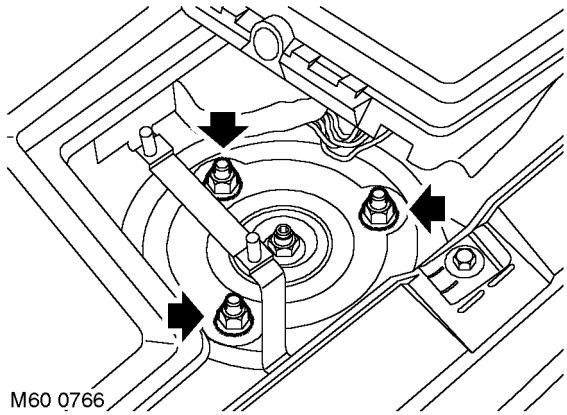
CAUTION: Use a spanner and an Allen key to prevent ball joint rotating when undoing link.


M47 0383

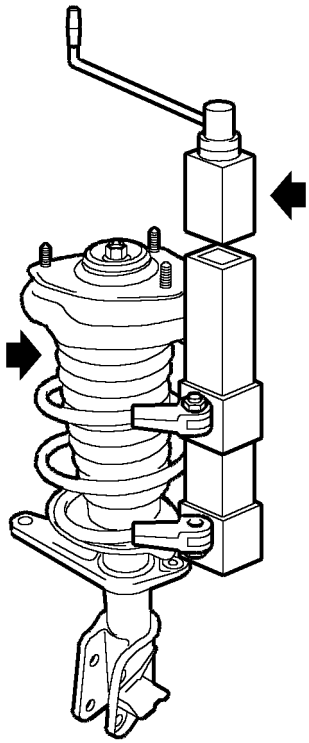
10. Remove 2 nuts and bolts securing hub to damper.
11. Release damper from hub.


M60 0765

12. LH side: Remove 2 bolts securing positive and negative leads to fusebox.
13. LH side: Disconnect multiplug from engine compartment fuse box.
14. LH side: Release leads and position aside.
15. LH side: Remove 3 nuts securing fusebox and position fusebox aside.
16. RH side: Remove bolt securing coolant reservoir and position reservoir aside.

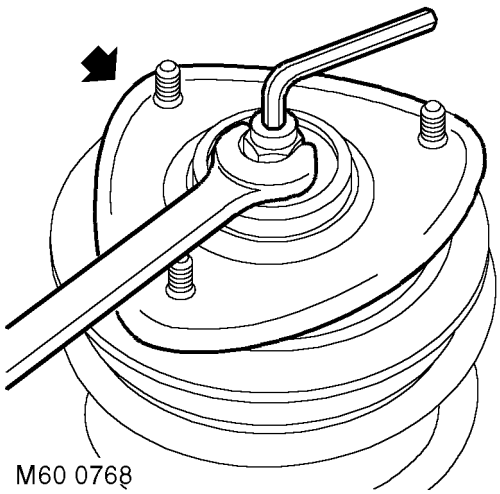

M60 0766

17. Reference mark top mounting in relationship to body.
18. Remove 3 nuts from damper top mounting and remove spring and damper assembly.



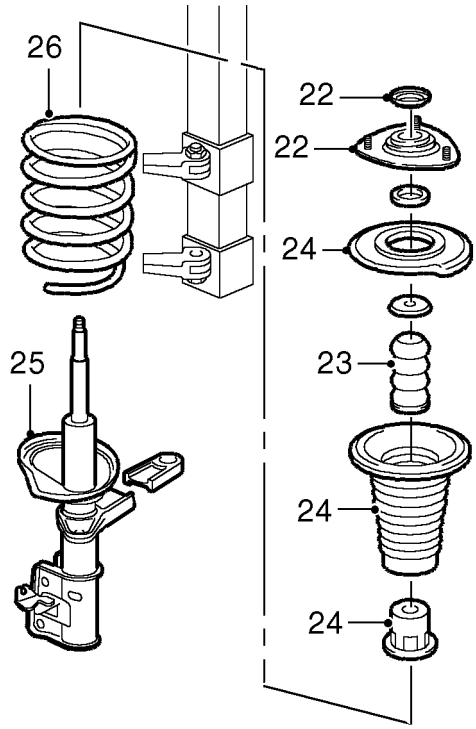
M60 0767

19. Position a suitable spring compressor in vice.
20. Position spring and damper assembly to spring compressor. Compress spring.
CAUTION: Note alignment of top mounting, spring and damper dust cover.



M60 0768

21. Compress spring by 2 to 3 cm until loose, hold damper shaft with Allen key, remove and discard mounting plate nut.



M60 0769

22. Remove rebound washer and mounting plate.
23. Remove spring aid and bump plate.
24. Remove spring seat, dust cover and bump stop cup.
25. Remove damper from spring.
26. Release and remove spring from compressor.

Refit

1. Inspect damper, spring mounting rubbers and bearing for deterioration and damage.
2. Clean mating faces of spring, mounting and mounting plate.
3. Clean damper shaft and bump stop plate.
4. Position spring and damper assembly to spring compressor. Compress spring.
5. Fit damper to spring, ensure spring locates in cut recess in damper plate.
6. Fit bump cup, bump stop and dust cover to damper.
7. Fit spring aid and bump plate.
8. Fit mounting plate and rebound washer.
9. Using new nut, hold damper shaft with Allen key and tighten nut to 57 Nm (42 lbf.ft).
CAUTION: Note alignment of top mounting, spring and damper dust cover.

10. Release and remove spring from compressor.
11. Clean mating face of top mounting plate.

12. Position damper assembly and align top mounting to body, fit nuts and tighten to 45 Nm (33 lbf.ft).
13. **LH side:** Position fusebox, fit nuts and tighten to 8 Nm (6 lbf.ft).
14. **LH side:** Connect positive and negative leads, fit bolts and tighten to 8 Nm (6 lbf.ft).
15. **LH side:** Connect multiplug to fusebox.
16. **RH side:** Position coolant reservoir and secure with bolt.
17. Fit hub to damper, fit nuts and bolts and tighten to 205 Nm (151 lbf.ft).
18. Clean anti-roll bar link taper and mating face.
19. Connect anti-roll bar link, fit new nut and tighten to 55 Nm (41 lbf.ft).

    CAUTION: Use a spanner and an Allen key to prevent ball joint rotating when undoing link.

20. Clean track rod taper and mating face.
21. Connect track rod end to steering arm using new nut and tighten nut to 55 Nm (41 lbf.ft).
22. Clean ABS sensor, smear sensor with an anti-seize grease and fit sensor to hub.

    CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

23. Position ABS harness and brake hose in bracket and secure with clip.
24. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
25. Remove stand and lower vehicle.
26. Connect battery earth lead.

Lower arm assembly

60.35.02

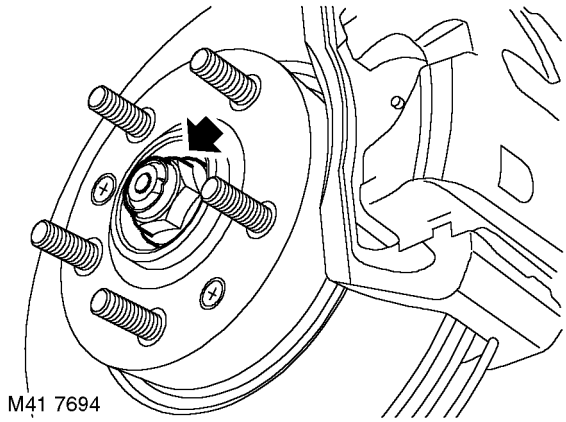
Remove

1. Raise front of vehicle.

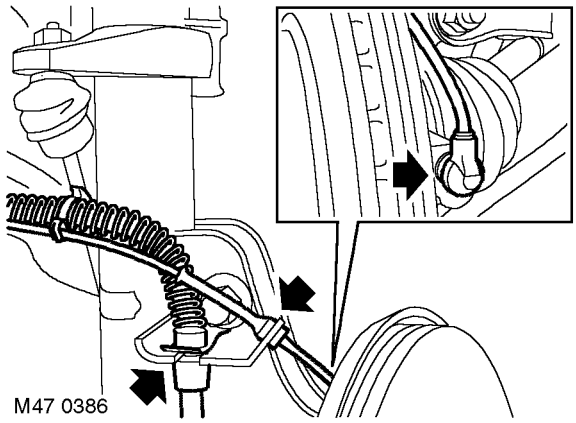
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.
3. Remove underbelly panel.

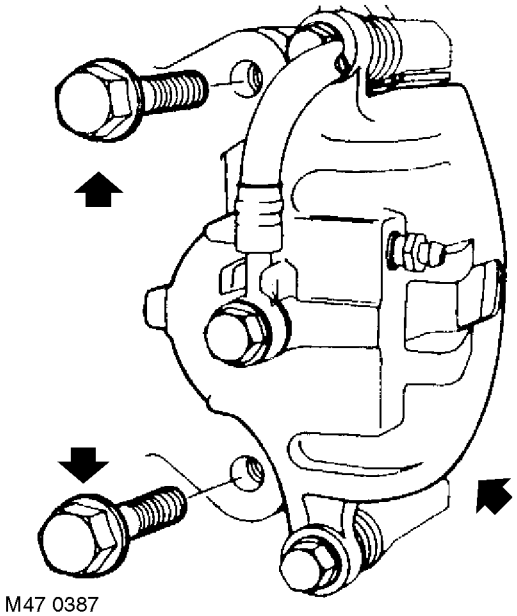
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



4. Release stake in drive shaft nuts.
5. With an assistant applying brakes, remove and discard drive shaft hub nut.



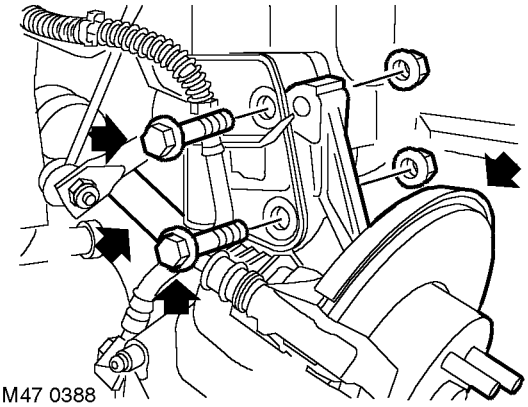
6. Remove clip securing brake hose to bracket on damper.
7. Release ABS sensor harness and brake hose from damper.
8. Release ABS sensor from hub.



M47 0387

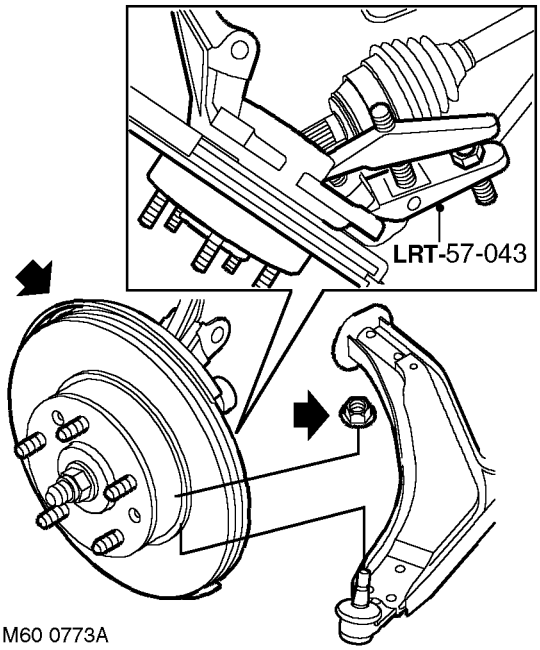
9. Remove 2 bolts securing brake caliper to hub. Release caliper from hub and tie aside.

CAUTION: Do not allow caliper to hang on brake hose.



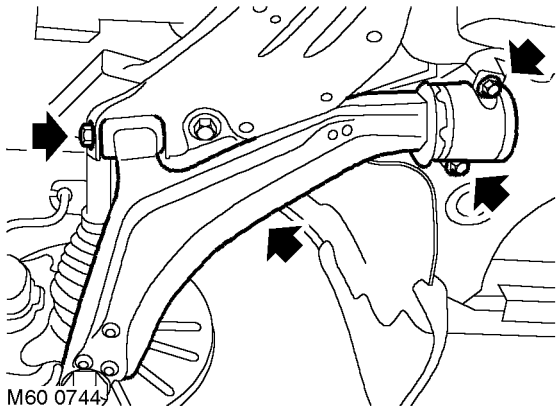
M47 0388

10. Remove 2 nuts and bolts securing hub to damper.
11. Release drive shaft from hub.
12. Tie drive shaft aside.



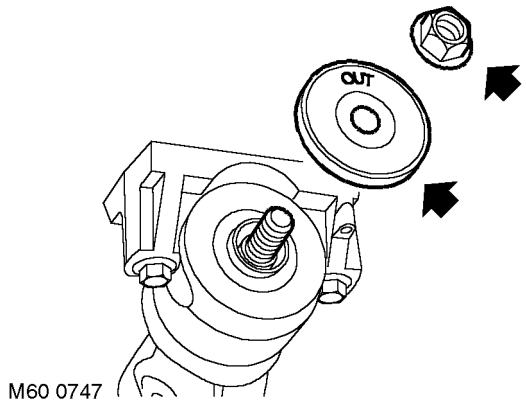
M60 0773A

13. Remove nut securing lower arm ball joint. discard nut.
14. Break taper joint using **LRT-57-043**.
15. Remove hub assembly.



M60 0744

16. Remove 2 bolts securing lower arm rear bush housing.
17. Remove bolt securing lower arm front mounting.
18. Remove lower arm.



19. Remove nut from rear mounting, remove snubber washer and remove mounting.

CAUTION: Note orientation of snubber washer.

Refit

1. Clean rear mounting mating faces.

2. Fit rear mounting and snubber rubber to lower arm, fit nut but do not tighten at this stage.

CAUTION: Ensure correct orientation of snubber washer. Ensure that 'OUT' is visible on snubber washer when fitted.

3. Position lower arm and align to subframe fit bolt but do not tighten at this stage.

4. Clean hub to lower arm ball joint mating faces.

5. Fit hub assembly to lower joint, fit new nut and tighten to 65 Nm (48 lbf.ft).

6. Clean drive shaft and flange splines.

7. Fit drive shaft to hub.

8. Fit new hub nut but do not tighten at this stage.

9. Fit hub to damper, fit nuts and bolts and tighten to 205 Nm (151 lbf.ft).

10. Position caliper to brake disc fit bolts and tighten to 100 Nm (74 lbf.ft).

11. Fit brake hose to bracket on damper and secure with clip.

12. Clean ABS sensor, smear sensor with an anti-seize grease and fit sensor to hub.

CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

13. Fit ABS sensor lead to bracket.

14. Tighten lower arm front bush bolts to 190 Nm (140 lbf.ft).

CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.

15. Align bush housings ensuring roll pin is correctly located. Fit bolts and tighten to 105 Nm (77 lbf.ft).

16. Tighten rear bush housing nut to 140 Nm (103 lbf.ft).

17. Fit new drive shaft nut and tighten to 400 Nm (295 lbf.ft). Stake nut to shaft.

18. Fit underbelly panel.

☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

19. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).

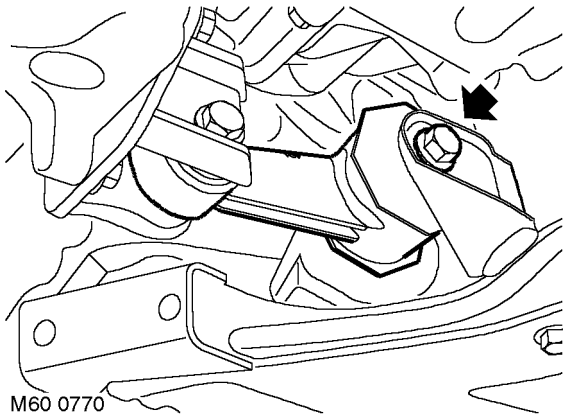
20. Remove stands and lower vehicle.

Rear beam

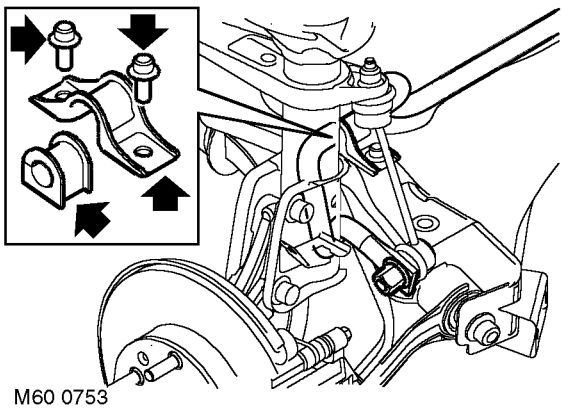
60.35.23

Remove

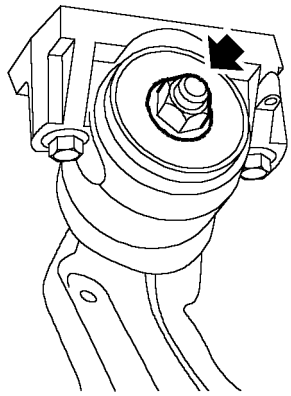
1. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M60 0770

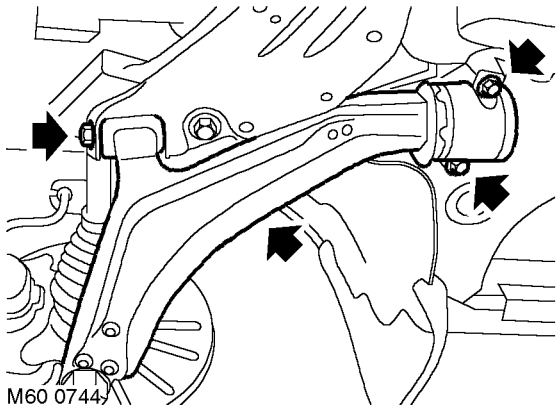
2. Remove bolt securing engine lower steady to beam.


M60 0753

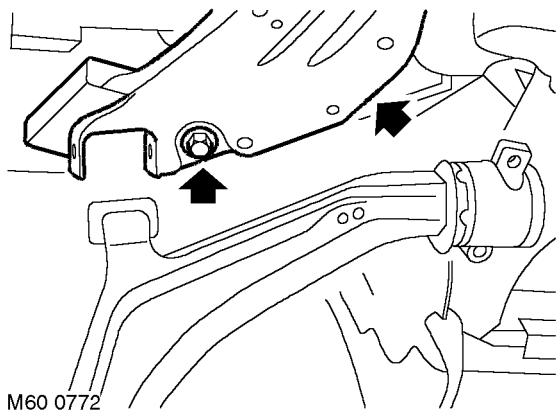
3. Remove 4 bolts securing anti-roll bar saddle clamps to beam.
4. Support anti-roll bar.


M60 0771

5. Loosen nuts securing lower arm rear mountings.


M60 0744

6. Remove 2 bolts securing each lower arm rear bush housing.
7. Remove lower arm pivot bush bolts.
8. Release lower arms from beam.


M60 0772

9. Support beam and remove 2 remaining bolts securing beam.
10. Lower and remove beam.

Refit

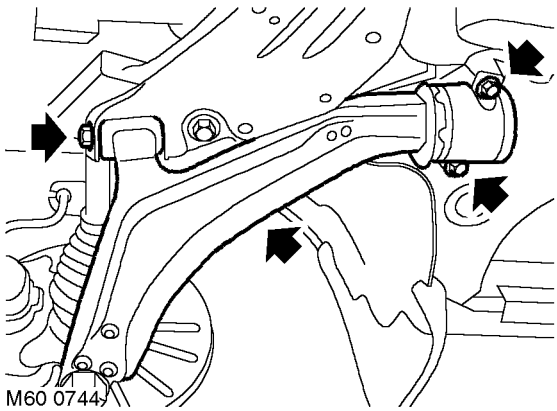
1. Position and align beam, fit new bolts securing beam to body but do not fully tighten at this stage.
2. Locate lower arm bushes, fit but do not fully tighten bolts.
   CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.
3. Clean bush housing and mating faces on beam.
4. Align bush housings ensuring roll pin is correctly located. Fit bolts and tighten to 105 Nm (77 lbf.ft).
5. Tighten bolts securing beam to body to 190 Nm (140 lbf.ft).
6. Fit saddle clamp bolts and tighten to 23 Nm (17 lbf.ft).
7. Align engine lower steady, fit bolt and tighten to 100 Nm (74 lbf.ft).
8. Lower vehicle.
9. Tighten lower arm front bush bolts to 190 Nm (140 lbf.ft).
10. Tighten lower arm rear bush nuts to 140 Nm 103 lbf.ft).
11. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Bush - lower arm - front

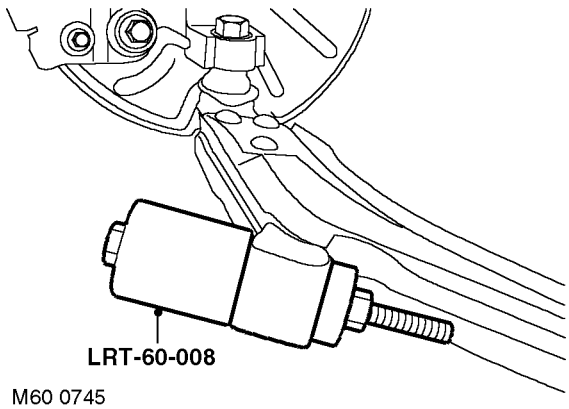
⊸ ***60.35.24***

Remove

1. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
2. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.


M60 0744

3. Remove 2 bolts securing rear bush housing to rear beam.
4. Release rear bush housing from body dowel.
5. Remove bolt securing lower arm front mounting.
6. Release lower arm front mounting from rear beam.

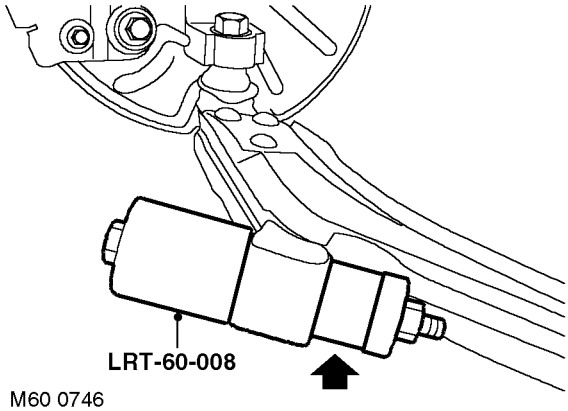


M60 0745

7. Using **LRT-60-008** and adaptors remove lower arm bush.

Refit

1. Ensure bush bore in hub is clean.



M60 0746

2. Using **LRT-60-008** fit new bush into lower arm.
3. Align lower arm to rear beam, fit bolt but do not tighten at this stage.
4. Align rear bush housing to body dowel, fit bolts but do not tighten at this stage.
5. Tighten rear bush housing bolts to 105 Nm (77 lbf.ft).

   CAUTION: Nuts and bolts must be tightened with the weight of the vehicle on the suspension.

6. Tighten lower arm front bush bolts to 190 Nm (140 lbf.ft).
7. Fit underbelly panel.

   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
8. Remove stands and lower vehicle.
9. Check and, if necessary, adjust wheel alignment.

   ☞ **STEERING, ADJUSTMENTS, Front wheel alignment - check & adjust.**

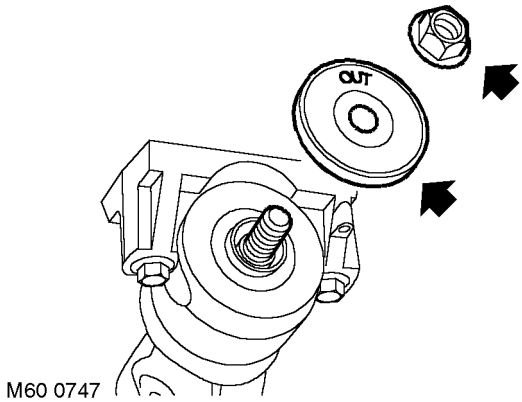
Bush - lower arm - rear

60.35.25

Remove

1. Raise front of vehicle.

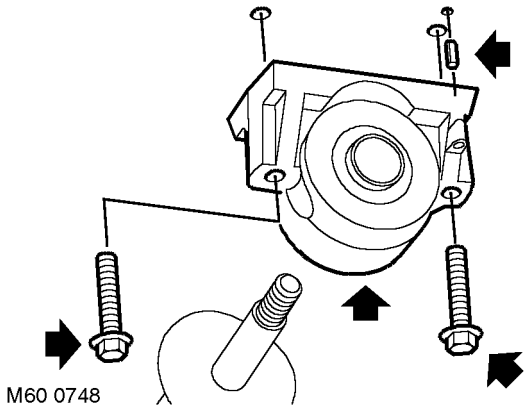
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



M60 0747

2. Remove nut securing lower arm rear bush housing and remove snubber rubber.

   CAUTION: Note orientation of snubber washer.


M60 0748

3. Remove 2 bolts securing lower arm rear bush housing.
4. Release bush locating pin from body and remove bush housing.

Refit

1. Clean lower arm and bush housing mating faces.
2. Fit bush housing to lower arm and locate dowel into body.
3. Fit bolts securing lower arm rear bush housings and tighten to 105 Nm (77 lbf.ft).
4. Fit snubber rubber and nut but do not tighten at this stage.

   CAUTION: Ensure correct orientation of snubber washer. Ensure that 'OUT' is visible on snubber washer when fitted.

5. Tighten rear bush housing nut to 140 Nm (103 lbf.ft).

   CAUTION: Nuts and bolts must be tightened with the weight of the vehicle on the suspension.

6. Remove stand and lower vehicle.
7. Check front wheel alignment.

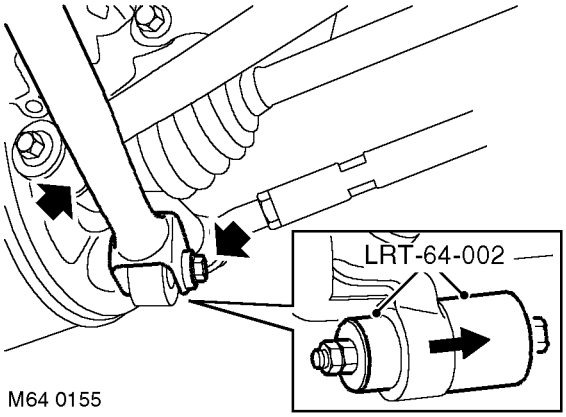
   ☞ **STEERING, ADJUSTMENTS, Front wheel alignment - check & adjust.**

Bush - trailing link

64.15.11

Remove

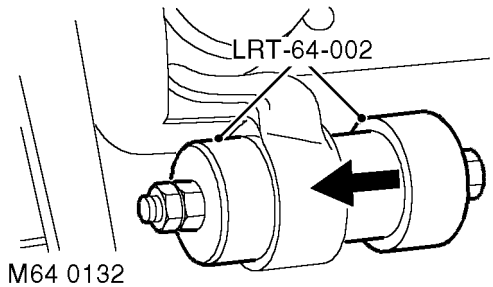
1. Raise rear of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.



3. Remove nut and bolt securing trailing link to rear hub, collect spacer from under bolt head.
4. Release trailing link from hub and tie aside.
5. Using **LRT-64-002** remove trailing link bush from hub.

Refit

1. Ensure bush bore in hub is clean.



2. Using **LRT-64-002** fit new bush into hub.
3. Align trailing link to hub, fit nut and bolt but do not tighten at this stage.
4. Support weight of vehicle with jack under rear hub.
   CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.
5. Fit spacer, nut and bolt to trailing link and tighten to 120 Nm (89 lbf.ft).
6. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
7. Remove stands and lower vehicle.
8. Check and, if necessary, adjust wheel alignment.

Bearing - hub

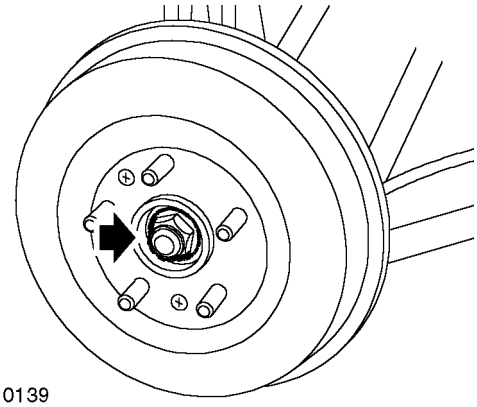
64.15.14

Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

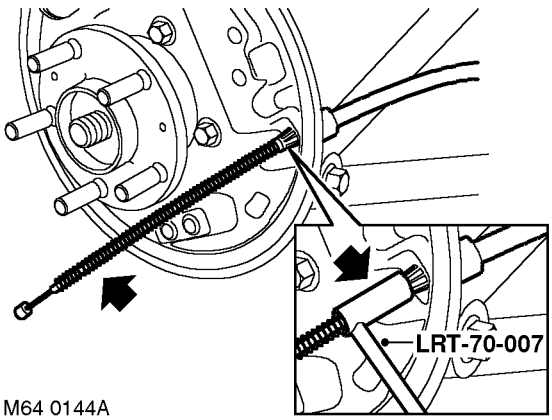
2. Remove road wheel.



M64 0139

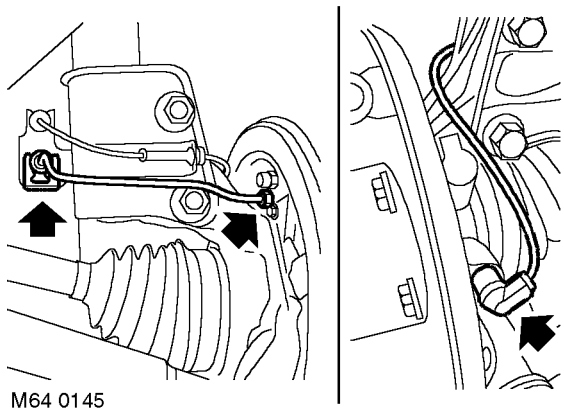
3. With assistant depressing the brake pedal, remove and discard drive shaft nut.
4. Remove brake shoe assembly.

   BRAKES, REPAIRS, Brake Shoes - rear set.



M64 0144A

5. Using **LRT-70-007** release handbrake cable from backplate and remove from backplate.

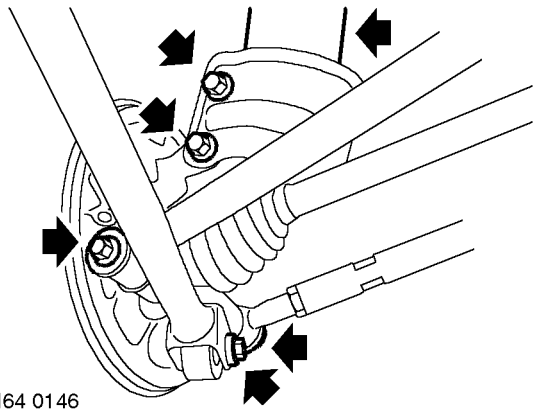


M64 0145

6. Remove clip securing brake hose to bracket on damper.
7. Disconnect brake pipe union from wheel cylinder.

   CAUTION: Always fit plugs to open connections to prevent contamination.

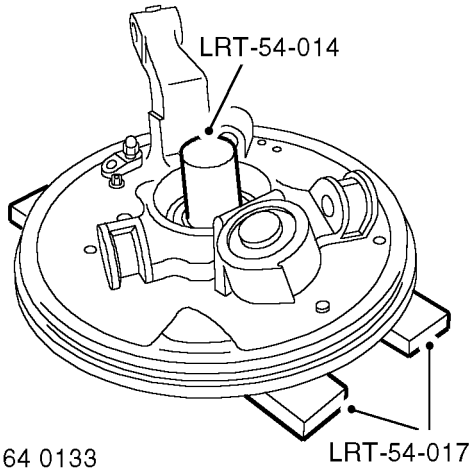
8. Release ABS sensor from hub.



M64 0146

9. Remove nut and bolt securing trailing link to hub.
10. Remove nut, bolt and washers securing transverse links to hub.
11. Remove 2 nuts and bolts securing hub to damper.
12. Release damper from hub.
13. Remove hub assembly from drive shaft.

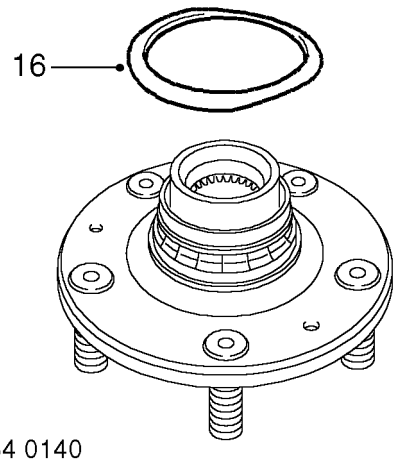
    NOTE: Do not carry out further dismantling if component is removed for access only.



M64 0133

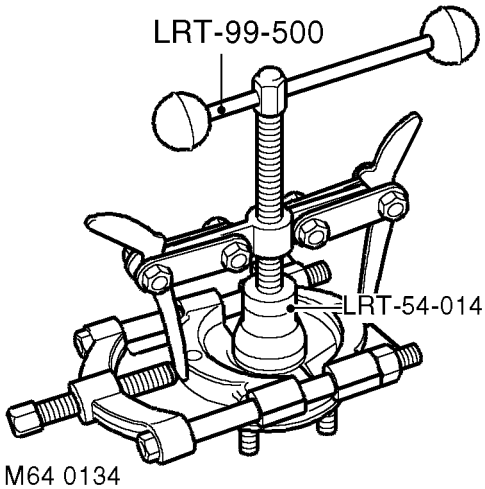
14. Position hub assembly to press, support on tools **LRT-54-017** and press out drive flange using tool **LRT-54-014**.

NOTE: Outer bearing track will remain on drive flange.



M64 0140

15. Remove bearing sealing plate from inner track.
16. Position drive flange in a vice.

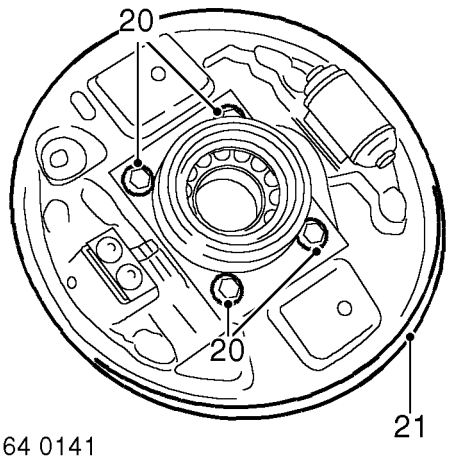


M64 0134

17. Clamp both halves of a suitable bearing separator around inner track ensuring that inner lip fits in groove on inner track.

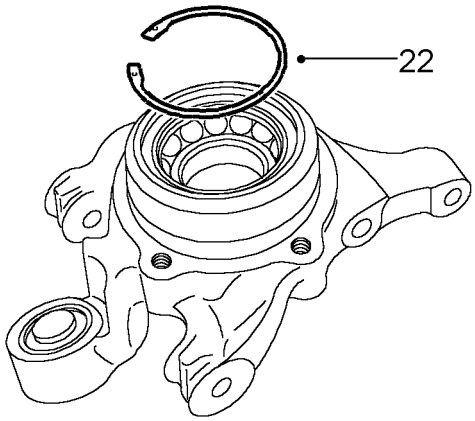
From 2002MY the groove in the inner track was deleted. To remove the inner track, clamp the separator around the inner track bearing surface.

18. Using tool **LRT-99-500** and thrust pad **LRT-54-014** withdraw inner track from drive flange.



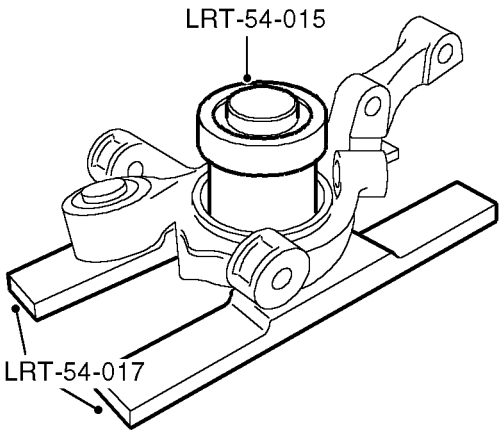
M64 0141

19. Fit hub to vice and remove 4 bolts securing backplate to hub.
20. Remove backplate.



M64 0135

21. Remove circlip from bearing.



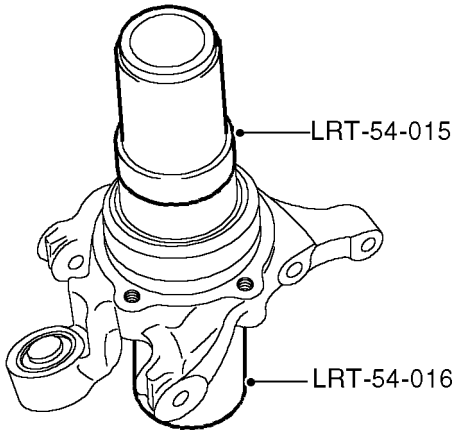
M64 0136

22. Position hub to press and press out bearing using tool **LRT-54-015** and **LRT-54-017**, discard bearing.

CAUTION: Never re-use existing bearing.

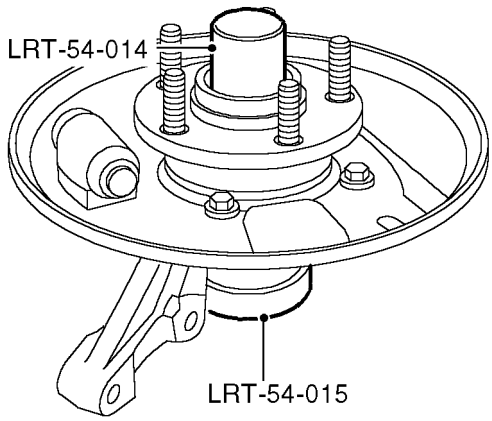
Refit

1. Clean hub and drive flange.



M64 0137

2. Support hub on tool **LRT-54-016** and press in new bearing using **LRT-54-015.**
3. Fit circlip to hub.
4. Fit hub to vice, fit backplate and tighten bolts to 45 Nm (33 lbf.ft).



M64 0138

5. Support bearing on tool **LRT-54-015** and press drive flange into bearing using **LRT-54-014.**
6. Fit hub assembly to drive shaft.
7. Fit hub to damper and tighten bolts to 205 Nm (151 lbf.ft).

CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.

8. Fit nut, bolt and washers securing transverse links to hub and tighten nut to 105 Nm (77 lbf.ft).

9. Fit trailing link to hub and tighten nut and bolt to 120 Nm (89 lbf.ft).
NOTE: Ensure that washers are fitted to both ends of bolts

10. Clean ABS sensor, smear sensor with an anti-seize grease and fit sensor to hub.
CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

11. Fit brake pipe to wheel cylinder and tighten union to 14 Nm (10 lbf.ft).
12. Fit clip securing brakepipe to bracket.
13. Fit and secure handbrake cable to backplate.
14. Fit brake shoes.
☞ **BRAKES, REPAIRS, Brake Shoes - rear set.**
15. Fit new drive shaft nut and tighten to 400 Nm (295 lbf.ft). Stake nut to shaft.
16. Bleed brakes.
☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
17. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
18. Remove stands and lower vehicle.

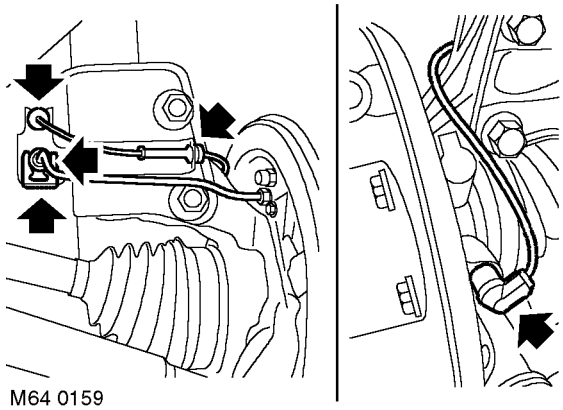
Damper

64.30.02

Remove

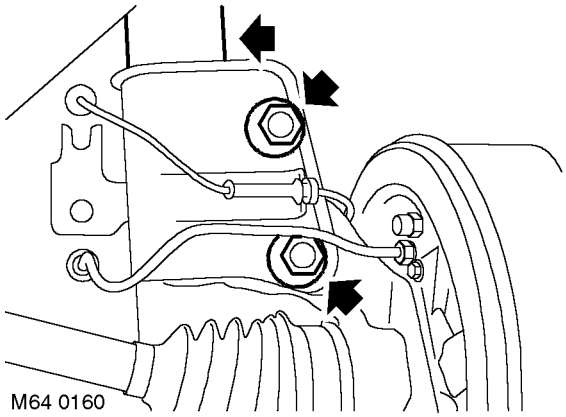
1. Raise rear of vehicle.
WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.
3. Clamp brake hose to prevent fluid loss.
4. Position absorbent cloth to catch spillage.

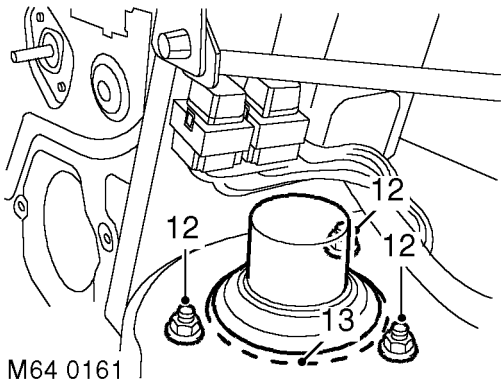

M64 0159

5. Loosen brake pipe union to hose and release union.
CAUTION: Always fit plugs to open connections to prevent contamination.

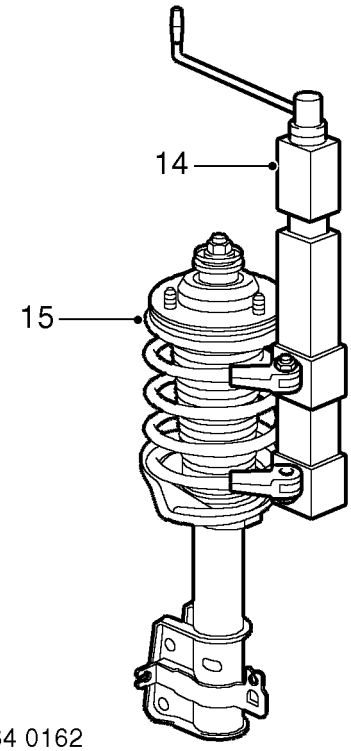
6. Remove clip securing brake hose to bracket on damper. Release brake hose from bracket.
7. Release ABS sensor harness and brake hose from damper.
8. Release ABS sensor from hub.



9. Remove 2 nuts and bolts securing hub to damper.
10. Release damper from hub.
11. Remove rear quarter lower casing.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**

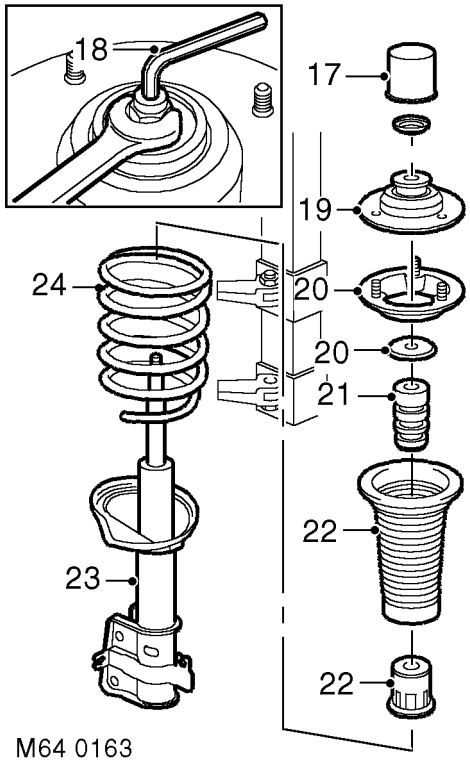


12. Remove 3 nuts from damper top mounting and remove spring and damper assembly.
13. Remove rubber seal from top mounting.



14. Position a suitable spring compressor in vice.
CAUTION: Note alignment of top mounting, spring and damper dust cover.

15. Position spring and damper assembly to spring compressor. Compress spring.
16. Reference mark between top mounting and spring.



M64 0163

17. Remove cover from top mounting.
18. Compress spring by 2 to 3 cm until loose, hold damper shaft with Allen key, remove and discard mounting plate nut.
19. Remove top mounting plate.
20. Remove rebound washer and mounting plate.
21. Remove spring aid and bump plate.
22. Remove spring seat, dust cover and bump stop cup.
23. Remove damper from spring.
24. Release and remove spring from compressor.

Refit

1. Inspect damper, spring mounting rubbers and bearing for deterioration and damage.
2. Clean mating faces of spring, mounting and mounting plate.
3. Clean damper shaft and bump stop plate.
4. Position spring and damper assembly to spring compressor. Compress spring.
5. Fit damper to spring, ensure spring locates in cut recess in damper plate.
6. Fit bump stop, bump stop cup and dust cover to damper.
7. Fit spring aid and bump plate.
8. Fit mounting plate and rebound washer.
9. Using new nut, hold damper shaft with Allen key and tighten nut to 57 Nm (42 lbf.ft).

CAUTION: Note alignment of top mounting, spring and damper dust cover.

10. Fit top mounting cover.
11. Release and remove spring from compressor.
12. Clean mating face of top mounting plate.
13. Fit rubber seal to top mounting.
14. Position damper assembly and align top mounting to body, fit nuts and tighten to 45 Nm (33 lbf.ft).
15. Fit rear quarter lower trim casings.

☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**

☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**

16. Fit hub to damper and tighten bolts to 205 Nm (151 lbf.ft).
17. Clean ABS sensor, smear sensor with an anti-seize grease and fit sensor to hub.

CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

18. Secure brake hose and ABS sensor harness to damper.
19. Secure brake hose with 'C' clip.
20. Remove plugs and clean brake pipe male end.
21. Align hose to brake pipe and tighten union to 14 Nm (10 lbf.ft).
22. Remove clamp from brake hose.
23. Bleed brake system.

☞ **BRAKES, ADJUSTMENTS, Brake bleed.**

24. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
25. Remove stands and lower vehicle.

Trailing arm

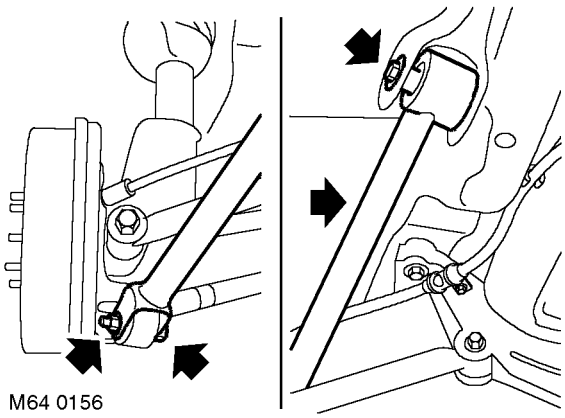
64.35.46

Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.



M64 0156

3. Remove nut and bolt securing trailing link to hub.
4. Remove bolt securing trailing link to bracket.
5. Remove trailing link.

Refit

1. Fit trailing link.
2. Fit bolt to bracket but do not tighten at this stage.
3. Align trailing link to hub, fit nut and bolt but do not tighten at this stage.
4. Support weight of vehicle with jack under rear hub.

   CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.

5. Tighten nuts and bolts to 120 Nm (89 lbf.ft).
6. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
7. Remove stands and lower vehicle.
8. Check and if necessary adjust rear wheel alignment.

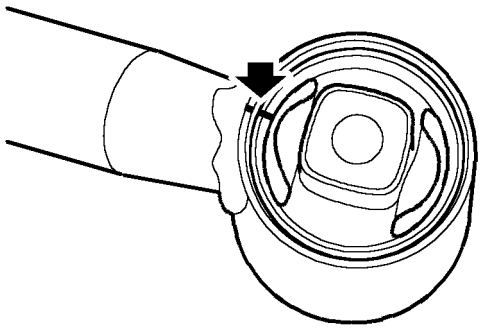
Bush - trailing arm

64.35.48

Remove

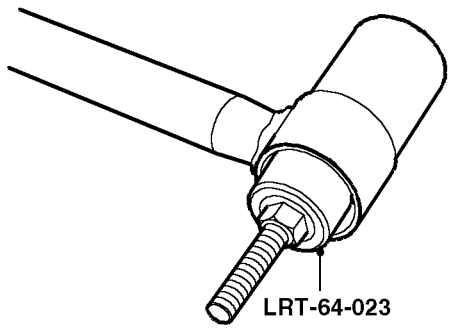
1. Remove trailing arm.

   ☞ **REAR SUSPENSION, REPAIRS, Trailing arm.**



M64 0168

2. Note and mark bush orientation to trailing arm.

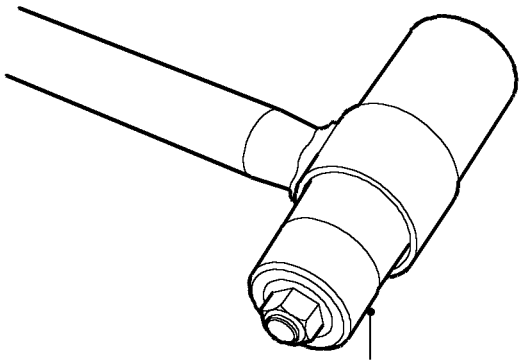


M64 0169

3. Using **LRT-64-023** remove trailing arm bush.

Refit

1. Ensure bush bore is clean.
2. Ensure bush is correctly aligned.



M64 0170

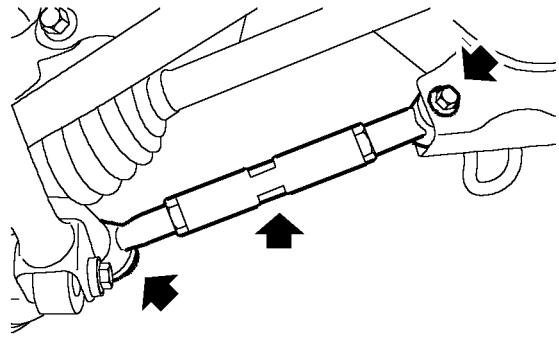
3. Using **LRT-64-023** fit new bush.
4. Fit trailing arm.
   ☞ **REAR SUSPENSION, REPAIRS, Trailing arm.**

Link - adjustable - transverse

🔧 ***64.35.70***

Remove

1. Raise rear of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.



M64 0158

3. Remove nut, bolt and washers securing transverse links to hub.
4. Remove nut and bolt securing adjustable transverse link to subframe. Collect dynamic damper.
5. Remove transverse link.

Refit

1. Fit transverse link.
2. Fit nuts, bolts, dynamic damper and washers securing transverse link to hub and subframe but do not tighten at this stage.
   NOTE: Ensure that washers are fitted to both ends of bolts
3. Support weight of vehicle with jack under rear hub.
   CAUTION: Nuts and bolts must be tightened with weight of vehicle on suspension.
4. Tighten nuts and bolts to 105 Nm (77 lbf.ft).
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stands and lower vehicle.
7. Check and if necessary adjust rear wheel alignment.

Link - transverse fixed

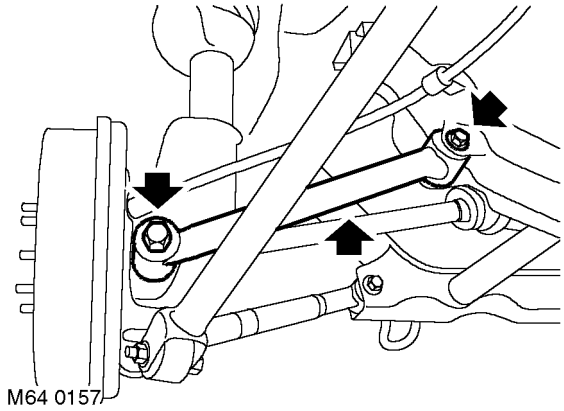
64.35.72

Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.



3. Remove nut and bolt securing transverse link to hub.
4. Remove nut and bolt securing fixed transverse link to subframe.
5. Remove transverse link.

Refit

1. Fit transverse link.
2. Fit nuts, bolts and washers securing transverse link to hub and subframe but do not tighten at this stage.
3. Support weight of vehicle with jack under rear hub.

   CAUTION: Nuts and bolts must be tightened with the weight of the vehicle on the suspension.

4. Tighten nuts and bolts to 105 Nm (77 lbf.ft).
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stands and lower vehicle.
7. Check and if necessary adjust rear wheel alignment.

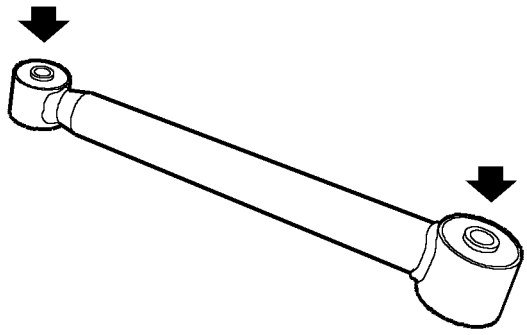
Bush - link - transverse

64.35.76

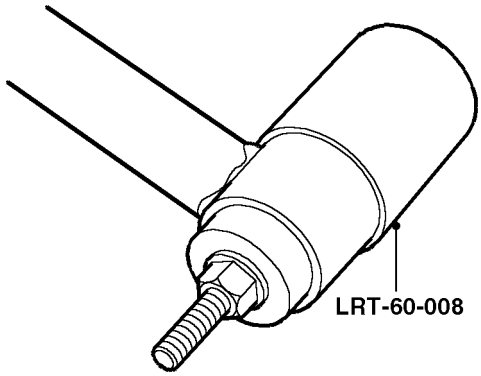
Remove

1. Remove transverse link.

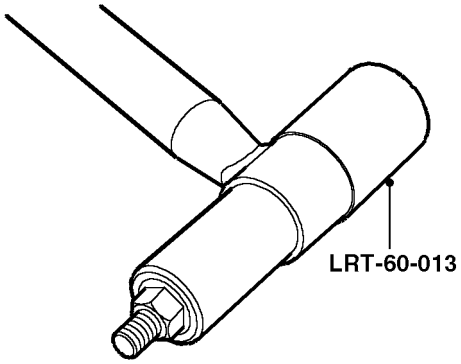
   REAR SUSPENSION, REPAIRS, Link - transverse fixed.



2. Note and mark bush orientation.



3. **Large bush:** Use **LRT-60-008** to remove bush.

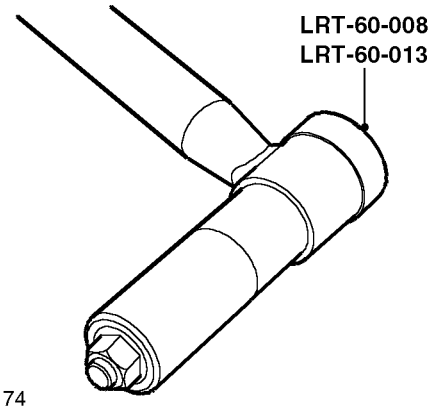


M64 0173

4. **Small bush:** Use **LRT-60-013** to remove bush.

Refit

1. Ensure bush bore is clean.
2. Ensure bush is correctly aligned.



M64 0174

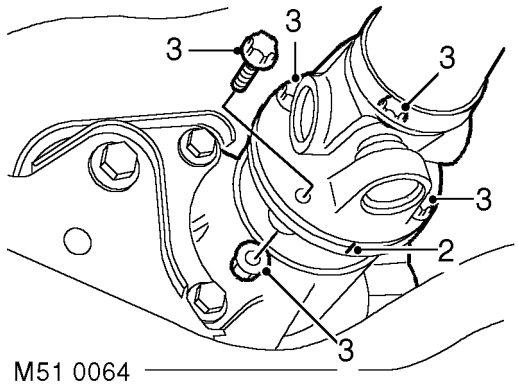
3. Using **LRT- 60-008** or **LRT-60-013** fit new bush.
4. Fit transverse link.
   ☞ **REAR SUSPENSION, REPAIRS, Link - transverse fixed.**

Sub frame

64.35.78

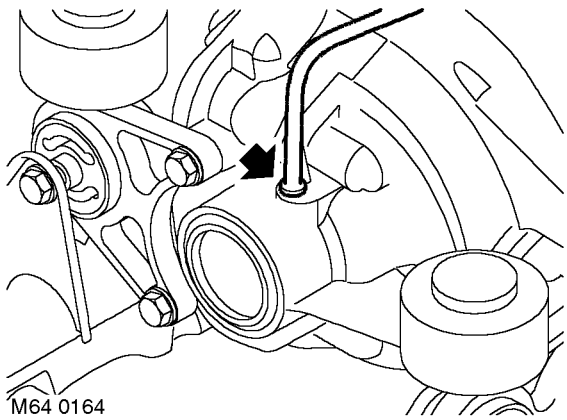
Remove

1. Remove both drive shafts.
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
   ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - RH.**



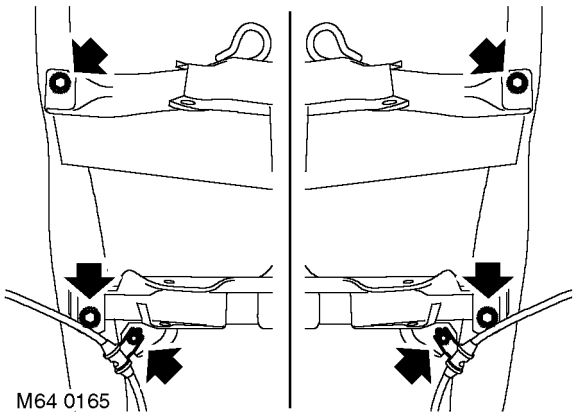
M51 0064

2. Reference mark rear propeller shaft for reassembly.
3. Remove 4 nuts and bolts securing propeller shaft to differential. Release propeller shaft and tie aside.



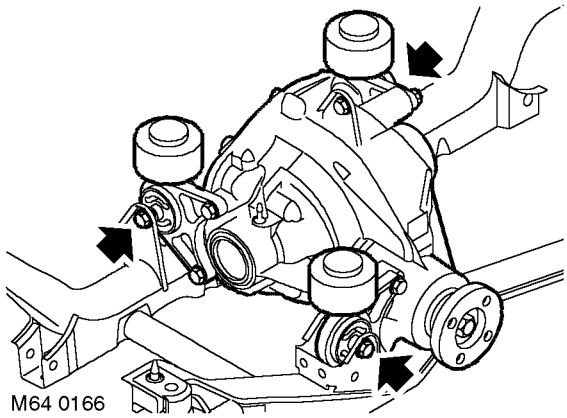
M64 0164

4. Depress red locking collar and disconnect breather pipe from differential casing.
5. Support the weight of the subframe assembly on a jack.

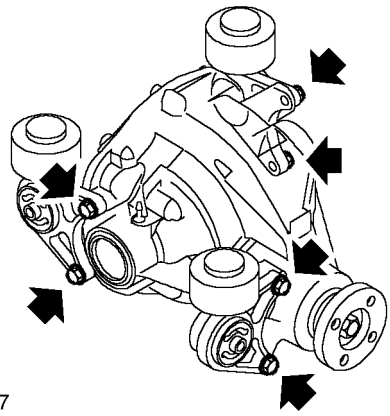

M64 0165

6. Remove 2 bolts securing handbrake cable clips to subframe.
7. Remove 4 bolts securing subframe to body.
8. With assistance lower jack, manoeuvre subframe around exhaust and remove from vehicle.

NOTE: Do not carry out further dismantling if component is removed for access only.

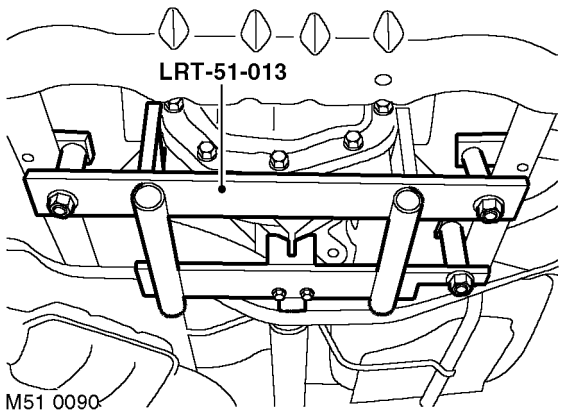

M64 0166

9. Remove 3 bolts securing differential mountings to subframe and remove differential assembly.


M64 0167

10. Loosen 6 bolts securing mountings to differential casing.

Refit



M51 0090

1. Position centralising jig **LRT-51-013** to align differential assembly.
2. Fit differential assembly.
3. Fit bolts securing differential mountings to subframe and tighten to 120 Nm (89 lbf.ft).
4. Tighten forward bolts to 65 Nm (48 lbf.ft).
5. Tighten rearward bolts to 65 Nm (48 lbf.ft).
6. Remove **LRT-51-013**.
7. With assistance position subframe assembly to body and locate on dowels.
8. Fit subframe bolts and tighten to 190 Nm (140 lbf.ft).

9. Align handbrake cables, fit bolts and tighten to 22 Nm (16 lbf.ft).
10. Connect breather pipe.
11. Position propeller shaft to rear axle and align reference marks.
12. Fit nuts and bolts securing propeller shaft to rear axle and tighten to 65 Nm (48 lbf.ft).
13. Fit drive shafts.
    ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - LH.**
    ☞ **DRIVESHAFTS, REPAIRS, Shaft with both joints - RH.**

Brake bleed

70.25.02

Check

1. The following procedure covers bleeding the complete system but where only the primary or secondary circuit have been disturbed in isolation, it should only be necessary to bleed that system. Partial bleeding of the hydraulic system is only permissible if a brake pipe or hose has been disconnected with only minor loss of fluid.

   CAUTION: Ensure the fluid in the reservoir is maintained between the minimum and maximum levels throughout the bleed procedure using new brake fluid.

Adjust

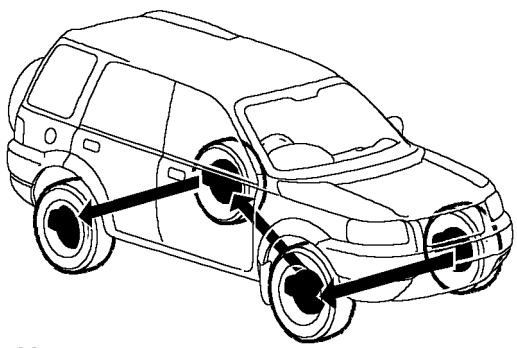
1. Raise front and rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Check all pipe and hose connections are tight and there are no signs of leakage.
3. Top-up fluid level in brake reservoir to 'MAX' mark.

   MAINTENANCE, MAINTENANCE, Brake Fluid.

   CAUTION: Never re-use fluid that has been bled from the system.



M70 1029

4. Bleed sequence: LH front to RH front, LH rear to RH rear.

   CAUTION: Use only new brake fluid of the recommended grade.

5. Attach bleed tube to front brake caliper bleed screw on passenger side, submerge free end in a clear container containing brake fluid.

   CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.

6. Apply pressure to brake pedal several times, then apply steady pressure.
7. Loosen bleed screw to release brake fluid and air. Allow pedal to return unassisted.
8. Depress brake pedal steadily through its full stroke and allow to return unassisted. Repeat procedure until a flow of clean air-free fluid is purged into container then, whilst holding pedal at end of downward stroke tighten bleed screw to 10 Nm (7.5 lbf.ft) on calipers and 8 Nm (6 lbf.ft) on wheel cylinders.

   CAUTION: Ensure the fluid in the reservoir is maintained between the minimum and maximum levels throughout the bleed procedure using new brake fluid.

9. Top up brake system reservoir.
10. Repeat procedure at each wheel in the sequence shown.

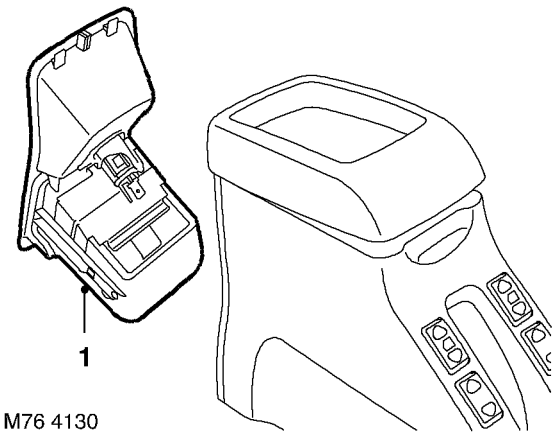
    WARNING: Braking efficiency may be seriously impaired if the incorrect bleed sequence is used.

11. Remove tube from bleed screw and fit bleed screw dust cap.
12. Apply brakes and check for leakage.
13. Remove stands and lower vehicle.
14. Road test vehicle. Check brake pedal for short firm travel when brakes are applied.

Cable - handbrake - check and adjust

70.35.10

Check



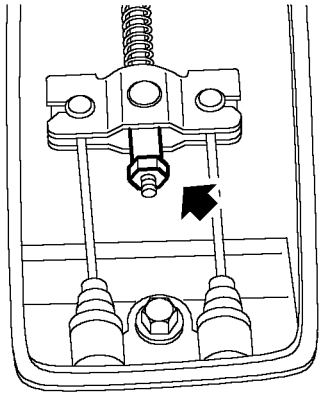
1. Release ash tray panel from rear console, disconnect multiplug from power socket and remove ash tray panel.
2. Fully release handbrake lever.
3. With engine running, apply footbrake a minimum of thirty times, to ensure full adjustment of rear brake shoes.
4. Switch off engine.
5. Apply handbrake lever one notch at a time and count the number of notches required to apply the brakes firmly, equivalent to a pull of 20 kgf. applied at mid point of handbrake lever grip. Handbrake lever travel = 4 to 5 notches.
6. Adjust handbrake cable tension if travel is outside limits.

   CAUTION: Hand brake travel must be within the limits given or the automatic adjusters may not work.

Adjust

1. If carrying out handbrake adjustment after brake drum installation, apply brake pedal a min. of 30 times, to ensure full adjustment of rear brake shoes.
2. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
3. Check handbrake cable connections for free movement in handbrake equalizer.
4. Apply handbrake lever one notch.



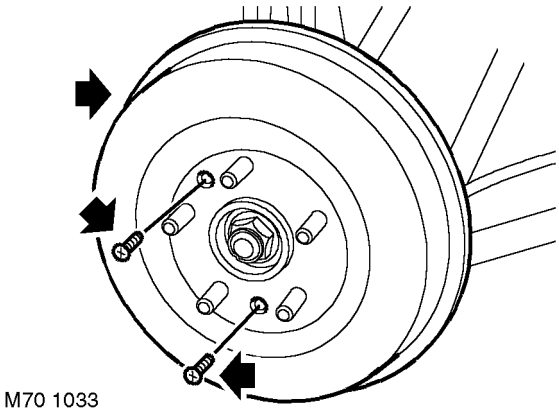
5. Tighten equalizer adjusting nut until rear wheels drag slightly when turned.
6. Release handbrake lever and check that rear wheels do not drag when turned. Adjust if necessary.
7. Apply handbrake one notch at a time and count the number of notches until both rear wheels lock. This should be a minimum of 4 and a maximum of 5 clicks. Adjust if necessary.
8. Release handbrake
9. Fit ash tray panel and cigar lighter to rear console.
10. Remove stands and lower vehicle.

Drum - rear

70.12.03

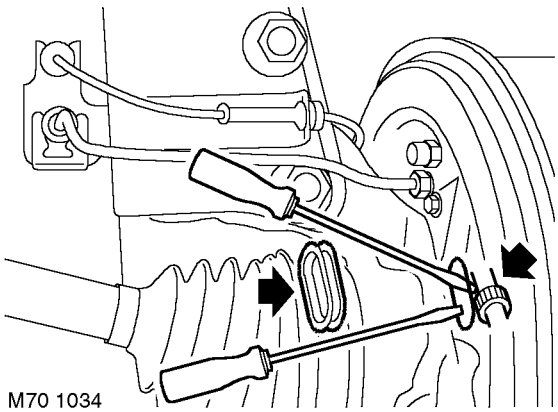
Remove

1. Raise rear of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.
3. Release handbrake.



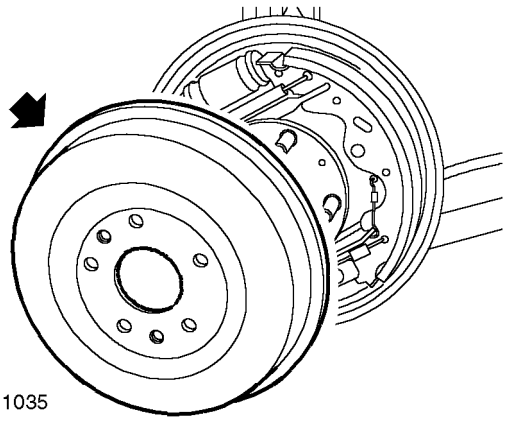
M70 1033

4. Remove 2 screws securing brake drum and remove brake drum.
   NOTE: If brake drum cannot be removed, release brake shoe adjustment as follows:



M70 1034

5. Remove rubber grommet from rear of backplate.
6. Using 2 flat bladed screwdrivers, release ratchet and turn the adjuster to increase the shoe to drum clearance.

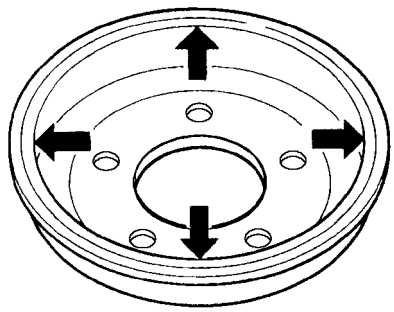


M70 1035

7. Remove brake drum.
   WARNING: Do not use compressed air to clean brake components. Dust from friction materials can be harmful if inhaled.

Refit

1. Renew brake drum if scored, grooved or cracked.
2. Check wheel cylinder pistons for freedom of movement.
3. Clean backplate and brake disc with brake cleaning fluid.
   WARNING: Do not use petroleum based fluid as damage will occur to rubber components



M70 1030

4. Measure inside diameter of drum at 2 points. Drum internal diameter: New = 254 mm. Service limit: = 255.49 mm. Drum ovality limit: = 0.012 mm. Renew drum if outside limits.
5. Examine wheel cylinder dust seals for signs of brake fluid leakage, a certain amount of dampness is usual. However, if excessive fluid is apparent, lift dust seals and check for leakage. Renew wheel cylinders and brake shoes if linings are contaminated.

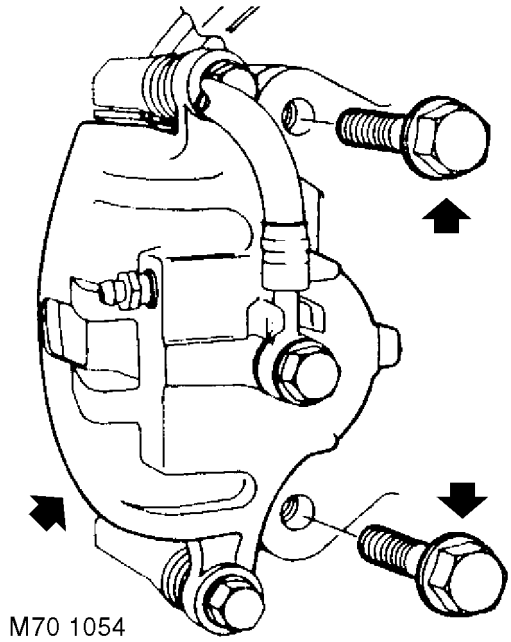
6. Apply molykote 111 grease to brake shoe and spring contact points.
   WARNING: Ensure grease does not contact brake shoe linings or wheel cylinder dust covers.
7. Fit brake drum and tighten screws.
8. If necessary, fit backplate grommet.
9. Apply brake pedal a min. of 30 times to ensure full adjustment of rear brake shoes after refitting.
10. Check handbrake operation, adjust if necessary.
11. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
12. Remove stands and lower vehicle.

Disc - front

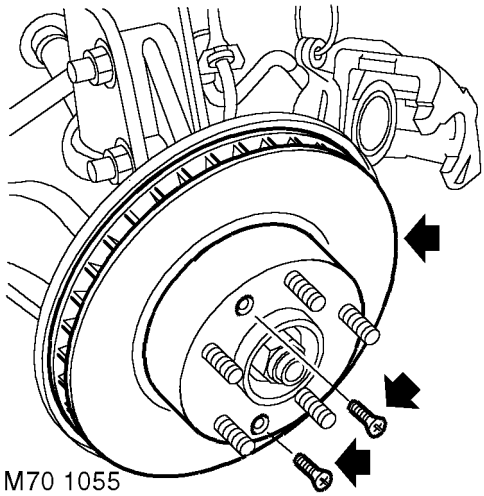
70.12.10

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).


M70 1054

3. Remove 2 bolts securing brake caliper to swivel hub.
4. Release caliper from disc and tie aside.
   CAUTION: Do not allow caliper to hang on brake hose.


M70 1055

5. Remove 2 screws securing brake disc to drive flange.
6. Remove brake disc from drive flange.

Refit

1. Clean brake disc and drive flange mating faces.
2. Fit disc to drive flange, fit screws and tighten to 5 Nm (3.5 lbf.ft).
3. Clean mating faces of caliper and hub.
4. Position caliper to brake disc fit bolts and tighten to 100 Nm (74 lbf.ft).
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stand and lower vehicle.

Hose - front - primary - LH

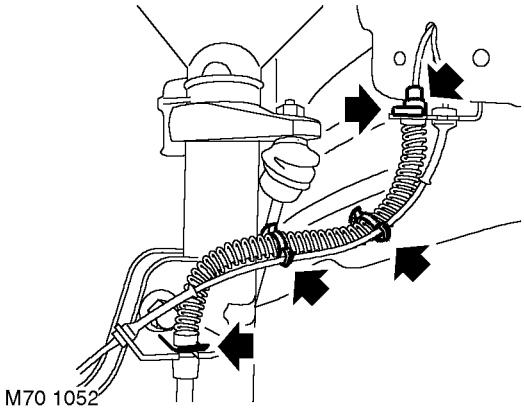
70.15.02

Remove

1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

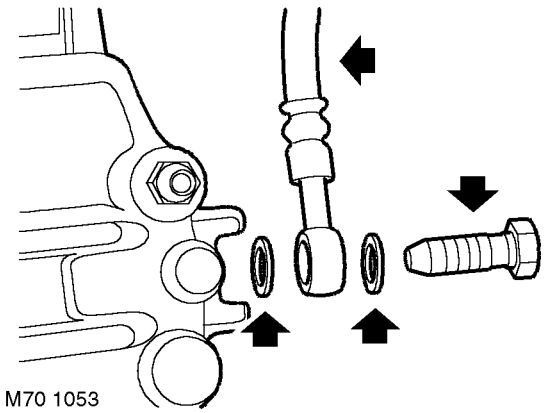
2. Remove road wheel(s).


M70 1052

3. Loosen brake pipe union to hose and release union.

   CAUTION: Always fit plugs to open connections to prevent contamination.

4. Remove 2 clips securing hose to valance and damper bracket.
5. Release clips securing ABS sensor lead to brake hose.


M70 1053

6. Remove banjo bolt securing brake hose to caliper and collect sealing washers.
7. Remove brake hose and plug brake caliper.

Refit

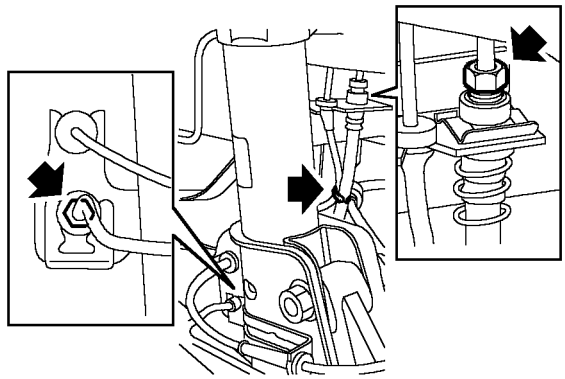
1. Remove plugs and clean brake pipe male end.
2. Position hose to support brackets and secure with clips.
3. Clean banjo bolt, hose and caliper mating faces.
4. Using new sealing washers, align hose to caliper, fit banjo bolt and tighten to 28 Nm (21 lbf.ft)
5. Align hose to brake pipe and tighten union to 17 Nm (12 lbf.ft).
6. Secure ABS sensor lead to brake hose.
7. Bleed brakes.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
8. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
9. Remove stand(s) and lower vehicle.

Hose - rear

⊸ ***70.15.17***

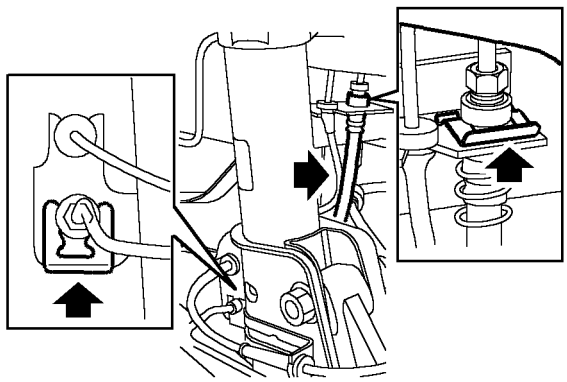
Remove

1. Raise rear of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.



M70 1073

3. Release clips securing ABS sensor lead to brake hose.
4. Loosen brake pipe unions to brake hose and release unions.
   CAUTION: Always fit plugs to open connections to prevent contamination.



M70 1074

5. Remove 2 clips securing hose to valance and damper bracket.
6. Remove brake hose.

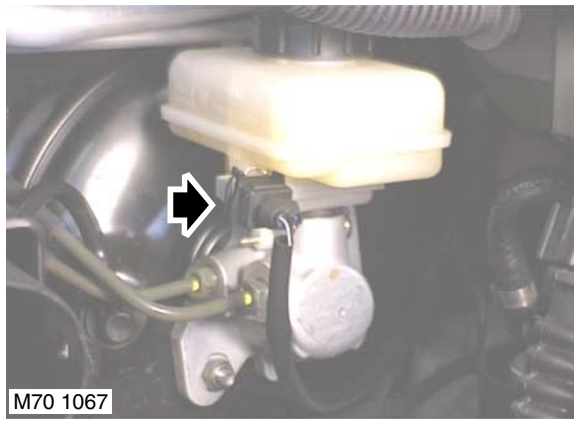
Refit

1. Remove plugs and clean brake pipe male end.
2. Position hose to support brackets and secure with clips.
3. Align brake pipes and tighten unions to 17 Nm (12 lbf.ft).
4. Secure ABS sensor lead to brake hose.
5. Bleed brakes.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
6. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
7. Remove stands and lower vehicle.

Cylinder - master - tandem - LHD

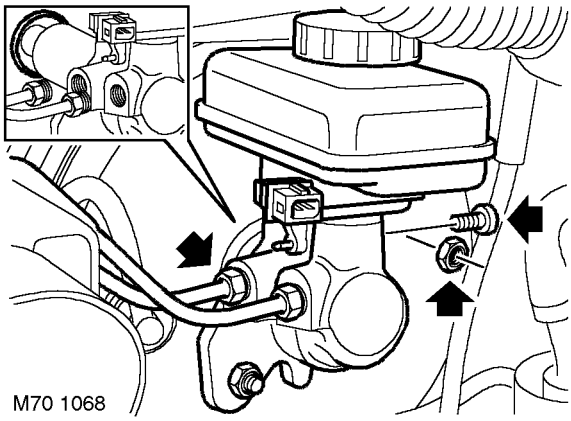
70.30.08

Remove



1. Disconnect brake fluid level multiplug.
2. Position cloth under master cylinder to absorb spilled fluid.

   CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.



3. Disconnect secondary system pipe union from master cylinder.
4. Disconnect primary system pipe union from master cylinder.

   CAUTION: Always fit plugs to open connections to prevent contamination.

5. Remove Torx bolt securing master cylinder reservoir to access master cylinder retaining nut.

6. Remove and discard 2 nuts securing master cylinder to servo, remove master cylinder.
7. Refit Torx bolt to reservoir.
8. Remove and discard sealing ring.

Refit

1. Clean master cylinder and servo mating surfaces.
2. Remove Torx bolt securing brake fluid reservoir to master cylinder.
3. Fit new sealing ring to master cylinder.
4. Align push rod and position master cylinder to servo.
5. Fit new nuts and tighten 25 Nm (18 lbf.ft).
6. Fit Torx bolt securing reservoir to master cylinder and tighten to 8 Nm (6 lbf.ft).
7. Clean brake pipe unions.
8. Connect primary and secondary brake pipes and tighten unions 17 Nm (12 lbf.ft).
9. Connect fluid level switch multiplug.
10. Bleed brakes.
    ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**

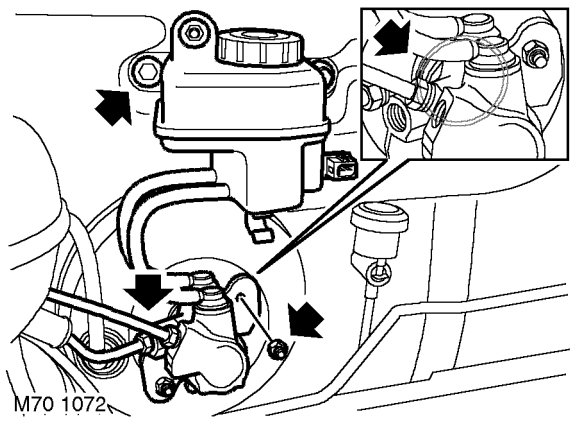
Cylinder - master - tandem - RHD

70.30.08

Remove


M70 1071

1. Disconnect brake fluid level multiplug.
2. Disconnect servo vacuum pipe from inlet manifold and release vacuum pipe from master cylinder reservoir.


M70 1072

3. Position cloth under master cylinder to absorb spilled fluid.
   CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.
4. Disconnect secondary system pipe union from master cylinder.
5. Disconnect primary system pipe union from master cylinder.
   CAUTION: Always fit plugs to open connections to prevent contamination.
6. Remove nut and 2 bolts securing master cylinder reservoir.

7. Remove and discard 2 nuts securing master cylinder to servo, remove master cylinder.
8. Remove and discard sealing ring.

Refit

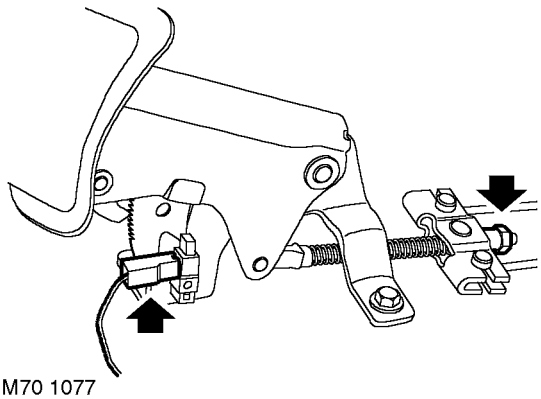
1. Clean master cylinder and servo mating surfaces.
2. Fit new sealing ring to master cylinder.
3. Align push rod and position master cylinder to servo.
4. Fit new nuts and tighten 25 Nm (18 lbf.ft).
5. Align reservoir, fit nut and bolts and tighten to 6 Nm (4.5 lbf.ft).
6. Clean brake pipe unions.
7. Connect primary and secondary brake pipes and tighten unions 17 Nm (12 lbf.ft).
8. Connect servo vacuum pipe to inlet manifold and secure to master cylinder reservoir.
9. Connect fluid level switch multiplug.
10. Bleed brakes.
    ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**

Lever assembly - handbrake

70.35.08

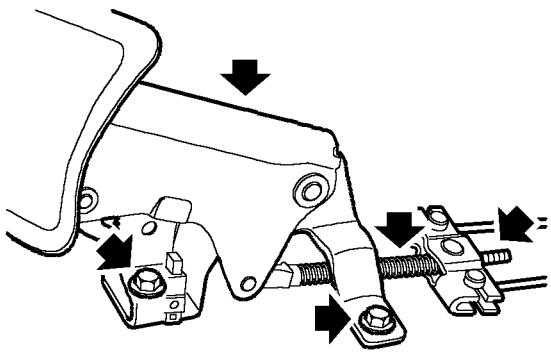
Remove

1. Remove rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**



M70 1077

2. Disconnect Lucar from handbrake warning switch.
3. Remove cable adjusting nut.



M70 1078

4. Remove 2 bolt securing handbrake lever assembly.
5. Release adjusting rod from equalizer and remove handbrake lever assembly.
6. Remove spring from adjusting rod.

Refit

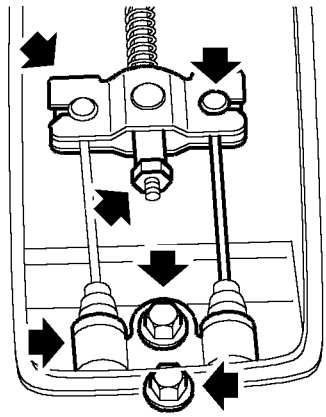
1. Fit spring to adjusting rod.
2. Fit handbrake lever assembly, fit bolts and tighten to 22 Nm (16 lbf.ft).
3. Fit cable adjusting nut.
4. Connect Lucar to handbrake switch.
5. Adjust handbrake.
   ☞ **BRAKES, ADJUSTMENTS, Cable - handbrake - check and adjust.**
6. Fit rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**

Cable - handbrake

🔧 ***70.35.25***

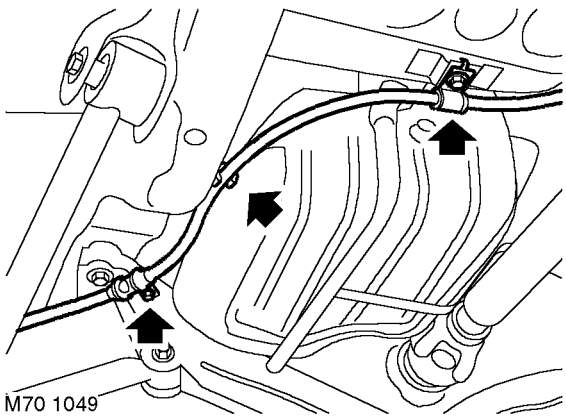
Remove

1. Raise rear of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel(s).
3. Release rear ash tray, disconnect connector from cigar lighter and remove ash tray.



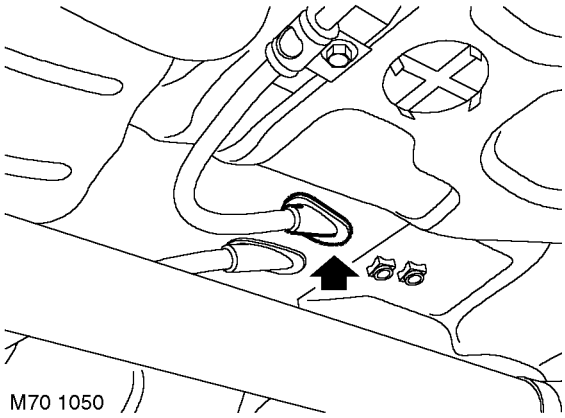
M70 1048

4. Remove cable adjusting nut.
5. Remove 2 bolts securing cable retaining plate to body and remove plate.
6. Release equalizer from adjusting rod.
7. Release cable from equalizer plate.

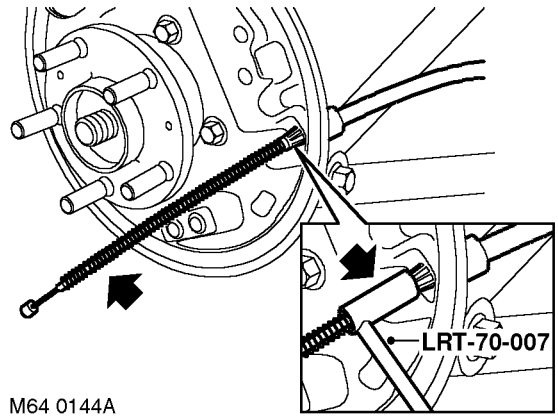


M70 1049

8. Remove 2 bolts securing cable to body and subframe.
9. Release cable from chassis clip.



10. Release cable grommet from floor and pull cable from interior.
11. Remove rear brake shoes.
    ☞ **BRAKES, REPAIRS, Brake Shoes - rear set.**



12. Using tool **LRT-70-007** release cable retainer from backplate and withdraw cable from vehicle.

Refit

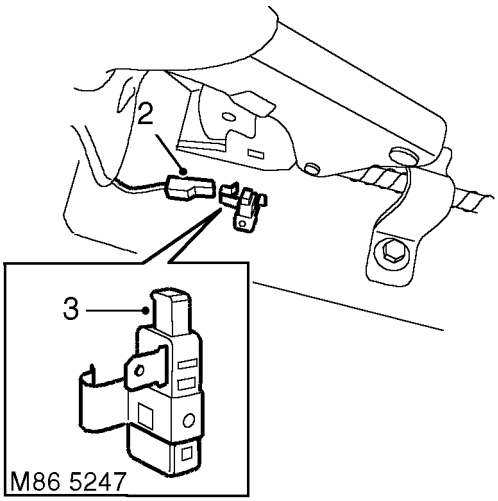
1. Manoeuvre cable into position and secure floor grommet.
2. Fit and secure handbrake cable to backplate.
3. Fit brake shoes.
   ☞ **BRAKES, REPAIRS, Brake Shoes - rear set.**
4. Align cable clips, fit bolts and tighten to 22 Nm (16 lbf.ft).
5. Secure cable in chassis clip.
6. Connect handbrake cable to equalizer.
7. Ensure spring is in place and fit equalizer to adjusting rod.
8. Fit cable adjusting nut.
9. Fit cable retaining plate, fit bolts and tighten to 22 Nm (16 lbf.ft).
10. Adjust handbrake cable.
    ☞ **BRAKES, ADJUSTMENTS, Cable - handbrake - check and adjust.**
11. Fit ash tray and cigar lighter to rear console.
12. Fit road wheel(s).
13. Remove stands and lower vehicle.

Switch - handbrake warning

70.35.40

Remove

1. Remove rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**



2. Disconnect Lucar from handbrake warning switch.
3. Release switch from handbrake.

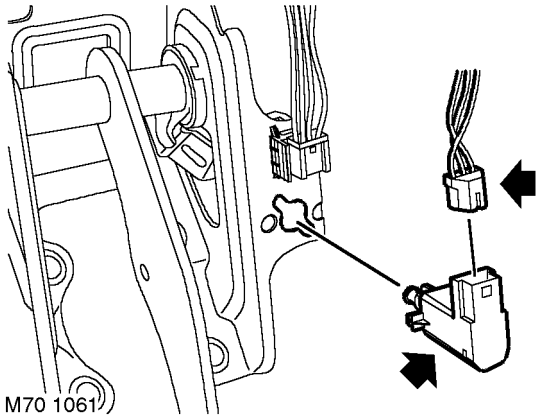
Refit

1. Fit switch to handbrake and connect Lucar.
2. Fit rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**

Switch - stop light

70.35.42

Remove



1. Disconnect brake light switch multiplug.
2. Release bayonet fitting on brake light switch and remove switch.

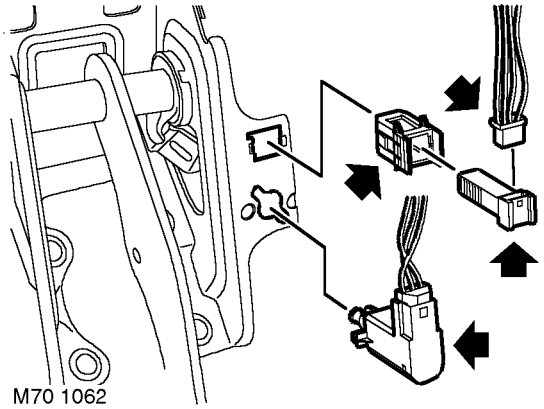
Refit

1. Position switch and secure bayonet fitting.
2. Connect brake light switch multiplug.
3. Depress and hold brake pedal.
4. Reset switch by pulling plunger fully out.
5. Release brake pedal slowly to set switch adjustment.

Sensor - brake pedal position

70.35.44

Remove


M70 1062

1. Release bayonet fitting on brake light switch and remove switch.
2. Release sensor from mounting bracket.
3. Disconnect sensor multiplug and remove sensor.
4. Remove sensor mounting from bracket.

Refit

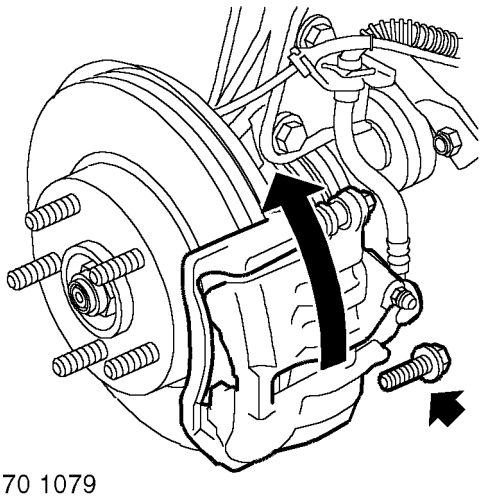
1. Position sensor to mounting bracket and connect multiplug.
2. Position switch and secure bayonet fitting.
3. Hold brake pedal depressed and push sensor fully into bracket, release pedal slowly to set sensor position.

Shoes/pads - front - set

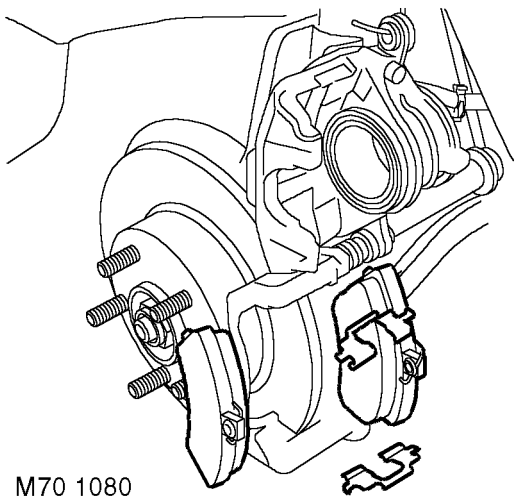
70.40.02

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove front road wheel.


M70 1079

3. Remove lower guide pin bolt from caliper and pivot caliper housing upwards.
   WARNING: Brake pads must be renewed in axle sets only, otherwise braking efficiency may be impaired.


M70 1080

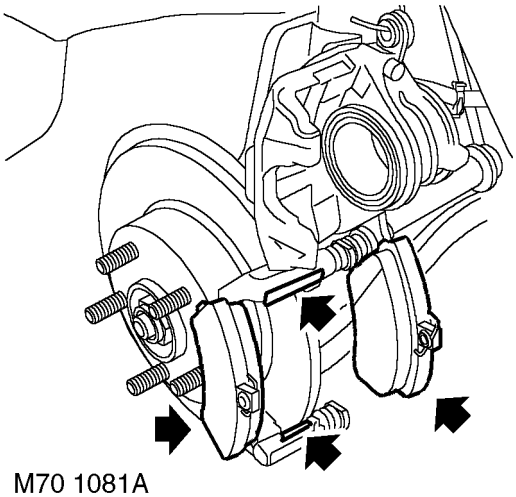
4. Remove brake pads and retainers from caliper brackets.

Refit

1. Rotate disc by hand and scrape all scale and rust from around edge of disc.
2. Scrape rust from pad locating surfaces on caliper.
3. Clean dust from calipers using brake cleaning fluid.

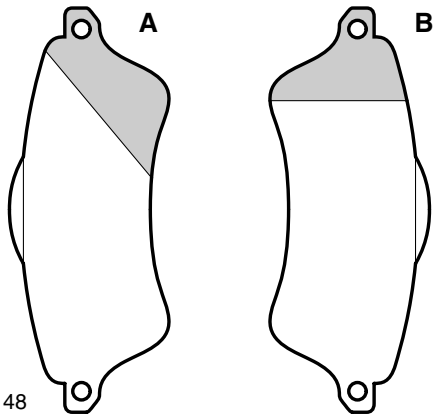
   WARNING: Do not use an air line to blow dust from brake assembly. Do not use petroleum based fluid as damage will occur to rubber components.

4. Position bleed bottle, connect bleed hose to bleed screw and loosen screw.
5. Press piston back into housing and tighten bleed screw to 10 Nm (7.5 lbf.ft).
6. Disconnect bleed hose and remove bottle.



M70 1081A

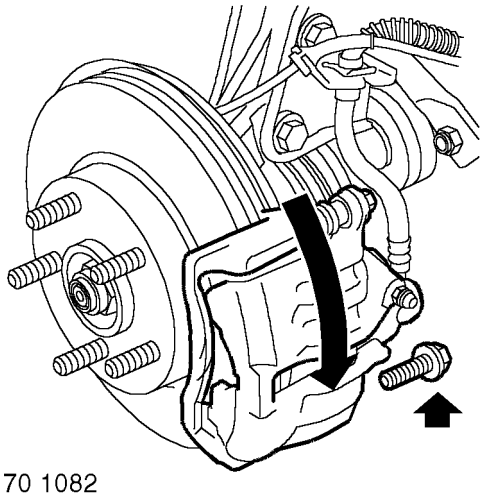
7. Fit pad retainers to caliper bracket.



M70 1148

8. Fit pads to caliper bracket.

   The leading edge of the pads have chamfers on them, the chamfers are asymmetric. It is imperative that the pads are correctly fitted. Pad 'A' in illustration must be fitted to the inboard side of the caliper. Pad 'B' must be fitted to the outboard side of the caliper. Illustration shows a LH pair of pads.



M70 1082

9. Lower caliper housing over pads.
10. Ensure flats on guide pins locate with lugs on caliper housing. Fit bolts and tighten to 27 Nm (20 lbf.ft).
11. Repeat procedure for other side.
12. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
13. Remove stands and lower vehicle.
14. Depress brake several times to set pad to disc clearance.
15. Check and top-up brake fluid.

Brake Shoes - rear set

70.40.09

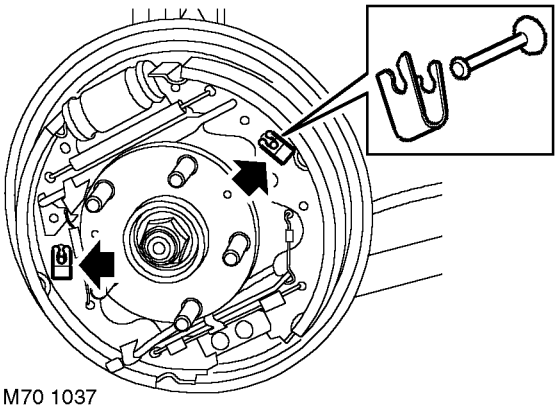
Remove

1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

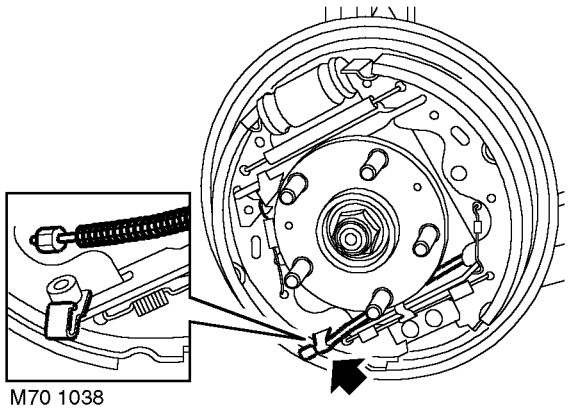
2. Remove rear road wheels.
3. Remove rear brake drums.

   BRAKES, REPAIRS, Drum - rear.



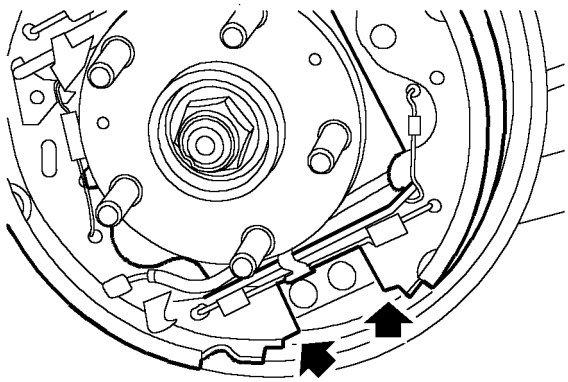
M70 1037

4. Depress brake shoe clips and turn to release, remove 2 clips and 2 retaining pins.



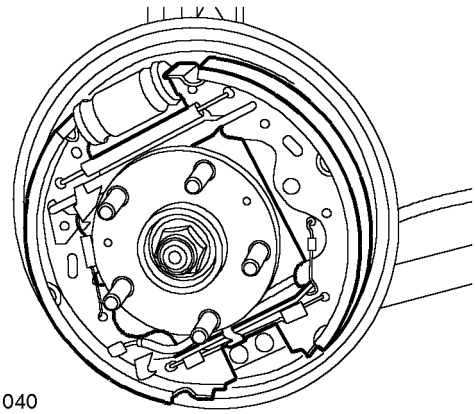
M70 1038

5. Release handbrake cable from brake shoe lever.



M70 1039

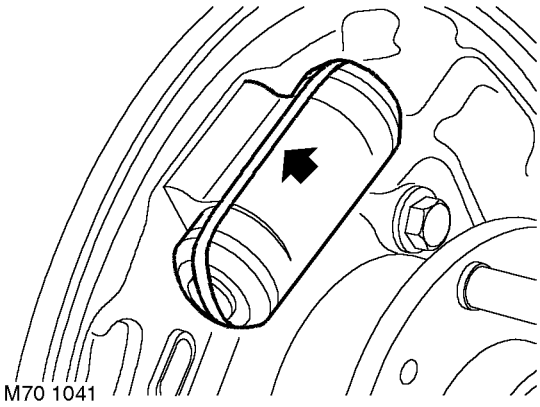
6. Ease one brake shoe out of retaining groove in abutment followed by the other shoe.



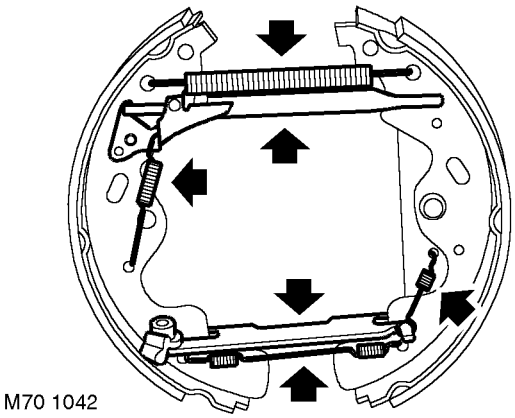
M70 1040

7. Manoeuvre brake shoe assembly around wheel cylinder and rear hub and remove brake shoe assembly.

   CAUTION: Ensure edges of brake shoes do not damage wheel cylinder dust covers.


M70 1041

8. Fit an elastic band around wheel cylinder to retain pistons.


M70 1042

9. Noting their fitted position, release and remove return springs. Collect adjuster and expander.
10. Clean backplate and drum with brake cleaning fluid.

    WARNING: Do not use petroleum based fluid as damage will occur to rubber components

11. Use a wire brush to remove any corrosion, take care not to damage wheel cylinder covers.

    WARNING: Do not use compressed air to clean brake components. Dust from friction materials can be harmful if inhaled.

12. Inspect all parts for wear or damage.
13. Examine wheel cylinder dust seals for signs of brake fluid leakage, a certain amount of dampness is usual. However, if excessive fluid is apparent, lift dust seals and check for leakage. Renew wheel cylinders and brake shoes if linings are contaminated.
14. Check wheel cylinder pistons for freedom of movement.
15. Check brake adjuster threads, nut and handbrake linkage for wear. Renew if necessary.
16. Check condition of return springs and renew if necessary.
17. Ensure brake adjuster is fully off.

Refit

1. Position adjuster and expander to brake shoes and fit return springs.
2. Smear brake shoe contact points with Molykote 111 grease.
3. Remove elastic band from wheel cylinder.
4. Manoeuvre brake shoes around rear hub and locate to abutment and wheel cylinder.
5. Fit brake shoe retaining pins and secure with clips.
6. Connect hand brake cable to brake shoe lever.
7. Fit brake drum.

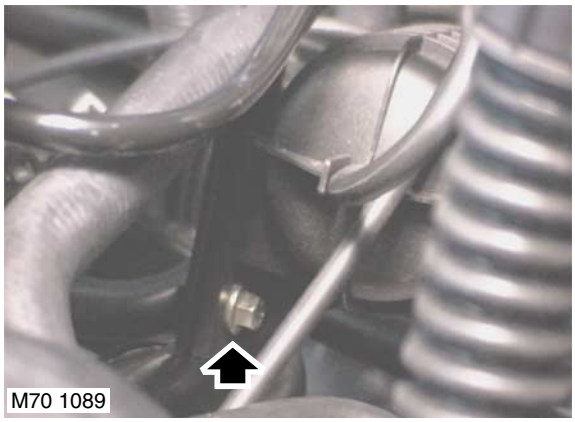
   ☞ **BRAKES, REPAIRS, Drum - rear.**
8. Apply brake pedal a min. of 30 times to ensure full adjustment of rear brake shoes after refitting.
9. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
10. Remove stands and lower vehicle.

Servo assembly - LHD

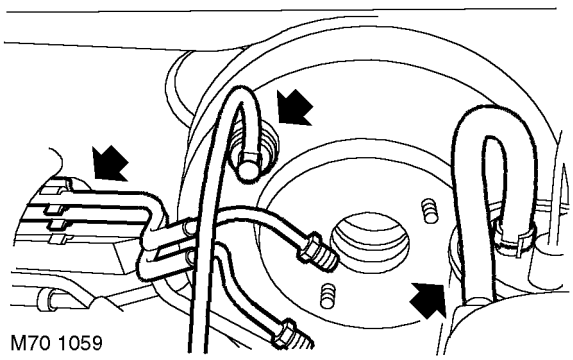
70.50.01

Remove

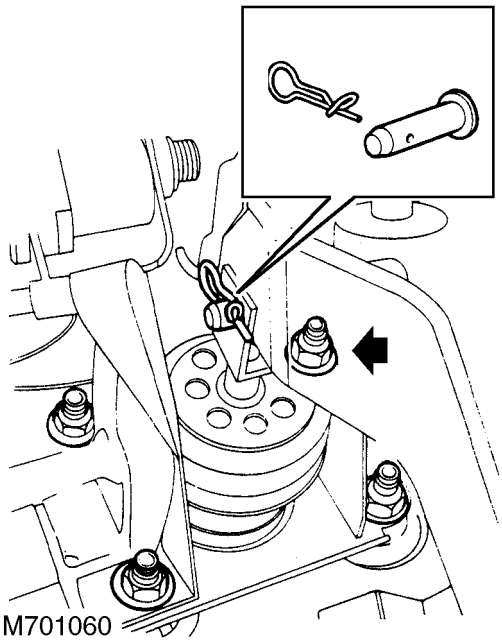
1. **Td4 models:** Remove air cleaner element
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.
2. Remove brake master cylinder.
   BRAKES, REPAIRS, Cylinder - master - tandem - LHD.



3. **Td4 models:** Remove bolt securing vacuum reservoir and position reservoir aside.



4. Remove screw securing fuel filter housing to bracket.
5. Release fuel filter housing from bracket.
6. Release and disconnect vacuum hose from servo.
7. Remove and discard vacuum hose seal.
8. Release brake pipes from clips on bulkhead.



9. Remove clip and clevis pin securing brake servo push rod to brake pedal.
10. Remove 4 nuts securing servo to body and remove servo.
11. Remove and discard gasket.

Refit

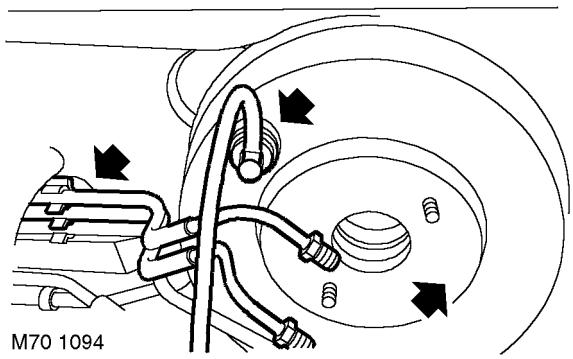
1. Fit new gasket to servo.
2. Position servo to body, fit nuts and tighten in a diagonal sequence to 22 Nm (16 lbf.ft).
3. Align push rod to brake pedal, fit clevis pin and secure with new spring clip.
4. Position fuel filter to support bracket and secure with screw.
5. **Td4 models:** Fit vacuum reservoir and washer to mounting bracket, tighten bolt to 10 Nm (7.5 lbf.ft).
6. Fit new vacuum hose seal.
7. Connect vacuum hose to servo.
8. Fit brake master cylinder.
   BRAKES, REPAIRS, Cylinder - master - tandem - LHD.
9. Secure brake pipes in retaining clips.
10. **Td4 models:** Fit air cleaner element.
    FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.

Servo assembly - RHD

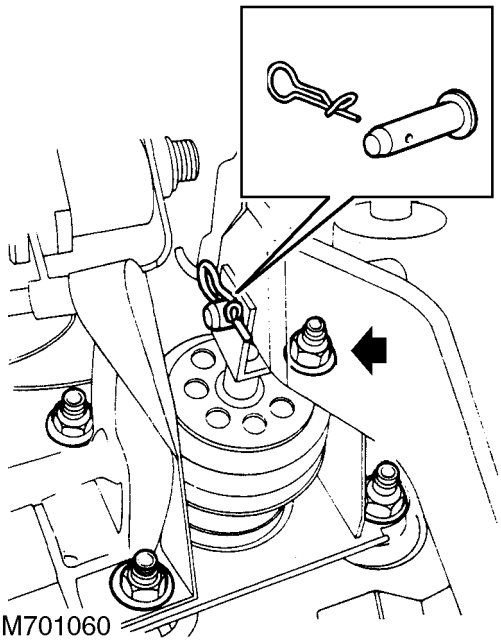
70.50.01

Remove

1. **KV6 models:** Remove engine acoustic cover.
2. **Td4 models:** Remove air cleaner element
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**
3. Remove brake master cylinder.
   ☞ **BRAKES, REPAIRS, Cylinder - master - tandem - RHD.**



4. Release and disconnect vacuum hose from servo.
5. Remove and discard vacuum hose seal.
6. Release brake pipes from clips on bulkhead.



7. Remove clip and clevis pin securing brake servo push rod to brake pedal.
8. Remove 4 nuts securing servo to body and remove servo.
9. Remove and discard gasket.

Refit

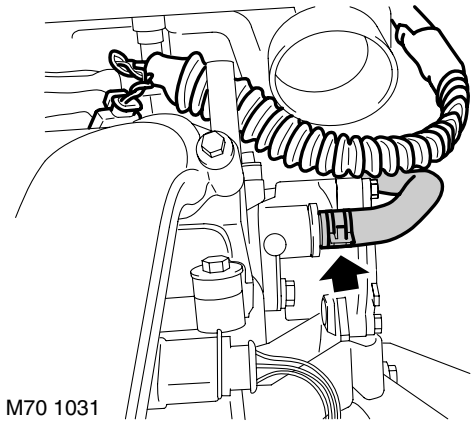
1. Fit new gasket to servo.
2. Position servo to body, fit nuts and tighten to 22 Nm (16 lbf.ft).
3. Align push rod to brake pedal, fit clevis pin and secure with new spring clip.
4. Fit new vacuum hose seal.
5. Connect vacuum hose to servo.
6. Fit brake master cylinder.
   ☞ **BRAKES, REPAIRS, Cylinder - master - tandem - RHD.**
7. Secure brake pipes in retaining clips.
8. **Td4 models:** Fit air cleaner element.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.**
9. **KV6 models:** Fit engine acoustic cover.

Vacuum pump - Td4 - manual

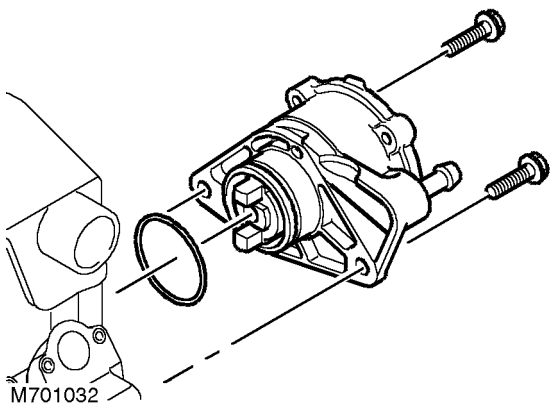
70.50.19

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner element.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.



3. Move injector harness clear of vacuum pump.
4. Release clip and disconnect hose from vacuum pump.



5. Remove and discard 2 bolts securing vacuum pump.
6. Remove vacuum pump and discard 'O' ring.

Refit

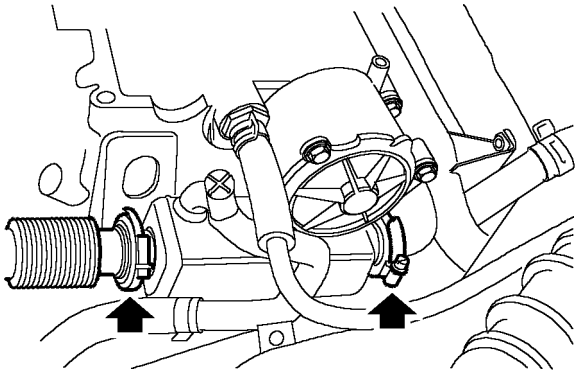
1. Clean vacuum pump and mating face.
2. Fit new 'O' ring to vacuum pump.
3. Rotate vacuum pump drive to align with camshaft, fit vacuum pump and tighten new bolts to 22 Nm (16 lbf.ft).
4. Connect hose to vacuum pump and secure with clip.
5. Reposition injector harness.
6. Fit air cleaner element.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Element - air cleaner.
7. Connect battery earth lead.

Vacuum pump - Td4 - automatic

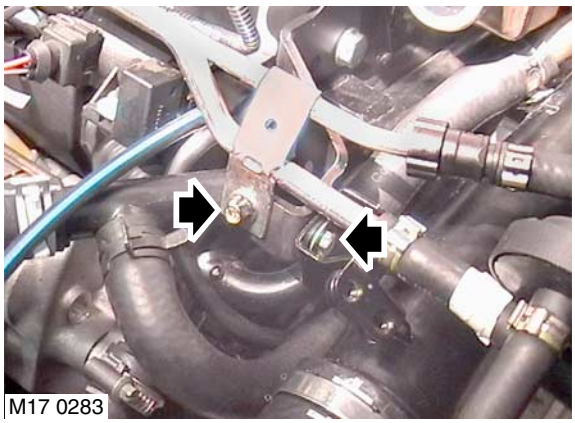
70.50.19

Remove

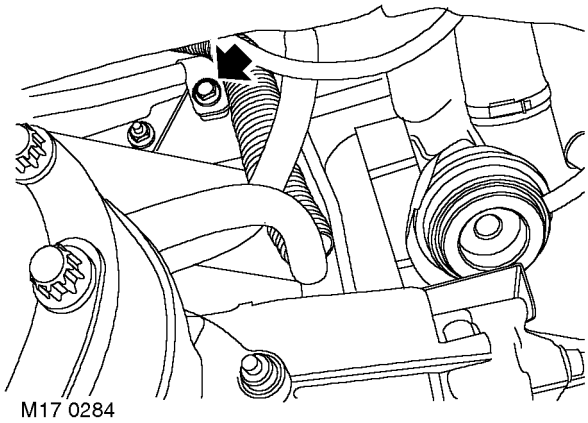
1. Disconnect battery earth lead.
2. Remove camshaft cover.
   ENGINE - Td4, REPAIRS, Gasket - camshaft cover.


M17 0282

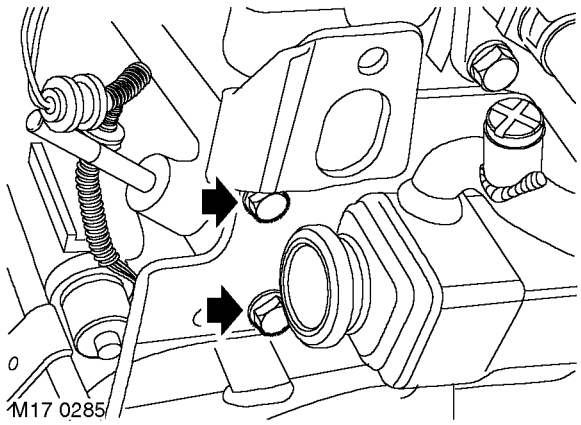
3. Mark EGR pipe and cooler to aid refit.
4. Loosen clamps EGR pipes to cooler and move clamps aside.
5. Remove pipe, EGR cooler to EGR valve.


M17 0283

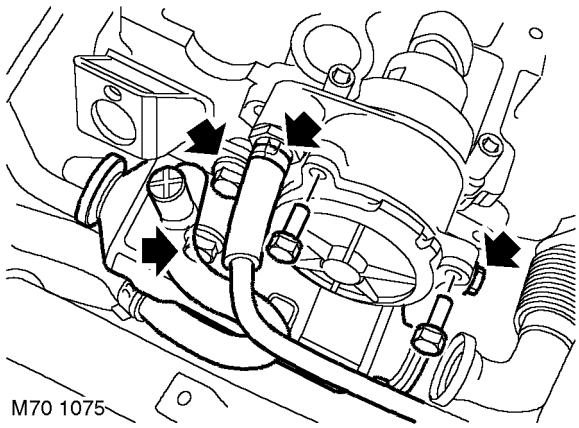
6. Remove bolt securing fuel rails to support bracket.
7. Remove bolt securing intercooler pipe to support bracket.
8. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.


M17 0284

9. Remove bolt securing turbo outlet pipe to upper coolant rail.

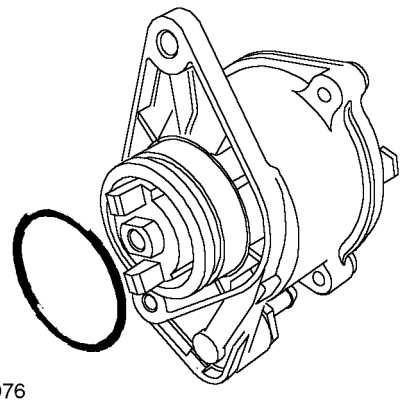

M17 0285

10. Remove 2 bolts securing pipe support bracket to engine lifting bracket, remove support bracket.


M70 1075

11. Release clip and remove vacuum hose.
12. Remove and discard 2 bolts securing vacuum pump.

13. Remove 3 bolts securing EGR cooler to cylinder head and lifting bracket.
14. Move EGR cooler aside for access to vacuum pump.



M70 1076

15. Remove vacuum pump and discard 'O' ring.

Refit

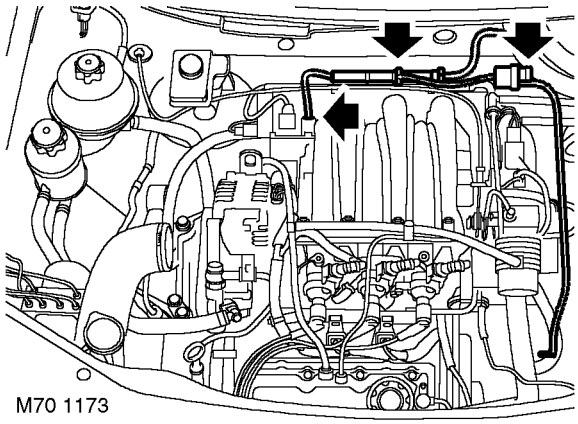
1. Clean vacuum pump and mating face.
2. Fit new seal to vacuum pump, fit vacuum pump and tighten new bolts to 22 Nm (16 lbf.ft).
3. Position EGR cooler to mounting, fit bolts and tighten to 25 Nm (18 lbf.ft).
4. Position pipe support bracket to engine lifting bracket, fit and tighten bolts to 25 Nm (18 lbf.ft).
5. Fit vacuum hose and tighten clip.
6. Fit bolt securing turbocharger pipe to coolant rail and tighten to 25 Nm (18 lbf.ft).
7. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
8. Fit bolt securing turbocharger intercooler pipe to support bracket and tighten to 10 Nm (7.5 lbf.ft).
9. Fit bolt securing fuel rails to support bracket and tighten to 10 Nm (7.5 lbf.ft).
10. Align EGR pipe to cooler, fit clamp but do not fully tighten until camshaft cover is refitted.
11. Fit EGR pipe clamp and tighten screw.
12. Fit camshaft cover.
    ☞ **ENGINE - Td4, REPAIRS, Gasket - camshaft cover.**
13. Connect battery earth lead.

Vacuum - enhancer - KV6

70.50.20

Remove

1. Disconnect battery earth lead.
2. Remove engine accoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**



M70 1173

3. Release enhancer from support clips.
4. Disconnect multiplug from solenoid valve.
5. Release and disconnect servo pipe.
6. Release clip and disconnect from intake hose.
7. Release and remove enhancer assembly from inlet manifold.

Refit

1. Fit enhancer to inlet manifold.
2. Connect to intake hose and secure with clip.
3. Connect servo hose.
4. Connect multiplug to solenoid valve.
5. Fit enhancer into clips.
6. Fit engine acoustic cover.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Cover - engine acoustic.**
7. Connect battery earth lead.

Carrier assembly - caliper - front

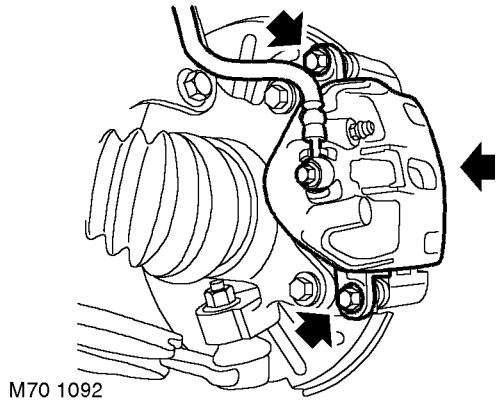
70.55.28

Remove

1. Raise front of vehicle.

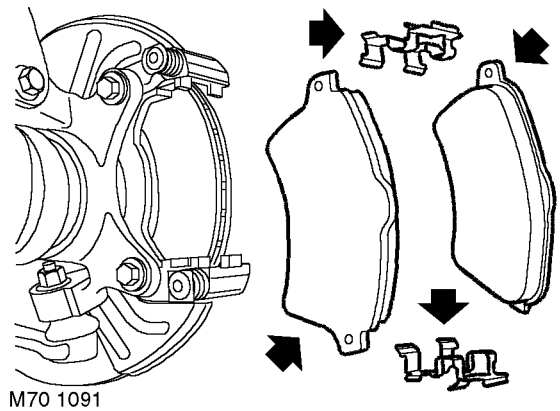
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.



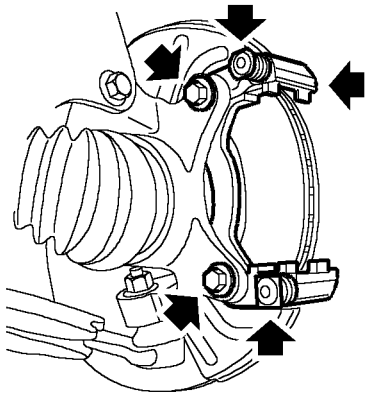
M70 1092

3. Remove 2 guide pins from caliper housing.
4. Release caliper housing from caliper carrier and tie aside.



M70 1091

5. Remove 2 brake pads and retainers from caliper carrier.



M701093

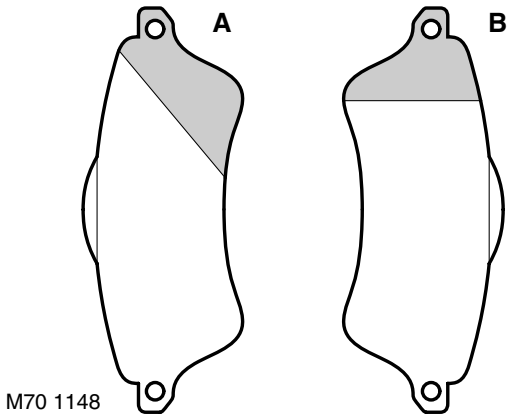
6. Remove 2 bolts securing caliper carrier and remove carrier.
7. Remove guide pins and seals from carrier.

Refit

1. Clean guide pins and carrier mating faces.
2. Fit guide pins and seals to carrier.
3. Fit carrier, fit bolts and tighten to 100 Nm (74 lbf.ft).
4. Rotate disc by hand and scrape all scale and rust from around edge of disc. Clean location surfaces on caliper bracket.
5. Clean dust from brake parts using brake cleaning fluid.

   WARNING: Do not use an air line to blow dust from brake assembly. Do not use petroleum based fluid as damage will occur to rubber components.

6. Clean mating faces of caliper and hub.
7. Fit pad retainers to caliper bracket.



8. Fit brake pads to caliper carrier.

The leading edge of the pads have chamfers on them, the chamfers are asymmetric. It is imperative that the pads are correctly fitted. Pad 'A' in illustration must be fitted to the inboard side of the caliper. Pad 'B' must be fitted to the outboard side of the caliper.

9. Position caliper housing to carrier, align flats on guide pins with caliper housing.
10. Ensure flats on guide pins locate with lugs on caliper housing. Fit bolts and tighten to 27 Nm (20 lbf.ft).
11. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
12. Remove stands and lower vehicle.

Wheel cylinder - rear

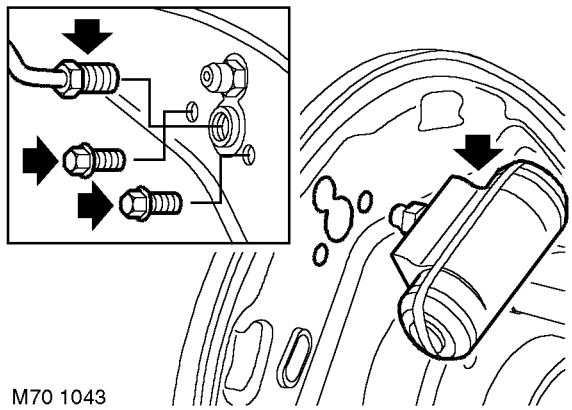
70.60.19

Remove

1. Raise rear of vehicle.

WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.
3. Remove rear brake shoes.
BRAKES, REPAIRS, Brake Shoes - rear set.



4. Disconnect pipe union from wheel cylinder.
CAUTION: Always fit plugs to open connections to prevent contamination.

5. Remove 2 bolts securing wheel cylinder and remove wheel cylinder.
6. Use a wire brush to remove any corrosion.
7. Clean backplate and drum with brake cleaning fluid.

WARNING: Do not use an air line to blow dust from brake assembly. Do not use petroleum based fluid as damage will occur to rubber components.

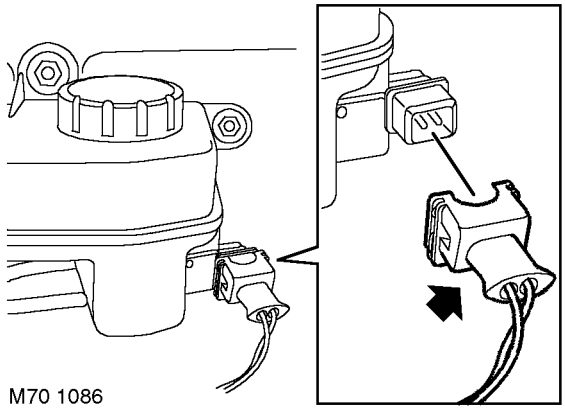
Refit

1. Fit wheel cylinder to backplate, fit bolts and tighten to 8 Nm (6 lbf.ft).
2. Connect brake pipe union to wheel cylinder and tighten union to 17 Nm (12 lbf.ft).
3. Fit brake shoes.
   ☞ **BRAKES, REPAIRS, Brake Shoes - rear set.**
4. Bleed brakes.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stands and lower vehicle.

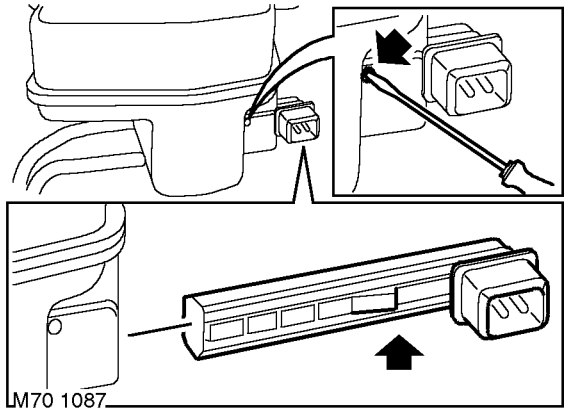
Switch - low fluid level

70.65.06

Remove



1. Disconnect brake fluid level multiplug.



2. Release retaining pin and remove fluid level switch.

Refit

1. Clean brake fluid level switch.
2. Fit brake fluid level switch.
3. Connect multiplug to brake fluid level switch.

Sensor & harness - front wheel - RH

70.65.29

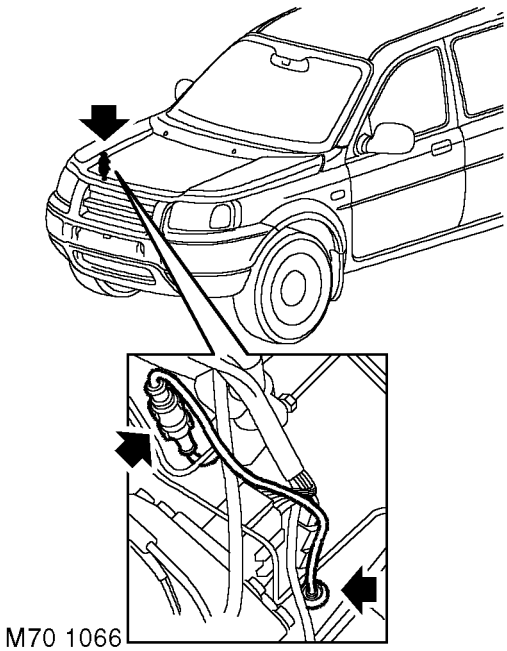
Remove

1. Raise front of vehicle.

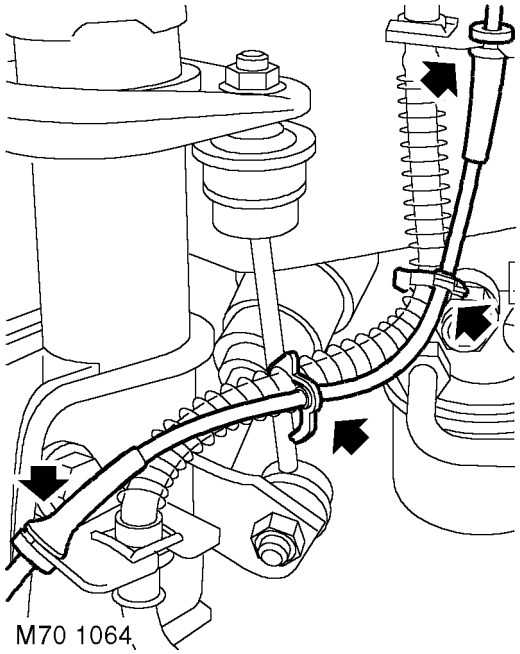
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.
3. Remove front wheel arch liner.

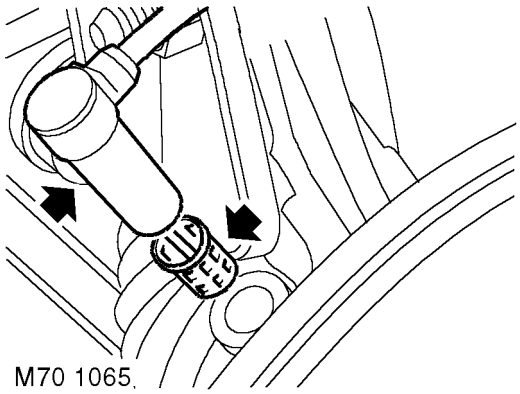
   EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.


M70 1066

4. Locate ABS sensor harness on inner wing.
5. Release ABS sensor multiplug from body clip and disconnect multiplug.
6. Release grommet from wing valance and pull harness through.


M70 1064

7. Release 2 grommets from wing valance and damper brackets
8. Release harness from brake hose clips.


M70 1065

9. Remove bolt securing ABS sensor to hub, if fitted.
10. Release ABS sensor from hub.
11. Remove ABS sensor and harness.
12. Remove bush from front hub.

Refit

1. Clean ABS sensors and mating faces.
2. Fit new bush to front hub.
3. Apply anti-seize grease to sensor.
4. Fit sensor to hub, ensure sensor is fully seated in hub.

   CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

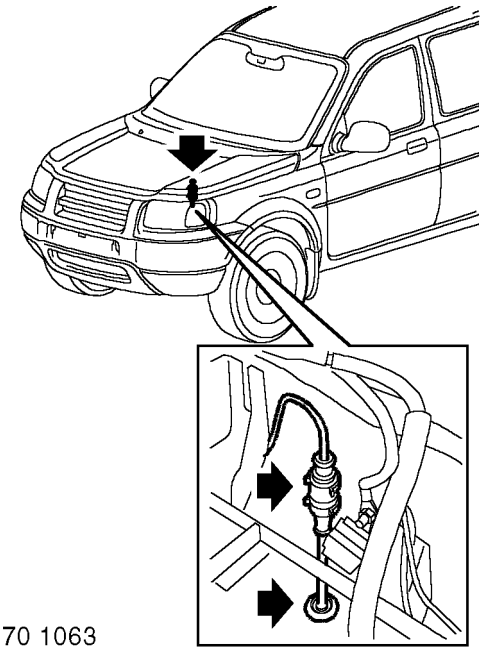
5. Fit and tighten bolt securing ABS sensor to hub, if fitted.
6. Secure harness grommets to brackets.
7. Pass sensor harness through wing valance and secure grommet.
8. Ensure 'O' ring is in place and connect sensor multiplug to body harness.
9. Secure multiplug in body clip.
10. Secure harness to brake hose clip.
11. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
12. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
13. Remove stand and lower vehicle.
14. To ensure correct operation, the ABS system MUST be tested using TestBook.

Sensor & harness - front wheel - LH

⊸ ***70.65.30***

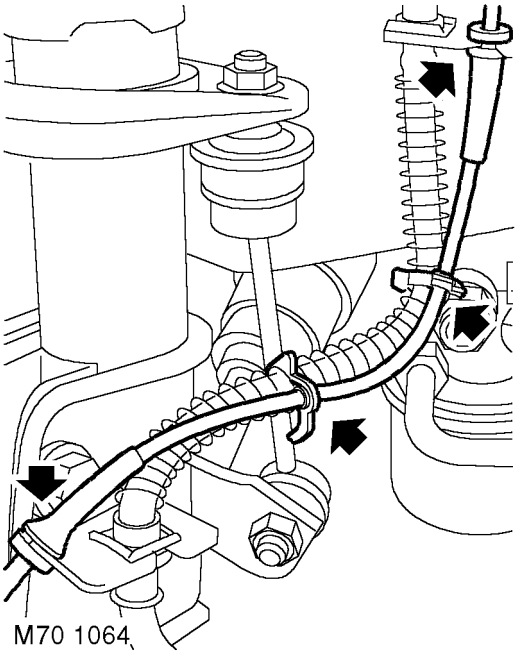
Remove

1. Remove battery carrier.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
2. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
3. Remove road wheel.
4. Remove front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**

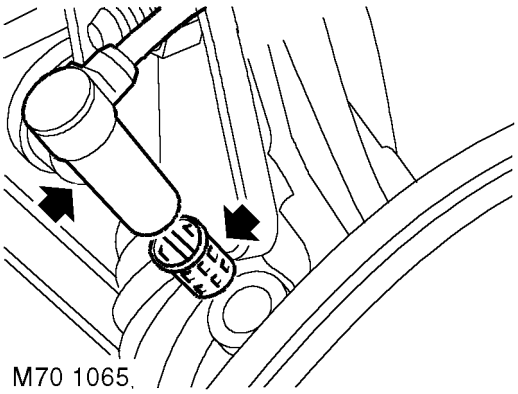


M70 1063

5. Locate ABS sensor harness on inner wing.
6. Release ABS sensor multiplug from body clip and disconnect multiplug.
7. Release grommet from wing valance and pull harness through.


M70 1064

8. Release 2 grommets from wing valance and damper brackets
9. Release harness from brake hose clips.


M70 1065

10. Remove bolt securing ABS sensor to hub, if fitted.
11. Release ABS sensor from hub.
12. Remove ABS sensor and harness.
13. Remove bush from front hub.

Refit

1. Clean ABS sensors and mating faces.
2. Fit new bush to front hub.
3. Apply anti-seize grease to sensor.
4. Fit sensor to hub, ensure sensor is fully seated in hub.

   CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

5. Fit bolt securing ABS sensor to hub, if fitted.
6. Secure harness grommets to brackets.
7. Pass sensor harness through wing valance and secure grommet.
8. Ensure 'O' ring is in place and connect sensor multiplug to body harness.
9. Secure multiplug in body clip.
10. Secure harness to brake hose clip.
11. Fit front wheel arch liner.

    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
12. Fit battery carrier.

    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
13. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
14. Remove stand and lower vehicle.
15. To ensure correct operation, the ABS system MUST be tested using TestBook.

Sensor & harness - rear wheel

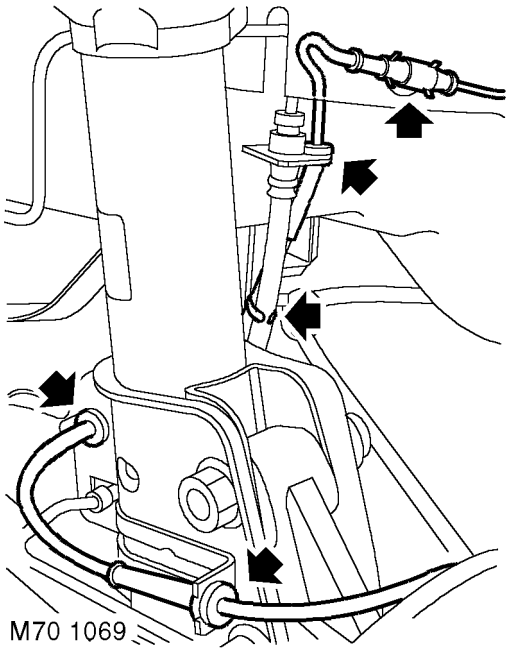
70.65.31

Remove

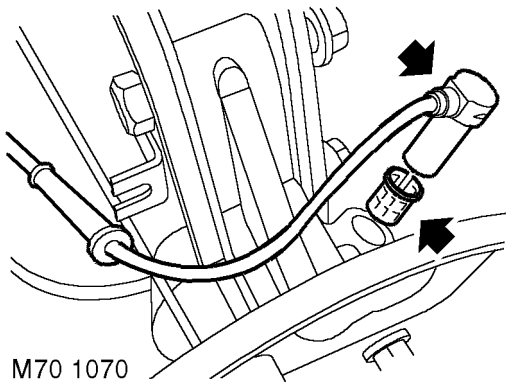
1. Raise rear of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel.


M70 1069

3. Release ABS sensor multiplug from body clip and disconnect multiplug.
4. Release ABS sensor harness from 3 grommets on suspension and body brackets.
5. Release harness from clip on rear brake hose.


M70 1070

6. Remove bolt securing ABS sensor to hub, if fitted.
7. Release sensor from rear hub and remove sensor and harness.
8. Remove bush from rear hub.

Refit

1. Clean sensor and rear hub mating faces.
2. Fit new bush to rear hub.
3. Apply anti-seize grease to sensor.
4. Fit sensor to hub, ensure sensor is fully seated in hub.

   CAUTION: Ensure ABS sensor is fully located into hub, so that sensor touches pole wheel teeth.

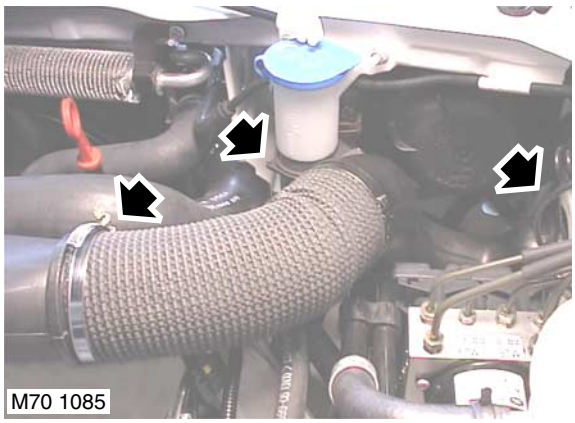
5. Fit bolt securing ABS sensor to hub, if fitted.
6. Ensure 'O' ring is in place and connect sensor multiplug to body harness.
7. Secure multiplug in body clip.
8. Secure harness grommets to brackets.
9. Secure harness to brake hose clip.
10. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
11. Remove stands and lower vehicle.
12. To ensure correct operation, the ABS system MUST be tested using TestBook.

Modulator unit

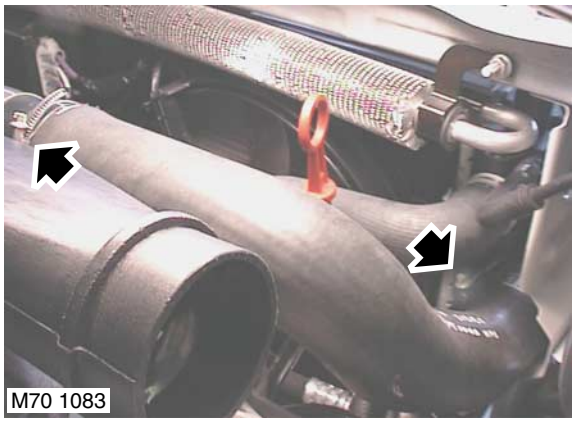
70.65.49

Remove

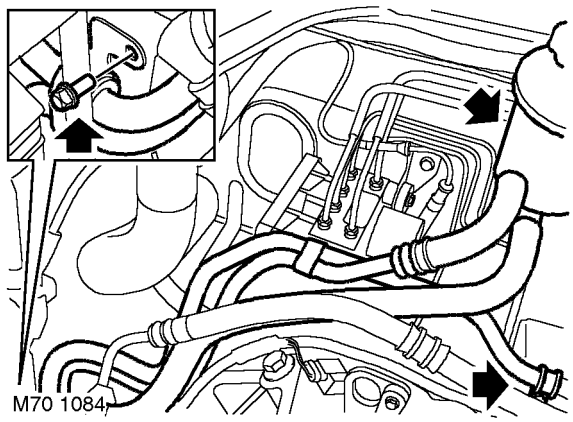
1. **Td4 and KV6 models:** Remove engine accoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.


M70 1085

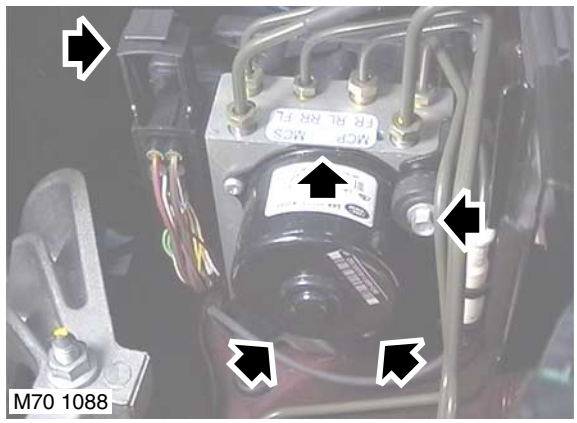
2. **Td4 and KV6 models:** Release and remove air intake hose.
3. **Td4 and KV6 models:** Release clip securing harness and intake duct to body.
4. **Td4 and KV6 models:** Lift duct from body, release clip from washer reservoir filler hose.
5. **Td4 and KV6 models:** Release and remove air intake duct.


M70 1083

6. **Td4 models:** Loosen 2 clips and remove intercooler outlet hose.


M70 1084

7. Remove 2 bolts securing PAS oil cooler pipes.
8. Release PAS reservoir from mounting bracket and position aside.


M70 1088

9. Release catch and disconnect ABS modulator multiplug.
10. Position cloth under modulator to absorb fluid spillage.
    CAUTION: Brake fluid will damage paint finished surfaces. If spilled, immediately remove fluid and clean area with water.
11. Disconnect 2 inlet brake pipes unions from ABS modulator.
12. Disconnect 4 outlet brake pipes unions from ABS modulator.
    CAUTION: Always fit plugs to open connections to prevent contamination.
13. Remove 3 bolts securing ABS modulator to mounting bracket.
14. Release and remove ABS modulator from mounting bracket.

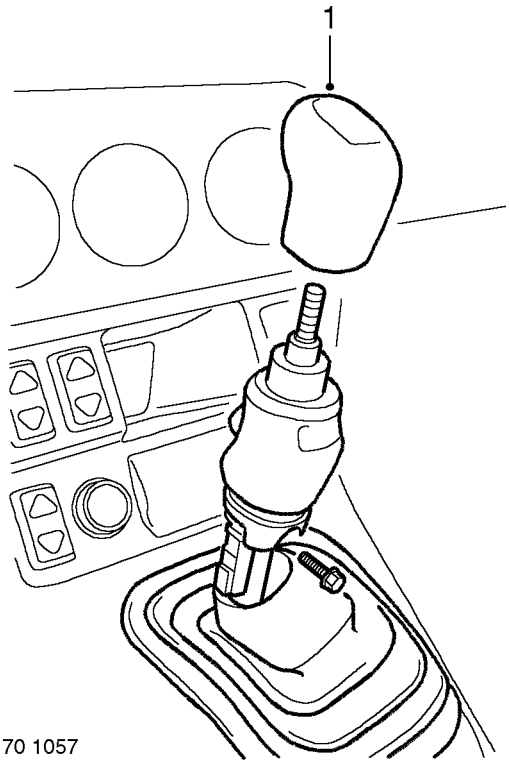
Refit

1. Position modulator to mounting bracket fit bolts and tighten to 9 Nm (7 lbf.ft).
2. Clean brake pipe unions.
3. Connect brake pipe unions to modulator ensuring pipes are connected to their correct ports.
4. Tighten unions to 17 Nm (12 lbf.ft).
5. Connect ABS modulator multiplug and secure catch.
6. **Td4 and KV6 models:** Position air intake duct to body.
7. **Td4 and KV6 models:** Secure intake duct to washer bottle filler neck and harness clip.
8. **Td4 and KV6 models:** Fit air intake hose.
9. Fit PAS reservoir to mounting bracket.
10. Fit bolts securing PAS oil cooler pipes and tighten to 10 Nm (7.5 lbf.ft).
11. **Td4 models:** Fit intercooler outlet hose and tighten clips.
12. **Td4 and KV6 models:** Fit engine accoustic cover.
    ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
13. Bleed brakes.
    ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
14. To ensure correct operation, the ABS system MUST be tested using TestBook.

Switch - hill descent

70.70.13

Remove



M70 1057

1. Remove gear lever knob.
2. Release gaiter from hill descent control switch.
3. Disconnect multiplug from switch.
4. Remove bolt and hill descent switch.

Refit

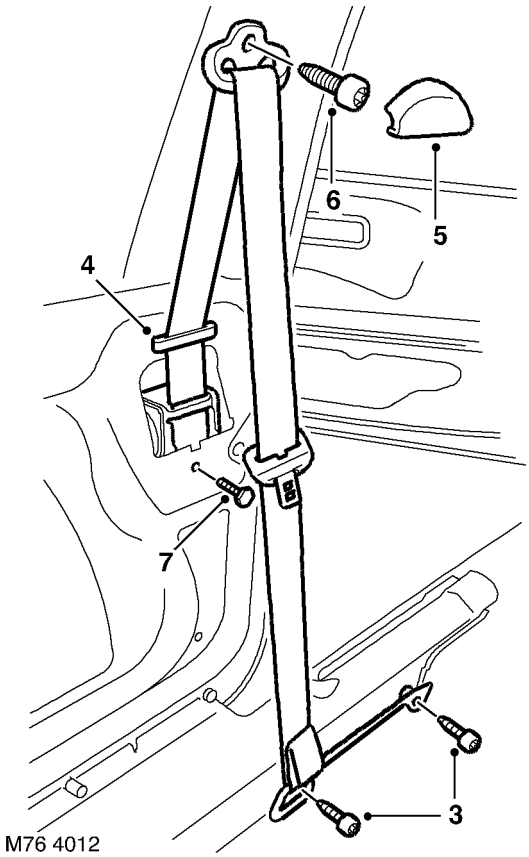
1. Fit hill descent switch and tighten bolt to 5 Nm (3.5 lbf.ft).
2. Connect multiplug.
3. Fit gaiter.
4. Fit gear lever knob.

Automatic belt assembly - front - 3 door

76.73.13

Remove

1. Remove seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.
2. Remove body side rear trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.



3. Remove 2 Torx bolts securing seat belt lower mounting and remove mounting from seat belt.
4. Release seat belt retaining strap.
5. Remove cover from upper mounting.
6. Remove Torx bolt from upper mounting.
7. Remove bolt from seat belt reel and remove reel.

Refit

NOTE: If the SRS component is to be replaced, the bar code of the new unit must be recorded.

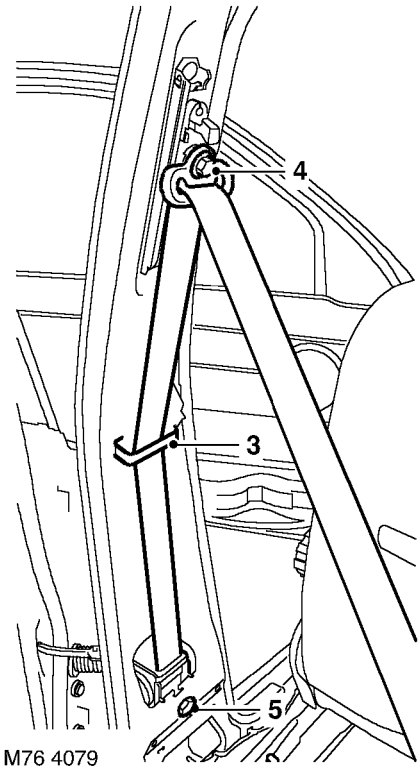
1. Position reel and tighten bolt to 31 Nm (23 lbf.ft).
2. Extend belt, position top mounting and tighten Torx bolt to 31 Nm (23 lbf.ft).
3. Fit top mounting cover.
4. Secure belt retaining strap.
5. Fit lower mounting to seat belt, position mounting, fit and tighten Torx bolts to 40 Nm (29 lbf.ft).
6. Fit body rear side trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.
7. Fit seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.

Automatic belt assembly - front - 5 door

76.73.13

Remove

1. Remove seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.
2. Remove 'B/C' post upper finisher.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'B/C' post - upper - renew.



M76 4079

3. Release seat belt retaining strap.
4. Remove nut securing seat belt upper anchorage to mounting.
5. Remove bolt from seat belt reel and remove reel.

Refit

NOTE: If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1. Position reel and tighten bolt to 31 Nm (23 lbf.ft).
2. Extend belt, position top mounting and tighten nut to 31 Nm (23 lbf.ft).
3. Secure belt retaining strap.
4. Fit 'B/C' post upper finisher.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'B/C' post - upper - renew.
5. Fit seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.

Seat belt - centre - rear

76.73.20

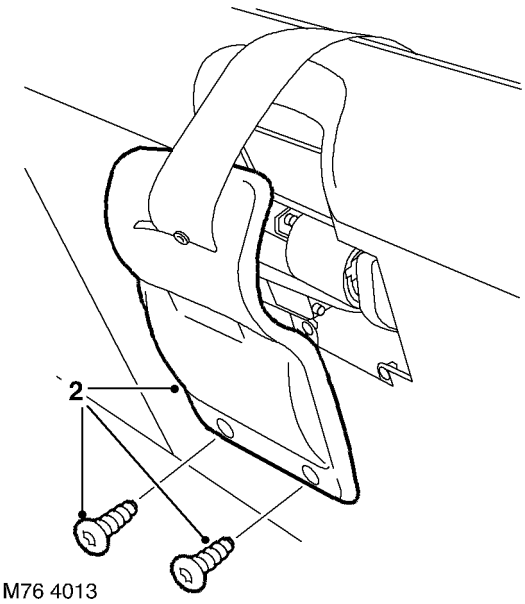
Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

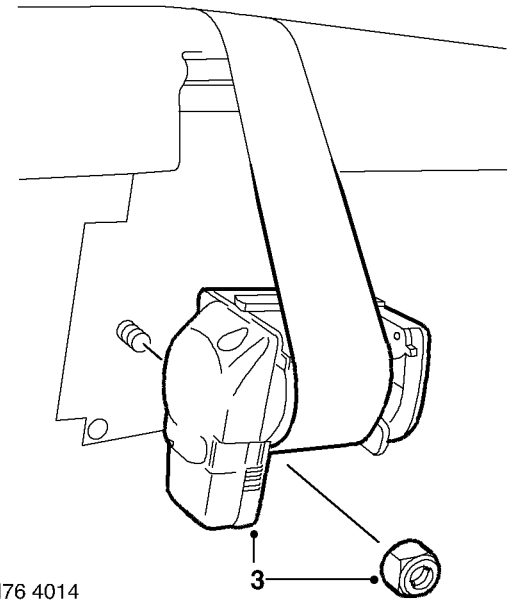
WARNING: When removing, testing or installing a seatbelt pre-tensioner, do not lean directly over it or block the end of the piston tube.

WARNING: Always remove the key from the starter switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

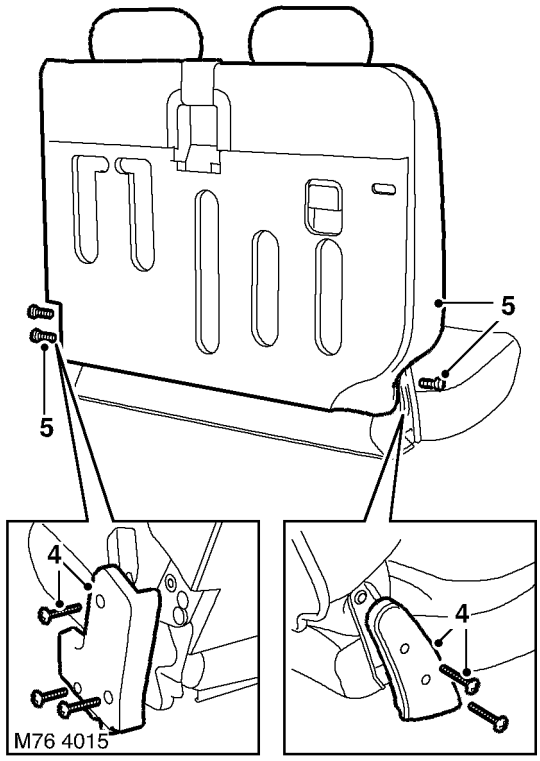
1. Remove RH rear seat.
   SEATS, REPAIRS, Rear seat - RH.



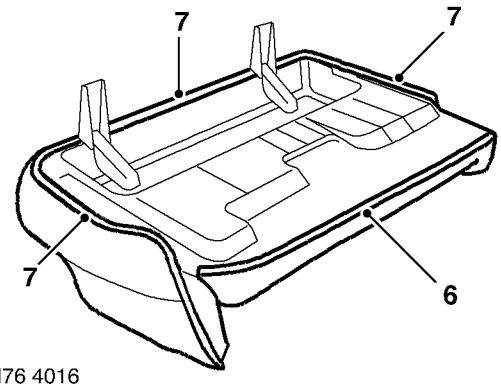
2. Remove 2 screws and remove seat belt reel cover.



3. Remove nut and release seat belt reel.

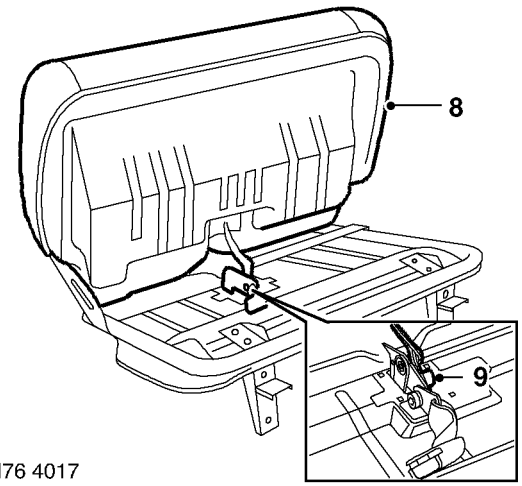


4. Remove 5 screws and remove both end covers.
5. Remove 3 Torx bolts and remove squab from cushion.



M76 4016

6. Release rear of cushion cover from frame.
7. Release sides and front of cushion cover from frame.



M76 4017

8. Release cover and pad from frame.
9. Remove Torx bolt from centre seat belt anchor and right seat belt buckle.
10. Remove seat belt and right seat belt buckle.

Refit

NOTE: If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1. Position centre seat belt anchor and right seat belt buckle to seat and tighten Torx bolt to 32 Nm (24 lbf.ft).
2. Fit cover and pad to frame.
3. Fit front and sides of cushion cover to frame.
4. Fit rear of cushion cover to frame.
5. Fit cushion to squab and tighten Torx bolts.
6. Fit end covers and tighten screws.
7. Position seat belt reel in seat squab and tighten nut to 32 Nm (24 lbf.ft).
8. Fit seat belt reel cover and tighten screws.
9. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - RH.**

Seat belt - rear - LH

76.73.23

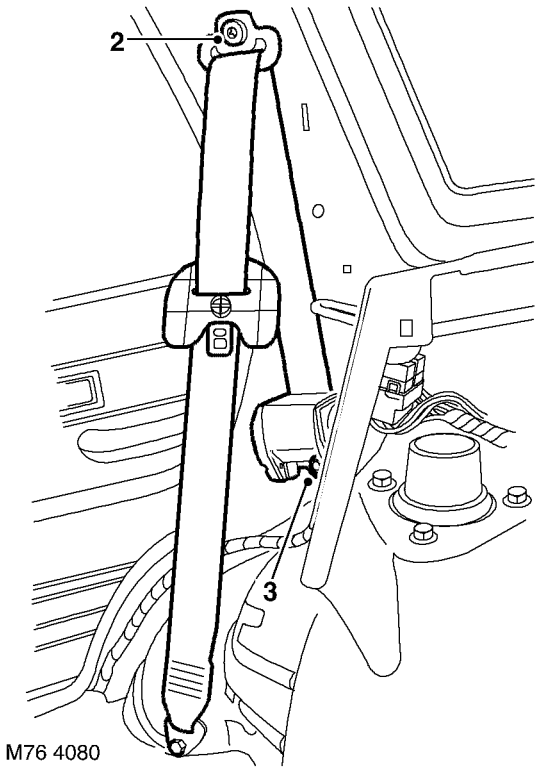
Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: When removing, testing or installing a seatbelt pre-tensioner, do not lean directly over it or block the end of the piston tube.

WARNING: Always remove the key from the starter switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

1. Remove rear quarter upper trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.



2. Remove Torx bolt from seat belt upper mounting.
3. Remove Torx bolt from seat belt reel and remove reel.

Refit

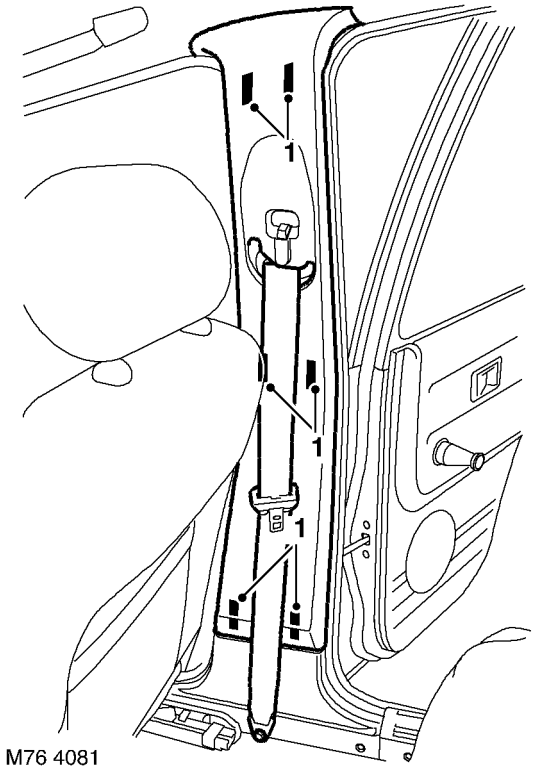
NOTE: If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1. Position reel and tighten Torx bolt to 50 Nm (37 lbf.ft).
2. Extend belt, position top mounting and tighten Torx bolt to 32 Nm (24 lbf.ft).
3. Fit rear quarter upper trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.

Adjustable mounting - seat belt - 'B' pillar

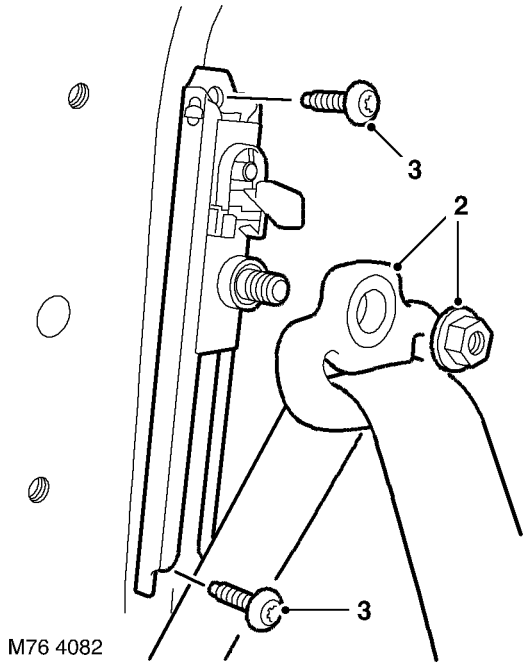
76.73.26

Remove



M76 4081

1. Release 'B/C' post upper finisher from 6 clips and position aside.



M76 4082

2. Remove nut from seat belt upper mounting and remove belt bracket.
3. Remove 2 Torx bolts from adjustable mounting and remove mounting.

Refit

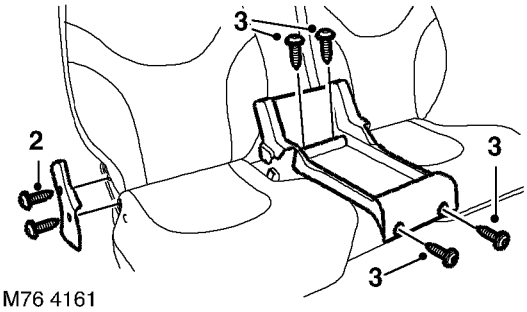
1. Position mounting and tighten Torx bolts to 26 Nm (19 lbf.ft).
2. Fit upper belt bracket and tighten nut to 31 Nm (23 lbf.ft).
3. Position 'B/C' post upper finisher and secure with clips.

Stalk - rear seat belt - LH - 3 door

76.73.32

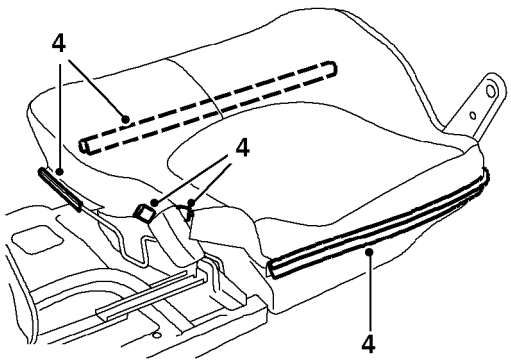
Remove

1. Remove rear seat.
   SEATS, REPAIRS, Cushion & squab - rear seat - bench type - 3 door.



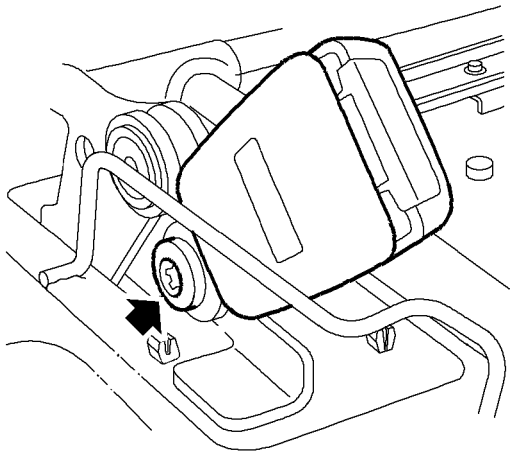
M76 4161

2. Remove 2 screws from hinge cover and remove cover from seat hinge.
3. Remove 4 screws and remove rear seat centre console.



M76 4162

4. Release rear seat cushion cover retainers and position cushion aside.


M76 4163

5. Remove Torx bolt from seat belt buckle and remove buckle.

Refit

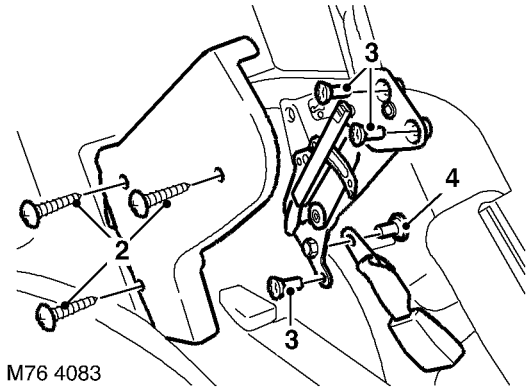
1. Fit buckle to seat frame and tighten Torx bolt to 32 Nm (24 lbf.ft).
2. Position seat cushion and secure cover retainers.
3. Fit centre console and secure with screws.
4. Fit hinge cover and secure with screws.
5. Fit rear seat.
   SEATS, REPAIRS, Cushion & squab - rear seat - bench type - 3 door.

Stalk - rear seat belt - LH - 5 door

76.73.32

Remove

1. Fold rear seat forward.



2. Remove 3 screws from end cover and remove cover from seat hinge.
3. Remove 4 Torx bolts from seat lock down catch and remove catch assembly.
4. Remove Torx bolt from seat belt buckle and remove buckle.

Refit

1. Fit buckle to catch assembly and tighten Torx bolt to 32 Nm (24 lbf.ft).
2. Fit catch assembly to seat and tighten Torx bolts.
3. Fit catch assembly to seat, fit Torx bolts but do not tighten at this stage.
4. Fold seat down and check that seat unfolds on lockdown bar correctly. Adjust catch assembly if required.
5. Tighten catch Torx bolts to 32 Nm (24 lbf.ft).
6. Recheck seat fold.
7. Fit end cover and tighten screws.
8. Reposition rear seats.

Pre-tensioner - seat belt - front

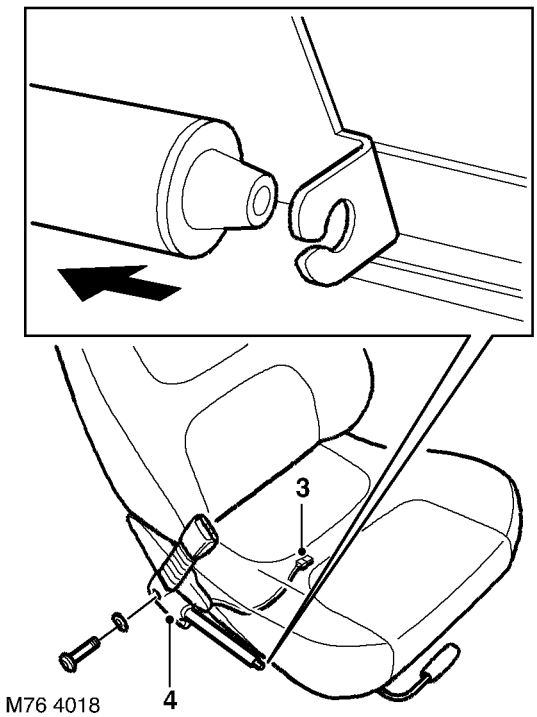
76.73.75

Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: When removing, testing or installing a seatbelt pre-tensioner, do not lean directly over it or block the end of the piston tube.

1. Make the SRS system safe.
   ☞ **GENERAL INFORMATION, Supplementary restraint system precautions.**
2. Remove rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**



3. Disconnect pretensioner multiplug.
4. Remove Torx bolt securing pretensioner to seat and remove pretensioner.

   WARNING: Store the airbag module or seat belt pre-tensioner in a designated storage area. If there is no designated storage area available, store in the locked luggage compartment/loadspace of the vehicle and inform the workshop supervisor.

Refit

NOTE: If the SRS component is to be replaced, the bar code of the new unit must be recorded.

1. Position pretensioner to seat and tighten Torx bolt to 32 Nm (24 lbf.ft).
2. Connect pretensioner multiplug and secure to seat frame.
3. Fit rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**
4. Connect battery leads, earth lead last.

Stalk - rear seat belt - centre

76.73.98

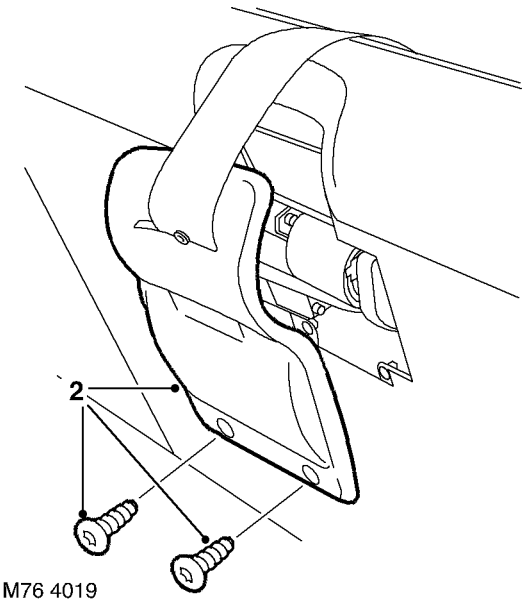
Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: When removing, testing or installing a seatbelt pre-tensioner, do not lean directly over it or block the end of the piston tube.

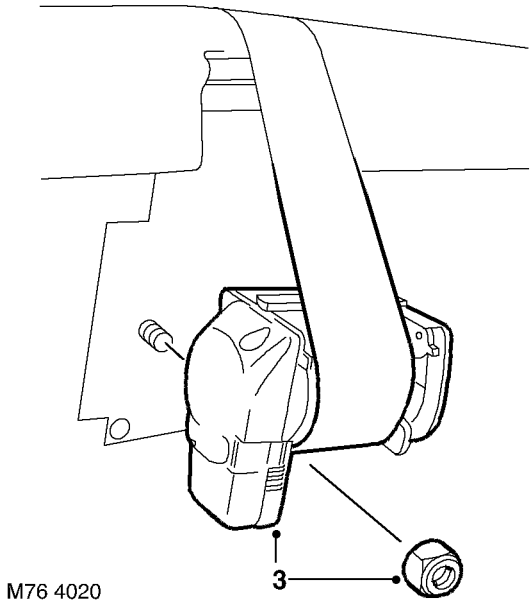
WARNING: Always remove the key from the starter switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

1. Remove RH rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - RH.**

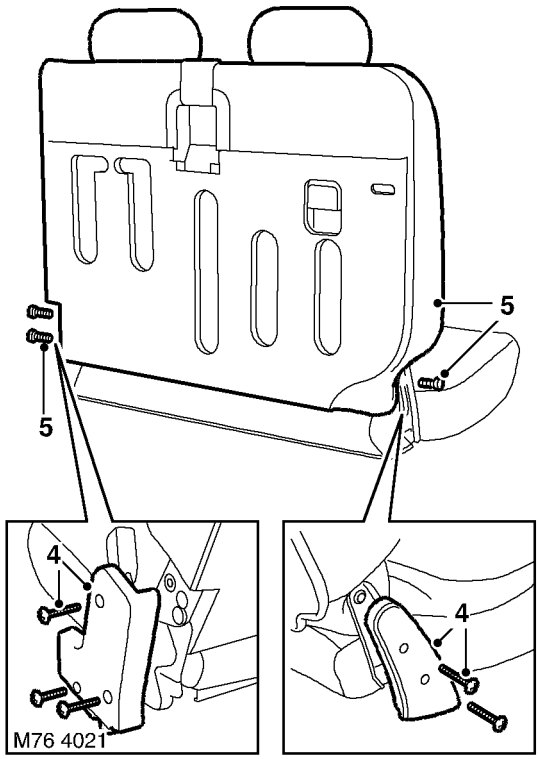


M76 4019

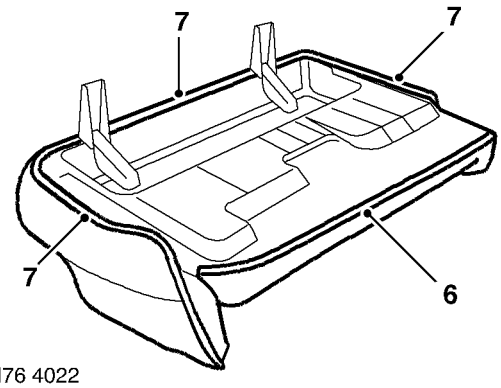
2. Remove 2 screws and remove seat belt reel cover.



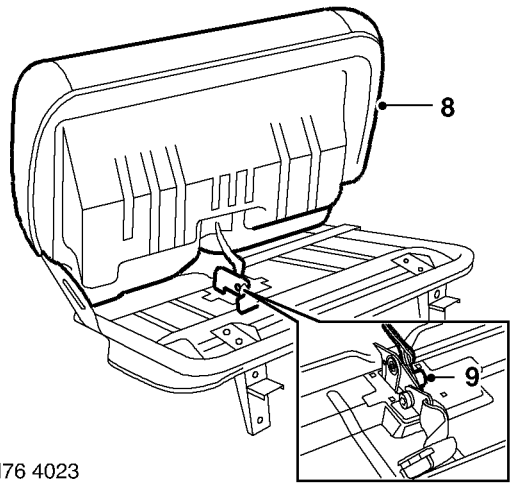
3. Remove nut and release seat belt reel.



4. Remove 5 screws and remove both end covers.
5. Remove 3 Torx bolts and remove squab from cushion.



6. Release rear of cushion cover from frame.
7. Release sides and front of cushion cover from frame.



8. Release cover and pad from frame.
9. Remove Torx bolt from seat belt buckle and remove buckle.

Refit

1. Position seat belt and buckle to frame and tighten to 32 Nm (24 lbf.ft).
2. Fit cover and pad to frame.
3. Fit front and sides of cushion cover to frame.
4. Fit rear of cushion cover to frame.
5. Fit cushion to squab and tighten Torx bolts.
6. Fit end covers and tighten screws.
7. Position seat belt reel in seat squab and tighten nut to 32 Nm (24 lbf.ft).
8. Fit seat belt reel cover and tighten screws.
9. Fit rear seat.

☞ **SEATS, REPAIRS, Rear seat - RH.**

Air bag - steering wheel

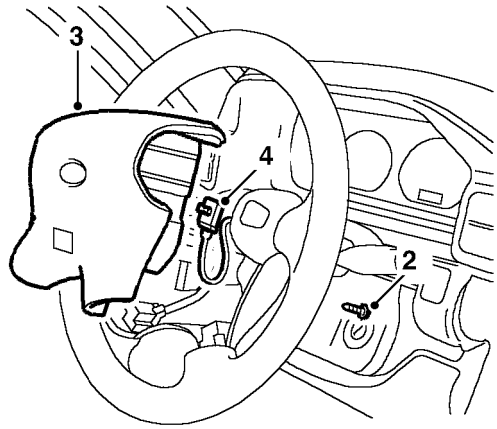
76.74.01

Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

1. Make the SRS system safe.
   ☞ **GENERAL INFORMATION, Supplementary restraint system precautions.**



M76 3991

2. Remove 2 Torx bolts securing airbag module to steering wheel.
3. Release airbag module from steering wheel.
   CAUTION: Do not allow the airbag module to hang by the airbag harness.
4. Disconnect SRS connector from air bag module.
5. Remove airbag module.
   WARNING: Store the airbag module with the deployment side uppermost. If it is stored deployment side down, accidental deployment will propel the airbag module with enough force to cause serious injury.

Refit

1. Position airbag module and fit connector with harness pointing upwards.
   NOTE: If the airbag module is to be replaced, the bar code of the new module must be recorded.
2. Fit airbag module to steering wheel and tighten Torx bolts to 9 Nm (7 lbf.ft).
3. Connect battery leads, earth lead last.

Air bag - fascia - passenger

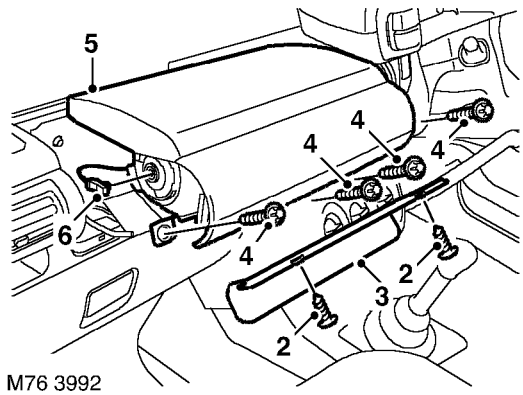
76.74.02

Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

1. Make the SRS system safe.
   ☞ **GENERAL INFORMATION, Supplementary restraint system precautions.**



M76 3992

2. Remove 2 screws securing airbag lower finisher.
3. Remove finisher.
4. Remove 4 Torx bolts securing airbag module to fascia.
5. Release airbag from fascia.
   CAUTION: Do not allow the airbag module to hang by the airbag harness.
6. Disconnect SRS connector from air bag module.
7. Remove airbag module.
   WARNING: Store the airbag module with the deployment side uppermost. If it is stored deployment side down, accidental deployment will propel the airbag module with enough force to cause serious injury.

Refit

NOTE: If the airbag module is to be replaced, the bar code of the new module must be recorded.

1. Position airbag and fit connector.
2. Fit airbag to fascia and tighten Torx screws to 9 Nm (7 lbf.ft).
3. Position airbag lower finisher and tighten screws.
4. Connect battery leads, earth lead last.

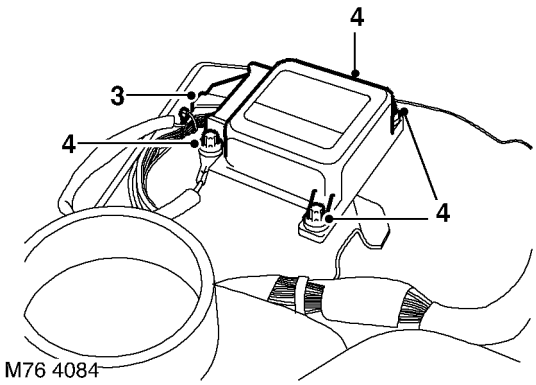
Diagnostic control unit (DCU)

76.74.06

Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

1. Make the SRS system safe.
   GENERAL INFORMATION, Supplementary restraint system precautions.
2. Remove heater assembly.
   HEATING AND VENTILATION, REPAIRS, Heater unit.



3. Disconnect multiplug from DCU.
4. Remove 3 Torx bolts securing DCU to body and remove DCU. Discard Torx bolts.

Refit

1. Fit DCU to body and secure with new bolts. Tighten bolts to 9 Nm (7 lbf.ft).
2. Connect multiplug to DCU.
3. Fit heater assembly.
   HEATING AND VENTILATION, REPAIRS, Heater unit.
4. Connect battery leads, earth lead last.

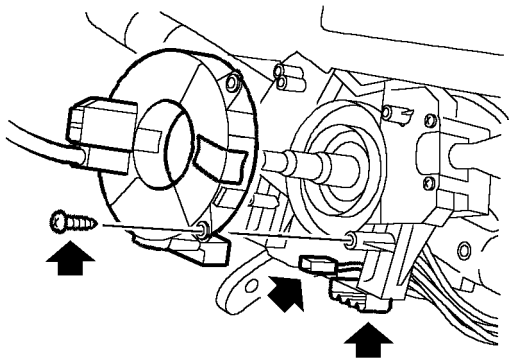
Rotary coupler - (SRS) air bag system

76.74.20

Remove

WARNING: It is imperative that before any work is undertaken on the SRS system the appropriate information is read thoroughly.

1. Make the SRS system safe.
   GENERAL INFORMATION, Supplementary restraint system precautions.
   CAUTION: Before disconnecting any part of the steering linkage, ensure the road wheels are positioned straight ahead and the steering wheel is prevented from turning. Unrestricted turning of the steering wheel will damage the SRS rotary coupler.
2. Remove steering wheel.
   STEERING, REPAIRS, Steering wheel.
   CAUTION: Use adhesive tape to prevent rotation of the rotary coupler once the steering wheel is removed.
3. Remove steering column nacelle.
   STEERING, REPAIRS, Nacelle - column.


M76 3966

4. Disconnect 2 multiplugs from rotary coupler.
5. Remove 4 screws and remove rotary coupler.
   CAUTION: Do not dismantle the rotary coupler, it has no serviceable parts and must be replaced as a complete assembly.

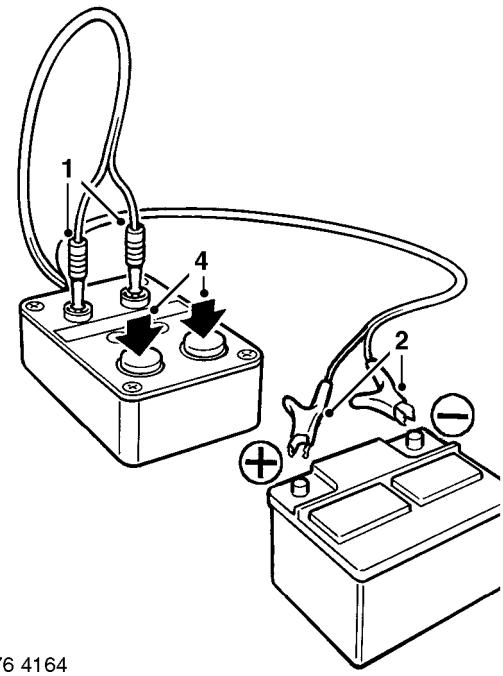
Refit

1. Ensure the rotary coupler is installed in its centred position. To obtain centre position, rotate coupler gently clockwise and anticlockwise until the white segment appears on the indicator wheel.
   CAUTION: Ensure front road wheels are in the straight ahead position.
2. Fit rotary coupler and secure with screws.
3. Connect multiplugs to rotary coupler.
4. Fit steering column nacelle.
   ☞ **STEERING, REPAIRS, Nacelle - column.**
5. Fit steering wheel.
   ☞ **STEERING, REPAIRS, Steering wheel.**
6. Connect battery leads, earth lead last.

Airbag deployment tool SMD 4082/1- self test procedure

🔧 ***76.74.99***

Test



M76 4164

1. Insert BLUE and YELLOW connectors of tool lead into corresponding sockets on face of tool.
2. Connect crocodile clips of second tool lead to battery, RED to positive and BLACK to negative.
3. RED "READY" light should illuminate.
4. Press and hold both operating buttons.
5. GREEN "DEFECTIVE" light should illuminate.
6. Release both operating buttons.
7. RED "READY" light should illuminate.
8. Disconnect tool from battery.
9. Disconnect blue and yellow connectors from tool face sockets.
10. Self test now complete.

Airbag module - driver's - deployment using tool SMD 4082/1

76.74.99

These guidelines are written to aid authorised personnel to carry out the safe disposal of airbag modules when removed from the vehicle.

If a vehicle is to be scrapped and contains an undeployed airbag module, the module must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before the deployment procedure commences, the deployment tool self test procedure should be carried out.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

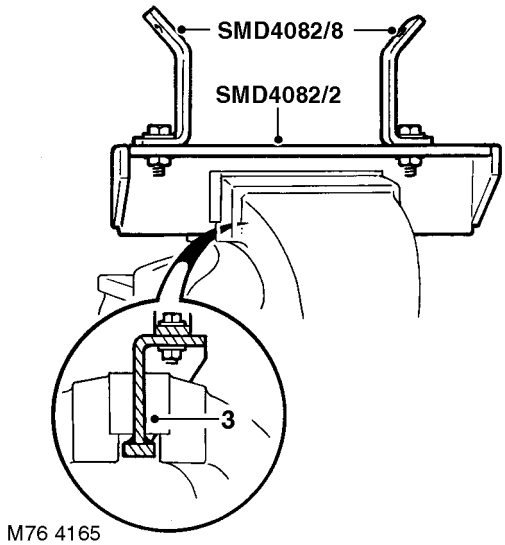
WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

CAUTION: Deployment in the vehicle will damage the steering wheel. If the vehicle is not being scrapped, deploy the module away from the vehicle in accordance with the correct procedure.

Deploy

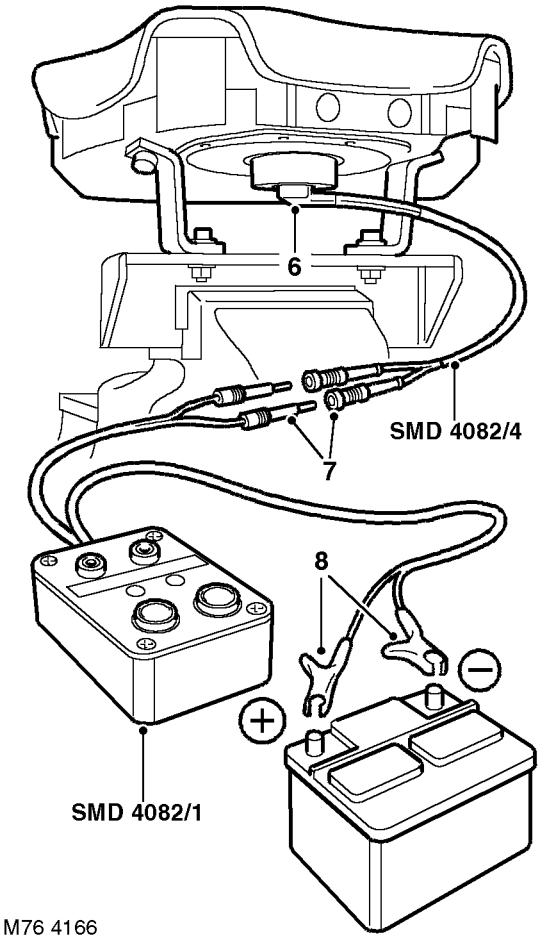
1. Carry out deployment tool self test.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Airbag deployment tool SMD 4082/1- self test procedure.**
2. Remove airbag module from steering wheel.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.**



M76 4165

3. Position tool **SMD 4082/2** in vice, ensuring that vice jaws grip tool above bottom flange to prevent possibility of tool being forced upwards from vice. Tighten vice.
4. Secure airbag module to tool **SMD 4082/2** using both fixings **SMD 4082/8**.
5. Ensure airbag module mounting brackets are secure.

   WARNING: Ensure the deployment tool is not connected to the battery.



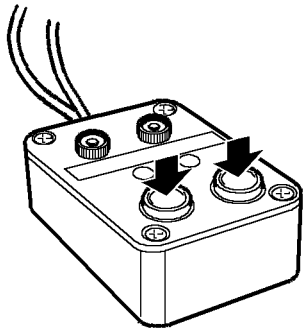
M76 4166

6. Connect flylead **SMD 4082/4** to airbag module.
7. Connect flylead **SMD 4082/4** to tool **SMD 4082/1**.

WARNING: Do not lean over airbag module whilst connecting.

8. Connect tool **SMD 4082/1** to battery.

WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the airbag module.



M76 4167

9. Press both operating buttons to deploy airbag module.

WARNING: If an airbag module cannot be deployed, it must not be treated as normal scrap. It must still be considered a potentially explosive device that can cause serious injury.

WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

10. Using gloves and face mask, remove airbag module from tool, place airbag module in plastic bag and seal bag.

WARNING: Wear a face shield and gloves when handling a deployed airbag module. Wash your hands and rinse them well with water after handling a deployed airbag module.

11. Wipe down tool with damp cloth.
12. Transport deployed airbag module to designated area for incineration.

NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

13. DO NOT re-use or salvage any parts of the SRS system including steering wheel or steering column.

Airbag module - driver's - deployment using tool LRT-86-003 (off vehicle)

76.74.99

These guidelines are written to aid authorised personnel to carry out the safe disposal of airbag modules when removed from the vehicle.

If a vehicle is to be scrapped and contains an undeployed airbag module, the module must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before the deployment procedure commences, check the condition of the deployment tool and associated flyleads are suitable to proceed.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

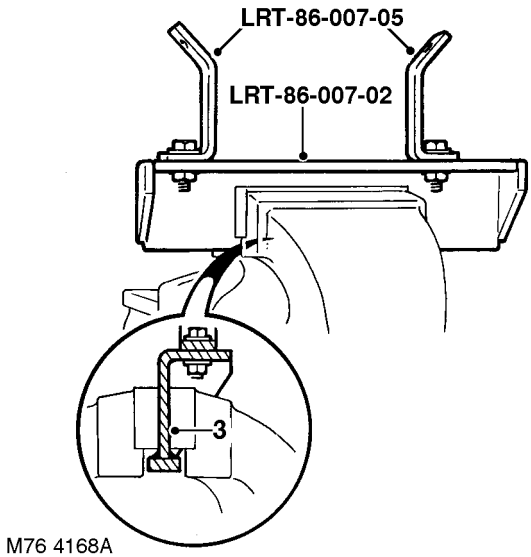
WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

CAUTION: Deployment in the vehicle will damage the steering wheel. If the vehicle is not being scrapped, deploy the module away from the vehicle in accordance with the correct procedure.

Deploy

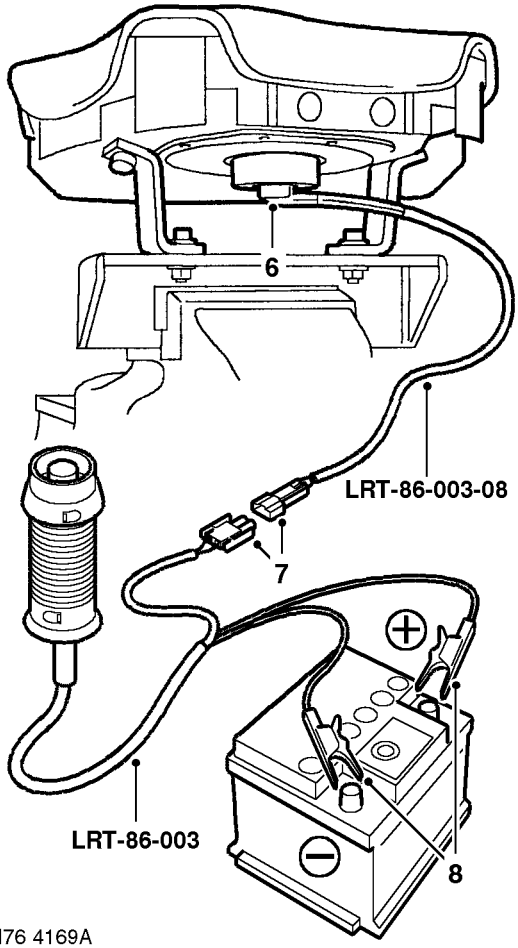
1. Check condition of deployment tool **LRT-86–003** and associated flyleads.
2. Remove airbag module from steering wheel.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.**



M76 4168A

3. Position tool**LRT-86–007–02** in vice, ensuring that vice jaws grip tool above bottom flange to prevent possibility of tool being forced upwards from vice. Tighten vice.
4. Secure airbag module to tool **LRT-86–007–02** using both fixings **LRT-86–007–05**.
5. Ensure airbag module mounting brackets are secure.

   WARNING: Ensure the deployment tool is not connected to the battery.



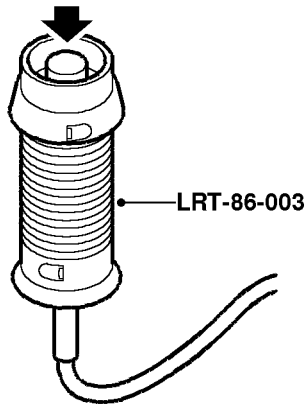
M76 4169A

6. Connect deployment tool flylead **LRT-86–003–08** to driver airbag module.
7. Connect deployment tool flylead **LRT-86–003–08** to deployment tool **LRT-86–003**.

   WARNING: Do not lean over airbag module whilst connecting.

8. Connect tool **LRT-86–003** to battery.

   WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the airbag module.



M76 4170A

9. Press deployment tool operating button to deploy airbag module.

   WARNING: If an airbag module cannot be deployed, it must not be treated as normal scrap. It must still be considered a potentially explosive device that can cause serious injury.

   WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

10. Disconnect deployment tool flylead **LRT-86–003–08** from driver airbag module.
11. Using gloves and face mask, remove airbag module from tool **LRT-86–007–02**, place airbag module in plastic bag and seal bag.

    WARNING: Wear a face shield and gloves when handling a deployed airbag module. Wash your hands and rinse them well with water after handling a deployed airbag module.

12. Wipe down tool with damp cloth.
13. Transport deployed airbag module to designated area for incineration.

    NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

14. DO NOT re-use or salvage any parts of the SRS system including steering wheel or steering column.

Airbag module - driver's - deployment using tool LRT–86–003 (in-vehicle)

76.74.99

These guidelines are written to aid authorised personnel to carry out the safe deployment and disposal of airbag modules when still fitted to the vehicle.

If a vehicle is to be scrapped and contains an undeployed airbag module, the module must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before the deployment procedure commences, check the condition of the deployment tool and associated flyleads are suitable to proceed.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

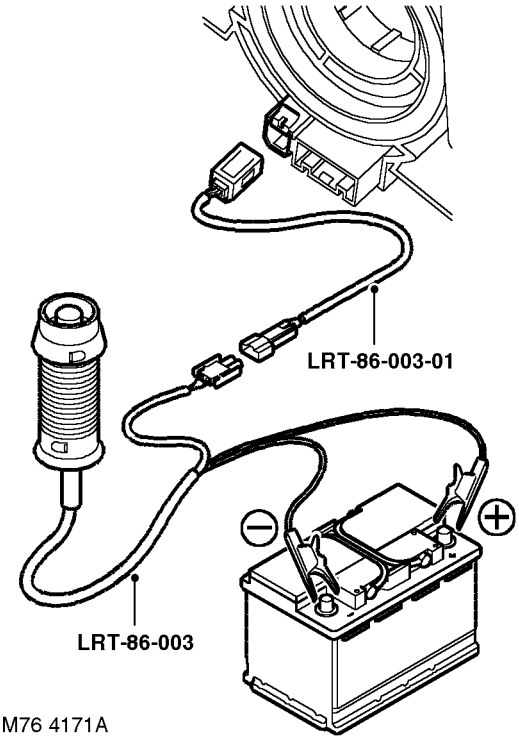
CAUTION: Deployment in the vehicle will damage the steering wheel. If the vehicle is not being scrapped, deploy the module away from the vehicle in accordance with the correct procedure.

Deploy

1. Check condition of deployment tool **LRT-86–003**and associated flyleads.
2. Remove steering column nacelle.
3. Disconnect SRS harness connector from back of rotary coupler.

   WARNING: Ensure airbag module is secure within steering wheel.

   WARNING: Ensure the deployment tool is not connected to the battery.



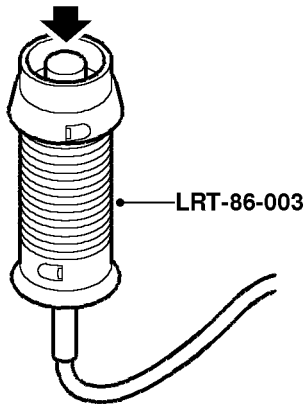
M76 4171A

4. Connect deployment tool flylead **LRT-86–003–01** to back of rotary coupler.
5. Connect deployment tool flylead **LRT-86–003–01** to deployment tool **LRT-86–003**.

   WARNING: Do not lean over airbag module whilst connecting.

6. Connect tool **LRT-86–003** to battery.

   WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the vehicle.



M76 4170A

7. Press deployment tool operating button to deploy airbag module.

WARNING: If an airbag module cannot be deployed, it must not be treated as normal scrap. It must still be considered a potentially explosive device that can cause serious injury.

WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

8. Disconnect deployment tool flylead **LRT-86–003–01** from back of rotary coupler.

9. Using gloves and face mask, remove airbag module from steering wheel.

☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.**

WARNING: Wear a face shield and gloves when handling a deployed airbag module. Wash your hands and rinse them well with water after handling a deployed airbag module.

10. Place airbag module in plastic bag and seal bag.

11. Transport deployed airbag module to designated area for incineration.

NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

12. DO NOT re-use or salvage any parts of the SRS system including steering wheel or steering column.

Airbag module - passenger - deployment using deployment tool SMD 4082/1 (in-vehicle)

76.74.99

These guidelines are written to aid authorised personnel to carry out the safe disposal of airbag modules when still fitted in the vehicle.

If a vehicle is to be scrapped and contains an undeployed airbag module, the module must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before deployment is started the deployment tool self test procedure should be carried out.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

Deploy

1. Carry out deployment tool **SMD 4082/1** self test.

☞ **RESTRAINT SYSTEMS, REPAIRS, Airbag deployment tool SMD 4082/1- self test procedure.**

2. Remove passenger airbag module from fascia.

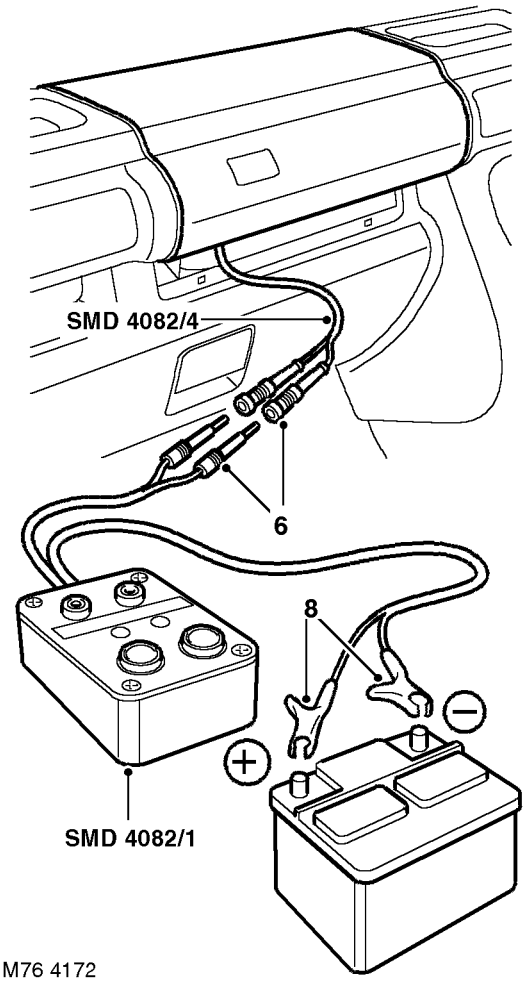
☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - fascia - passenger.**

3. Connect deployment tool flylead **SMD 4082/4** to passenger airbag module.

WARNING: Do not lean over airbag module whilst connecting.

4. Refit passenger airbag module, ensuring that deployment tool flylead **SMD 4082/4** is routed to accessible area beneath fascia.

5. Tighten passenger airbag fixings to 9 Nm (7 lbf.ft) and ensure passenger airbag module is secure.



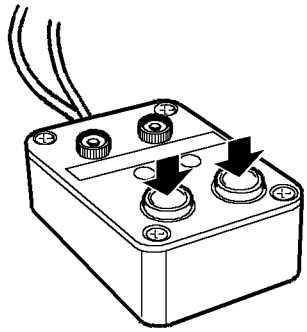
M76 4172

6. Connect deployment tool flylead **SMD 4082/4** to deployment tool **SMD 4082/1**.

7. Ensure all vehicle doors are open.

WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the vehicle.

8. Connect deployment tool **SMD 4082/1** to battery.



M76 4167

9. Press both operating buttons to deploy airbag module.

10. DO NOT return to airbag module for 30 minutes.

WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

WARNING: Wear a face shield and gloves when handling a deployed airbag module. Wash your hands and rinse them well with water after handling a deployed airbag module.

11. Release passenger airbag module and disconnect deployment tool flylead **SMD 4082/4**.

12. Remove passenger airbag module from vehicle.

☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - fascia - passenger.**

13. Place passenger airbag module in a strong plastic bag and seal bag.

14. Transport deployed airbag module to designated area for incineration.

NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

15. If the vehicle is being scrapped, scrap all remaining parts of the SRS system. **DO NOT** re-use or salvage any parts of the SRS system.

NOTE: If the vehicle is not being scrapped, ensure all dust/particle by-products of airbag deployment are removed from vehicle interior; vacuum all fabric surfaces and wipe all other surfaces with a damp cloth.

Airbag module - passenger - deployment using deployment tool LRT–86–003 (in-vehicle)

76.74.99

These guidelines are written to aid authorised personnel to carry out the safe disposal of airbag modules when still fitted in the vehicle.

If a vehicle is to be scrapped and contains an undeployed airbag module, the module must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before the deployment procedure commences, check the condition of the deployment tool and associated flyleads are suitable to proceed.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

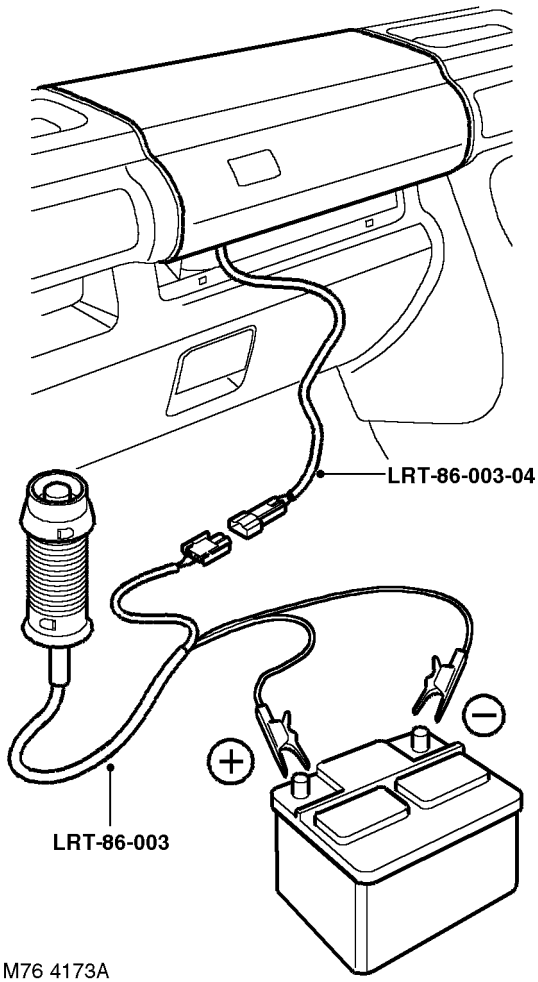
WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

WARNING: When removing, testing or installing an airbag module, do not lean directly over it.

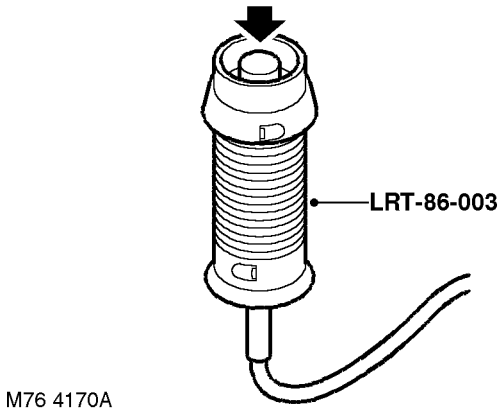
WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

Deploy

1. Check condition of deployment tool **LRT-86–003**and associated flyleads.
2. Remove passenger airbag module from fascia.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - fascia - passenger.**
3. Connect deployment tool flylead**LRT-86–003–04** to passenger airbag module flylead.
   WARNING: Do not lean over airbag module whilst connecting.
4. Refit passenger airbag module, ensuring that deployment tool flylead **LRT-86–003–04** is routed to accessible area beneath fascia.
5. Tighten passenger airbag fixings to 9 Nm (7 lbf.ft) and ensure passenger airbag module is secure.



6. Connect deployment tool flylead **LRT-86–003–04** to deployment tool **LRT-86–003**.
7. Ensure all vehicle doors are open.
   WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the vehicle.
8. Connect deployment tool **LRT-86–003** to battery.



9. Press deployment tool operating button to deploy airbag module.
10. DO NOT return to airbag module for 30 minutes.

    WARNING: During deployment parts of the airbag module become hot enough to burn you. Wait 30 minutes after deployment before touching the airbag module.

    WARNING: Wear a face shield and gloves when handling a deployed airbag module. Wash your hands and rinse them well with water after handling a deployed airbag module.

11. Release passenger airbag module and disconnect deployment tool flylead **LRT-86–003–04**.
12. Remove passenger airbag module from vehicle.

    ☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - fascia - passenger.**
13. Place passenger airbag module in a strong plastic bag and seal bag.
14. Transport deployed airbag module to designated area for incineration.

    NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

15. If the vehicle is being scrapped, scrap all remaining parts of the SRS system. **DO NOT** re-use or salvage any parts of the SRS system.

    NOTE: If the vehicle is not being scrapped, ensure all dust/particle by-products of airbag deployment are removed from vehicle interior; vacuum all fabric surfaces and wipe all other surfaces with a damp cloth.

Pre-tensioner - front seatbelt - deployment using deployment tool SMD 4082/1 (in-vehicle)

⊸ ***76.74.99***

These guidelines are written to aid authorised personnel to carry out the safe deployment and disposal of seatbelt pre-tensioners when they are still fitted in the vehicle.

If a vehicle is to be scrapped and contains an undeployed pre-tensioner, the pre-tensioner must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before deployment is started the deployment tool self test procedure should be carried out.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

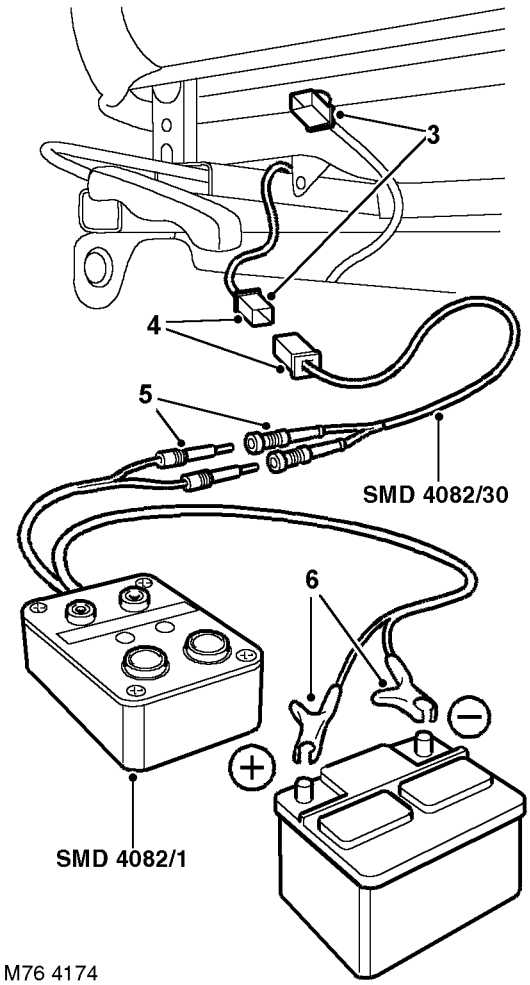
WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

WARNING: When removing, testing or installing a seatbelt pre-tensioner, do not lean directly over it or block the end of the piston tube.

Deploy

1. Carry out deployment tool**SMD 4082/1** self test.

   ☞ **RESTRAINT SYSTEMS, REPAIRS, Airbag deployment tool SMD 4082/1- self test procedure.**
2. Slide seat fully rearwards to access pre-tensioner harness connector.



M76 4174

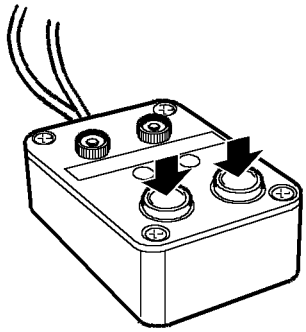
3. Disconnect pre-tensioner harness connector.
WARNING: Ensure the deployment tool is not connected to the battery.

4. Connect deployment tool flylead **SMD 4082/30** to pre-tensioner connector.

5. Connect deployment tool flylead **SMD 4082/30** to deployment tool **SMD 4082/1**.
WARNING: Ensure the SRS component to be deployed is securely fastened to its mounting.

WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the vehicle.

6. Connect deployment tool **SMD 4082/1** to battery.



M76 4167

7. Press both operating buttons to deploy pre-tensioner.
WARNING: A deployed airbag or seatbelt pre-tensioner is very hot, DO NOT return to a deployed airbag module until at least 30 minutes have elapsed since deployment.

8. Disconnect flylead **SMD 4082/30** from pre-tensioner connector and remove pre-tensioner from seat.
☞ **RESTRAINT SYSTEMS, REPAIRS, Pre-tensioner - seat belt - front.**
WARNING: Contact with chemicals from deployed and damaged SRS components could present a health hazard, wear protective clothing when handling. DO NOT eat, drink or smoke when handling SRS components.

9. Place pre-tensioner in plastic bag and seal bag.

10. Transport deployed pre-tensioner to designated area for incineration.
NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

11. Scrap all remaining parts of the seat belt and SRS system. **DO NOT** re-use or salvage any parts of the seat belt and SRS system.

Pre-tensioner - front seatbelt - deployment using deployment tool LRT–86–003 (in-vehicle)

76.74.99

These guidelines are written to aid authorised personnel to carry out the safe deployment and disposal of seatbelt pre-tensioners when they are still fitted in the vehicle.

If a vehicle is to be scrapped and contains an undeployed pre-tensioner, the pre-tensioner must be manually deployed. This operation should only be carried out using the following recommended manual deployment procedure. Before the deployment procedure commences, check the condition of the deployment tool and associated flyleads are suitable to proceed.

WARNING: Only use approved deployment equipment, and only deploy SRS components in a well ventilated designated area. Ensure SRS components are not damaged or ruptured before deployment. Notify the relevant authorities.

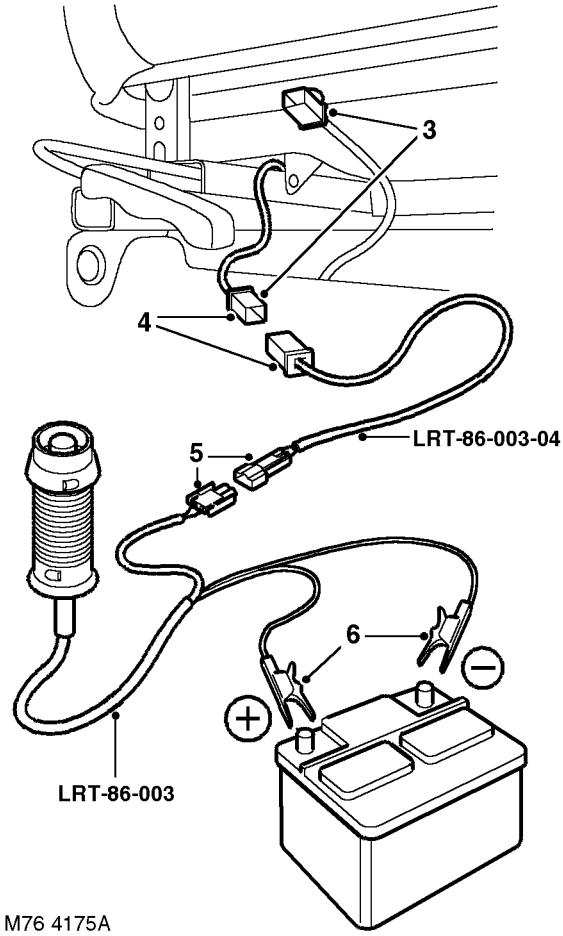
WARNING: Always remove the ignition key from the ignition switch, disconnect the vehicle battery and wait 10 minutes before commencing work on the SRS system.

WARNING: Only personnel who have undergone the appropriate training should undertake deployment of airbag and seat belt pre-tensioner modules.

WARNING: When removing, testing or installing a seatbelt pre-tensioner, do not lean directly over it or block the end of the piston tube.

Deploy

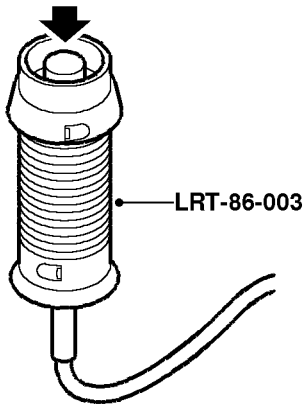
1. Check condition of deployment tool**LRT-86–003** and associated flyleads.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Airbag deployment tool SMD 4082/1- self test procedure.**
2. Slide seat fully rearwards to access pre-tensioner harness connector.



M76 4175A

3. Disconnect pre-tensioner harness connector.
   WARNING: Ensure the deployment tool is not connected to the battery.
4. Connect deployment tool flylead **LRT-86–003–04** to pre-tensioner connector.
5. Connect deployment tool flylead **LRT-86–003–04** to deployment tool **LRT-86–003**.
   WARNING: Ensure the SRS component to be deployed is securely fastened to its mounting.

   WARNING: Ensure all personnel are at least 15 metres (50 ft) away from the vehicle.
6. Connect deployment tool **LRT-86–003** to battery.



M76 4170A

7. Press deployment tool operating button to deploy airbag module.

   WARNING: A deployed airbag or seatbelt pre-tensioner is very hot, DO NOT return to a deployed airbag module until at least 30 minutes have elapsed since deployment.

8. Disconnect flylead **LRT-86–003–04** from pre-tensioner connector and remove pre-tensioner from seat.

   ☞ **RESTRAINT SYSTEMS, REPAIRS, Pre-tensioner - seat belt - front.**

   WARNING: Contact with chemicals from deployed and damaged SRS components could present a health hazard, wear protective clothing when handling. DO NOT eat, drink or smoke when handling SRS components.

9. Place pre-tensioner in plastic bag and seal bag.
10. Transport deployed pre-tensioner to designated area for incineration.

    NOTE: Do not transport deployed SRS components in the vehicle passenger compartment.

11. Scrap all remaining parts of the seat belt and SRS system. **DO NOT** re-use or salvage any parts of the seat belt and SRS system.

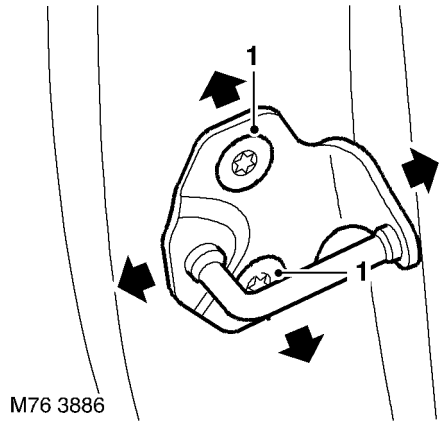
Door - front or rear - adjust on striker

76.28.05

Check

1. A closed door should be flush with adjacent panels and edges have equal gaps.

Adjust



1. Loosen 2 Torx bolts securing door latch striker.
2. Adjust striker to obtain required door to panel fit and open and close operation.
3. Tighten Torx screws to 10 Nm (7.5 lbf.ft).

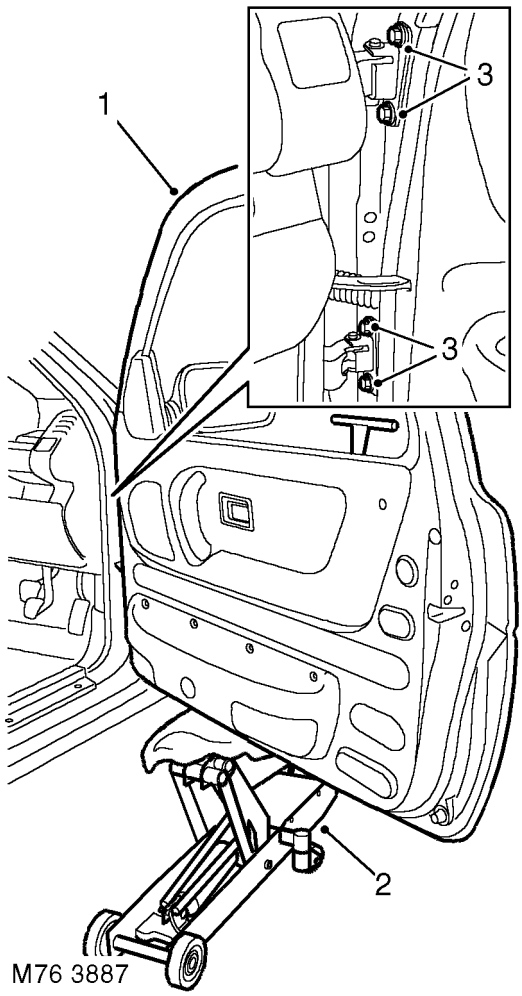
Door - front - align on hinges

76.28.07

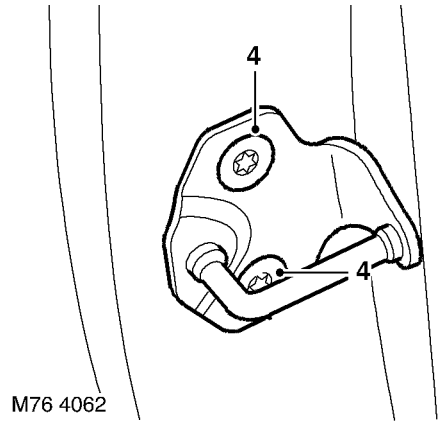
Check

1. Check door for flush fit to adjacent panels and edges for equal gaps.

Adjust



1. Open front door.
2. Place wooden block on jack and position jack to support door under lower edge.
3. Loosen 4 bolts securing hinges to door.



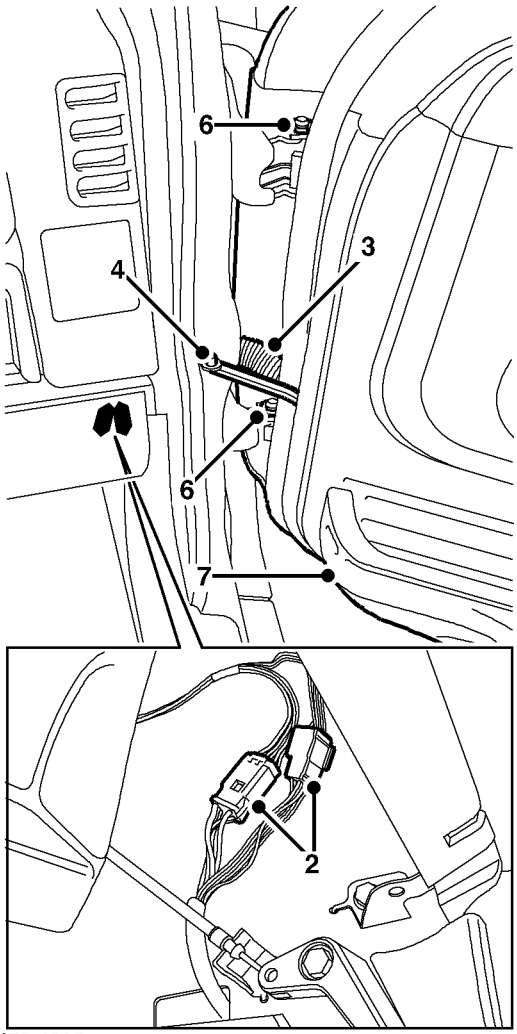
4. Loosen 2 Torx bolts securing door latch striker.
5. Use jack to assist with door alignment.
6. Tighten hinge bolts.
7. Remove jack and close door to check for correct alignment.
8. When alignment is satisfactory,tighten hinge bolts to 30 Nm (22 lbf.ft).
9. Adjust door latch striker.
   ☞ **DOORS, ADJUSTMENTS, Door - front or rear - adjust on striker.**

Door assembly - front - remove for access & refit

76.28.01.99

Remove

1. Remove scrivet and 5 Torx screws securing front carpet retainer and remove carpet retainer.



M76 4095

2. Release and disconnect multiplugs from lower 'A' post.
3. Release harness sheath from 'A' post and pull door harness through 'A' post.
4. Remove roll pin from door check strap, and release check strap from ' A' post.
5. Discard roll pin.
6. Remove 2 'C' clips from door hinges.
7. With assistance raise and remove door.

Refit

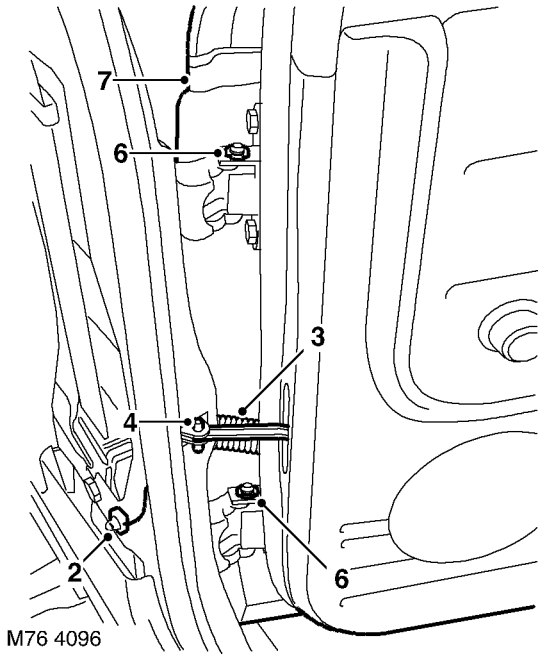
1. With assistance position door to hinges.
2. Fit 'C' clips to hinge pins.
3. Position check strap to 'A' post and secure with new roll pin.
4. Feed door harness through 'A' post and secure harness sheath.
5. Connect and secure multiplugs at lower 'A' post.
6. Fit carpet retainer and secure with Torx screws and scrivet.
7. Check door alignment.
   DOORS, ADJUSTMENTS, Door - front - align on hinges.

Door assembly - rear - remove for access & refit

76.28.02.99

Remove

1. Release 'B/C' post upper finisher from 6 clips and position aside.



2. Release and disconnect multiplug from lower 'B/C' post.
3. Release harness sheath from 'B/C' post and pull door harness through 'B/C' post.
4. Remove roll pin from door check strap, and release check strap from 'B/C' post.
5. Discard roll pin.
6. Remove 2 'C' clips from door hinges.
7. With assistance raise and remove door.

Refit

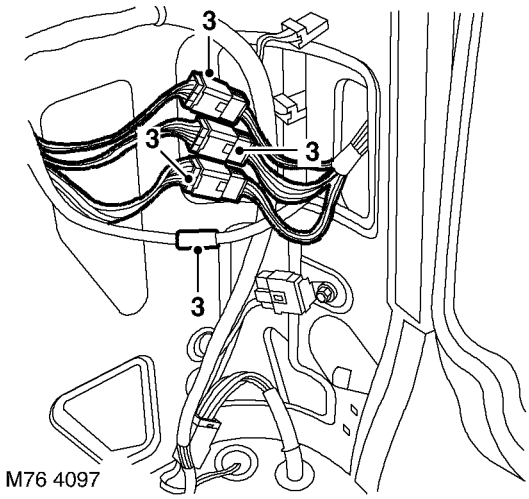
1. With assistance position door to hinges.
2. Fit 'C' clips to hinge pins.
3. Position check strap to 'B/C' post and secure with NEW roll pin.
4. Feed door harness through 'B/C' post and secure harness sheath.
5. Connect and secure multiplug at base of 'B/C' post.
6. Position 'B/C' post upper finisher and secure with clips.
7. Check door alignment.
   DOORS, ADJUSTMENTS, Door - front - align on hinges.

Door - tail assembly - remove for access & refit

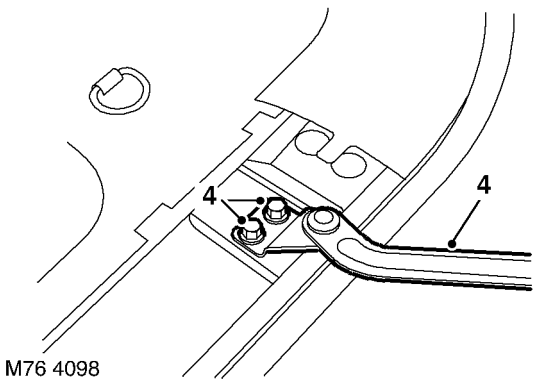
76.28.19.99

Remove

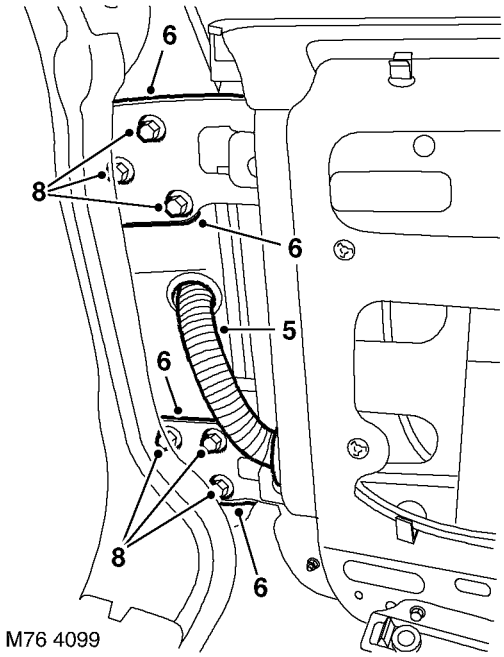
1. Remove spare wheel from taildoor.
2. Remove RH rear quarter lower trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.



3. Release and disconnect 3 multiplugs and rear washer tube from lower 'E' post.



4. Remove 2 bolts from tail door check strap, release strap and position aside.



5. Release door harness sheath from 'E' post and pull harness through 'E' post.
6. Mark position of hinges.
7. Support weight of tail door.
8. Remove 6 bolts securing tail door hinges to body and with assistance, remove tail door.

Refit

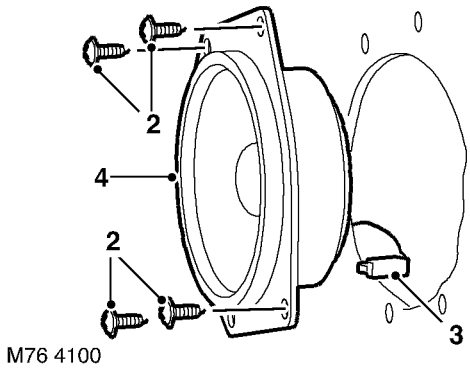
1. With assistance position door. Fit securing bolts but do not tighten at this stage.
2. Position check strap and secure with bolts.
3. Align hinges and tighten bolts to 30 Nm (22 lbf.ft).
4. Feed door harness through 'E' post and secure harness sheath.
5. Connect and secure multiplugs and rear washer tube at 'E' post.
6. Fit rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
7. Fit spare wheel to tail door.

Glass - front door

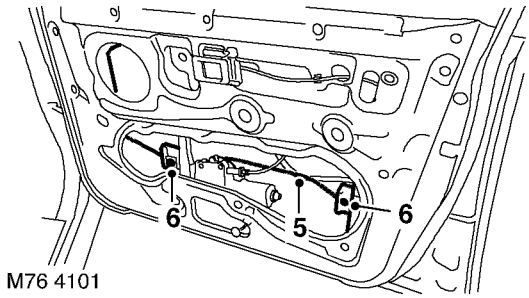
🔧 ***76.31.01***

Remove

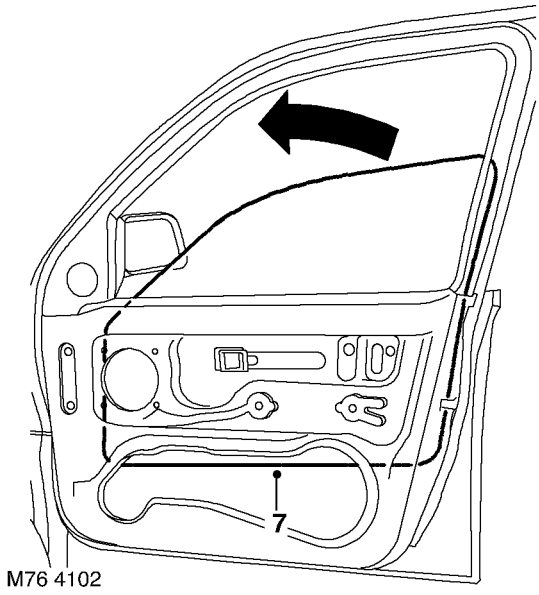
1. Remove front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**



2. Remove 4 screws securing speaker to door.
3. Disconnect multiplug from door speaker.
4. Remove front door speaker.



5. Lower glass to access clamp bolts.
6. Loosen 2 bolts securing glass to clamps.



7. Release glass from clamps, raise and rotate glass to remove from door frame.

Refit

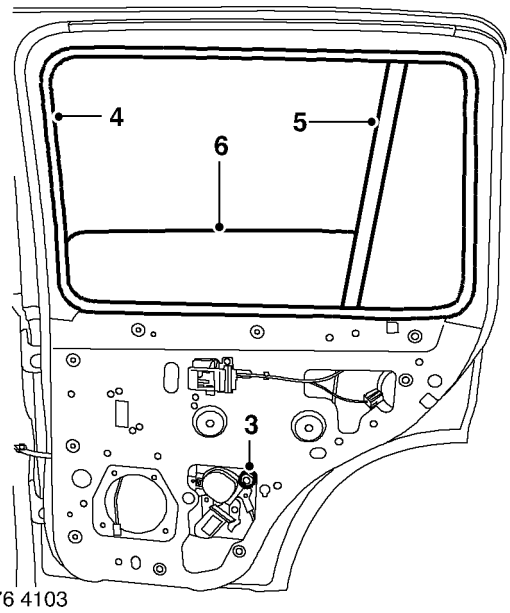
1. Locate glass in door frame and rotate into position to engage seal and clamps.
2. Tighten glass clamp bolts to 9 Nm (7 lbf.ft).
3. Raise and lower glass to check operation.
4. Position speaker to door and connect multiplug.
5. Fit speaker to door and secure with screws.
6. Fit front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**

Glass - rear door

⊸ ***76.31.02***

Remove

1. Remove rear door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - rear door.**



2. Lower glass to access nut on clamp.
3. Loosen nut securing clamp to glass.
4. Remove seal from door.
5. Release glass from quarter light seal.
6. Raise glass and remove from door.

Refit

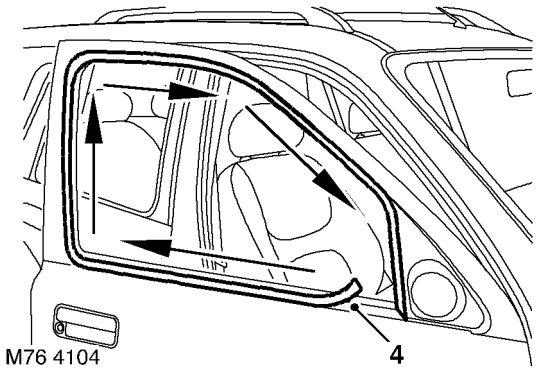
1. Fit glass to door and locate in quarter light seal.
2. Fit seal to door.
3. Position glass in clamp and tighten nut to 8 Nm (6 lbf.ft).
4. Raise and lower glass to check seal fit.
5. Fit rear door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - rear door.**

Rubber/felt - glass channel - front door

76.31.13

Remove

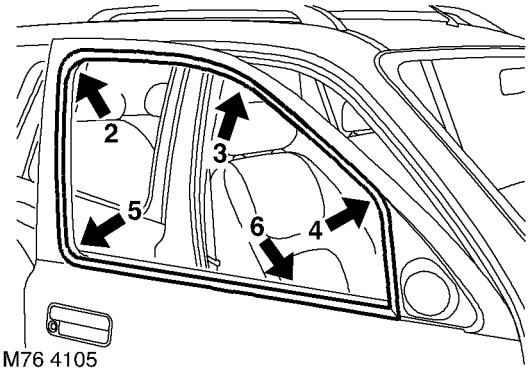
1. Remove exterior mirror.
   EXTERIOR FITTINGS, REPAIRS, Mirror - exterior - electric.
2. Lower door glass.
3. Remove inner seal.



4. Carefully release seal from door flange, starting from the cheater panel, working along the waist rail and around the door flange.

Refit

1. Lubricate corners of seal with soapy water.
   CAUTION: This seal assembly uses an internal metal former. Take care not to bend the seal during fitment, or the former will become kinked.



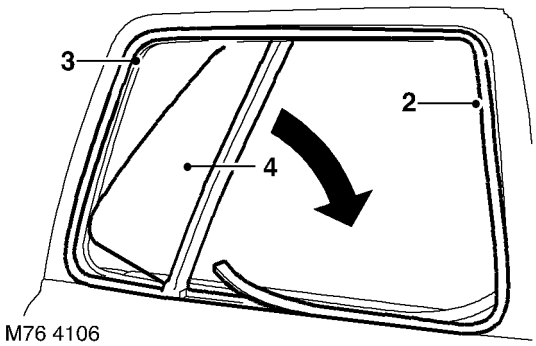
2. Starting at the rearmost top corner of the glass aperture, seat the seal onto the flange, ensuring that the radius of the seal matches the door profile.
3. Secure seal to flange across cantrail and down 'A' post.
4. Secure seal in corner at base of 'A' post.
5. Carefully pull 'B' post length of seal away from flange until bottom corner is just clear of flange, seal will then locate over flange. Ensure seal has not become twisted. Starting from the top, push the seal onto the flange.
   NOTE: The bottom radius should match the door profile.
6. Secure the seal to the bottom flange by rotating the seal onto the flange and pushing evenly on its length along the waist rail.
7. Fit inner seal.
8. Raise and lower glass to check seal fit.
9. Fit exterior mirror.
   EXTERIOR FITTINGS, REPAIRS, Mirror - exterior - electric.

Rubber/felt - glass channel - rear door

76.31.14

Remove

1. Remove rear door glass.
   DOORS, REPAIRS, Glass - rear door.



2. Release seal from flange. Remove lower section first, then front vertical section, followed by top section.
3. Release top corner of quarter light from frame. Rotate quarter light and seal, release rest of seal from flange and remove quarter light and seal from door.
4. Remove quarter light from seal.

Refit

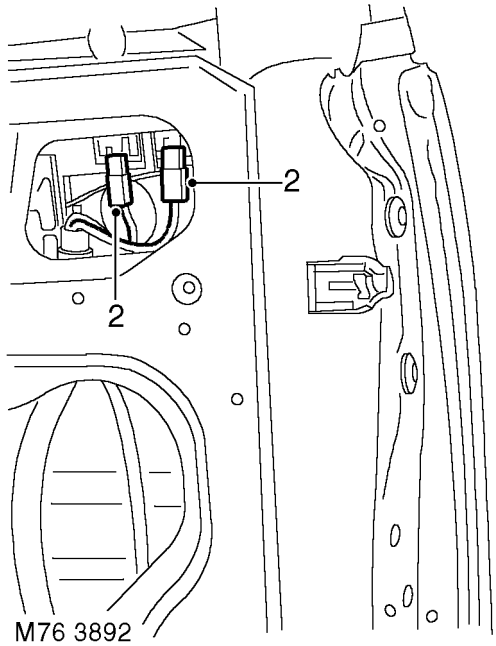
1. Fit quarter light to seal.
2. Lubricate seal around quarter light with soft soap.
3. Position quarter light and seal to flange at bottom rear corner of window aperture and rotate into top rear corner. Using dividing bar, pull quarter light rearwards to locate seal around quarter light on flange.
4. Starting at top of divider bar, push seal onto top flange and locate in top front corner. Ensure radius of seal matches door profile.
5. Ease seal away from front flange and locate seal in bottom front corner. Ensure radius of seal at bottom front corner matches profile of door and that seal is still correctly located in top front corner, then push seal onto front flange.
6. Push seal onto bottom flange.
7. Fit rear door glass.
   DOORS, REPAIRS, Glass - rear door.

Glass - tail door

76.31.20

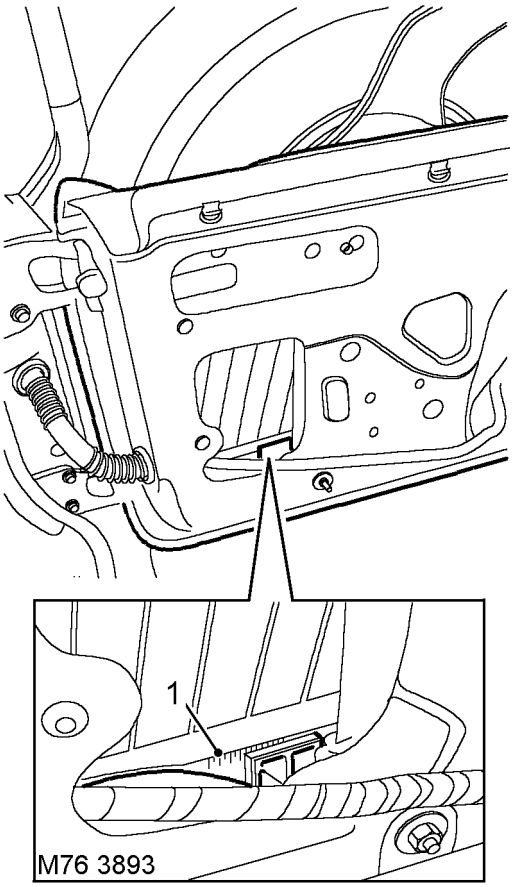
Remove

1. Remove tail door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - tail door.



2. Disconnect 2 Lucars from heater element.
3. Lower screen to access clamp bolts.
4. Loosen both clamp bolts, release and remove rear screen.

Refit



1. Position screen to door and align in clamps using timing marks on screen.
2. Ensure glass is fully pushed down in clamp closest to door hinge, then tighten clamp bolt.
3. Position screen horizontally by lifting clamp closest to door latch so that screen heater element is aligned with waist seal.
4. Tighten clamp bolts to 8 Nm (6 lbf.ft).
5. Raise screen and connect Lucars to screen heater element.
6. Ensure a 5mm equal gap exists between screen and both 'E' post finishers. If required, adjust screen again using timing marks.
7. Loosen lower adjuster lock nuts.
8. Loosen pre-load screws so screen clears seal.
9. Adjust pre-load screws until screen is just in contact with seal.
10. Adjust pre-load screws until screen applies a 1mm pre-load on seal.
11. Ensure there is full screen to seal contact.
12. Lower glass and tighten lock nuts to 14 Nm (10 lbf.ft).
13. Recheck pre-load.
14. Raise and lower screen to confirm correct alignment.
15. Fit tail door plastic sheet.
    ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**

Quarter light - rear door

76.31.31

Remove

1. The procedure for renewing the quarter light is identical to renewing the rear door glass channel seal.
   DOORS, REPAIRS, Rubber/felt - glass channel - rear door.

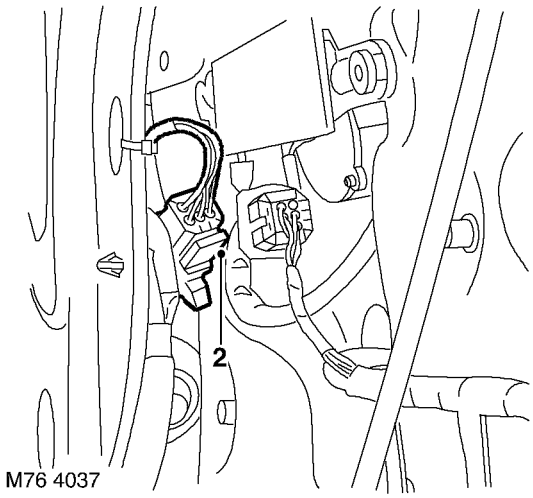
1.

Glass regulator - tail door

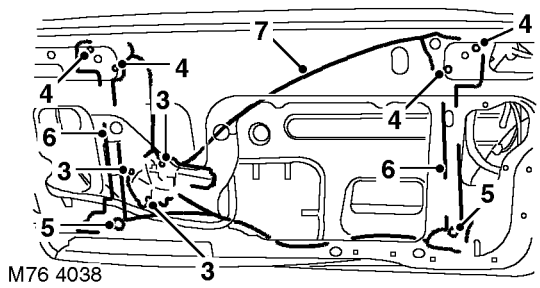
76.31.65

Remove

1. Remove rear screen.
   DOORS, REPAIRS, Glass - tail door.



2. Disconnect multiplug from regulator motor.



3. Loosen 3 nuts securing regulator motor and rotate motor to release from door.
4. Loosen 4 nuts securing top of cable guides and release guides from door.
5. Remove 2 nuts securing pre-load adjusters and rotate adjusters fully clockwise to improve access.
6. Release regulator from door and detach electrical harness from LH glass clamp.
7. Remove regulator from door.

Refit

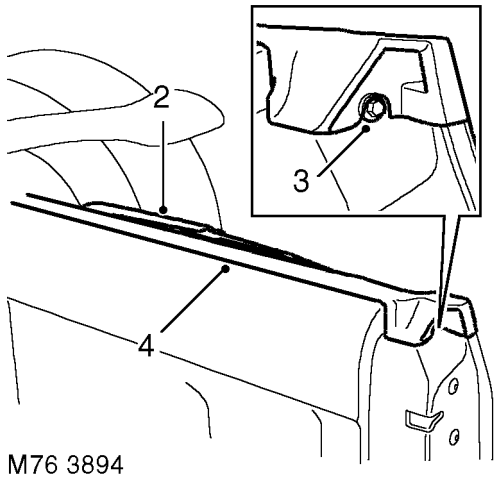
1. Position regulator to door and unclip motor transit package from rail.
2. Connect multiplug to regulator motor.
3. Connect harness clip and align regulator to door.
4. Fit nuts to pre-load adjusters, but do not tighten at this stage.
5. Position tops of cable guides to door, leaving fixings finger tight.
6. Tighten regulator motor fixings.
7. Fit rear screen.
   ☞ **DOORS, REPAIRS, Glass - tail door.**

Seal - waist inner - tail door

76.31.67

Remove

1. Lower rear screen.



M76 3894

2. Raise wiper blade away from seal.
3. Remove 2 bolts from ends of seal.
4. Release seal from door flanges.
5. Remove waist seal.

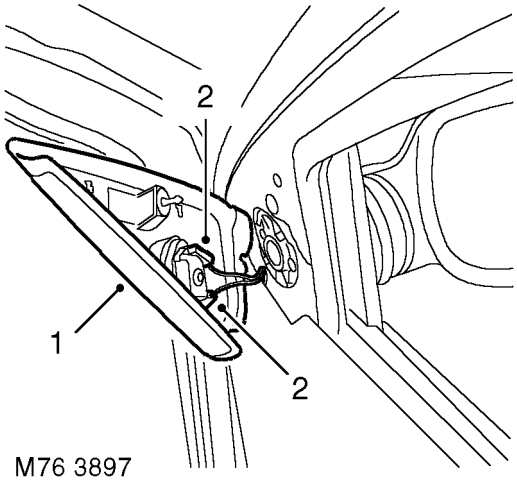
Refit

1. Position seal to door flanges and secure with bolts.
2. Lower wiper blade onto seal.
3. Raise rear screen.

Trim casing - front door - 3 door

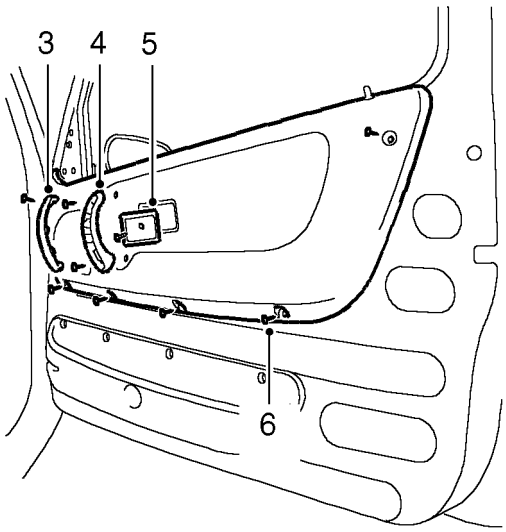
76.34.01

Remove



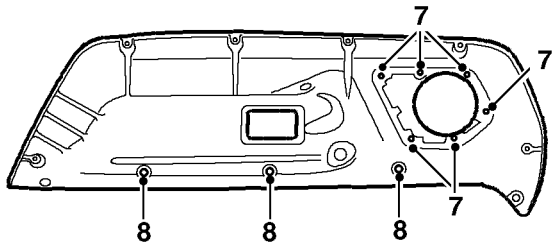
M76 3897

1. Release cheater panel from front door.
2. Disconnect Lucars and remove cheater panel.



M76 3898

3. Remove door pull centre trim.
4. Remove 2 screws securing door pull and remove door pull.
5. Remove screw securing door handle escutcheon to door and remove escutcheon.
6. Remove 6 Torx screws securing door casing, release casing from 3 studs and sill button and remove casing.



M76 4025

7. Remove 6 speed nuts securing speaker grill and remove speaker grill.

   NOTE: Do not carry out further dismantling if component is removed for access only.

8. Remove 3 casing studs.
9. Remove sill button guide.

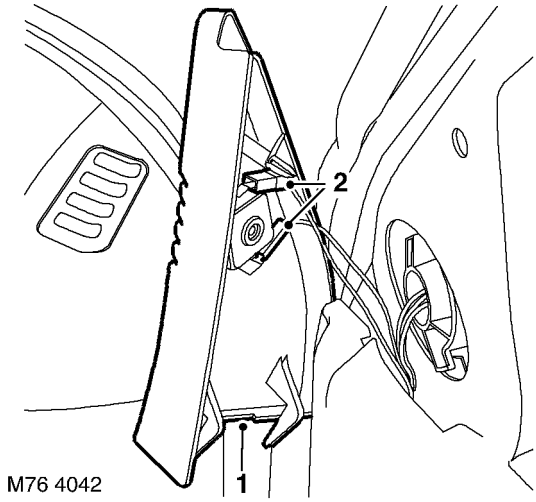
Refit

1. Position speaker grill and secure with speed nuts.
2. Fit sill button guide.
3. Fit casing studs.
4. Position casing to door, locate sill button and secure in studs.
5. Fit and tighten Torx screws.
6. Fit escutcheon to door handle and secure with screw.
7. Fit door pull and secure with screws.
8. Fit door pull centre trim.
9. Connect Lucars to cheater panel and fit cheater panel.

Trim casing - front door - 5 door

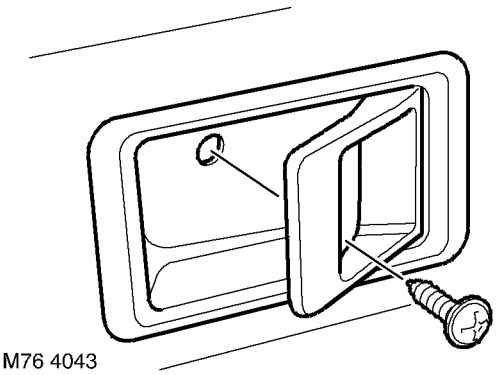
76.34.01

Remove

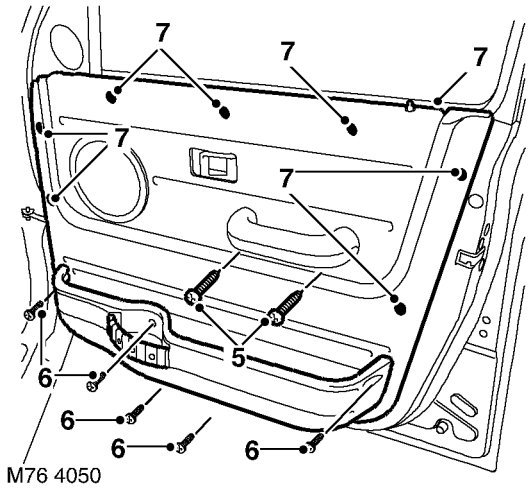


M76 4042

1. Release cheater panel from front door.
2. Disconnect Lucars from tweeter speaker.
3. Remove cheater panel.


M76 4043

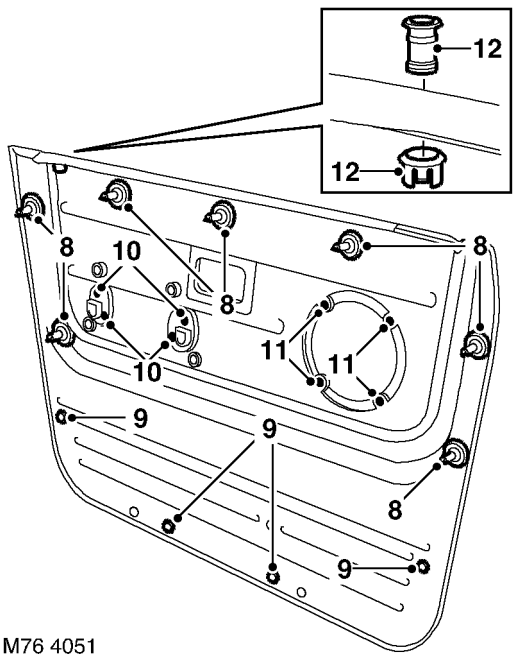
4. Remove screw securing door handle escutcheon to door and remove escutcheon.



M76 4050

5. Remove 2 screws from door pull.
6. Remove 5 screws from door pocket.
7. Release 7 trim studs and remove casing.

NOTE: Do not carry out further dismantling if component is removed for access only.



M76 4051

8. Remove 7 trim studs from casing.
9. Remove 4 Torx screws securing door pocket to trim casing and remove pocket.
10. Remove 4 Torx screws securing door pull to trim casing and remove door pull.
11. Remove 4 Torx screws securing door speaker grille to trim casing and remove grille.
12. Release retainer and remove sill button guide.

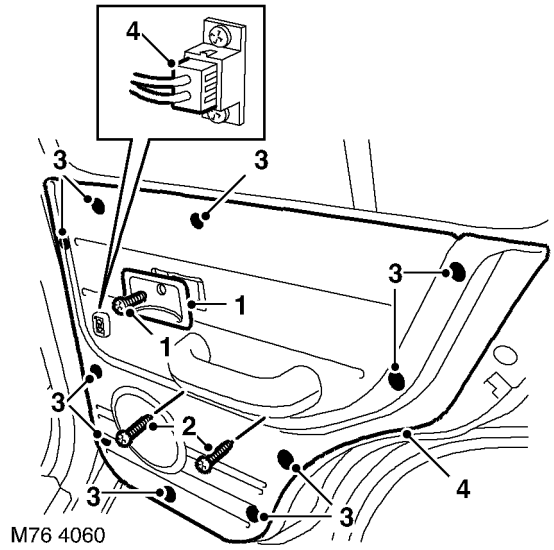
Refit

1. Fit sill button guide to trim casing and secure with retainer.
2. Fit speaker grille to trim casing and secure with Torx screws.
3. Fit door pull to trim casing and secure with Torx screws.
4. Fit door pocket to trim casing and secure with Torx screws.
5. Fit trim studs to casing.
6. Fit trim casing to door and secure trim studs.
7. Fit screws to door pull and door pocket.
8. Fit door release escutcheon and secure with screw.
9. Position cheater panel, connect Lucars to tweeter speaker and fit cheater panel.

Trim casing - rear door

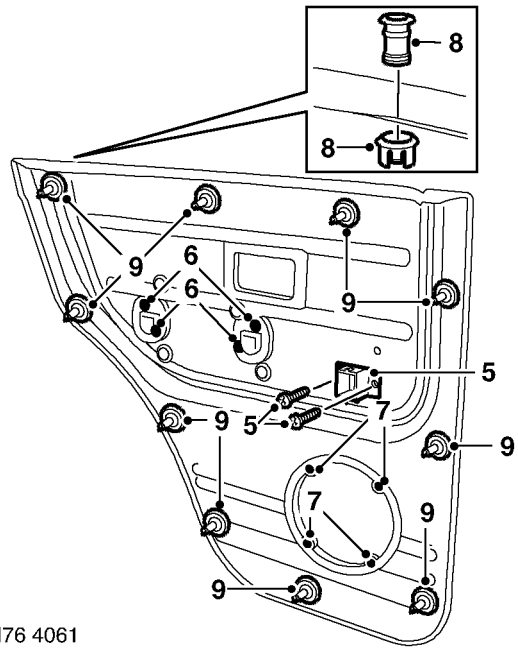
76.34.04

Remove



1. Remove screw securing door release escutcheon and remove escutcheon.
2. Remove 2 screws from door pull.
3. Release 10 trim studs securing trim casing to door.
4. Disconnect multiplug and remove door trim casing.

   NOTE: Do not carry out further dismantling if component is removed for access only.



M76 4061

5. Remove 2 Torx screws securing window switch to door trim and remove window switch.
6. Remove 4 Torx screws securing door pull to trim casing and remove door pull.
7. Remove 4 Torx screws securing door speaker grille to trim casing and remove grille.
8. Release retainer and remove sill button guide.
9. Remove 10 trim studs from door trim.

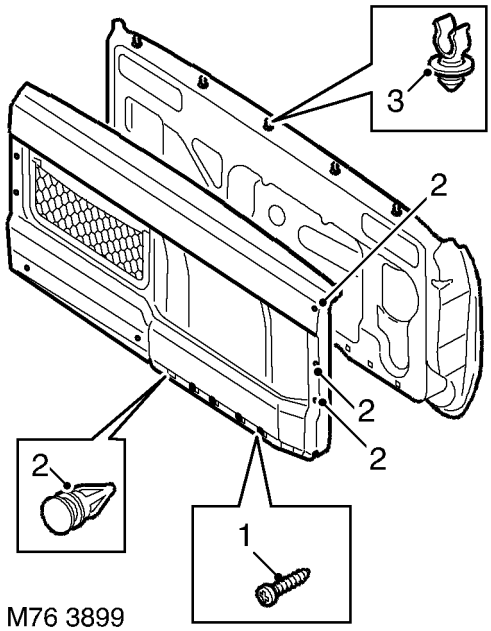
Refit

1. Fit trim studs to casing.
2. Fit sill button guide to trim casing and secure with retainer.
3. Fit speaker grille to trim casing and secure with Torx screws.
4. Fit door pull to trim casing and secure with Torx screws.
5. Fit window switch to trim casing and secure with Torx screws.
6. Position door trim casing and connect window switch multiplug.
7. Fit trim casing to door and secure trim studs.
8. Fit screws to door pull.
9. Fit door release escutcheon and secure with screw.

Trim casing - tail door(s) - each

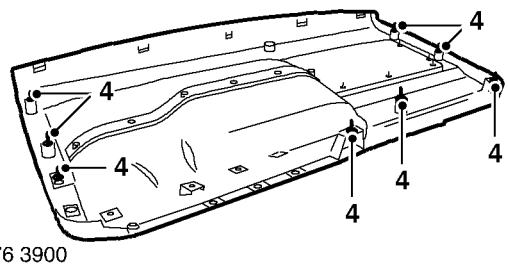
76.34.10

Remove



M76 3899

1. Remove 4 screws securing bottom of trim casing to door.
2. Release 8 clips securing sides and bottom of casing.
3. Release 5 clips securing top of casing and remove casing.



M76 3900

4. Remove 8 trim studs from casing.

Refit

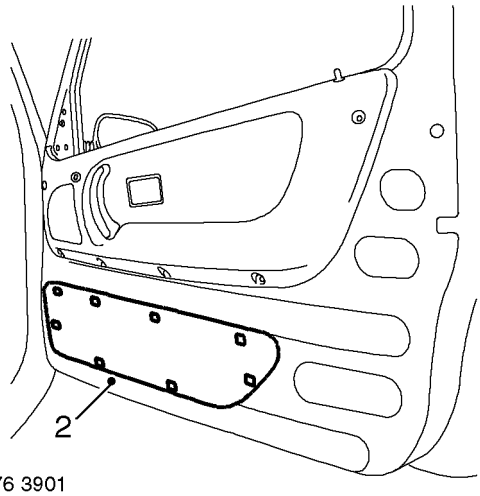
1. Fit trim studs to casing.
2. Position casing and secure top clips.
3. Secure clips on sides and bottom of casing.
4. Fit screws to bottom of casing.

Plastic sheet - front door - lower

76.34.18

Remove

1. Remove front door pocket.
   DOORS, REPAIRS, Pocket - front door.



M76 3901

2. Release and discard plastic sheet.

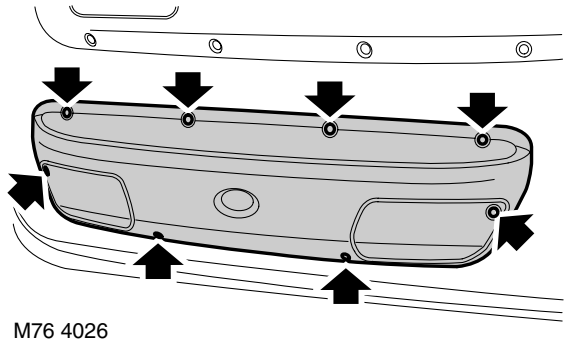
Refit

1. Clean door contact area with white spirit.
2. Position NEW plastic sheet to door and seal in position, by applying hand pressure to centre bottom of sheet first then move out from this point in both directions applying an even pressure to the seal, smooth out any creases.
3. Fit front door pocket.
   DOORS, REPAIRS, Pocket - front door.

Pocket - front door

76.34.19

Remove



M76 4026

1. Remove 8 Torx screws securing pocket to door and remove pocket.

Refit

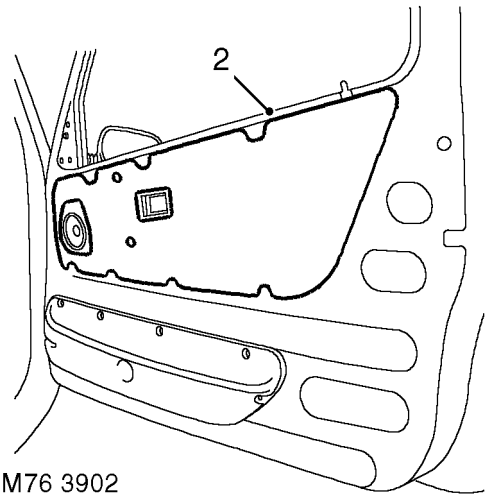
1. Fit pocket and secure with Torx screws.

Plastic sheet - front door - upper - 3 door

76.34.24

Remove

1. Remove front door trim casing.
   DOORS, REPAIRS, Trim casing - front door - 3 door.



M76 3902

2. Release and discard plastic sheet.

Refit

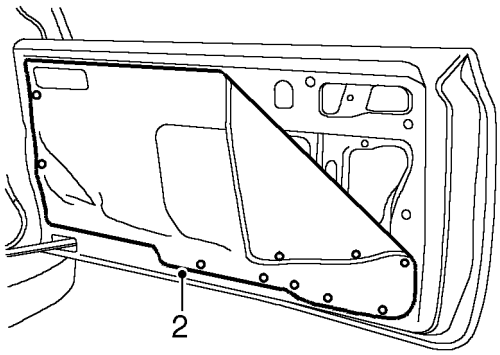
1. Clean door contact area with white spirit.
2. Position NEW plastic sheet to door and seal in position, by applying hand pressure to centre bottom of sheet first then move out from this point in both directions applying an even pressure to the seal, smooth out any creases.
3. Fit front door trim casing.
   DOORS, REPAIRS, Trim casing - front door - 3 door.

Plastic sheet - tail door

76.34.25

Remove

1. Remove tail door trim casing.
   DOORS, REPAIRS, Trim casing - tail door(s) - each.



M76 3903

2. Release and discard plastic sheet.

Refit

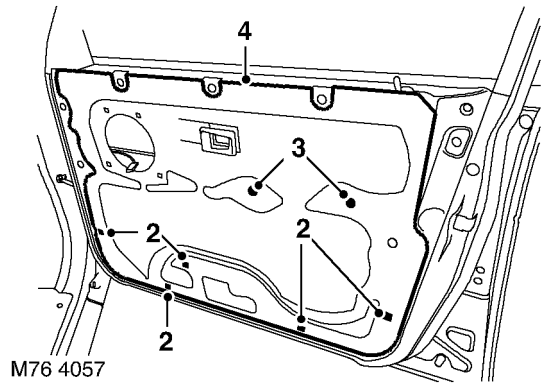
1. Clean door contact area with white spirit.
2. Position NEW plastic sheet to door and seal in position, by applying hand pressure to centre bottom of sheet first then move out from this point in both directions applying an even pressure to the seal, smooth out any creases.
3. Fit tail door trim casing.
   DOORS, REPAIRS, Trim casing - tail door(s) - each.

Plastic sheet - front door - 5 door

76.34.26

Remove

1. Remove front door speaker.
   IN CAR ENTERTAINMENT, REPAIRS, Speaker - front.



M76 4057

2. Remove 5 door pocket screw fixings.
3. Remove 2 door handle screw fixings.
4. Release and discard plastic sheet.

Refit

1. Clean door contact area with white spirit.
2. Position NEW plastic sheet to door and seal in position, by applying hand pressure to centre bottom of sheet first then move out from this point in both directions applying an even pressure to the seal, smooth out any creases.

   CAUTION: It is crucial that no creases are present along the base of the plastic sheet.

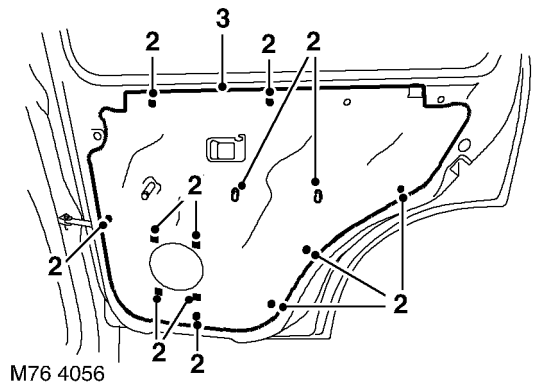
3. Fit front door speaker.
   IN CAR ENTERTAINMENT, REPAIRS, Speaker - front.

Plastic sheet - rear door

76.34.28

Remove

1. Remove rear door speaker.
   IN CAR ENTERTAINMENT, REPAIRS, Speaker - rear - 5 door.



2. Noting their fitted position, remove 7 trim stud retainers, 2 door pull screw retainers and 4 speaker screw retainers.
3. Release and discard plastic sheet.

Refit

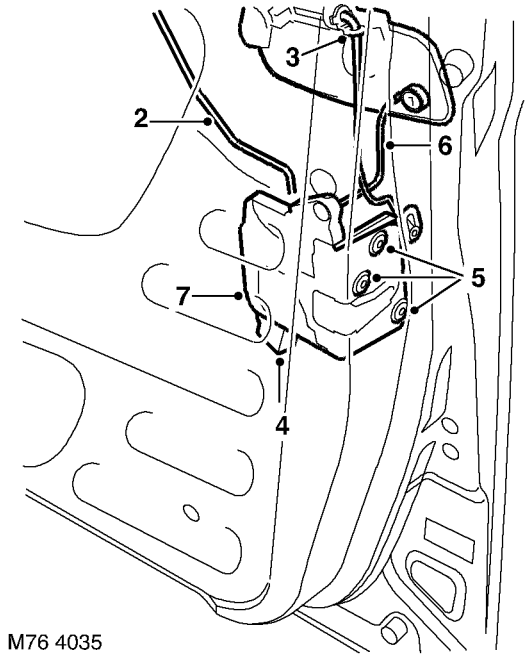
1. Clean door contact area with white spirit.
2. Position NEW plastic sheet to door and seal in position, by applying hand pressure to centre bottom of sheet first then move out from this point in both directions applying an even pressure to the seal, smooth out any creases.
   CAUTION: It is crucial that no creases are present along the base of the plastic sheet.
3. Fit trim stud retainers and screw retainers to door.
4. Fit rear door speaker.
   IN CAR ENTERTAINMENT, REPAIRS, Speaker - rear - 5 door.

Latch - front door - 3 door

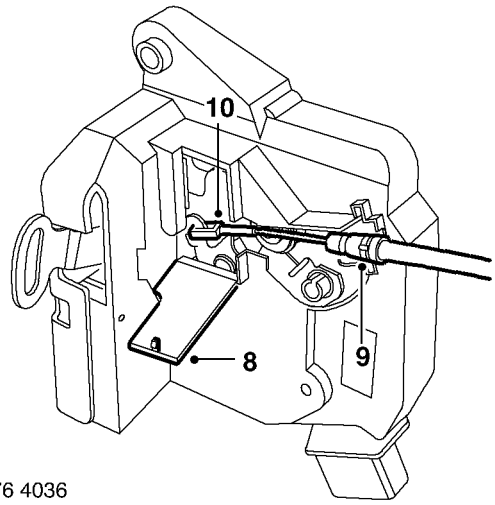
76.37.12

Remove

1. Remove upper plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - upper - 3 door.



2. Release sill button lock rod from door latch.
3. Remove control rod from exterior handle.
4. Disconnect multiplug from latch.
5. Remove 3 Torx screws securing latch to door.
6. On drivers door, release door lock barrel paddle from latch.
7. Remove latch from aperture.



M76 4036

8. Open security flap on latch.
9. Release interior release cable clamp from latch.
10. Disengage interior release cable from latch.

Refit

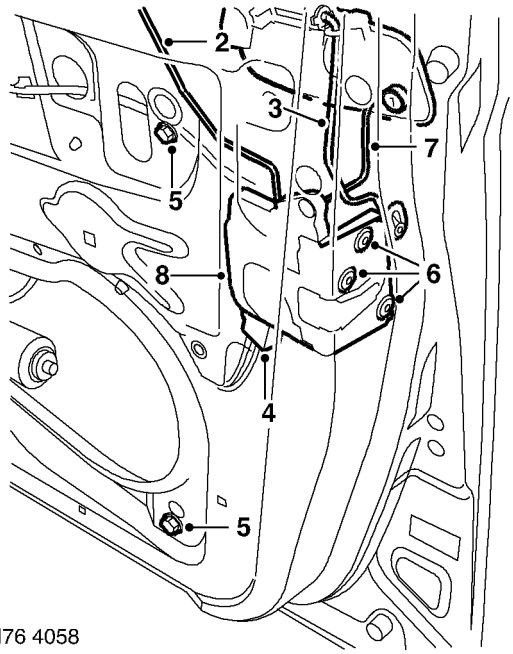
1. Secure interior release cable to latch and close latch security flap.
2. Fit interior release cable clamp to latch.
3. Position latch to door. On drivers door, align lock barrel paddle to latch.
4. Fit and tighten Torx screws securing latch to door.
5. Connect multiplug to latch.
6. Connect exterior handle control rod to latch.
7. Fit sill button lock rod to latch.
8. Check operation of latch.
9. Fit plastic sheet to door.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - upper - 3 door.**

Latch - front door - 5 door

⊸ ***76.37.12***

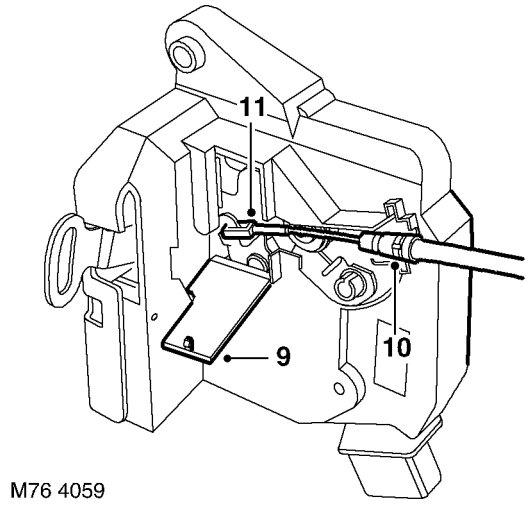
Remove

1. Remove front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**



M76 4058

2. Release sill button lock rod from door latch.
3. Release control rod from exterior handle.
4. Disconnect multiplug from latch.
5. Remove 2 screws securing RH glass cable guide and position guide aside.
6. Remove 3 Torx screws securing latch to door.
7. On drivers door, release door lock barrel paddle from latch.



M76 4059

8. Remove latch from aperture.
9. Open security flap on latch.
10. Release interior release cable clamp from latch.
11. Disengage interior release cable from latch.

Refit

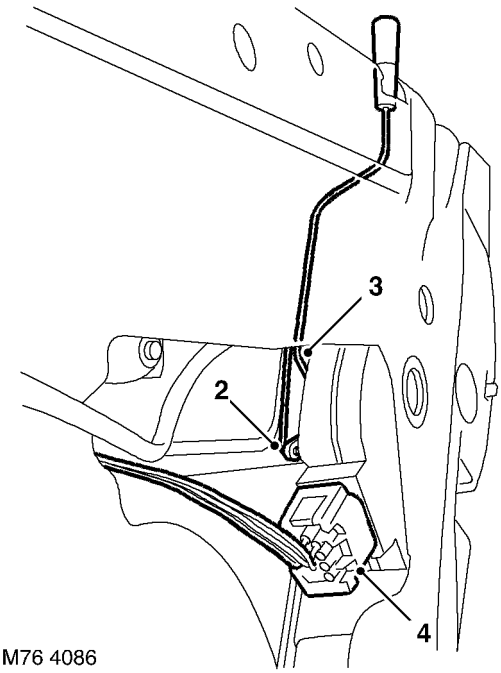
1. Secure interior release cable to latch and close latch security flap.
2. Fit interior release cable clamp to latch.
3. Position latch to door. On drivers door, align lock barrel paddle to latch.
4. Fit and tighten Torx screws securing latch to door.
5. Position RH glass cable guide and tighten screws.
6. Connect multiplug to door latch.
7. Connect exterior handle control rod to latch.
8. Fit sill button lock rod to latch.
9. Check operation of door latch.
10. Fit front door plastic sheet.
    DOORS, REPAIRS, Plastic sheet - front door - 5 door.

Latch - rear door

76.37.13

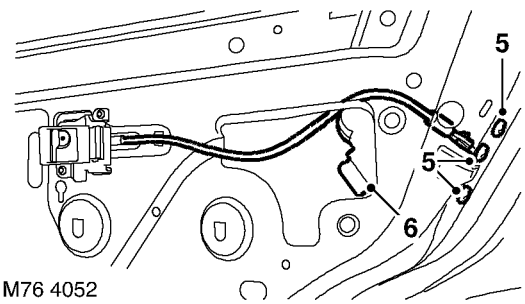
Remove

1. Remove rear door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - rear door.



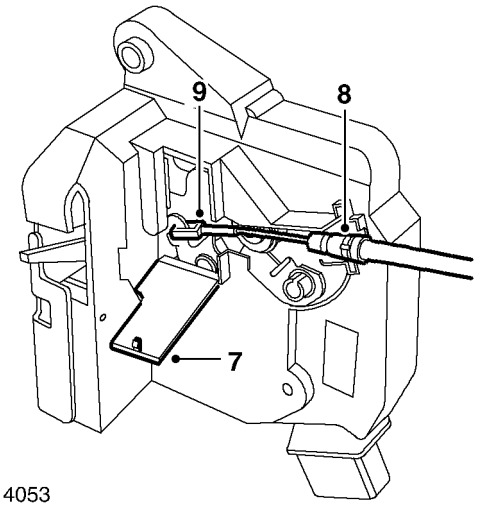
M76 4086

2. Release exterior handle control rod from latch.
3. Release sill button lock rod from door latch.
4. Disconnect multiplug from latch.



M76 4052

5. Remove 3 Torx screws securing latch to door.
6. Remove latch from aperture.



M76 4053

7. Open security flap on latch.
8. Release interior release cable clamp from latch.
9. Disengage interior release cable from latch.

Refit

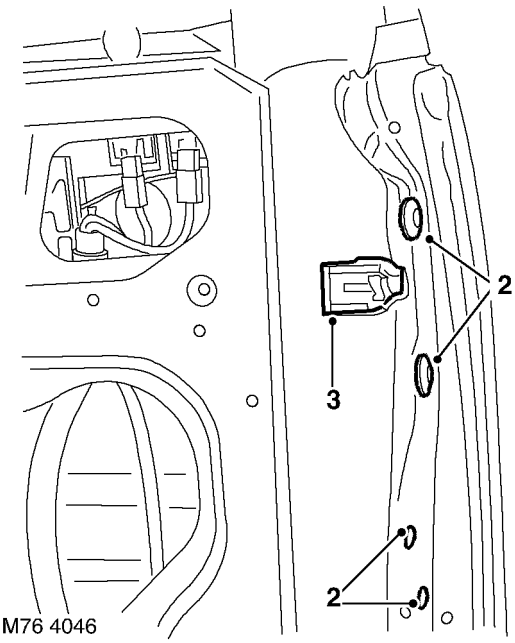
1. Secure interior release cable to latch and close latch security flap.
2. Position latch to door, fit and tighten Torx screws.
3. Connect multiplug to latch.
4. Connect exterior handle control rod to latch.
5. Fit sill button lock rod to latch.
6. Check operation of latch.
7. Fit rear door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - rear door.**

Latch - tail door

⊸ ***76.37.16***

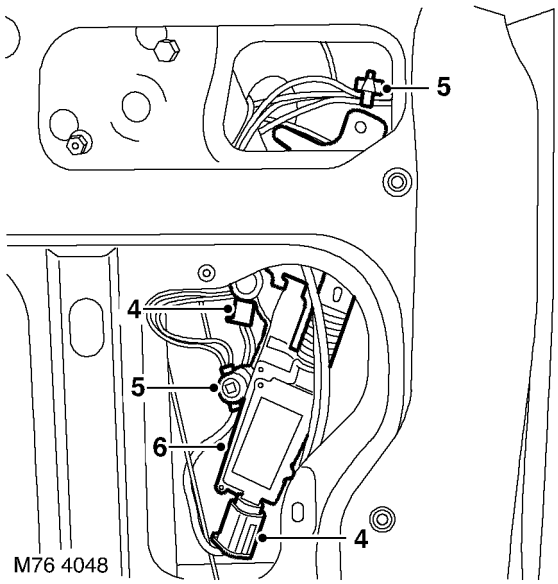
Remove

1. Remove tail door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**

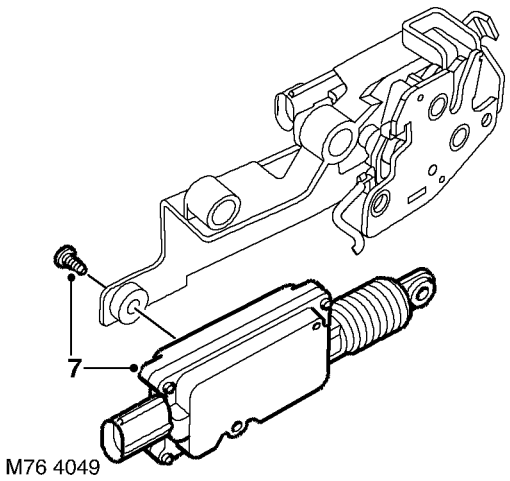


M76 4046

2. Remove 4 screws securing door latch.
3. Release door latch to access harness clips and multiplugs.



4. Disconnect 2 multiplugs from door latch.
5. Release 2 door harness clips from latch.
6. Remove door latch.



7. Remove screw from solenoid motor and remove motor from latch.

Refit

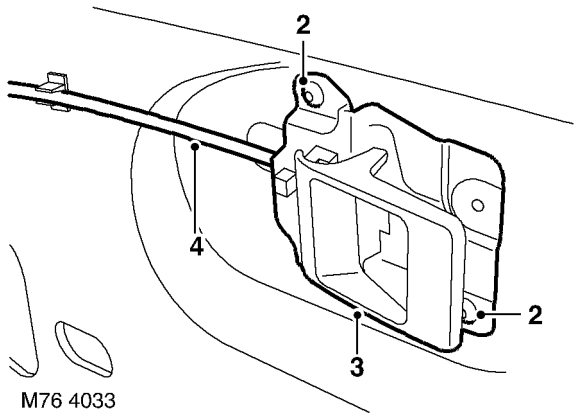
1. Position solenoid motor to latch, fit and tighten screw.
2. Position door latch, connect multiplugs and harness clips.
3. Locate door latch in position, fit and tighten screws.
4. Fit tail door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**

Remote control - front door

76.37.31

Remove

1. Remove front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**



2. Drill out 2 rivets from door release.
3. Remove door release.
4. Release cable from door release.

Refit

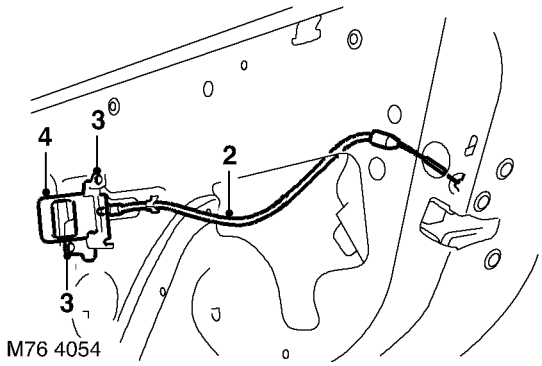
1. Connect cable to door release.
2. Position door release and secure with rivets.
3. Fit front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**

Remote control - rear door

76.37.32

Remove

1. Remove rear door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - rear door.



2. Release cable from door release.
3. Drill out 2 rivets from door release.
4. Remove door release.

Refit

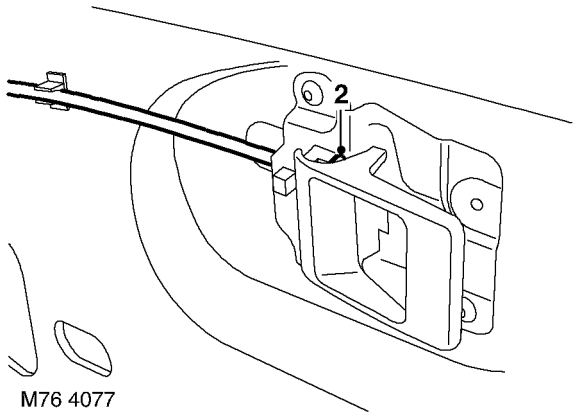
1. Connect cable to door release.
2. Position door release and secure with rivets.
3. Fit rear door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - rear door.

Operating cable - lock remote control - 5 door

76.37.60

Remove

1. Remove door latch.
   DOORS, REPAIRS, Latch - front door - 5 door.
   DOORS, REPAIRS, Latch - rear door.



2. Release cable from interior door release and remove cable.

Refit

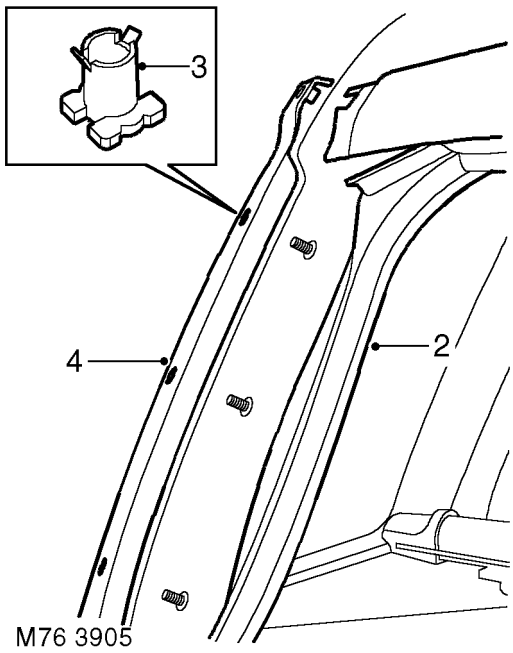
1. Connect cable to interior door release.
2. Fit door latch.
   DOORS, REPAIRS, Latch - front door - 5 door.
   DOORS, REPAIRS, Latch - rear door.

Finisher - rear screen - side - 5 door

76.43.81

Remove

1. Open tail door.



2. Release tail door glass seal from aperture for access to side finisher fixings.
3. Using a suitable trim stud removal tool, release 3 side finisher fixings from studs on body.
4. Remove side finisher from upper fixing.
5. Remove and discard fixings from finisher.

Refit

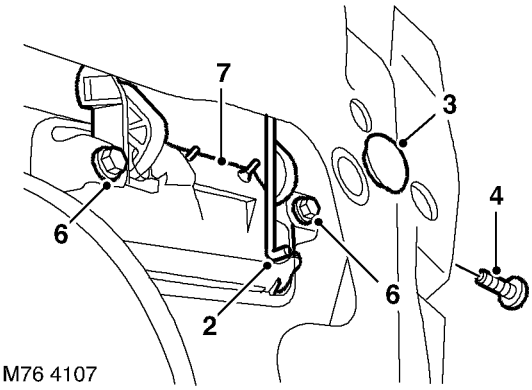
1. Fit NEW fixings to finisher.
2. Fit door glass seal to flange.
3. Fit finisher and secure fixings.

Handle - exterior - rear door

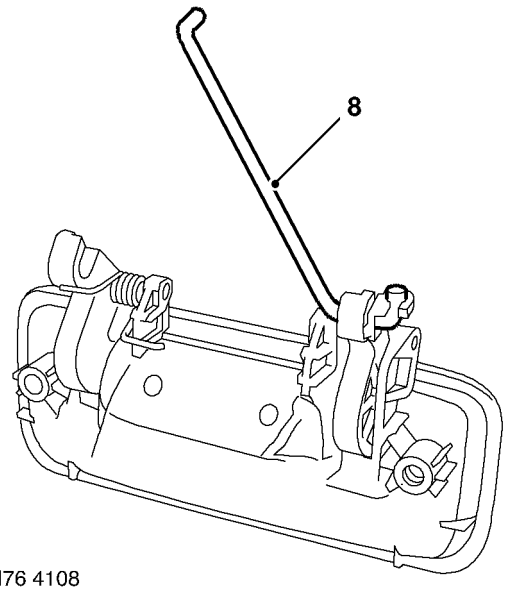
76.58.02

Remove

1. Remove rear door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - rear door.



2. Release door latch control rod.
3. Remove grommet to access screw.
4. Remove 3 Torx screws securing latch to door.
5. Release and lower latch to access screw.
6. Remove 2 door handle screw fixings.
7. Remove door handle.



8. Remove door latch control rod.

Refit

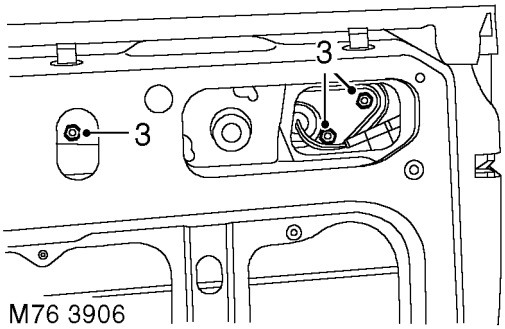
1. Fit door latch control rod to handle.
2. Position handle to door and tighten securing screws.
3. Position latch to door, fit and tighten Torx screws.
4. Fit grommet to door.
5. Connect door latch control rod.
6. Fit rear door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - rear door.**

Handle - exterior - tail door

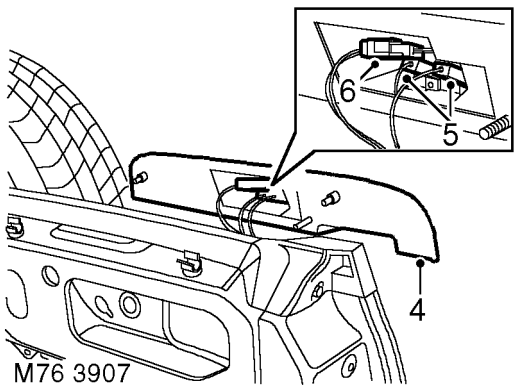
⊸ ***76.58.05***

Remove

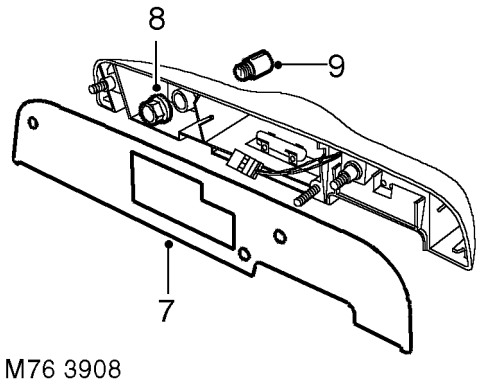
1. Remove tail door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**
2. Raise glass by clicking latch.



3. Remove 3 nuts securing tail door handle to tail door.



4. Release handle from tail door.
5. Disconnect 2 Lucars from number plate lamp.
6. Disconnect multiplug and remove handle from door.



M76 3908

7. Collect gasket.
8. Remove nut from lock barrel.
9. Remove lock barrel from handle.

Refit

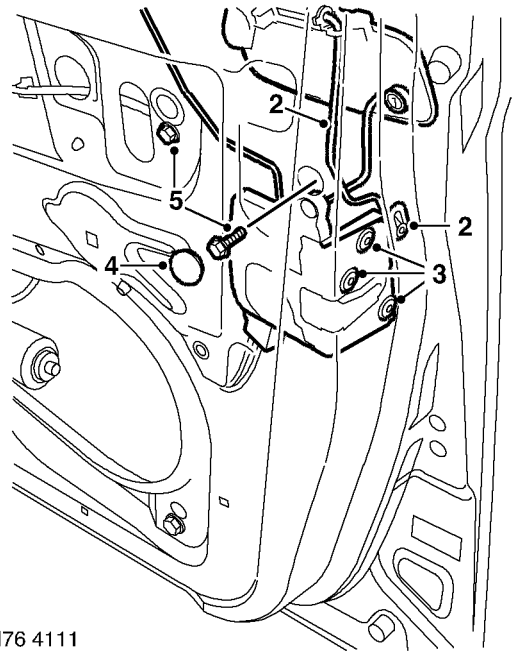
1. Fit lock barrel to handle.
2. Fit gasket to handle.
3. Position handle and connect Lucars and multiplug.
4. Fit handle to door and tighten nuts to 5 Nm (3.5 lbf.ft).
5. Fit tail door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**
6. Reset latch to lower glass.
7. Close door.

Handle - exterior - front door

76.58.07

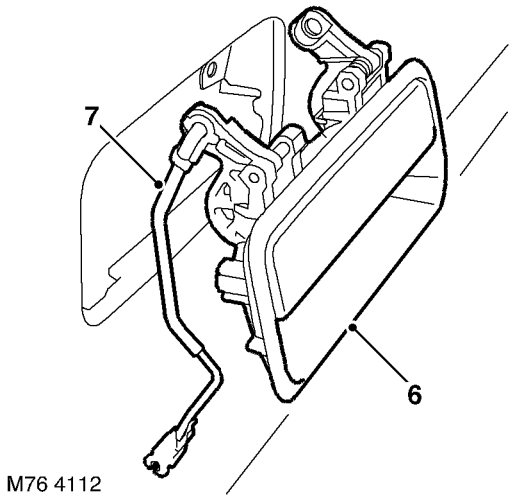
Remove

1. Remove front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**



M76 4111

2. Release clip securing latch control rod to door latch and release rod.
3. Remove 3 Torx screws securing door latch, lower latch and release door lock paddle.
4. Remove grommet to access screw.
5. Remove 2 door handle screw fixings.



6. Remove door handle.
7. Remove door latch control rod.

Refit

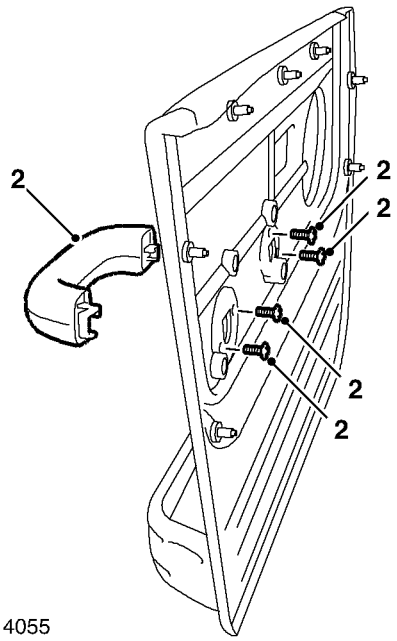
1. Fit door latch control rod to handle.
2. Position handle to door and tighten securing screws.
3. Fit grommet to door.
4. Position latch, locate door lock paddle, fit and tighten Torx screws.
5. Connect control rod to door latch.
6. Fit front door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - front door - 5 door.**

Door pull - 5 door

🔧 ***76.58.25***

Remove

1. Remove front door trim casing.
   ☞ **DOORS, REPAIRS, Trim casing - front door - 5 door.**



2. Remove 4 Torx screws securing door pull to trim casing and remove door pull.

Refit

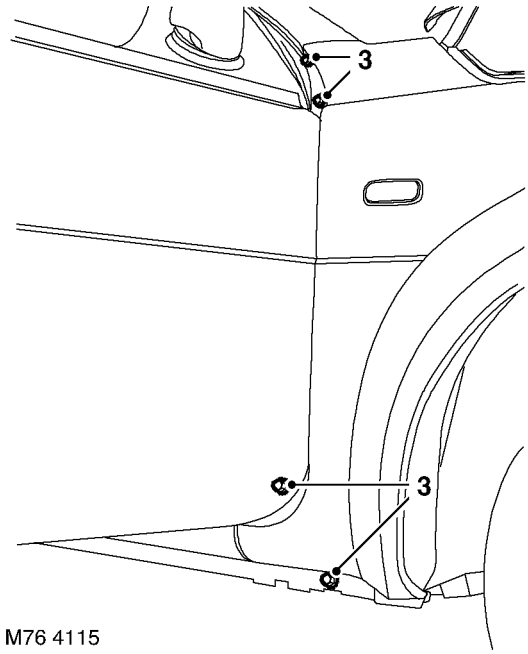
1. Fit door pull to trim casing and secure with Torx screws.
2. Fit front door trim casing.
   ☞ **DOORS, REPAIRS, Trim casing - front door - 5 door.**

Wing - front

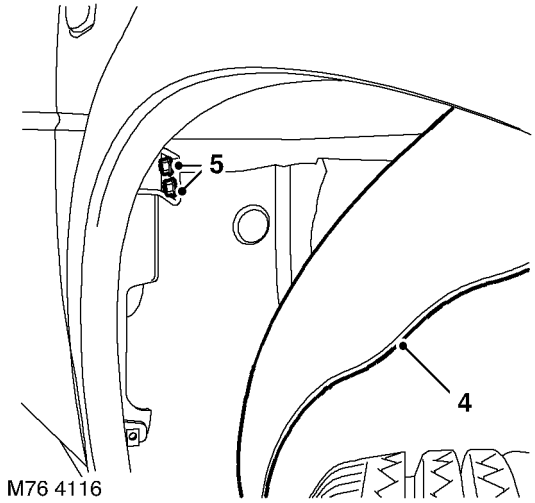
76.10.24

Remove

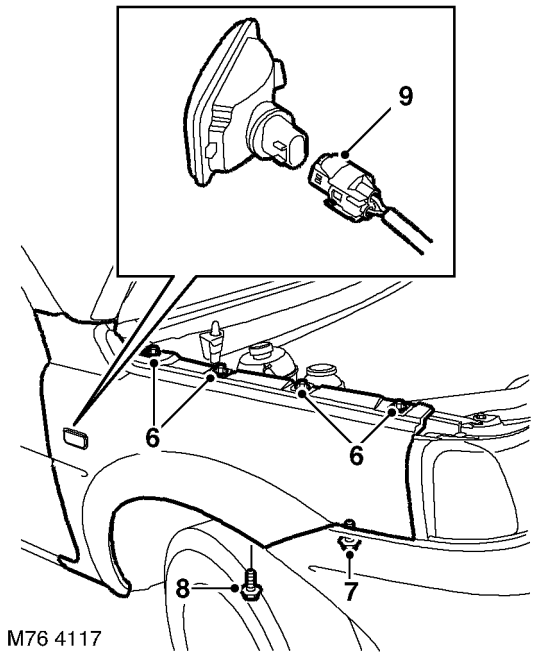
1. Remove front mud flap.
   EXTERIOR FITTINGS, REPAIRS, Mud flap - front.
2. Remove lower sill finisher.
   EXTERIOR FITTINGS, REPAIRS, Finisher - sill - lower.



3. Remove 4 bolts securing rear of front wing.



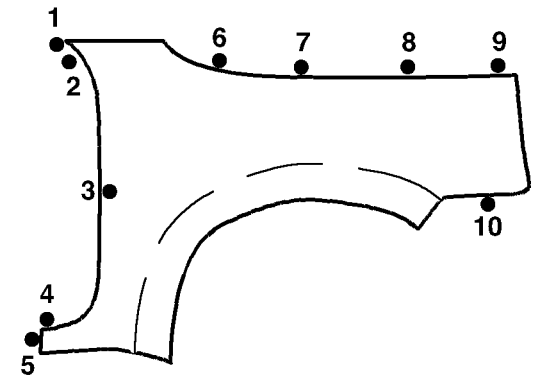
4. Release wheel arch liner from rear of front wing.
5. Remove 2 bolts securing wing bracket to 'A' post.



6. Remove 4 bolts securing top of wing.
7. Remove bolt securing front of wing to bracket on body.
8. Remove screw securing wheelarch liner to under side of wing.
9. Release wing from body and disconnect multiplug from repeater lamp.
10. Remove front wing from body.
11. Remove side repeater lamp from front wing.

Refit

1. Fit side repeater lamp to front wing.
2. Position front wing to body.
3. Connect repeater lamp multiplug.
4. Align front wing to body.
5. Fit bolts securing rear wing to 'A' post, top of wing and front of wing, but do not tighten at this stage.



M76 4124

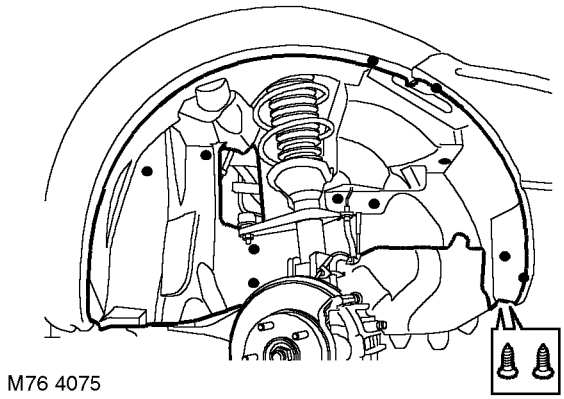
6. Align wing and tighten bolts in sequence shown to 5 Nm (3.5 lbf.ft).
7. Align wheel arch liner to rear of wing.
8. Fit screw securing wheel arch liner to under side of wing.
9. Fit lower sill finisher.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Finisher - sill - lower.**
10. Fit front mud flap.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Mud flap - front.**

Liner - front wheel arch

🔧 ***76.10.48***

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Remove road wheel.
3. Remove front mud flap.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Mud flap - front.**


M76 4075

4. Remove 3 screws securing wheel arch liner to wing and bumper.
5. Remove 8 retaining studs securing wheel arch liner to inner wing.
6. Release and remove wheel arch liner.

Refit

1. Fit wheel arch liner.
2. Fit retaining studs securing wheel arch liner to inner wing.
3. Fit and tighten screws securing wheel arch liner to wing and bumper.
4. Fit front mud flap.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Mud flap - front.**
5. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
6. Remove stand and lower vehicle.

Liner - rear wheel arch

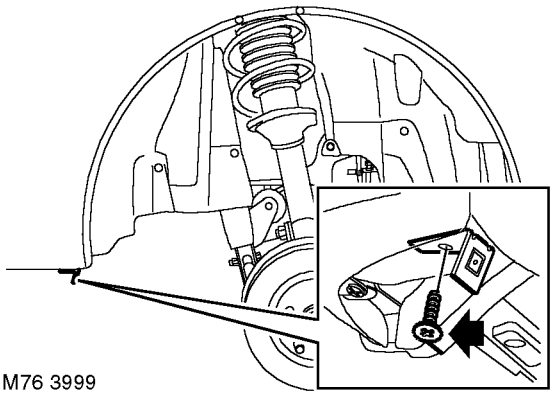
76.10.49

Remove

1. Raise rear of vehicle.

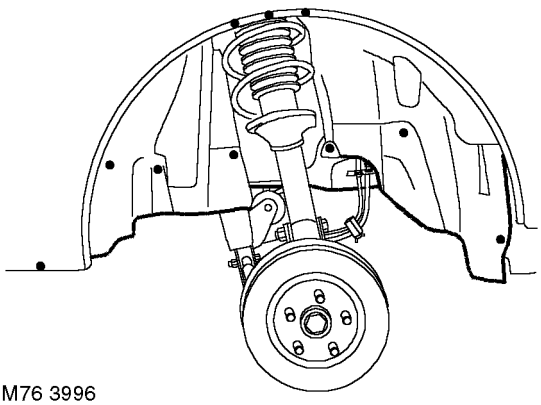
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

2. Remove road wheel(s).
3. Remove rear mud flap.
   EXTERIOR FITTINGS, REPAIRS, Mud flap - rear.



M76 3999

4. Remove screw securing mud flap bracket to bumper and remove bracket.



M76 3996

5. Remove 2 scrivets securing wheel arch liner to wing.
6. Remove 3 screws securing wheel arch liner to wing and bumper.
7. Remove 5 retaining studs securing wheel arch liner to inner wing.
8. Release and remove wheel arch liner.

Refit

1. Position wheel arch liner to inner wing.
2. Fit retaining studs securing wheel arch liner to inner wing.
3. Fit and tighten screws securing wheel arch liner to wing and bumper.
4. Fit scrivets securing wheel arch liner to wing.
5. Position mud flap bracket to bumper and secure with screw.
6. Fit rear mud flap.
   EXTERIOR FITTINGS, REPAIRS, Mud flap - rear.
7. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
8. Remove stands and lower vehicle.

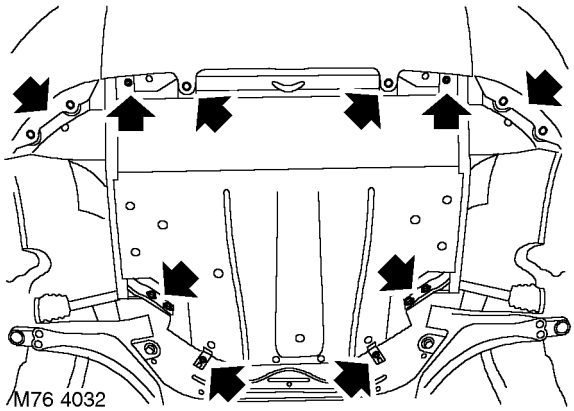
Panel - underbelly

76.10.50

Remove

1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



2. Remove 2 screws securing bumper valance to underbelly panel brackets.
3. Remove 4 screws securing wheel arch liners to bumper valance, if fitted.
4. Remove 2 bolts securing rear of underbelly panel.
5. Remove 6 bolts securing underbelly panel frame.
6. Remove underbelly panel.

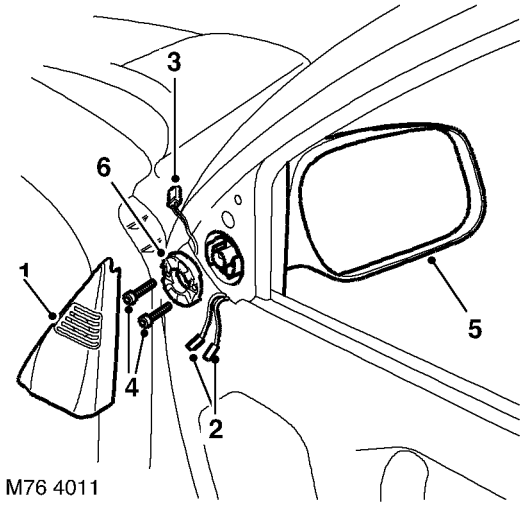
Refit

1. Position underbelly panel.
2. Fit bolts securing underbelly panel frame and tighten to 45 Nm (33 lbf.ft).
3. Fit bolts securing rear of underbelly panel and tighten to 8 Nm (6 lbf.ft).
4. Fit and tighten screws securing wheel arch liners to bumper valance, if fitted.
5. Fit and tighten screws securing bumper valance to brackets.
6. Remove stands and lower vehicle.

Mirror - exterior - electric

76.10.57

Remove



1. Remove cheater panel.
2. Disconnect 2 Lucars from tweeter and place cheater panel aside.
3. Disconnect multiplug from mirror.
4. Support mirror and remove 2 Torx screws.
5. Remove exterior mirror.
6. Collect clamping plate.

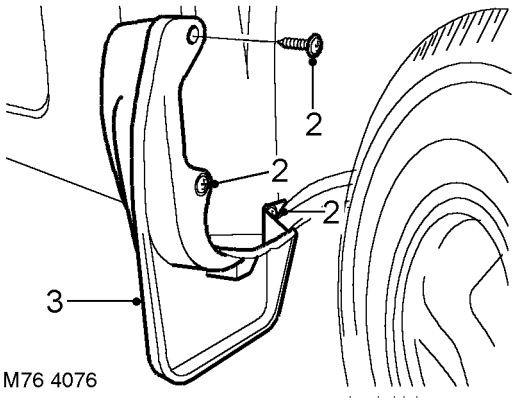
Refit

1. Position mirror, locate clamping plate, fit and tighten Torx screws to 6 Nm (4.5 lbf.ft).
2. Connect multiplug to mirror.
3. Connect Lucars to tweeter in cheater panel.
4. Fit cheater panel to door.

Mud flap - front

76.10.83

Remove



M76 4076

1. Turn steering wheel to full lock.
2. Remove 3 screws securing mud flap.
3. Remove mud flap.

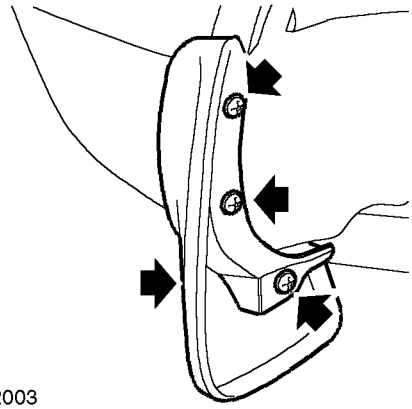
Refit

1. Position mud flap to body and secure with screws.
2. Straighten steering.

Mud flap - rear

76.10.85

Remove


M76 2003

1. Remove 3 screws securing mud flap.
2. Remove mud flap.

Refit

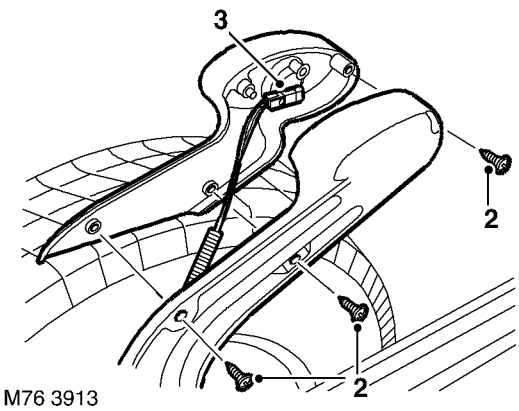
1. Position mud flap to body and secure with screws.

Bracket - spare wheel mounting

76.11.18

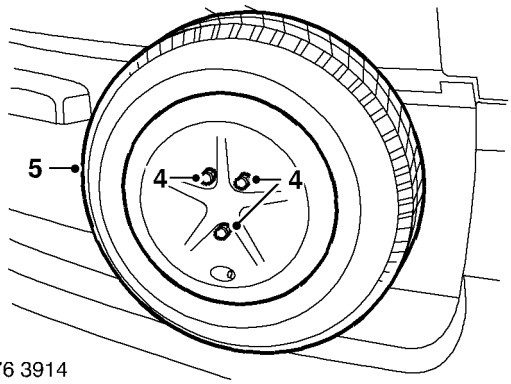
Remove

1. Lower tail door glass.



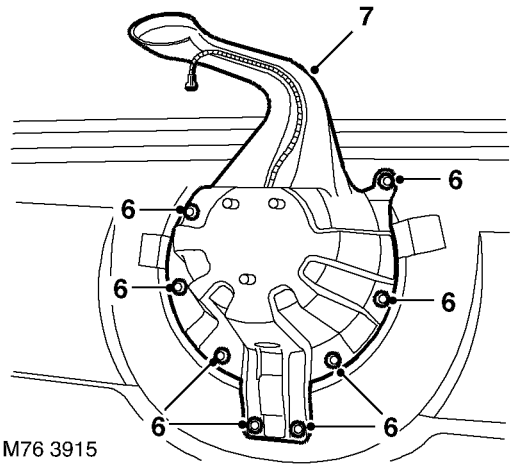
M76 3913

2. Remove 3 screws securing high mounted stop lamp bracket to spare wheel carrier.
3. Disconnect multiplug and remove lamp.



M76 3914

4. Remove 3 nuts securing spare wheel to mounting bracket.
5. Remove spare wheel from mounting bracket.



M76 3915

6. Remove 6 Torx bolts and 2 nuts securing spare wheel mounting bracket to tail door.
7. Remove mounting bracket.

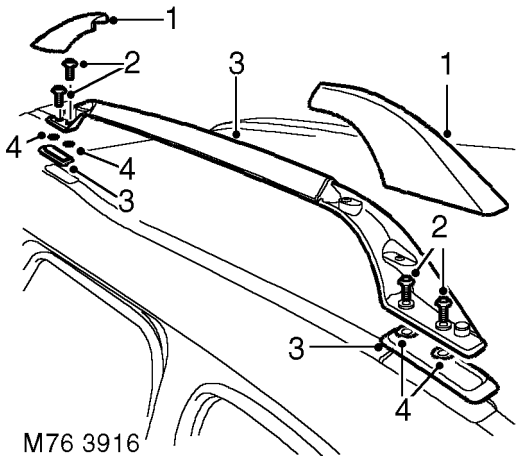
Refit

1. Position spare wheel mounting bracket to tail door and tighten bolts to 13 Nm (10 lbf.ft).
2. Tighten mounting bracket nuts to 25 Nm (18 lbf.ft).
3. Position stop lamp and connect multiplug.
4. Fit stop lamp and secure with screws.
5. Fit spare wheel and tighten nuts to 45 Nm (33 lbf.ft).
6. Raise tail door glass.

Side rail - integral roof rack - 5 door

76.11.30

Remove



1. Remove finishers from feet of side rail.
2. Remove 4 Torx screws securing side rail to roof panel.
3. Remove side rail and 2 gaskets.
   NOTE: Do not carry out further dismantling if component is removed for access only.
4. Remove seal from each torque bolt.
5. Remove Torx bolts from side rail.

Refit

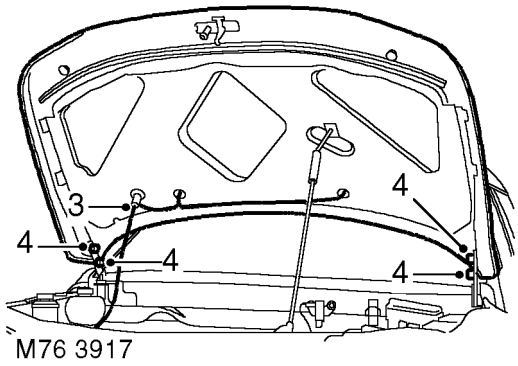
1. Fit Torx bolts and seals to replacement side rail.
2. Fit gaskets to side rail.
3. Position side rail and tighten Torx bolts to 22 Nm (16 lbf.ft).
4. Fit finishers to feet of side rail.

Bonnet

76.16.01.99

Remove

1. Support bonnet in open position.
2. Fit protection covers to wings and mark hinge outline on bonnet if bonnet is to be refitted.



3. Disconnect windscreen washer tube at elbow joint.
4. With assistance, remove bolts securing hinges to bonnet and remove bonnet.

Refit

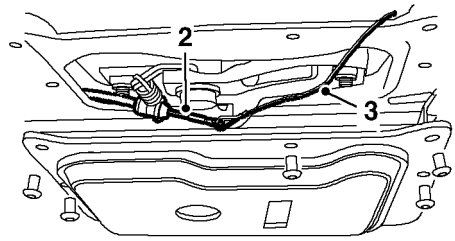
1. With assistance, position bonnet to hinges. Fit and lightly tighten bolts.
2. Connect windscreen washer tube.
3. Close bonnet. Check that bonnet is aligned to both front wings and that gaps are equal. If necessary, adjust bonnet alignment and/or gaps.
4. Finally tighten hinge bolts to 9 Nm (7 lbf.ft).

Cable/rod - bonnet lock control

76.16.29

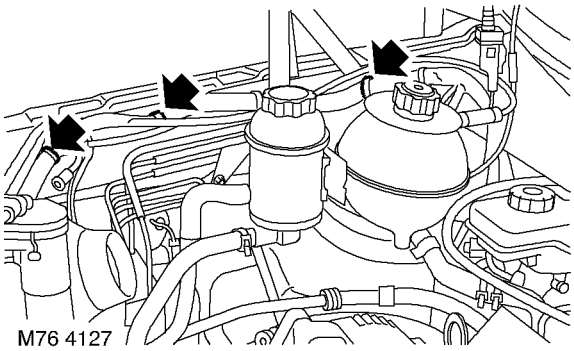
Remove

1. Remove bonnet lock.

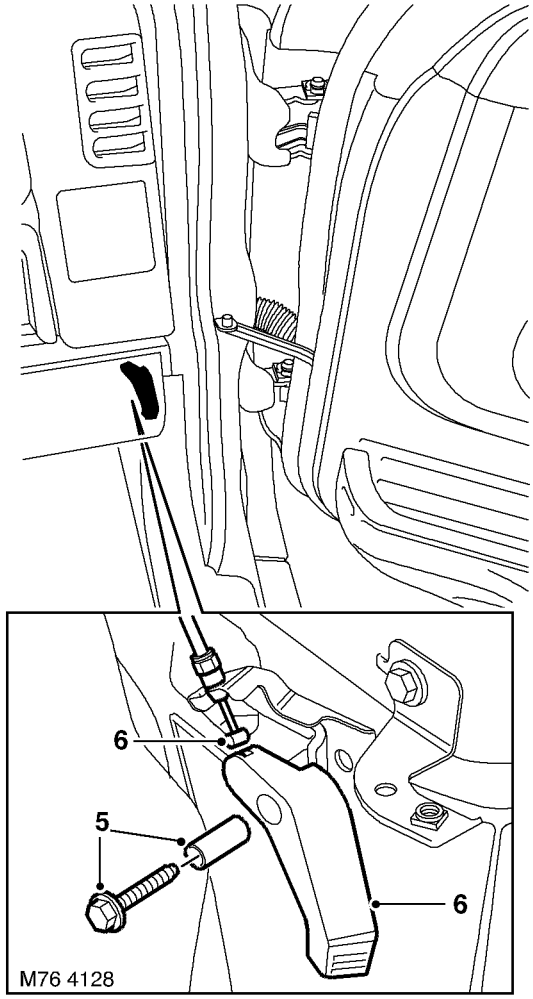


M76 4126

2. Tie a draw string to end of bonnet release cable and pull cable from bonnet locking platform.
3. Untie draw string from bonnet release cable.

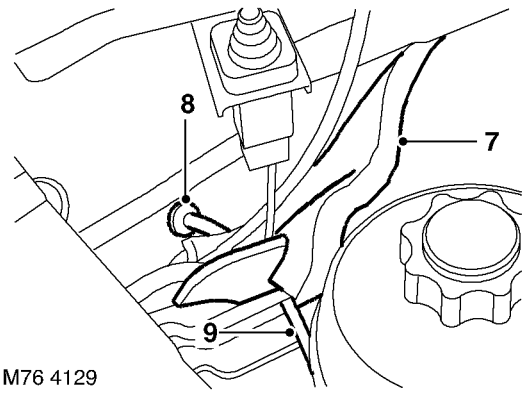

M76 4127

4. Remove 3 cable ties and release bonnet release cable from harness.



M76 4128

5. Remove bolt securing bonnet release lever to 'A' post lower panel.
6. Remove bonnet release cable from lever and remove lever.



M76 4129

7. Pull sound insulation away from bulkhead for access to bonnet release cable grommet.
8. Remove grommet from engine bulkhead.

9. Remove bonnet release cable.

Refit

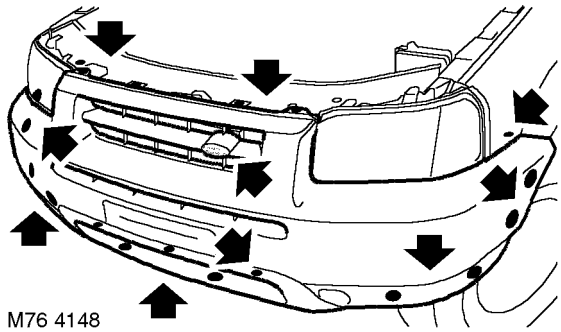
1. Fit bonnet release cable through bulkhead.
2. Position bonnet release lever and connect bonnet release cable to lever.
3. Fit release lever to 'A' post and tighten bolt to 9 Nm (7 lbf.ft).
4. Fit bonnet release cable grommet to bulkhead.
5. Position bonnet release cable to main harness and secure with cable ties.
6. Fit sound insulation to bulkhead.
7. Tie draw string to end of bonnet release cable.
8. Pull draw string to fit bonnet release cable through bonnet locking platform.
9. Untie draw string from bonnet release cable.
10. Fit bonnet lock.
11. Close bonnet and check for correct locking operation.

Bumper - assembly - front

76.22.72

Remove

1. Open bonnet.


M76 4148

2. Remove 8 screws securing wheel arch liners to bumper, release liners from wheelarch for access.
3. Remove 2 screws securing bumper valance to underbelly panel brackets.
4. Remove 3 scrivets securing bumper to armature.
5. Remove 2 bolts securing rear edge of front bumper to inner front wing.
6. Remove 4 screws securing bumper to bonnet locking platform.
7. **NAS Models:** Release side repeater, disconnect multiplug and remove repeater.
8. With assistance carefully lift and pull forward each side of bumper to release bumper side mounts and clips.

   CAUTION: Always protect paintwork when removing or refitting any body trims or bumpers.

9. Remove front number plate.
10. Remove badge from grill and discard clips.

Refit

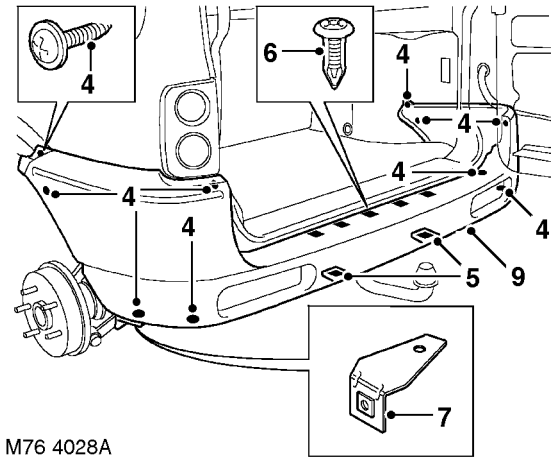
1. Fit badge to grill.
2. Fit number plate.
3. With assistance, fit bumper assembly to body.
4. **NAS Models:** Feed side repeater harness through bumper, connect multiplug and fit repeater.
5. Ensure bumper locating pegs are correctly aligned.
6. Fit and tighten bolts securing bumper to wings.
7. Fit screws securing bumper to bonnet locking platform.
8. Fit scrivets to armature.
9. Fit screws securing bumper to underbelly panel.
10. Fit and align wheelarch liners and tighten screws.
11. Close bonnet.

Bumper valance - rear

76.22.74

Remove

1. Remove rear mud flaps.
   EXTERIOR FITTINGS, REPAIRS, Mud flap - rear.
2. Remove both rear tail lamps.
   LIGHTING, REPAIRS, Lamp assembly - tail.
3. Remove rear wheel arch extensions.
   EXTERIOR FITTINGS, REPAIRS, Wheelarch extension - rear wing part.



M76 4028A

4. Remove 10 screws securing bumper valance to body.
5. Remove 2 nuts and bolts securing bumper valance to armature.
6. Remove 5 scrivets securing bumper valance to body.
7. Remove 2 mud flap brackets.
8. **NAS Models:** Release side repeater, disconnect multiplug and remove repeater.
9. With assistance remove bumper valance.

Refit

1. With assistance fit bumper valance and secure with scrivets, screws, nuts and bolts.
2. **NAS Models:** Feed side repeater harness through bumper, connect multiplug and fit repeater.
3. Fit mud flap brackets and secure with screws.
4. Fit rear wheel arch extensions.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wheelarch extension - rear wing part.**
5. Fit both rear tail lamps.
   ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
6. Fit rear mud flaps.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Mud flap - rear.**

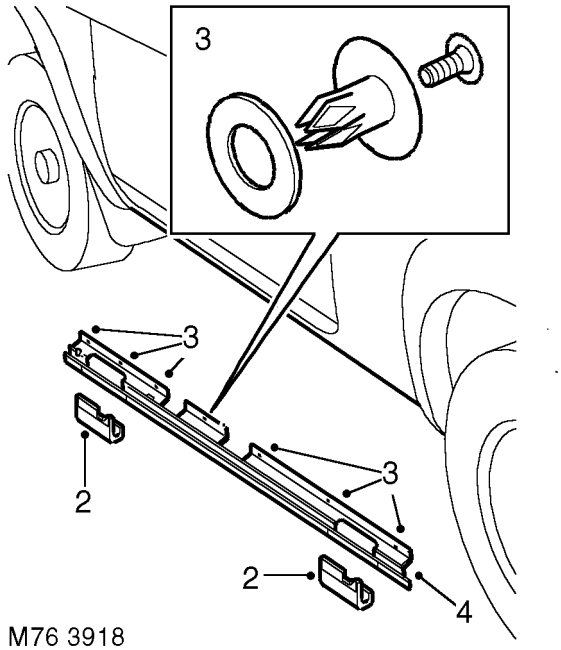
Finisher - sill - lower

76.43.28

Remove

1. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.



M76 3918

2. Remove both jacking point covers.
3. Remove 7 scrivets securing sill finisher to body.
4. Release and remove finisher from sill.

Refit

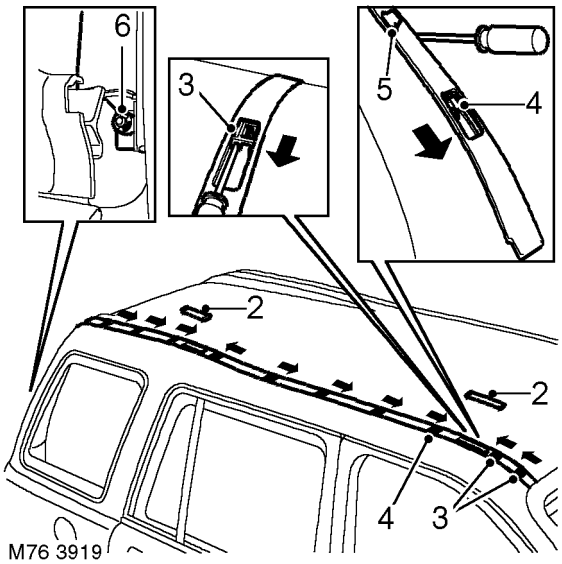
1. Clean mating faces of finisher.
2. Position finisher to sill, locate over jacking points and secure with scrivets.
3. Fit jacking point covers.
4. Remove stands and lower vehicle.

Moulding - roof - 5 door

76.43.68

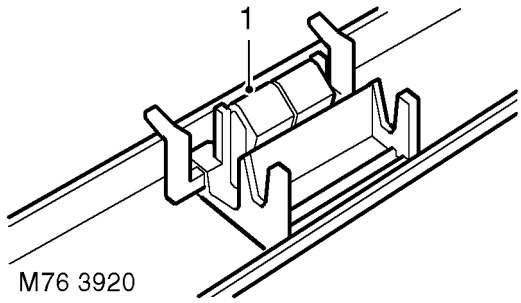
Remove

1. Remove tail door glass side finisher.
   DOORS, REPAIRS, Finisher - rear screen - side - 5 door.



2. Remove roof finisher caps or roof rack side rail.
   EXTERIOR FITTINGS, REPAIRS, Side rail - integral roof rack - 5 door.
3. Using a suitable hooked tool in the front foot hole of the roof finisher, slide the finishers 2 forward clips rearward from the roof channel.
4. Slide the clip rear of the foot hole forward from the roof channel.
5. Slide the remaining 7 clips from the roof channel.
6. Remove nut securing rear end of roof finisher and remove finisher.
7. Remove clips from roof finisher.

Refit



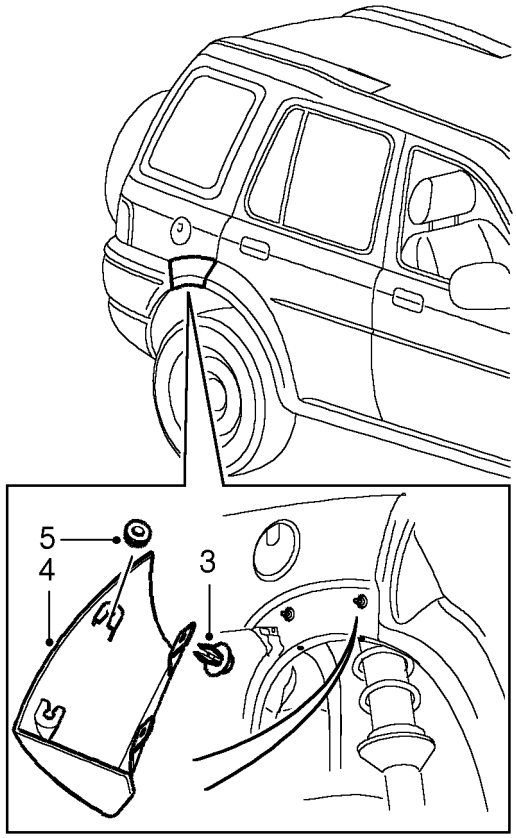
1. Fit clips to roof finisher.
2. Fit finisher to roof channel with forward 2 clips.
3. Slide finisher to align with screen. Feed forward clip below screen seal.
4. Fit remaining clips to roof channel.
5. Fit nut and secure rear end of finisher.
6. Ensure full length of finisher is correctly seated in roof channel.
7. Fit roof finisher caps or roof rack side rail.
   EXTERIOR FITTINGS, REPAIRS, Side rail - integral roof rack - 5 door.
8. Fit tail door glass side finisher.
   DOORS, REPAIRS, Finisher - rear screen - side - 5 door.

Wheelarch extension - rear wing part

76.43.94

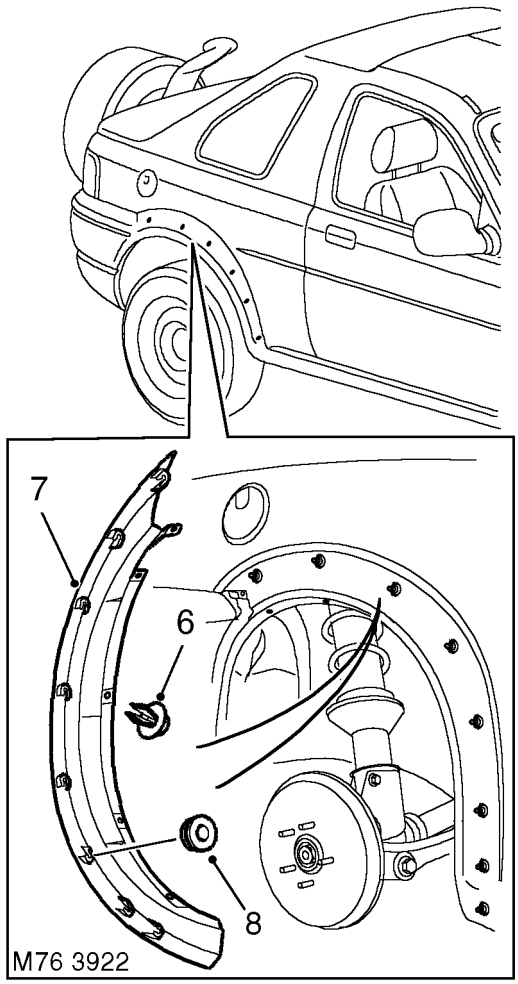
Remove

1. Raise rear of vehicle.
2. Remove road wheel(s).



M76 3921

3. **5 door models:**Remove 2 scrivets securing extension to edge of wheel arch.
4. **5 door models:** Remove wheel arch extension from 2 fixing studs.
5. **5 door models:** Remove fasteners from arch extension.



6. **3 door models:** Remove 6 scrivets securing extension to edge of wheel arch and sill panel.
7. **3 door models:** Remove wheel arch extension from 8 fixing studs.
8. **3 door models:** Remove fasteners from arch extension.

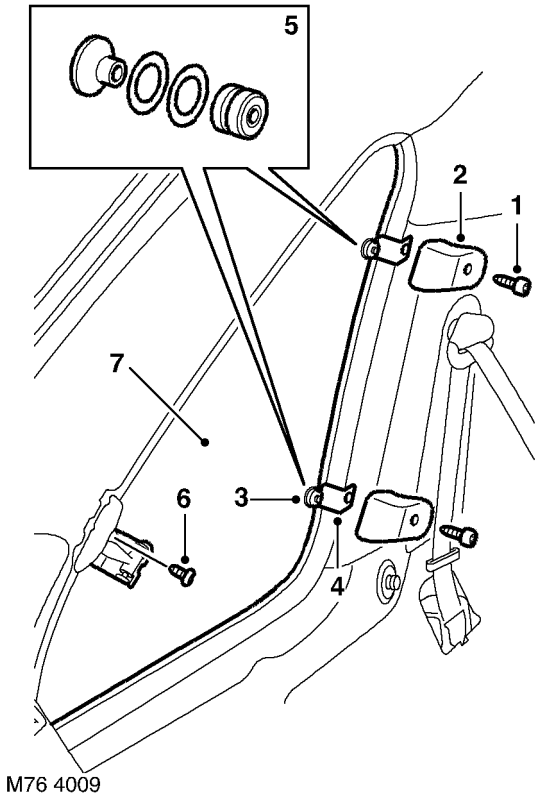
Refit

1. Fit fasteners to wheel arch extension.
2. Fit wheel arch extension to studs.
3. Fit scrivets securing extension to wheel arch.
4. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
5. Remove stands and lower vehicle.

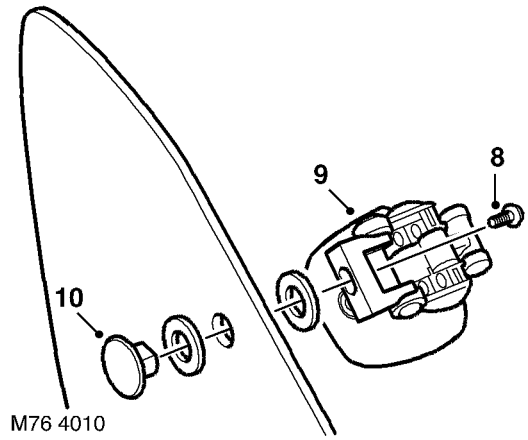
Body quarter vent assembly - 3 door

76.81.24

Remove



1. Remove 2 Torx screws securing vent hinge covers.
2. Remove covers from hinges.
3. Remove 2 screws securing hinges to vent.
4. Remove hinges from vent.
5. Remove nuts from vent and discard sealing washers.
6. With assistance remove screw securing vent catch to body.
7. Remove vent.



8. Remove screw securing catch to vent.
9. Remove catch from vent.
10. Remove nut from vent and discard sealing washers.

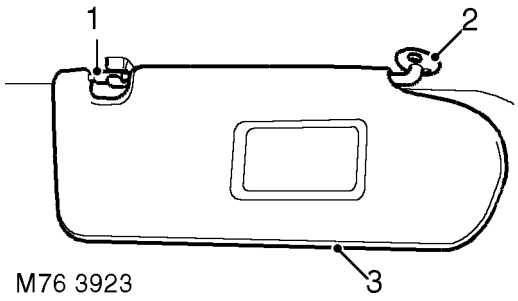
Refit

1. Fit nut and new sealing washer to vent.
2. Fit catch and tighten screw.
3. With assistance fit vent and tighten catch screw.
4. Using new sealing washers fit nuts and hinges to vent. Fit and tighten hinge screws to vent.
5. Fit hinge covers and tighten Torx screws.

Sun visor

76.10.47

Remove



M76 3923

1. Release sun visor from retaining clip.
2. Remove 2 screws securing sun visor to roof.
3. Disconnect multiplug from sun visor.
4. Remove sun visor.
5. Remove screw securing sun visor clip to roof and remove clip.

Refit

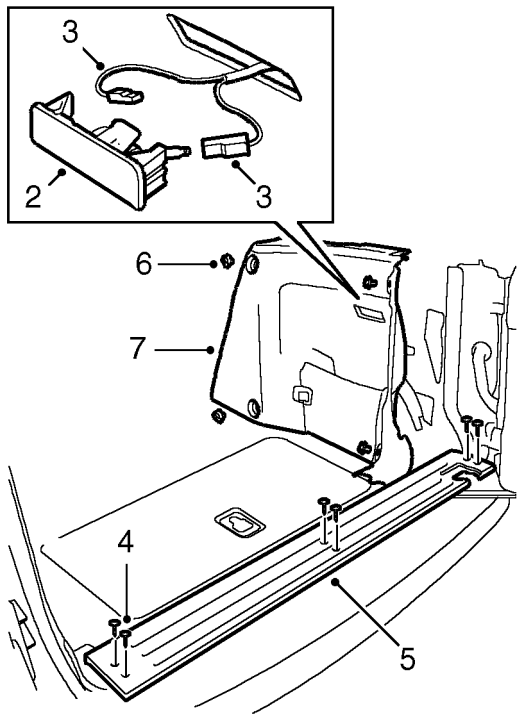
1. Fit sun visor clip to roof and secure with screw.
2. Fit sun visor to roof and secure with screws.
3. Fit sun visor to clip.
4. Position sun visor and connect multiplug.

Trim casing - rear quarter - lower - 3 door

76.13.12

Remove

1. Release rear seat squab and fold seat forward.



M76 3925

2. Release load space lamp from trim casing.
3. Disconnect 2 Lucars and remove load space lamp.
4. Remove 6 Torx screws securing luggage compartment carpet retainer.
5. Remove carpet retainer.
6. Release 4 turn buckles securing trim casing.
7. Release and remove trim casing from luggage compartment.

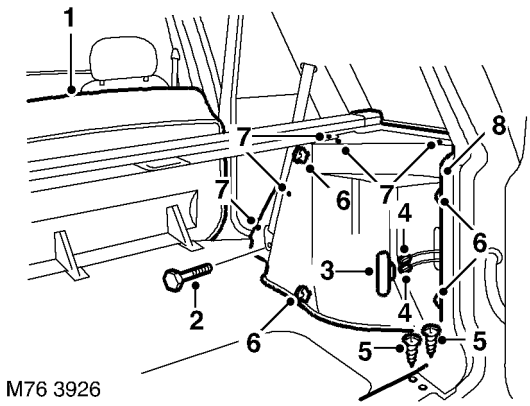
Refit

1. Fit trim casing to luggage compartment and secure with turn buckles.
2. Fit luggage compartment carpet retainer and secure with Torx screws.
3. Position load space lamp to casing, connect Lucars and secure lamp to casing.
4. Reposition rear seat.

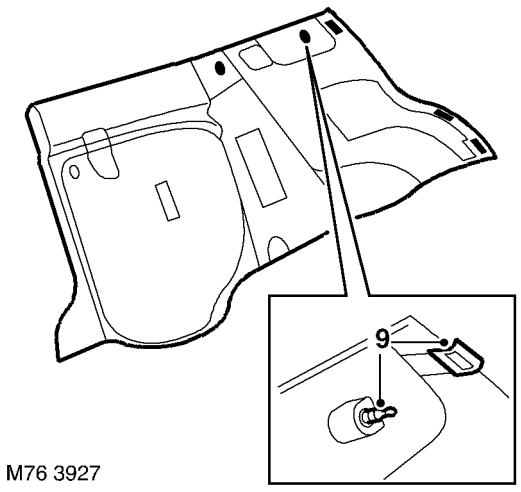
Trim casing - rear quarter - lower - 5 door

76.13.12

Remove



1. Release rear seat squab and fold seat forward.
2. Remove Torx bolt securing rear seat belt lower fixing to body and position seat belt aside.
3. Release load space lamp from trim casing.
4. Disconnect 2 Lucars and remove load space lamp.
5. Remove 2 screws securing casing to load space carpet retainer.
6. Release 4 turn buckles securing trim casing.
7. Release trim casing from 5 retaining clips.
8. Remove loadspace side trim casing.



9. Remove 5 retaining clips from trim casing.

Refit

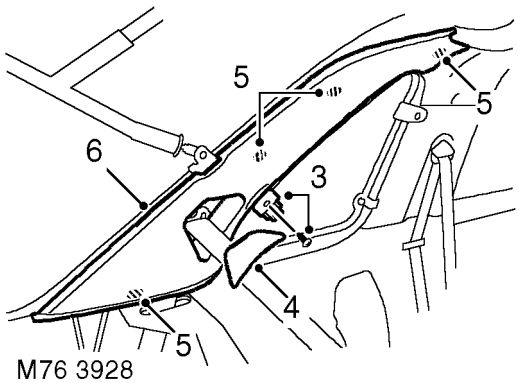
1. Fit retaining clips to casing.
2. Position casing in loadspace, locate and secure retaining clips.
3. Fit turn buckles.
4. Fit screws securing casing to carpet retainer.
5. Position load space lamp to casing, connect Lucars and secure lamp to casing.
6. Position loadspace cover retainer and secure with screw.
7. Fit loadspace cover and secure in retainers.
8. Position rear seat belt and tighten bolt to 40 Nm (29 lbf.ft).
9. Reposition rear seats.

Trim casing - rear quarter - upper - 3 door

76.13.13

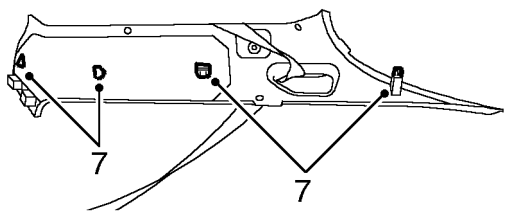
Remove

1. Remove rear quarter lower casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.
2. Remove body rear side casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.



M76 3928

3. Remove screw and release rear vent catch.
4. Remove seat belt access cover from upper casing.
5. Release 4 clips securing upper casing to body and remove casing.



M76 3929

6. Remove 4 retaining clips from trim casing.

Refit

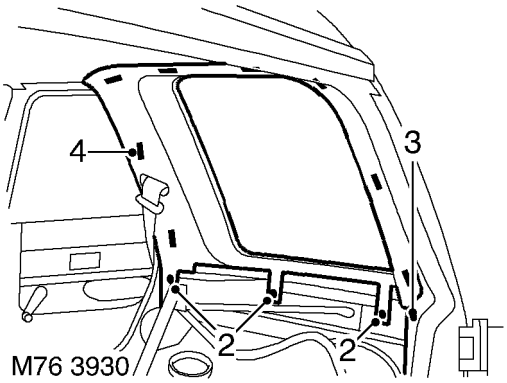
1. Fit retaining clips to casing.
2. Position trim casing, align seat belt and secure casing retaining clips.
3. Fit seat belt access cover.
4. Position rear vent sealing rubber to trim casing.
5. Position rear vent catch and tighten screw.
6. Fit body rear side trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.
7. Fit rear quarter lower casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.

Trim casing - rear quarter - upper - 5 door

76.13.13

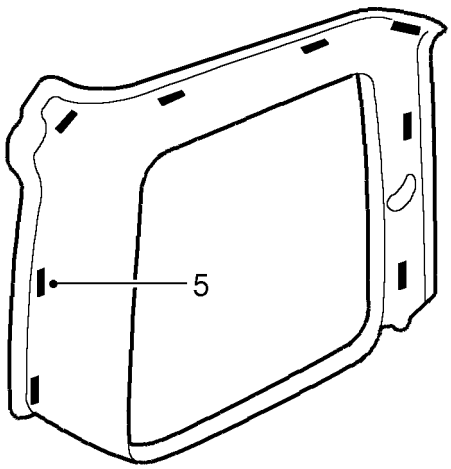
Remove

1. Remove rear quarter lower casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.



M76 3930

2. Remove 3 screws securing upper casing to body.
3. Remove retainer from tail door seal.
4. Release trim casing from 8 retaining clips.



M76 3931

5. Remove upper casing from loadspace.
6. Remove 8 retaining clips from casing.

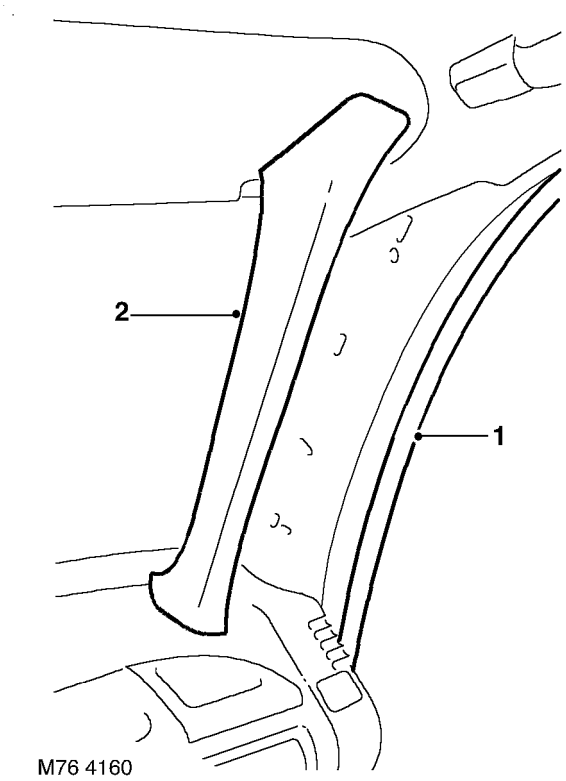
Refit

1. Fit retaining clips to casing.
2. Position casing in loadspace, locate and secure retaining clips.
3. Fit retainer to tail door seal.
4. Fit screws securing bottom of casing.
5. Fit rear quarter lower casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.

Trim finisher - 'A' post - upper - renew

76.13.26

Remove



1. Release seal from door aperture.
2. Release 4 clips and remove 'A' post finisher.
3. Remove clips from finisher.

Refit

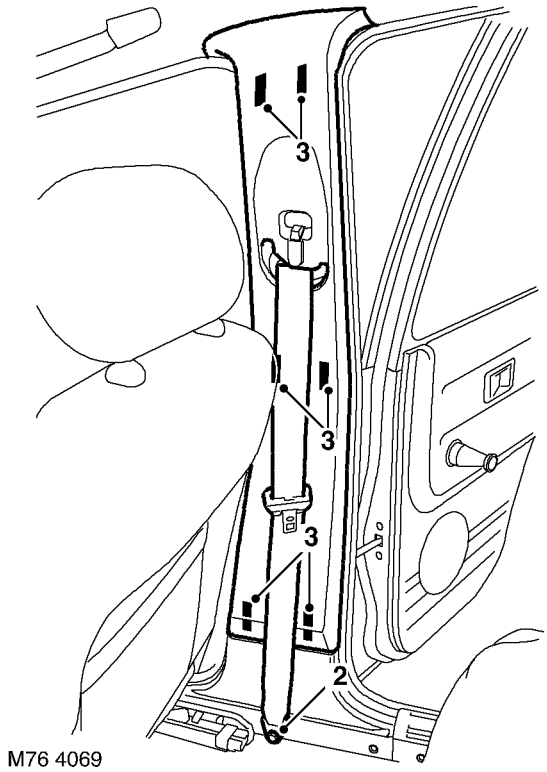
1. Fit clips to 'A' post finisher.
2. Fit finisher to 'A' post and secure with clips.
3. Fit seal to door aperture.

Trim finisher - 'B/C' post - upper - renew

76.13.28

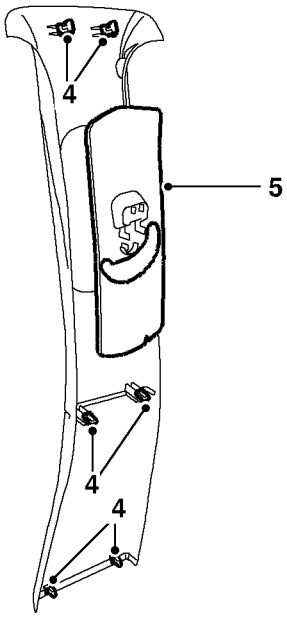
Remove

1. Remove seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.



2. Remove Torx bolt securing rear seat belt lower fixing to body and position seat belt aside.
3. Release finisher from 6 retaining clips and remove finisher.

   NOTE: Do not carry out further dismantling if component is removed for access only.



M76 4070

4. Remove 6 retaining clips from finisher.
5. Remove seat belt slide.

Refit

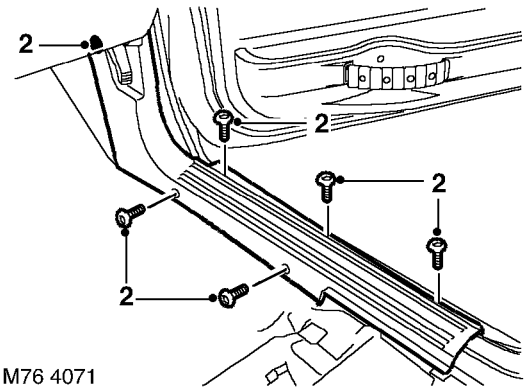
1. Fit seat belt slide to finisher.
2. Fit retaining clips to finisher.
3. Position finisher and engage retaining clips.
4. Position seat belt lower mounting, fit Torx bolt and tighten to 40 Nm (29 lbf.ft).
5. Fit seat base finisher.
   ☞ **SEATS, REPAIRS, Finisher - seat base - front - each.**

Trim finisher - 'B' post - lower - 5 door

76.13.29

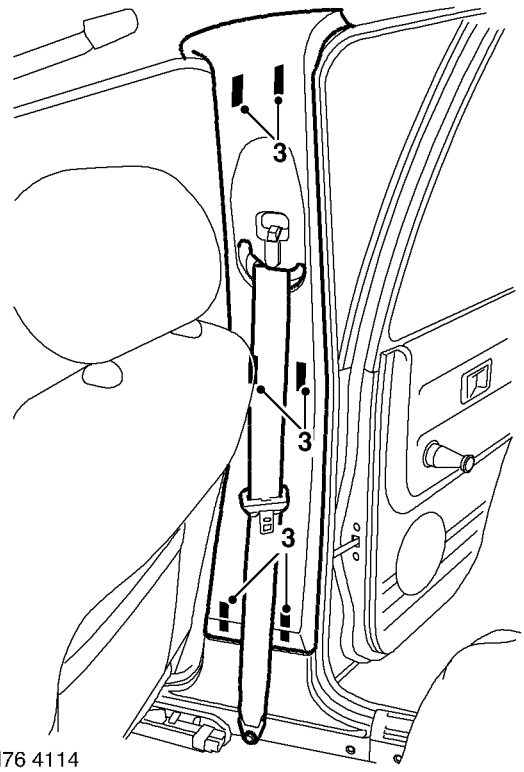
Remove

1. Remove front seat cushion side finisher.
   ☞ **SEATS, REPAIRS, Finisher - cushion side - front seat.**



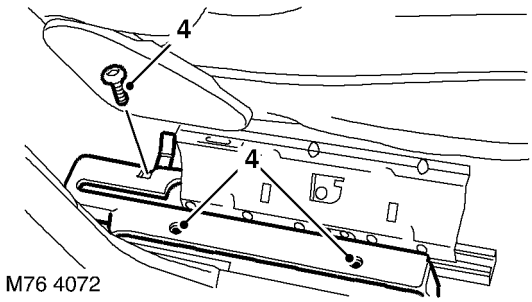
M76 4071

2. Remove scrivet and 5 Torx screws securing front carpet retainer and remove carpet retainer.

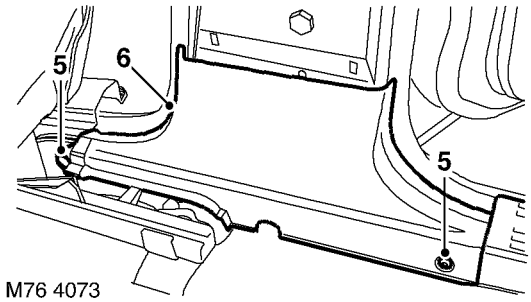


M76 4114

3. Release 'B/C' post upper finisher.



4. Remove 3 Torx screws from top of seat base finisher.



5. Remove scrivet and Torx screw from 'B/C' post lower finisher.
6. Release and remove 'B/C' post lower finisher from seat base finisher.

Refit

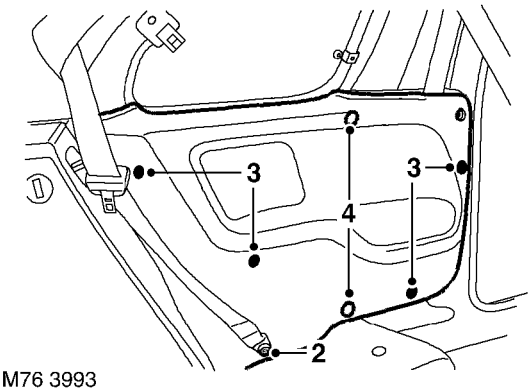
1. Locate 'B/C' post lower finisher under seat base finisher and rear carpet retainer.
2. Fit scrivet and Torx screw to 'B/C' post lower finisher.
3. Fit Torx screws to seat base finisher.
4. Align and secure 'B/C' post upper finisher.
5. Fit front seat cushion side finisher.
   SEATS, REPAIRS, Finisher - cushion side - front seat.
6. Fit carpet retainer and secure with Torx screws and scrivet.

Trim casing - body side - rear - LH

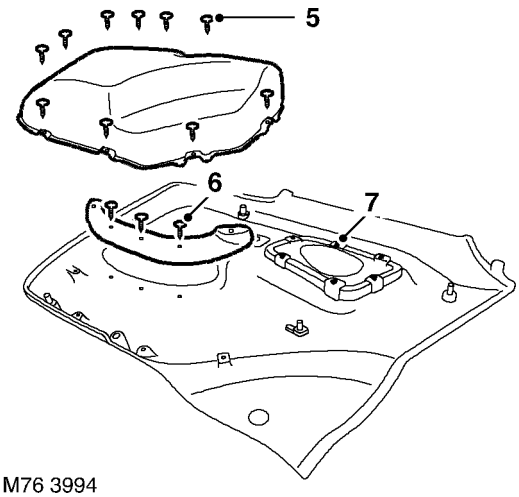
76.13.57

Remove

1. Remove rear seat.
   SEATS, REPAIRS, Rear seat - RH.



2. Remove Torx bolt securing rear seat belt lower fixing to body and position seat belt aside.
3. Remove 4 Torx bolts securing trim casing to body.
4. Release 2 trim clips and remove trim casing.



5. Noting the position of the 3 long screws, remove 10 Torx screws and remove pocket from trim casing.
6. Remove 3 screws securing pocket finisher to trim casing and remove finisher.
7. Release 6 tags and remove speaker grille.

Refit

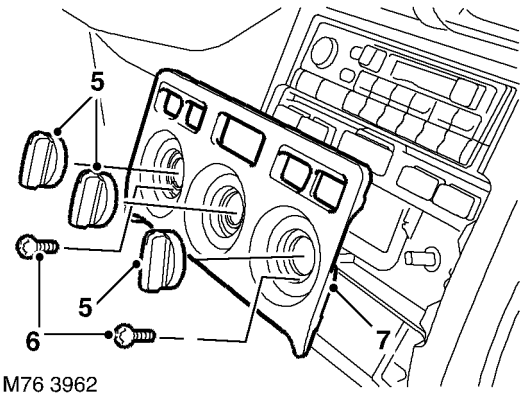
1. Position speaker grille on replacement casing and secure tags.
2. Fit pocket finisher and secure with screws.
3. Fit pocket and secure with Torx screws.
4. Fit trim clips to trim casing.
5. Fit trim casing to body and secure with clips and Torx screws.
6. Fit seat belt lower fixing and tighten Torx bolt to 50 Nm (37 lbf.ft).
7. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - RH.**

Console - front

⊸ ***76.25.01***

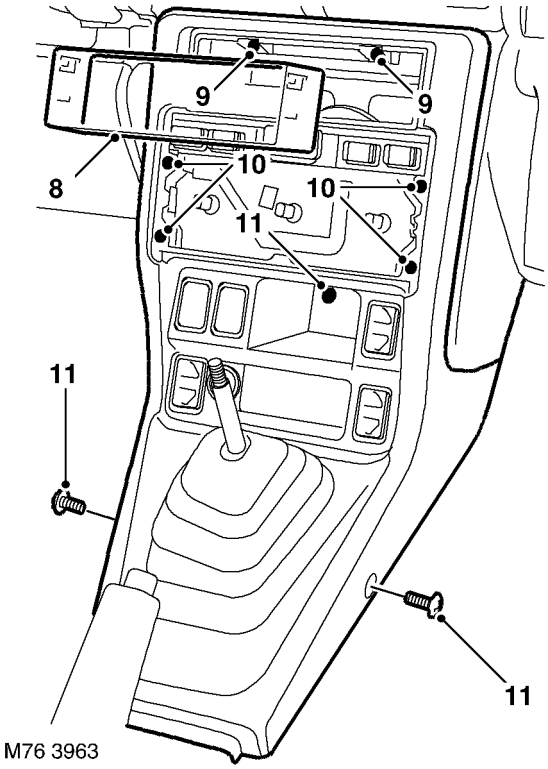
Remove

1. Remove rear console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**
2. Remove radio.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Radio.**
3. Remove gear lever knob.
4. **Manual gearbox only:** Remove descent selector.

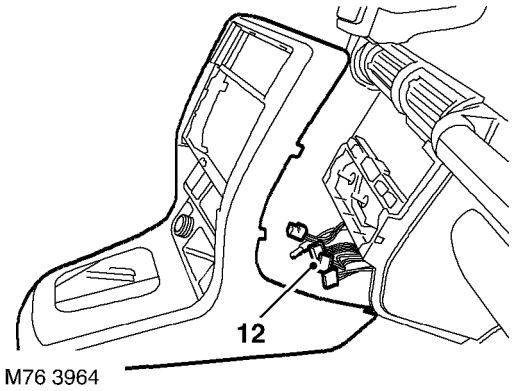


M76 3962

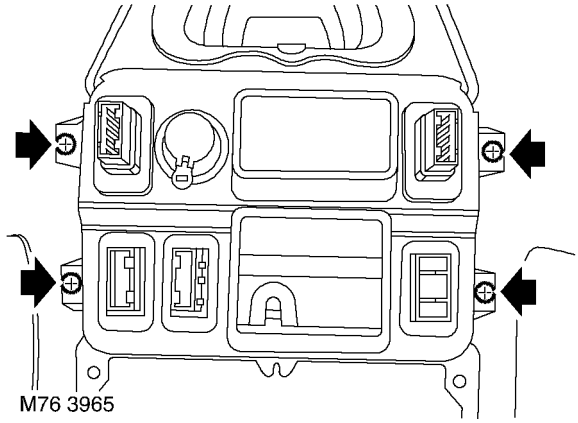
5. Remove 3 heater control knobs.
6. Remove 2 screws from heater control panel.
7. Remove heater control panel.



8. Release tags and remove radio cage.
9. Remove 2 screws from top of console.
10. Remove 4 screws securing heater controls to centre console.
11. Remove 3 screws from centre and sides of console.



12. Disconnect multiplugs and bulb holder from switch pack.
13. **Automatic gearbox only:** Disconnect multiplugs from gear selector.



14. Remove centre console.
15. Remove 4 screws from switch pack assembly and remove assembly.

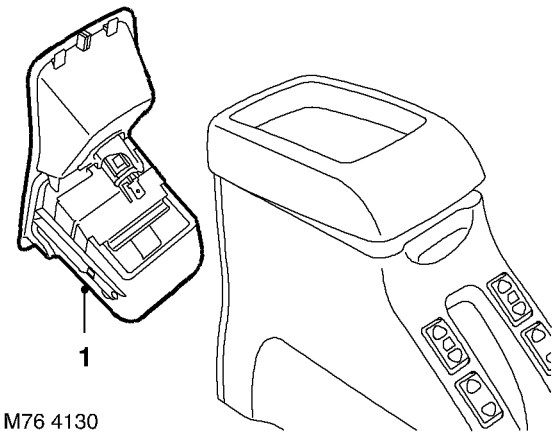
Refit

1. Position switch pack assembly, fit and tighten screws.
2. Position console to fascia.
3. Connect multiplugs and bulb holder to switch pack.
4. **Automatic gearbox only:** Connect multiplugs to gear selector.
5. Fit centre console.
6. Fit and tighten screws securing centre and sides to console.
7. Fit and tighten screws securing switch pack to console.
8. Fit and tighten screws to top of console.
9. Position radio cage to console and secure with retaining tags.
10. Position heater control panel, fit and tighten screws.
11. Fit heater control knobs.
12. **Manual gearbox only:** Fit descent selector.
13. Fit gear lever knob.
14. Fit radio.
☞ **IN CAR ENTERTAINMENT, REPAIRS, Radio.**
15. Fit rear console.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.**

Console - rear

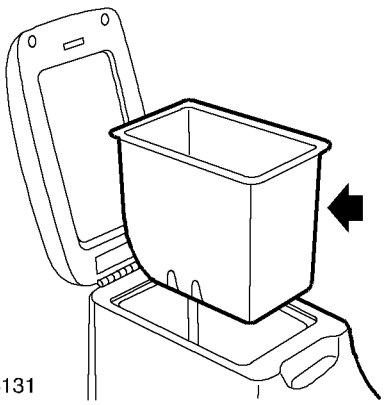
76.25.04

Remove

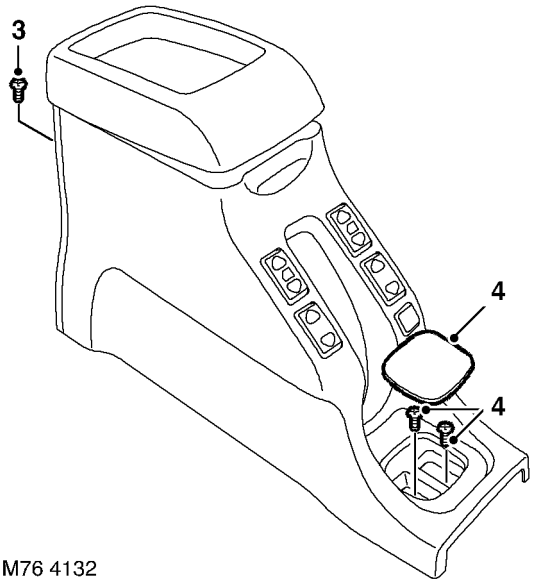


M76 4130

1. Release rear ash tray panel from rear console, disconnect multiplug from power socket and remove panel.

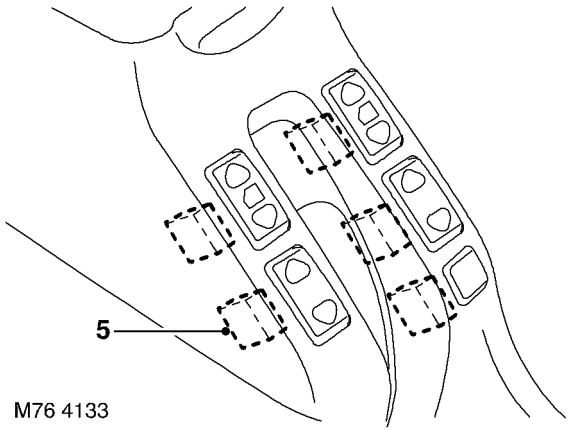

M76 4131

2. Remove oddments tray liner, raise cubby box lid and remove cubby box.



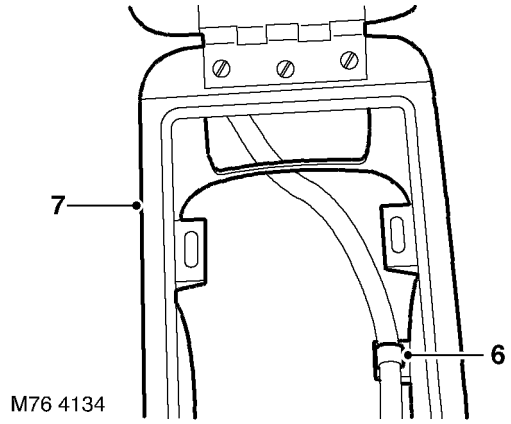
M76 4132

3. Remove 2 screws securing rear of console.
4. Remove screw cover and remove 2 screws securing front of console.

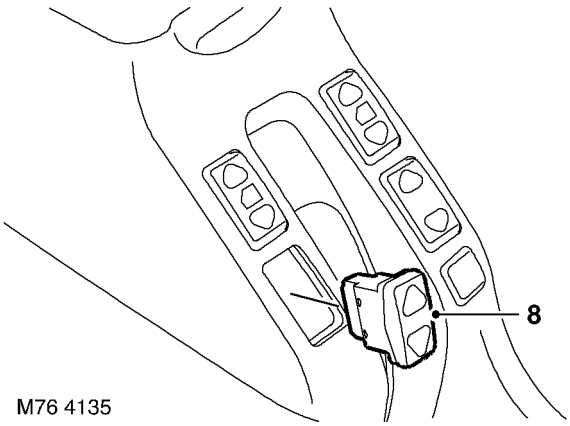


M76 4133

5. Disconnect multiplugs from window lift switches and if fitted, rear window isolator switch.



6. Release clip securing harness to centre console.
7. Remove rear console.



8. Remove switches from rear console.

Refit

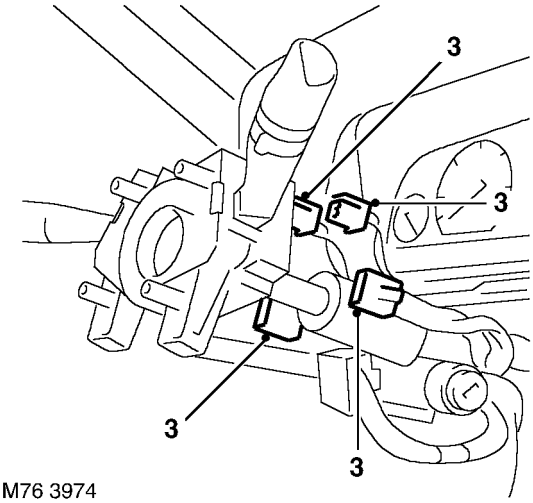
1. Fit switches to console.
2. Position rear console and connect multiplugs.
3. Fit harness clip to centre console.
4. Align console, fit screws and screw cover.
5. Fit cubby box and oddments tray mat.
6. Position rear ash tray panel, connect multiplug and secure ash tray panel to console.

Fascia

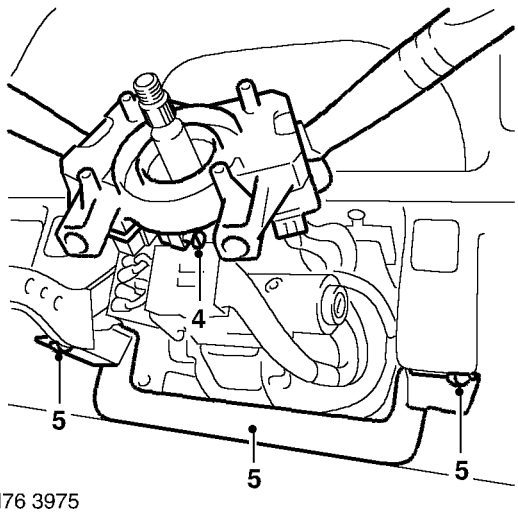
76.46.23

Remove

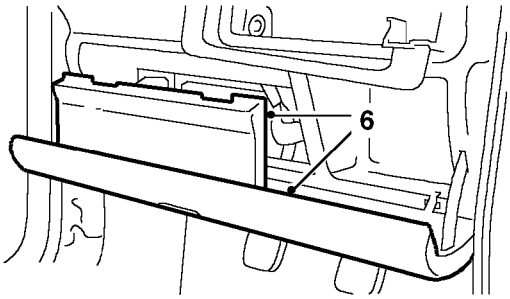
1. Remove front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.
2. Remove rotary coupler.
   RESTRAINT SYSTEMS, REPAIRS, Rotary coupler - (SRS) air bag system.



3. Disconnect 4 multiplugs from wiper/indicator switch.

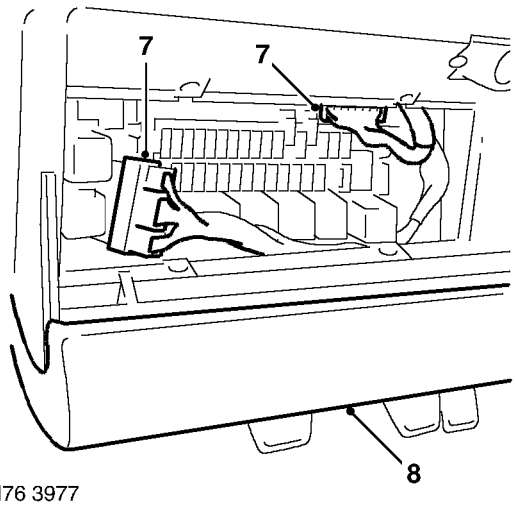


4. Loosen clamping screw and remove wiper/indicator switch.
5. Remove 2 screws from steering column lower finisher and remove finisher.



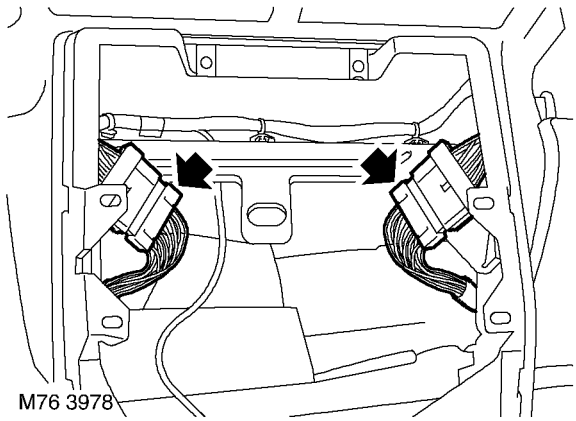
M76 3976

6. Open drivers glove box lid and remove fuse box cover.



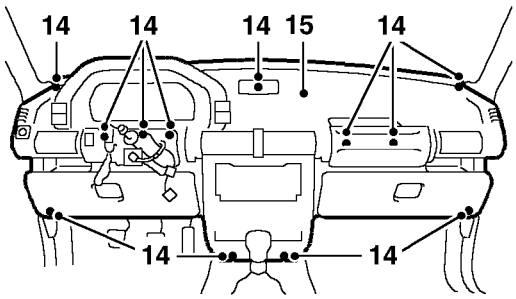
M76 3977

7. Disconnect 2 multiplugs from fusebox.
8. Close glove box.
9. Remove clock.
☞ **INSTRUMENTS, REPAIRS, Clock.**
10. Remove both 'A' post upper trim finishers.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
11. Models without passenger airbag: Remove fascia stowage box.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Stowage box - fascia.**
12. Models with passenger airbag: Remove passenger airbag.
☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - fascia - passenger.**



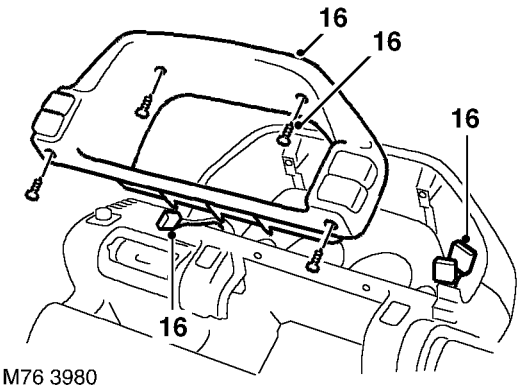
M76 3978

13. Disconnect 2 main harness to fascia harness multiplugs.



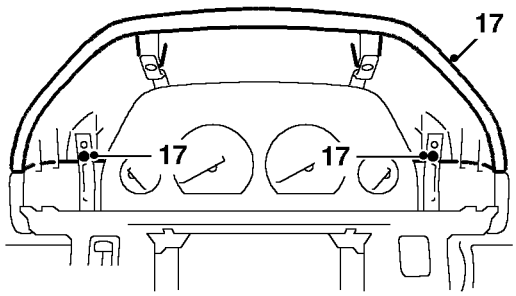
M76 3979

14. Remove 12 bolts securing fascia.
15. With assistance remove fascia.



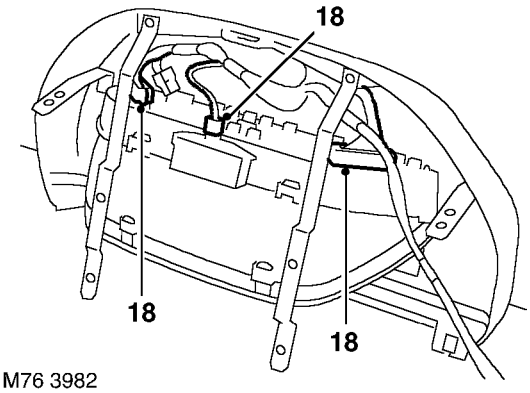
M76 3980

16. Remove 4 screws, disconnect 3 multiplugs from switches, and remove instrument bezel finisher.



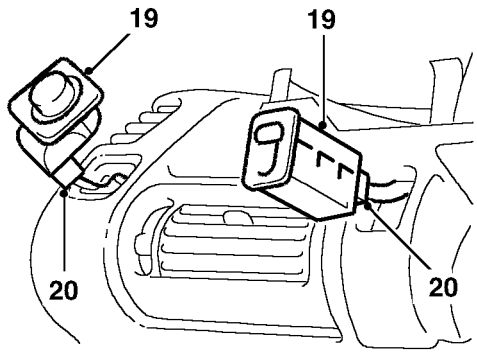
M76 3981

17. Remove 2 screws from instrument upper cover and remove cover.



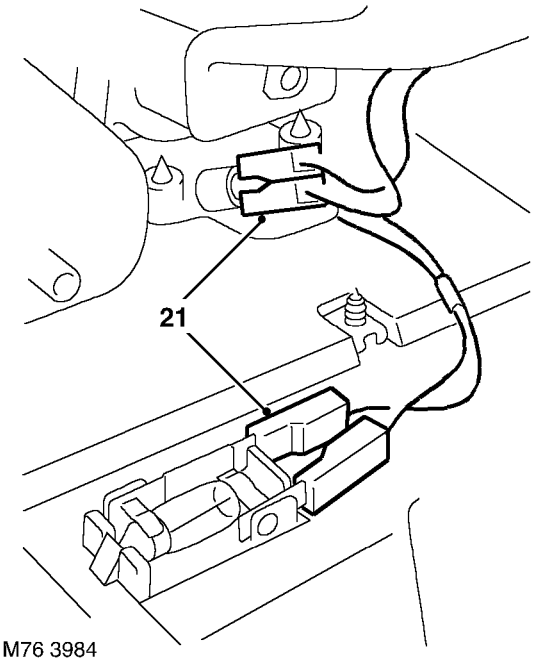
M76 3982

18. Disconnect 3 multiplugs from instrument pack.



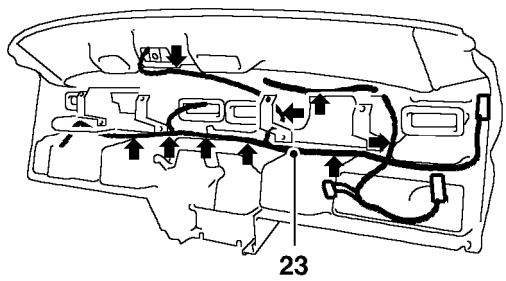
M76 3983

19. Release mirror and headlamp levelling switches.
20. Disconnect multiplugs from mirror switch and headlamp levelling switch.



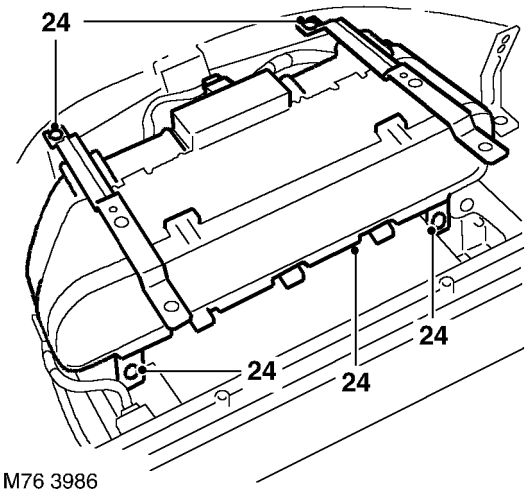
M76 3984

21. Disconnect 4 Lucars from glove box lamp and switch.



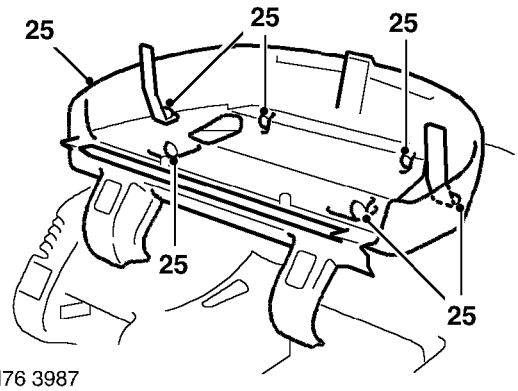
M76 3985

22. Release 9 harness clips.
23. Feed harness through fascia and remove harness.



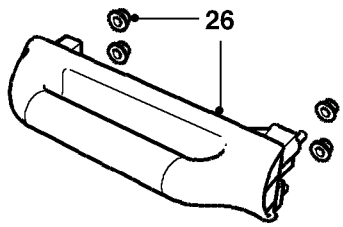
M76 3986

24. Remove 4 screws from instrument pack and remove instrument pack.



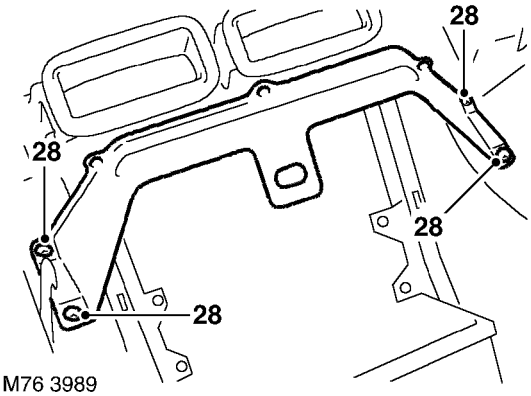
M76 3987

25. Remove 6 screws from instrument pack lower cover and remove cover.



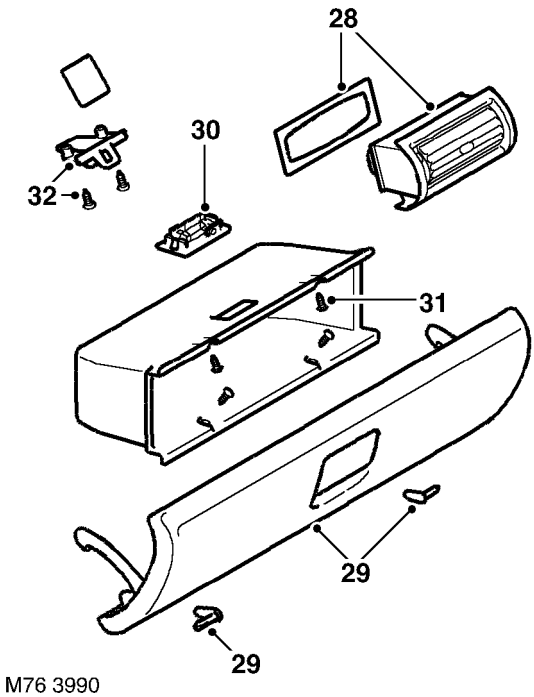
M76 3988

26. Models without passenger airbag: Remove 4 nuts from grab handle and remove handle.



M76 3989

27. Remove 4 screws from centre bracket and remove bracket.



M76 3990

28. Remove 4 face level vents and collect seals.
29. Remove glove box hinge pins and remove glove box lids.
30. Remove glove box lamp and mat.
31. Remove 4 screws from glove box and remove glove box.
32. Remove 2 screws from each glove box lock and remove locks.
33. Remove switch blank.


M76 3995

34. Disconnect multiplug from immobilisation ECU.
35. Remove 2 nuts securing immobilisation ECU to fascia and remove ECU.
36. Remove fascia and coin tray mats.

Refit

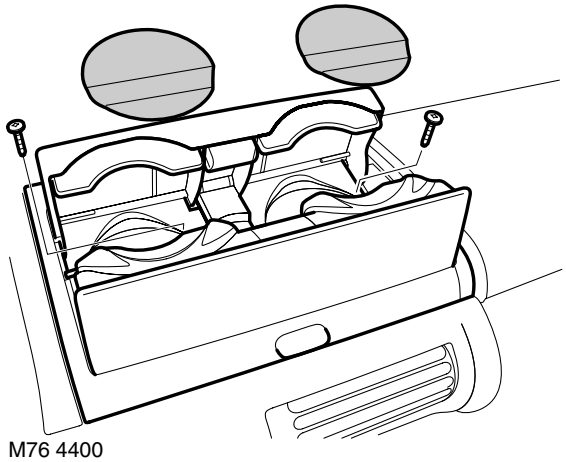
1. Fit fascia and coin tray mats.
2. Fit immobilisation ECU to fascia and secure with nuts.
3. Connect multiplug to immobilisation ECU.
4. Fit switch blank.
5. Fit glove box locks to fascia and secure with screws.
6. Fit glove box and secure with screws.
7. Fit glove box lamp and mat.
8. Fit glove box lids and secure hinge pins.
9. Fit face level vents and seals to fascia.
10. Fit centre bracket and secure with screws.
11. **Models without passenger airbag:** Fit grab handle and secure with nuts.
12. Fit instrument pack lower cover and secure with screws.
13. Fit instrument pack to fascia and secure with screws.
14. Fit fascia harness to fascia and secure with clips.
15. Connect Lucars to glove box lamp and switch.
16. Connect multiplugs to mirror switch and headlamp levelling switch.
17. Fit mirror switch and headlamp levelling switch.
18. Connect multiplugs to instrument pack.
19. Fit instrument pack upper cover and secure with screws.
20. Connect multiplugs to switches on instrument bezel finisher, fit bezel and secure with screws.
21. With assistance fit fascia to vehicle and secure with bolts.
22. Connect fascia harness multiplugs to main harness.
23. **Models with passenger airbag:** Fit passenger airbag.
☞ **RESTRAINT SYSTEMS, REPAIRS, Air bag - fascia - passenger.**
24. **Models without passenger airbag:** Fit fascia stowage box.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Stowage box - fascia.**
25. Fit 'A' post upper trim finishers.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
26. Fit clock.
☞ **INSTRUMENTS, REPAIRS, Clock.**
27. Open drivers glove box lid and remove fuse box cover.
28. Connect multiplugs to fusebox.
29. Fit fusebox cover and close glove box lid.
30. Fit steering column lower cover and secure with screws.
31. Fit wiper/indicator switch and tighten clamping screw.
32. Connect multiplugs to wiper/indicator switch.

33. Fit rotary coupler.
☞ **RESTRAINT SYSTEMS, REPAIRS, Rotary coupler - (SRS) air bag system.**
34. Fit front console.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**

Cup holder assembly - fascia

76.46.41

Remove


M76 4400

1. Open cup holder and remove both rubber matts.
2. Remove 2 screws securing cup holder assembly and remove assembly.

Refit

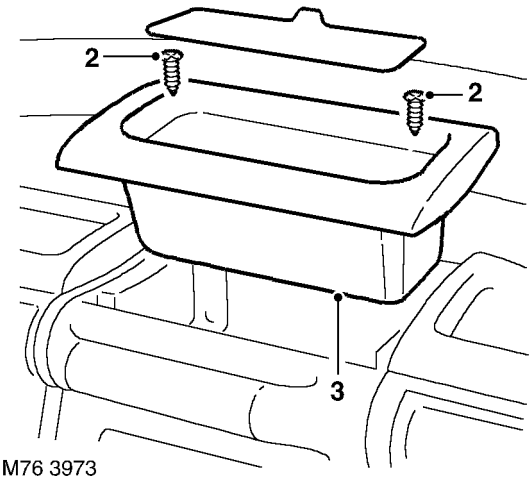
1. Position cup holder assembly and secure with screws.
2. Fit rubber matts and close cup holder.

Stowage box - fascia

76.46.45

Remove

1. Remove mat from stowage box to access screws.



M76 3973

2. Remove 2 screws.
3. Remove stowage box from fascia.

Refit

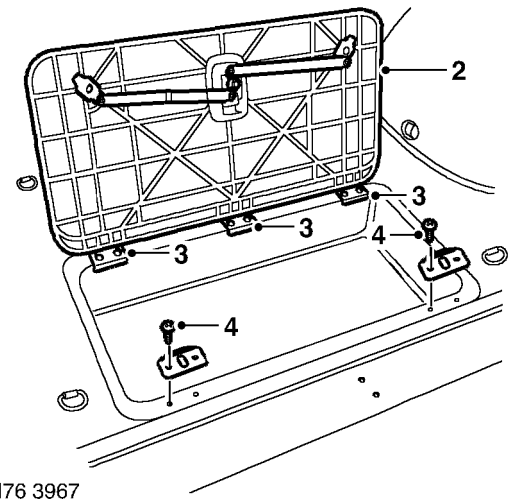
1. Position stowage box and secure with screws.
2. Fit mat to stowage box.

Carpet - luggage compartment

76.49.04

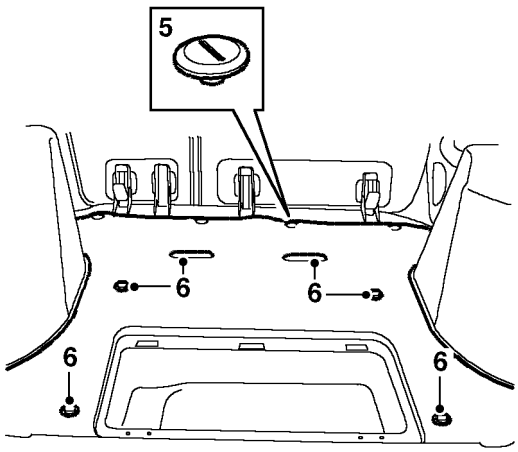
Remove

1. Remove both rear quarter lower trim casings.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.



M76 3967

2. Open lid on security box.
3. Remove 6 screws securing lid to body and remove lid.
4. Remove 4 screws securing lid latch strikers to body and remove strikers.



M76 3968

5. Remove 4 buckles from rear carpet.
6. Release carpet from rear seat strikers and lashing eyes and remove carpet.

Refit

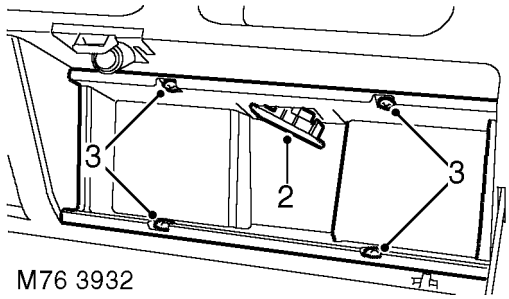
1. Fit rear carpet in loadspace and secure with buckles.
2. Fit lid latch strikers and secure with screws.
3. Fit security box lid and secure with screws.
4. Close security box lid.
5. Fit rear quarter lower trim casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**

Glove box

🔧 ***76.52.03***

Remove

1. Open glove box and remove glove box mat.



M76 3932

2. Release illumination lamp from glove box.
3. Remove 4 screws from glove box and remove glove box.

Refit

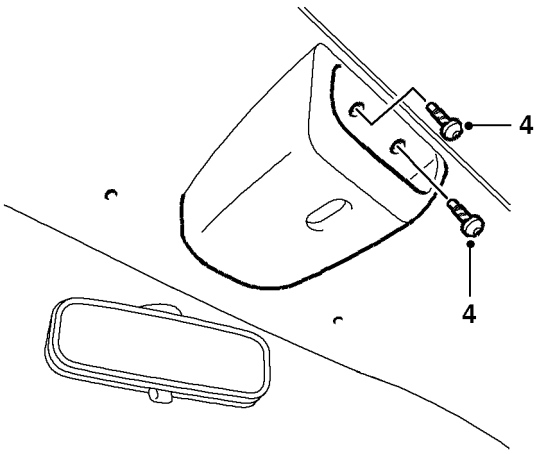
1. Fit glove box and secure with screws.
2. Fit illumination lamp.
3. Fit glove box mat.
4. Close glove box.

Headlining - 3 door

76.64.15

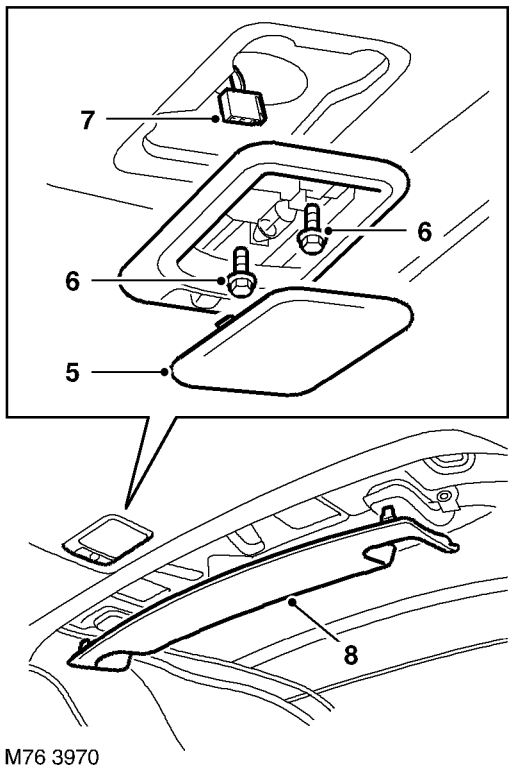
Remove

1. Fold front seat squabs forward.
2. Remove both sun visors.
   INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.
3. Remove both 'A' post upper trim finishers.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.



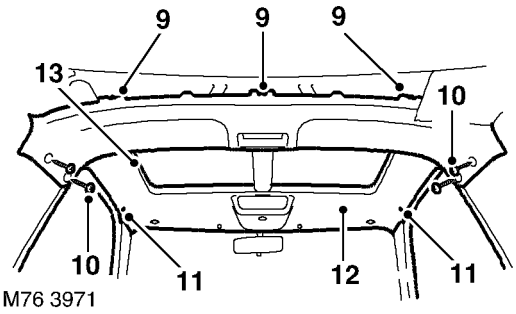
M76 3969

4. Remove 2 screws securing headlining to front end of roof panel.



M76 3970

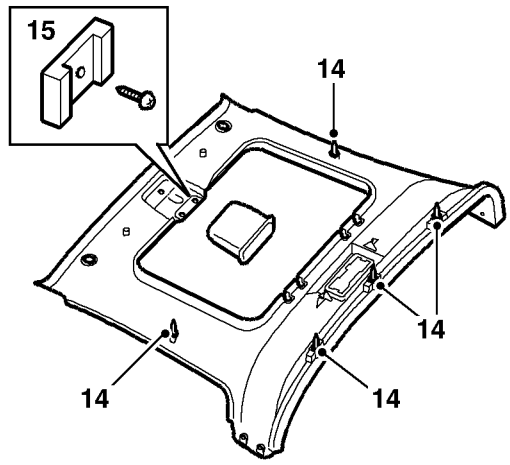
5. Remove roof lamp lens.
6. Remove 2 screws securing roof lamp to body.
7. Disconnect multiplug from roof lamp and remove lamp.
8. Release clips securing headlining rear finisher to body and remove finisher.



M76 3971

9. Release 3 studs securing rear edge of headlining to roof panel.
10. Remove 4 screws securing headlining to 'B' posts.
11. Release 2 studs securing sides of headlining to body.
12. Lower front edge of headlining.

13. Release headlining from sun roof seal and remove headlining.



M76 3972

14. Remove studs from headlining.
15. Remove 3 screws and remove pocket from headlining.

Refit

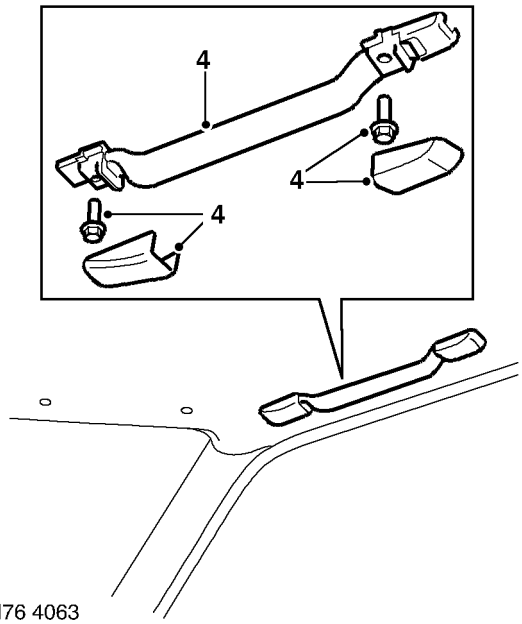
1. Fit pocket to headlining and secure with screws.
2. Fit studs to headlining.
3. Position headlining and secure studs to roof panel.
4. Position headlining to 'B' posts and secure with screws.
5. Secure headlining behind rear vent rubbers.
6. Fit headlining rear finisher and secure clips.
7. Fit headlining to sun roof seal.
8. Position roof lamp and connect multiplug.
9. Fit roof lamp and secure with screws.
10. Fit lens to roof lamp.
11. Fit both sun visors.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.**
12. Fit 'A' post upper finishers.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
13. Reposition front seat squabs.

Headlining - 5 door

76.64.15

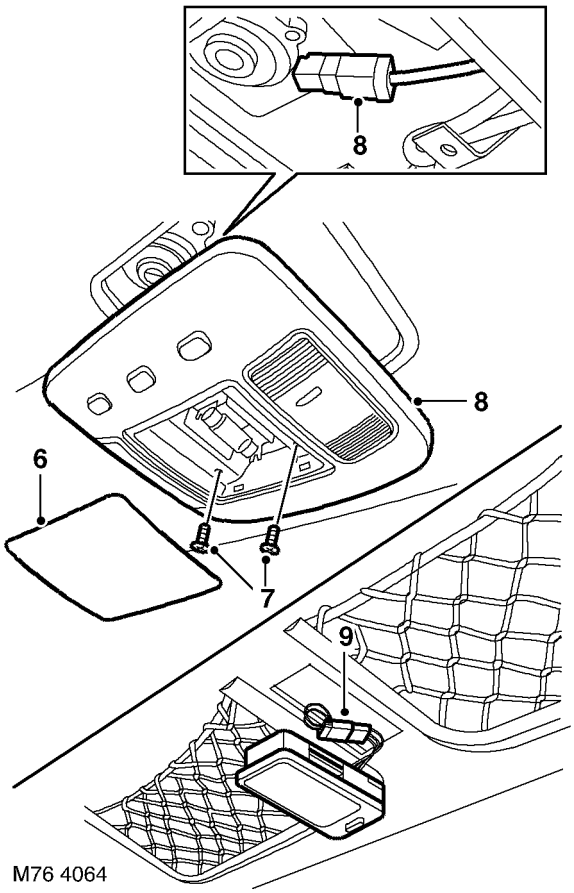
Remove

1. Remove both 'A' post upper trim finishers.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
2. Remove both rear quarter upper trim casings.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**
3. Remove both sun visors.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.**

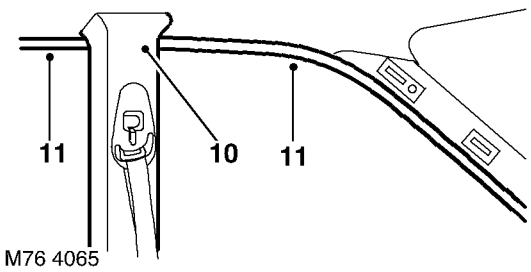


M76 4063

4. Remove screw covers and screws from grab handles and remove handles.
5. Remove grab handle blanking plugs.

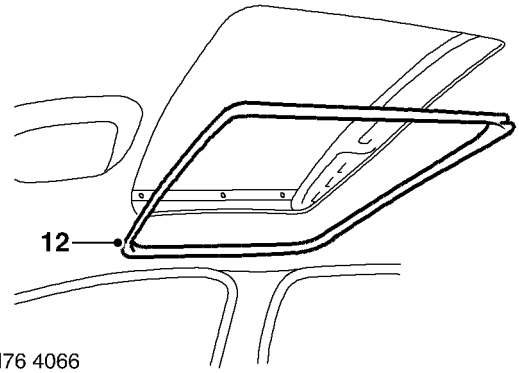


6. Remove lens from front interior lamp.
7. Remove 2 bolts securing front interior lamp to body.
8. Release interior lamp from headlining, disconnect multiplug and remove lamp.
9. Release rear interior lamp from headlining, disconnect multiplug and remove lamp.

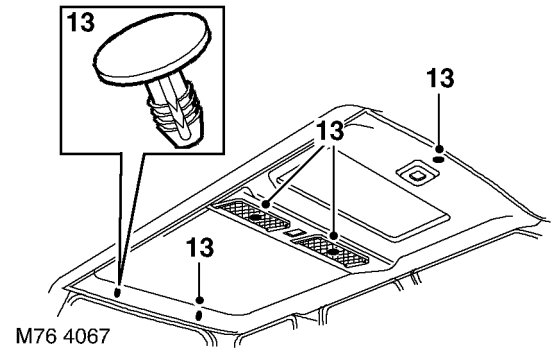


10. Release both 'B/C' post upper finishers and position aside.

11. Release headlining from front and rear door aperture seals.

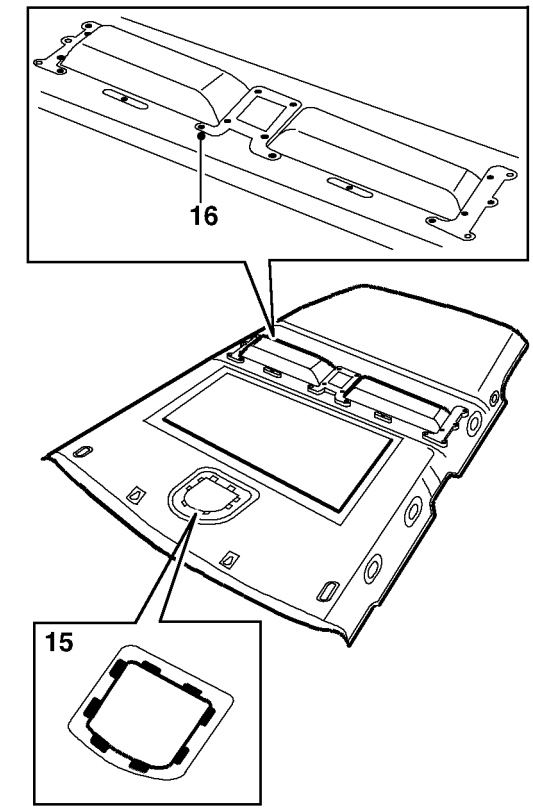


12. **Models with sun roof:** Release and remove sun roof surround finisher from sun roof aperture.



13. Remove 5 retaining studs from headlining.
14. With assistance remove headlining through tail door.

NOTE: Do not carry out further dismantling if component is removed for access only.



M76 4068

15. Release 8 tags securing front roof lamp support and remove support.
16. Remove 14 nuts from stowage pockets, collect backing plates and remove stowage pockets.

Refit

1. Position stowage pockets, and backing plates to headlining and secure with nuts.
2. Position roof lamp support and secure retaining tags.
3. With assistance position headlining and secure with retaining studs.
4. **Models with sun roof:** Position sun roof surround finisher and secure in position.
5. Locate headlining to front and rear door aperture seals.
6. Fit and secure 'B/C' post upper finishers.
7. Position rear interior lamp and connect multiplug.
8. Fit rear interior lamp to headlining.
9. Position front interior lamp and connect multiplug.
10. Fit front interior lamp to headlining and secure with bolts.
11. Fit grab handle blanking plugs.
12. Fit grab handles, tighten screws and fit screw covers.
13. Fit both sun visors.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.**
14. Fit 'A' post upper trim finishers.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
15. Fit rear quarter upper trim casings.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**

Windscreen

76.81.01

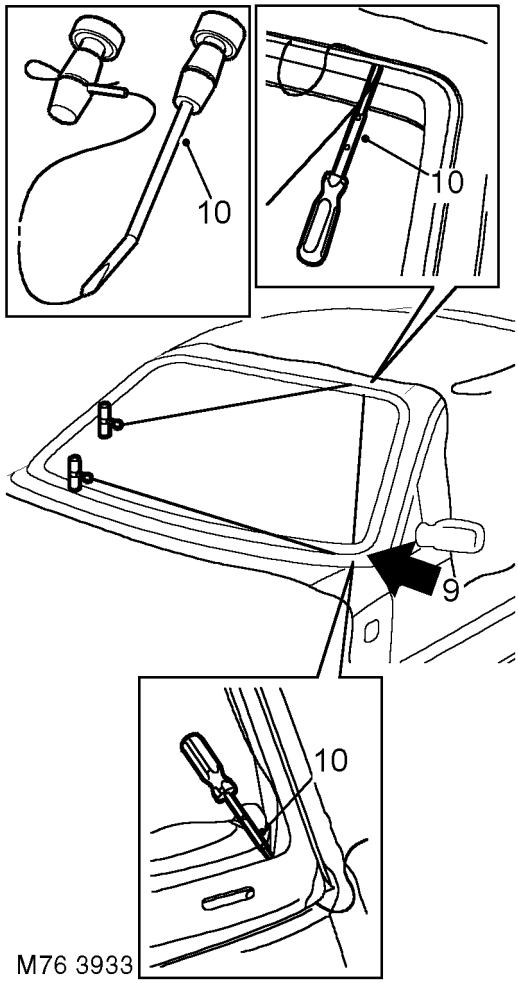
The following equipment is required: Cutting wire and handles, Windscreen repair kit, Sealer applicator gun and Suction cups

Wear protective gloves when handling glass, solvents and primers.

Wear suitable eye protection when removing and refitting glass.

Remove

1. Remove air intake panel.
   ☞ **HEATING AND VENTILATION, REPAIRS, Plenum - air intake.**
2. Remove sun visors and sun visor retaining clips.
3. Remove 'A' post upper trim casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
4. Remove retaining stud from front of headlining.
5. Remove interior mirror.
6. Fit protection to bonnet and areas around screen.
7. Cover heater ducts with masking tape.
8. Cover interior of vehicle with protective sheet.
9. Make knife cut in sealant at bottom of 'A' post.



10. Insert cutting wire through previously made knife cut and fit handles as shown, with approximately 200 mm of wire between handles.
11. Using suitable cutting wire, with assistance if required, carefully cut sealer. Ensure that glass is retained as last sealant is cut.

    If multi-strand cutting wire is used, a sawing action can be used to cut through heavy sealant deposits around corners.

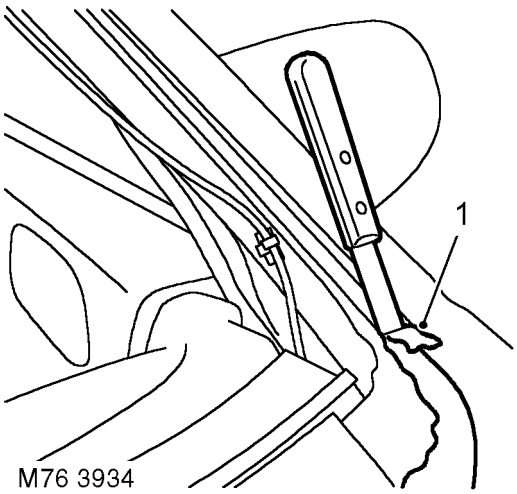
    Use of a sawing action may overheat and break single strand wire.

12. Attach suction cups and use assistance to remove glass from body.

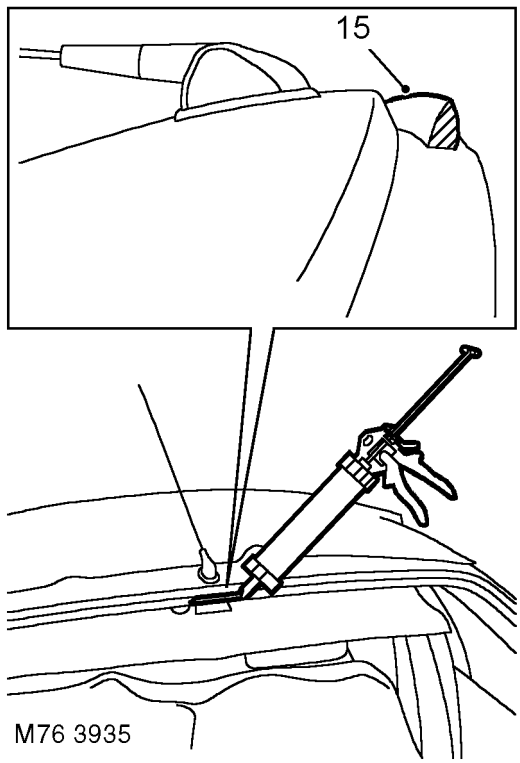
    Lay glass on felt covered supports. Do not stand on edge. Any chipping of glass edge may develop into cracks.

13. Collect screen support blocks.

Refit



1. Carefully remove excess sealer from body leaving a smooth surface.
2. Use a vacuum cleaner to clear away any waste.
3. Original glass: Carefully cut back old sealer to obtain a smooth surface without damaging obscuration band on glass.
4. Fit spacer blocks to body.
5. With assistance, locate screen to body.
6. Apply masking tape reference marks to aid fitment.
7. With assistance, remove screen and place aside.
8. Clean frame and edge of screen with solvent.
   Do not touch cleaned or primed surfaces with fingers.
9. Apply etch primer to any bare metal on frame.
10. Apply bonding agent to screen and allow to cure.
11. Apply primer over etch primer on frame.
12. Apply activator over old sealer on frame.
13. Allow activator to cure.
14. Fit pre-cut nozzle to sealer cartridge, remove lid and shake out crystals, and install in applicator gun.
    Nozzle will need modification to achieve required bead section.



15. Apply a continuous bead of sealer around edge of frame as shown.
16. Check for breaks and air bubbles in sealer.
17. With assistance, lift screen into place and align to screen supports and tape. Raise screen up to roof on ratchet support blocks. Lightly press glass to fully seat sealer.
18. Remove protective covers and tape.
19. Test sealer for leaks, apply additional sealer if necessary. If water is used, allow sealer to dry before testing. Spray water around glass and check for leaks. Mark any area that leaks. Dry glass and sealer then apply additional sealer.
20. Fit 'A' post upper trim casings.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
21. Fit headlining retaining stud.
22. Fit sun visor retaining clips and sun visors.
23. Fit interior mirror.
24. Fit air intake panel.
    ☞ **HEATING AND VENTILATION, REPAIRS, Plenum - air intake.**

A curing time of 6 hours is desirable, during this time leave a window open and do not slam the doors. If the car must be used, drive slowly.

Glass - body side - rear

76.81.18

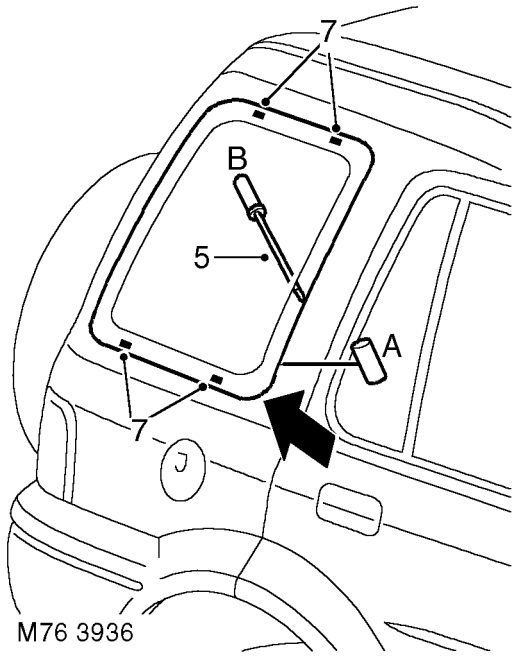
The following equipment is required: Cutting wire and handles Windscreen repair kit, Sealer applicator gun, Suction cups.

Wear protective gloves when handling glass, solvents and primers.

Wear suitable eye protection when removing and refitting glass.

Remove

1. Remove rear quarter upper casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.
2. Cover interior of vehicle with protective sheet.



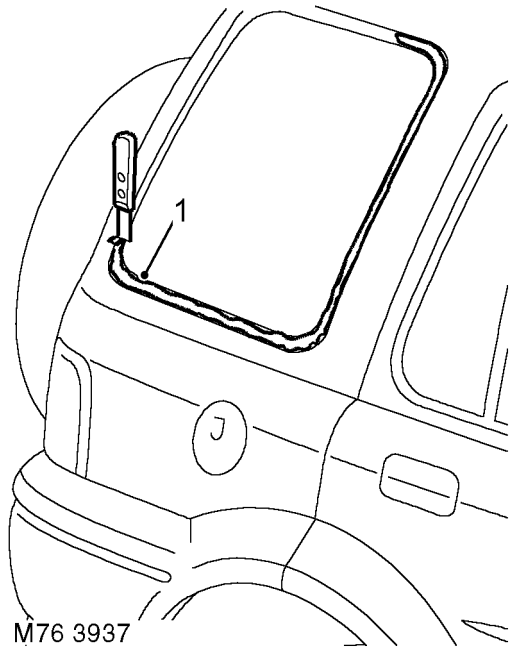
3. Make knife cut in sealant at bottom of 'D' post.
4. Insert cutting wire through previously made knife cut and fit handles as shown, with approximately 200 mm of wire between handles.
5. With assistance, wedge tube of handle B between glass and body, ahead of cutting position, and carefully cut sealer using a continuous pull on handle A from the outside. Ensure that glass is retained as last sealant is cut.
   If multi-strand cutting wire is used, a sawing action can be used to cut through heavy sealant deposits around corners.

   Use of a sawing action may overheat and break single strand wire.

6. Attach suction cup and remove glass body.
   Lay glass on felt covered supports. Do not stand on edge. Any chipping of glass edge may develop into cracks.

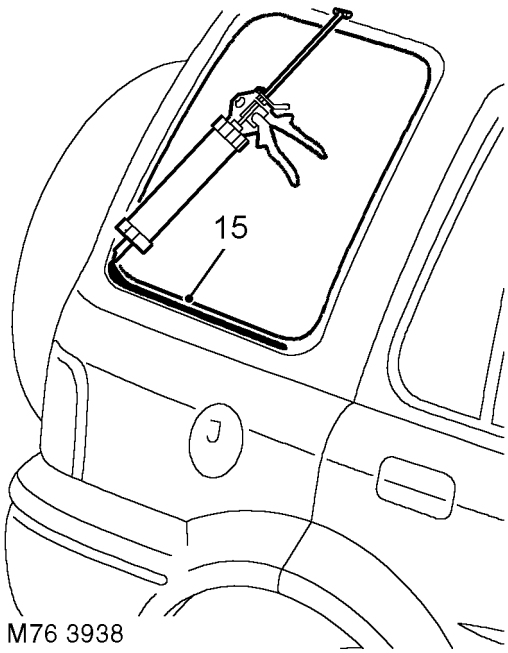
7. Collect 4 spacer blocks.

Refit



1. Carefully remove excess sealer from body leaving a smooth surface.
2. Use a vacuum cleaner to clear away any waste.
3. Original glass: Carefully cut back old sealer to obtain a smooth surface without damaging obscuration band on glass.
4. Fit rubber spacer blocks to body.
5. With assistance, locate screen to body.
6. Apply masking tape reference marks to aid fitment.
7. Remove screen and place aside.

8. Clean frame and edge of screen with solvent.
   Do not touch cleaned or primed surfaces with fingers.
9. Apply etch primer to any bare metal on frame.
10. Apply bonding agent to screen and allow to cure.
11. Apply primer over etch primer on frame.
12. Apply activator over old sealer on frame.
13. Allow activator to cure.
14. Fit pre-cut nozzle to sealer cartridge, remove lid and shake out crystals. Install cartridge in applicator gun.
    Nozzle will need modification to achieve required bead section.



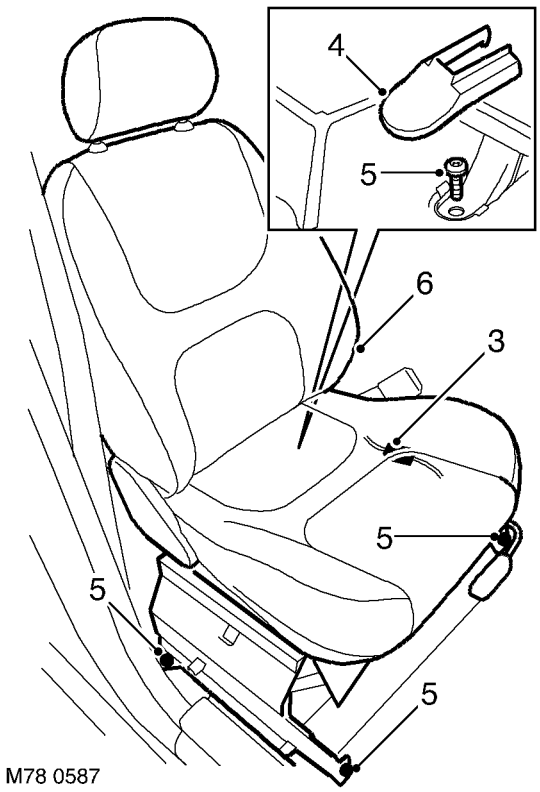
15. Apply a continuous bead of sealer around edge of frame as shown. Make bead slightly thicker at each corner.
16. Check for breaks and air bubbles in sealer.
17. Position glass to body and align to reference tape.
18. Lightly press glass to fully seat sealer.
19. Secure glass with tape until sealer has cured.
20. Remove protective covers and tape.
21. Test sealer for leaks, apply additional sealer if necessary. If water is used, allow sealer to dry before testing. Spray water around glass and check for leaks. Mark leakage points and apply additional sealer as necessary when area is completely dry.
22. Fit rear quarter upper casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**

Front seat

78.10.44.99

Remove

1. Make the SRS system safe.
   GENERAL INFORMATION, Supplementary restraint system precautions.
2. Remove seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.



3. Release pretensioner multiplug from seat frame and disconnect.
4. Remove cover from rear securing bolt.
5. Remove 4 Torx screws securing seat.
6. Remove front seat.

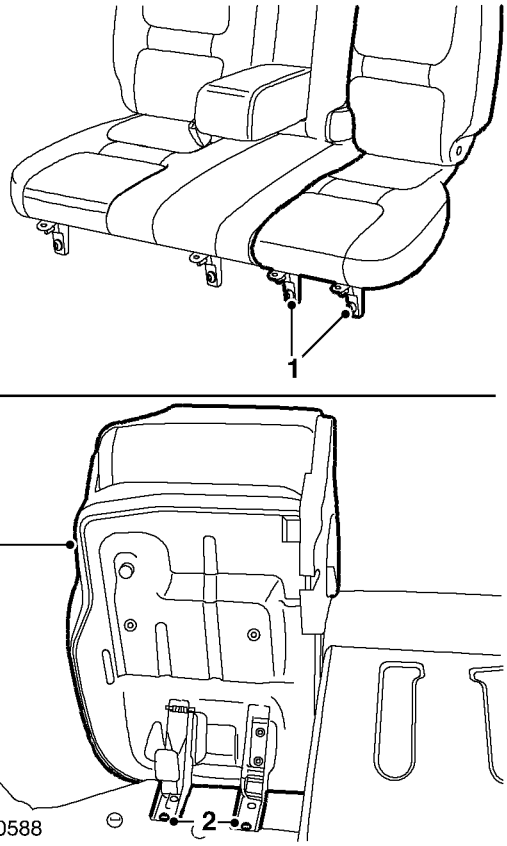
Refit

1. Position front seat and secure with Torx screws.Tighten screws to 45 Nm (33 lbf.ft).
2. Fit cover to rear bolt.
3. Connect pretensioner multiplug and secure to seat frame.
4. Fit seat base finisher.
   SEATS, REPAIRS, Finisher - seat base - front - each.

Rear seat - LH

78.10.48.99

Remove



1. Remove 2 Torx bolts from seat hinges.
2. Fold seat forward and remove 2 Torx bolts from hinges.
3. Remove seat.

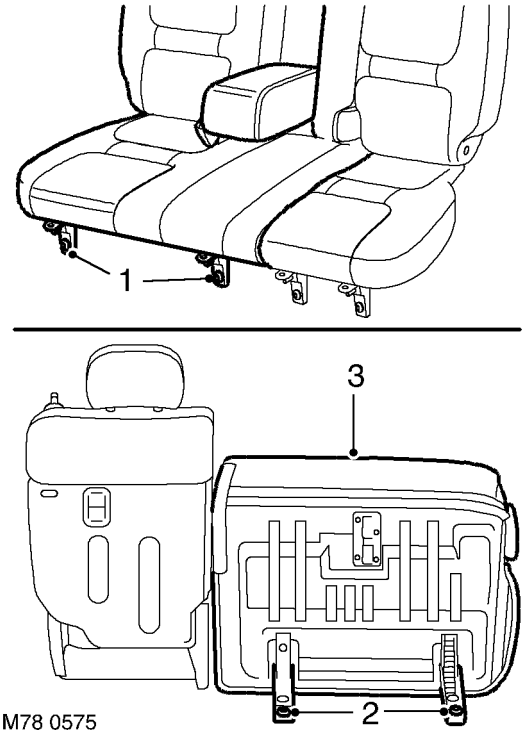
Refit

1. Position seat in vehicle and align hinges.
2. Fit Torx bolts to seat hinges and tighten to 25 Nm (18 lbf.ft).
3. Lower seat.
4. Fit Torx bolts to heel board and tighten to 25 Nm (18 lbf.ft).

Rear seat - RH

78.10.49.99

Remove



M78 0575

1. Remove 2 Torx bolts from seat hinges.
2. Fold seat forward and remove 2 Torx bolts from hinges.
3. Remove seat.

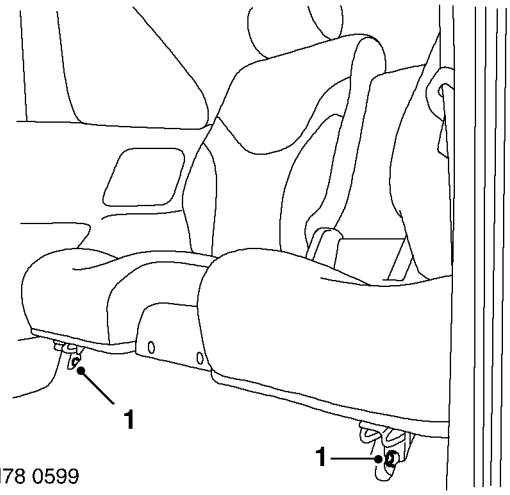
Refit

1. Position seat in vehicle and align hinges.
2. Fit Torx bolts to seat hinges and tighten to 25 Nm (18 lbf.ft).
3. Lower seat.
4. Fit Torx bolts to heel board and tighten to 25 Nm (18 lbf.ft).

Cushion & squab - rear seat - bench type - 3 door

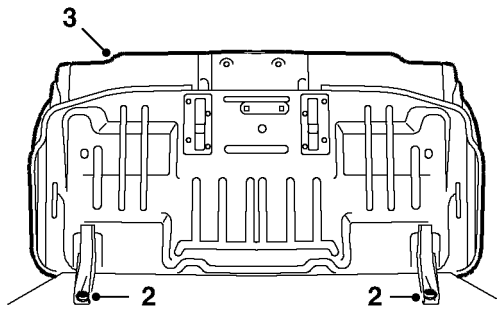
78.10.57.99

Remove



M78 0599

1. Remove 2 Torx bolts securing seat to heel board.



M78 0600

2. Fold seat forward and remove 2 Torx bolts from hinges.
3. With assistance, remove seat.

Refit

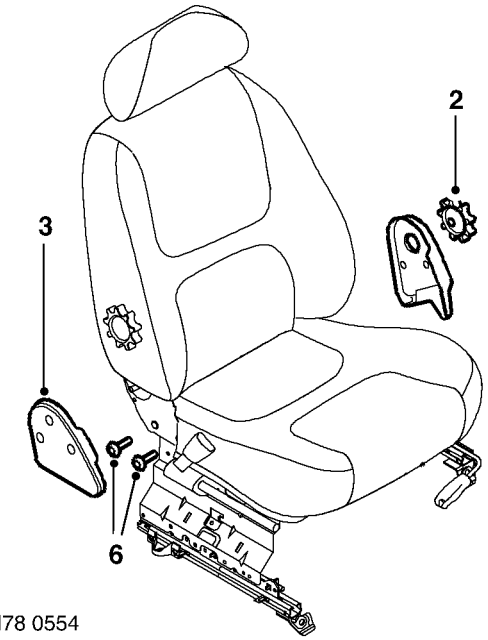
1. With assistance, position seat and align hinges.
2. Fit Torx bolts, lower seat and tighten to 25 Nm (18 lbf.ft).
3. Fit Torx bolts to heel board and tighten to 25 Nm (18 lbf.ft).

Cover - one piece - front seat cushion

78.30.01

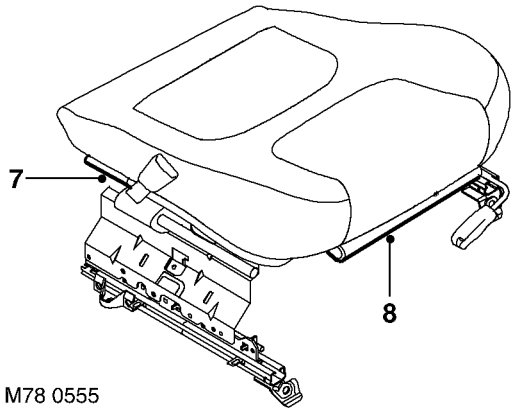
Remove

1. Remove front seat.
   SEATS, REPAIRS, Front seat.



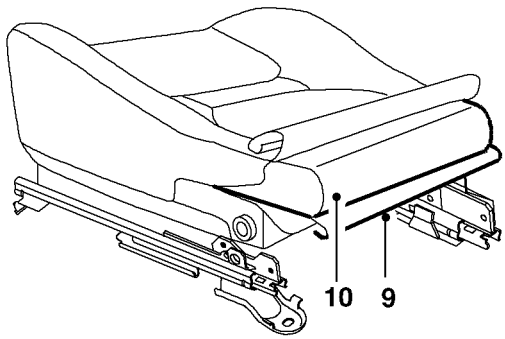
M78 0554

2. Remove recline control knob.
3. Release retaining studs from side covers and remove covers.
4. Disconnect 2 multiplugs from underside of seat cushion.
5. Release 2 clips securing multiplug to seat frame.
6. Remove 4 Torx bolts from squab frame and remove squab frame from cushion frame.



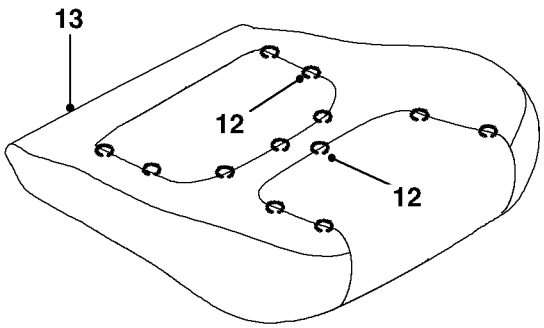
M78 0555

7. Release clips securing side edges of cushion cover to seat frame.
8. Release clip securing front edge of cushion cover to seat frame.



M78 0556

9. Release main central clip securing rear edge of cushion cover to seat frame.
10. Release rear of cushion pad from frame.
11. Remove cushion cover and pad.



M78 0557

12. Remove 12 hog rings securing cover to cushion.
13. Remove cushion cover from cushion.

Refit

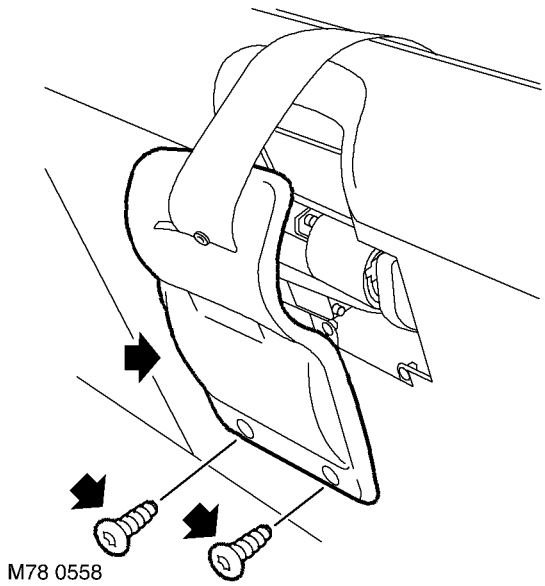
1. Position cushion cover to cushion pad and secure to frame with hog rings in position noted during removal.
2. Position and secure cushion cover and pad to frame.
3. Fit squab frame to cushion frame and tighten Torx bolts to 45 Nm (33 lbf.ft).
4. Connect multiplugs.
5. Position multiplug to frame and secure clips.
6. Fit recline control knob.
7. Fit side covers and secure retaining studs.
8. Fit front seat.
   ☞ **SEATS, REPAIRS, Front seat.**

Cover - rear seat cushion - RH

78.40.04

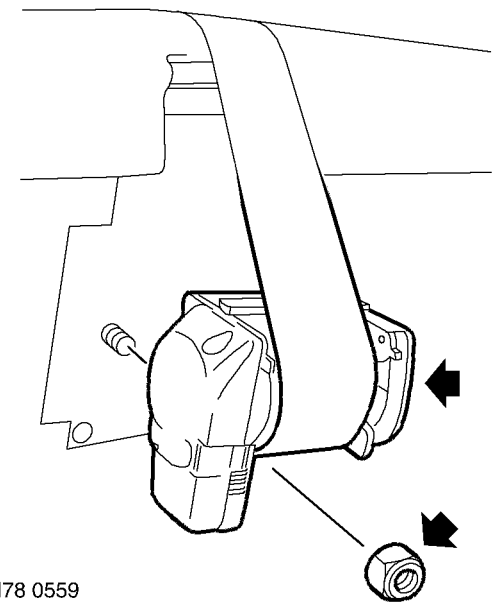
Remove

1. Remove RH rear seats.
   ☞ **SEATS, REPAIRS, Rear seat - RH.**



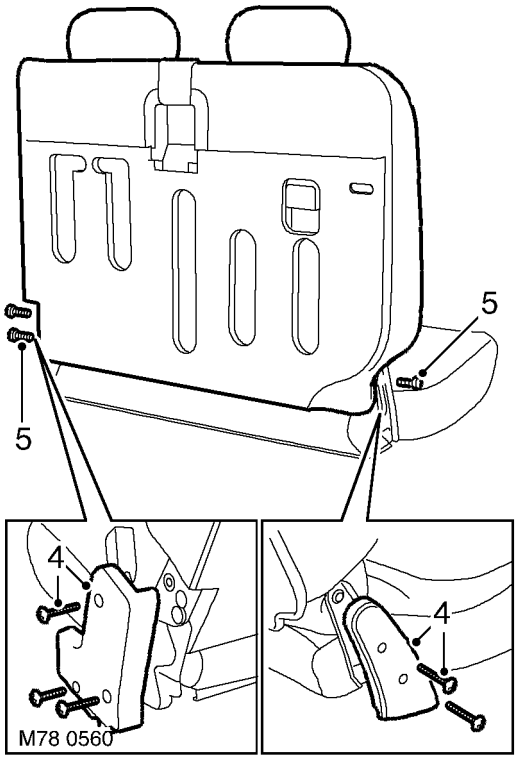
M78 0558

2. Remove 2 screws and remove seat belt reel cover.

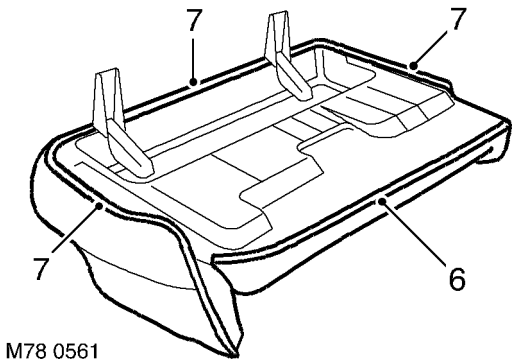


M78 0559

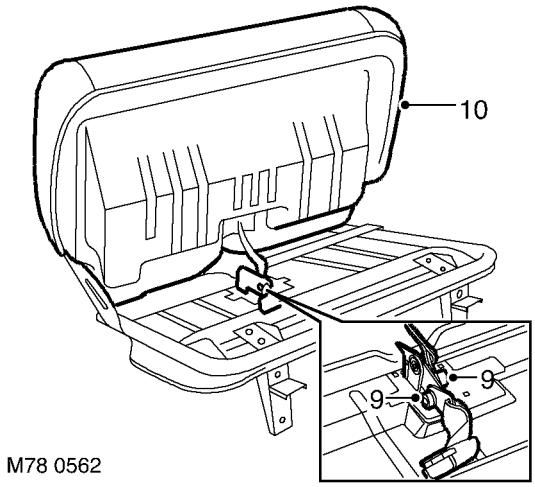
3. Remove nut and release seat belt reel.



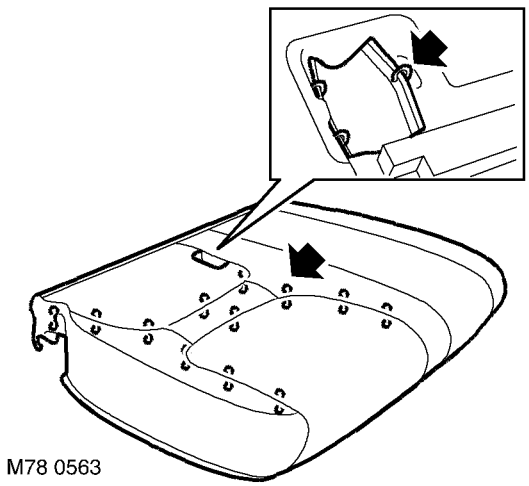
4. Remove 5 screws and remove both end covers.
5. Remove 3 Torx bolts and remove squab from cushion.



6. Release rear of cushion cover from frame.
7. Release sides and front of cushion cover from frame.
8. Release cover and pad from frame.



9. Remove 2 Torx bolts from seat belt and buckle and remove seat belt and buckle from frame.
10. Remove cushion cover and pad.



11. Remove and discard 17 hog rings and remove cover from pad.

Refit

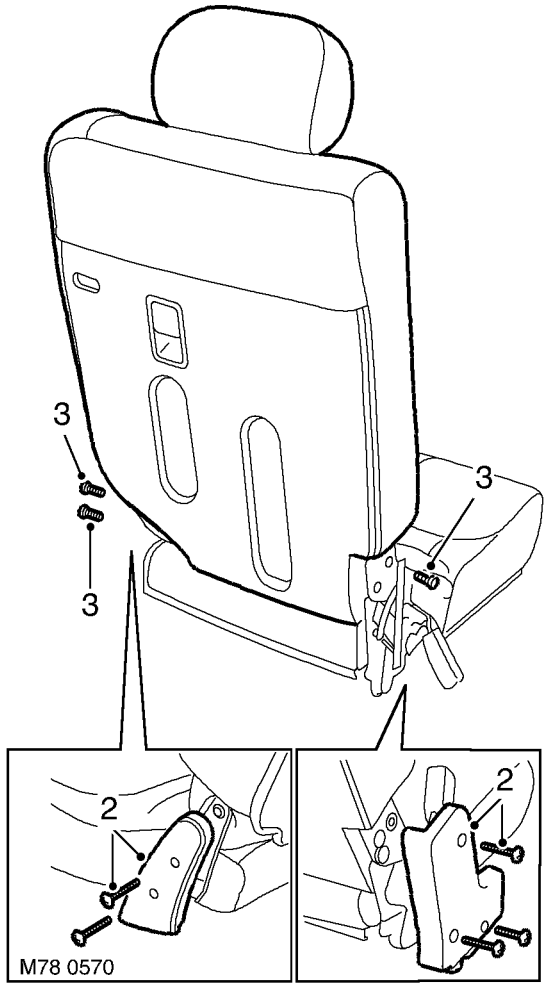
1. Position cushion cover to cushion pad and secure to frame with hog rings in position noted during removal.
2. Position seat belt and buckle to frame and tighten to 32 Nm (24 lbf.ft).
3. Fit squab cover and pad to frame.
4. Fit front and sides of cushion cover to frame.
5. Fit rear of cushion cover to frame.
6. Fit cushion to squab and tighten Torx bolts to 28 Nm (21 lbf.ft).
7. Fit end covers and tighten screws.
8. Position seat belt reel in seat squab and tighten nut to 32 Nm (24 lbf.ft).
9. Fit seat belt reel cover and tighten screws.
10. Fit rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - RH.**

Cover - rear seat cushion - LH

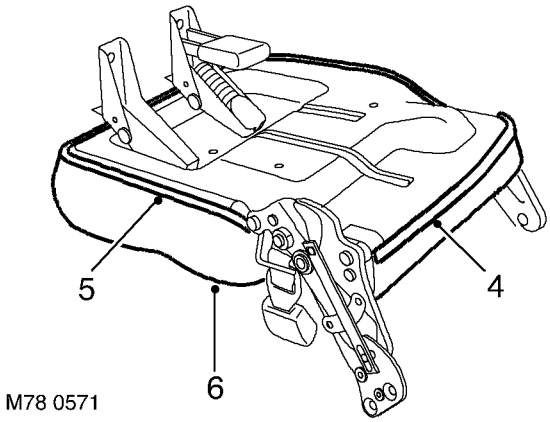
78.40.05

Remove

1. Remove LH rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - LH.**

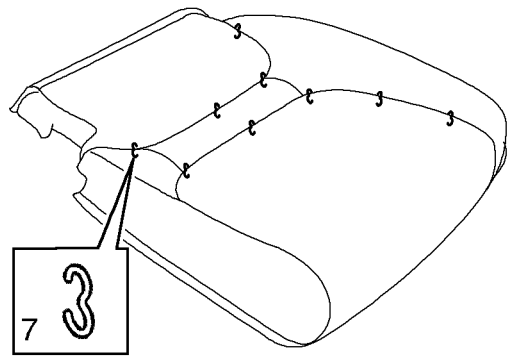


2. Remove 5 screws and remove both end covers.
3. Remove 3 Torx bolts and remove squab from cushion.



M78 0571

4. Release rear of cushion cover from frame.
5. Release sides and front of cushion cover from frame.
6. Remove cushion cover and pad.



M78 0572

7. Remove and discard 16 hog rings and remove cover from pad.

Refit

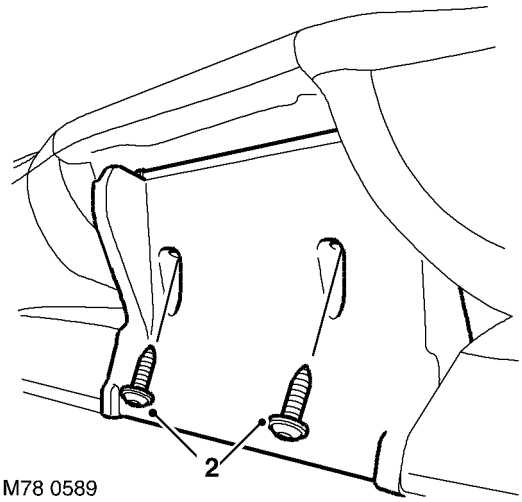
1. Position cushion cover to cushion pad and secure to frame with hog rings in position noted during removal.
2. Fit cover and pad to frame.
3. Fit front and sides of cushion cover to frame.
4. Fit rear of cushion cover to frame.
5. Fit cushion to squab and tighten Torx bolts to 28 Nm (21 lbf.ft).
6. Fit end covers and tighten screws.
7. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**

Cover - cushion - rear single seat - 3 door

78.40.08

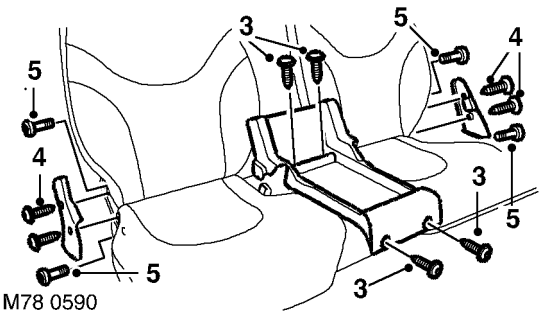
Remove

1. Remove rear seat assembly.
   ☞ **SEATS, REPAIRS, Cushion & squab - rear seat - bench type - 3 door.**



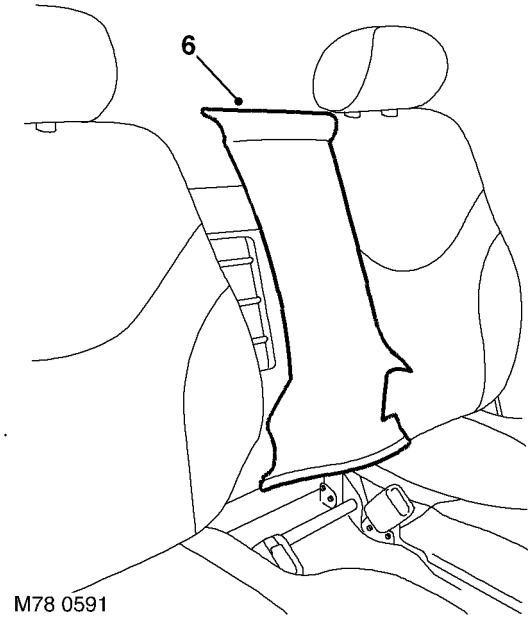
M78 0589

2. Remove 2 screws securing console cover and remove cover.

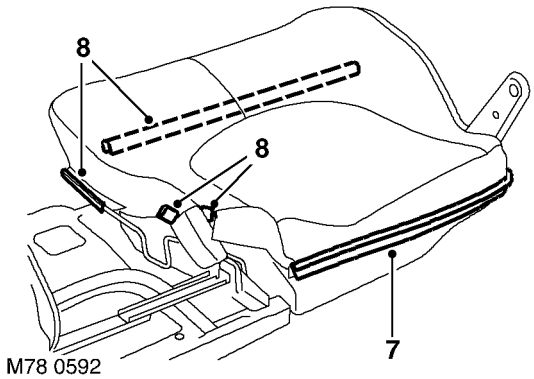


M78 0590

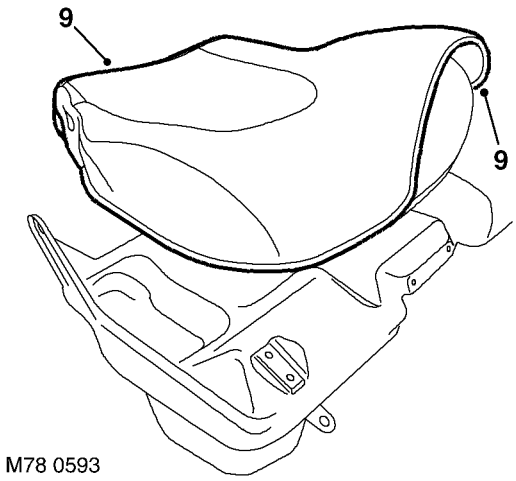
3. Remove 4 screws and remove rear seat centre console.
4. Remove 4 screws securing end covers and remove covers.
5. Remove 4 Torx bolts and remove squab assembly from cushion assembly.



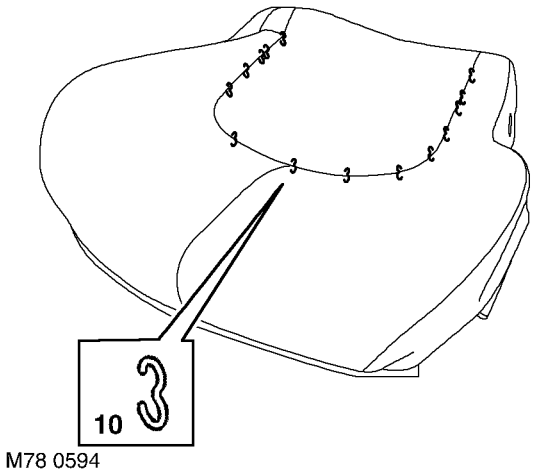
6. Release back board assembly from squab frame and remove back board.



7. Release rear of cushion cover from frame.
8. Release sides and front of cushion cover from frame.



9. Remove cover and pad from frame.



10. Remove and discard 13 hog rings and remove cover from pad.

Refit

1. Position cushion cover to pad and secure with hog rings.
2. Fit cover to pad.
3. Position and secure cushion cover and pad to frame.
4. Fit cushion to squab and tighten Torx bolts to 28 Nm (21 lbf.ft).
5. Position back board and secure to frame.
6. Fit end covers and tighten screws.
7. Position rear seat console and secure with screws.
8. Position console cover and secure with screws.
9. Fit rear seat.

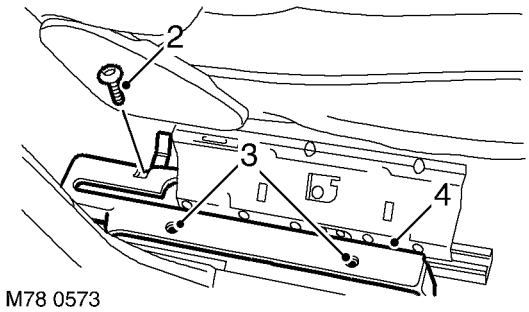
☞ **SEATS, REPAIRS, Cushion & squab - rear seat - bench type - 3 door.**

Finisher - seat base - front - each

78.55.01

Remove

1. Remove front seat cushion side finisher.
   SEATS, REPAIRS, Finisher - cushion side - front seat.



M78 0573

2. Release cover to access Torx screw under front seat and remove Torx screw.
3. Remove 2 Torx screws securing finisher to seat runner.
4. Remove finisher.

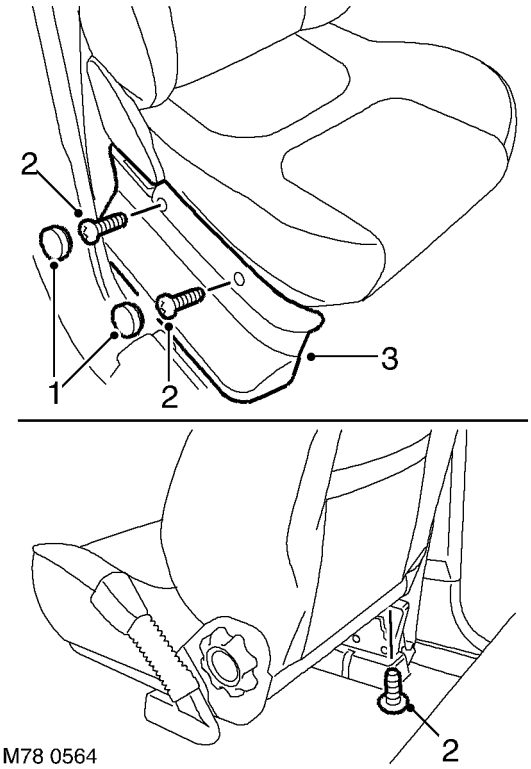
Refit

1. Position finisher to seat runner.
2. Fit and tighten Torx screws.
3. Fit and tighten Torx screw under front seat and close cover.
4. Fit front seat cushion side finisher.
   SEATS, REPAIRS, Finisher - cushion side - front seat.

Finisher - cushion side - front seat

78.55.06

Remove



M78 0564

1. Remove 2 covers to access screws.
2. Remove 3 screws securing finisher.
3. Release clips at front and side of seat and remove finisher.

Refit

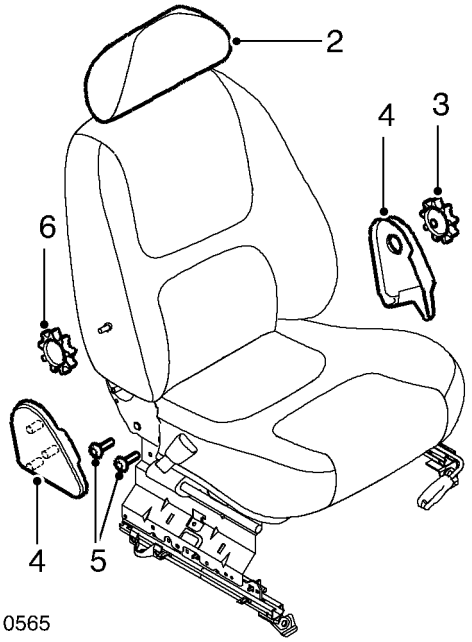
1. Fit finisher to seat and secure with clips and screws.
2. Fit screw covers.

Manual mechanism - lumbar support - front seat

78.60.07

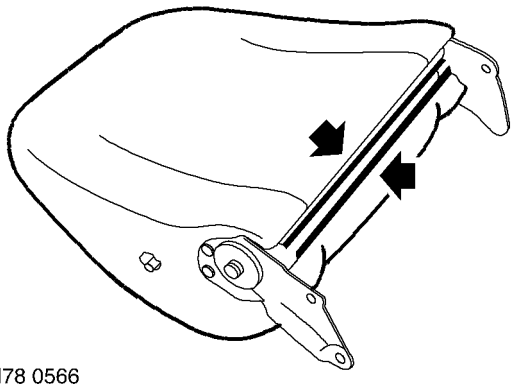
Remove

1. Remove front seat.
   SEATS, REPAIRS, Front seat.

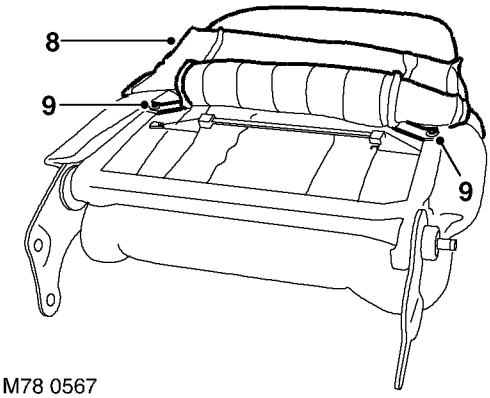


M78 0565

2. Release and remove head restraint.
3. Remove recline control knob.
4. Release retaining studs from side covers and remove covers.
5. Remove 4 Torx bolts from squab frame and remove squab frame from cushion frame.
6. Remove lumbar control knob.

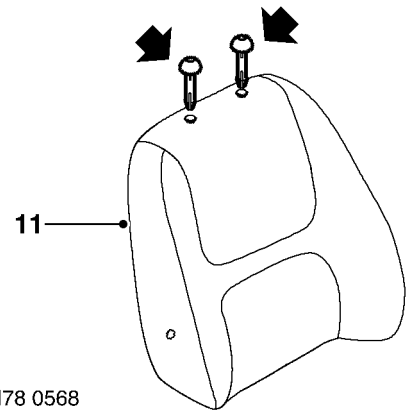

M78 0566

7. Release squab cover at base of seat frame.



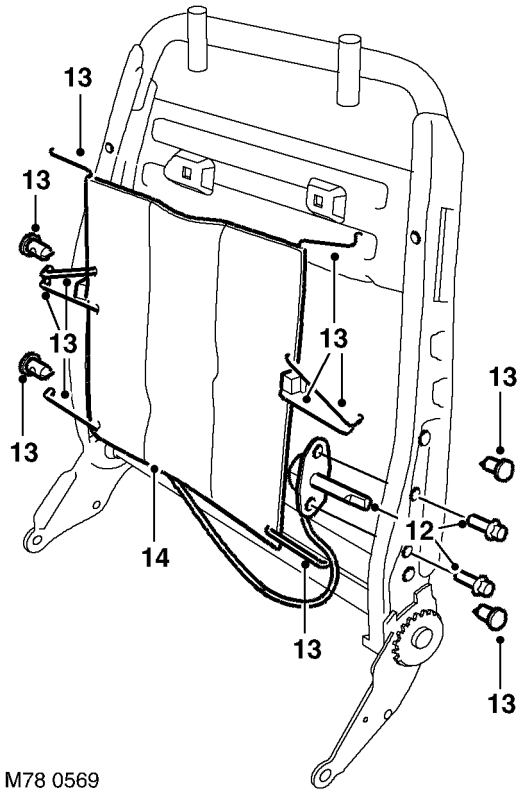
M78 0567

8. Release squab cover from squab frame and squab pad.
9. Drill out 2 pop rivets from squab frame.



M78 0568

10. Remove both head restraint guide tubes.
11. Remove squab cover and pad from frame.



12. Remove 2 bolts from cable control and release cable control.
13. Release 8 lumbar support retainers from squab frame and collect 4 hook retainers.
14. Remove lumbar support mechanism.

Refit

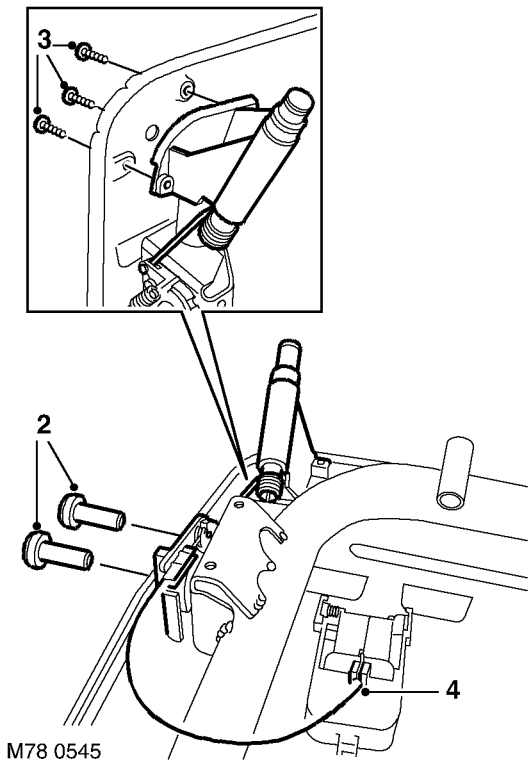
1. Position lumbar support to squab frame and locate hook retainers
2. Fit lumbar support retainers to squab frame.
3. Position cable control and tighten bolts.
4. Fit squab cover and pad to frame.
5. Fit head restraint guide tubes.
6. Position straps and secure with pop rivets.
7. Fit squab cover to squab pad and squab frame.
8. Secure squab cover at base of squab frame.
9. Fit lumbar support control knob.
10. Fit squab frame to cushion frame and tighten Torx bolts to 45 Nm (33 lbf.ft).
11. Fit side covers and secure retaining studs.
12. Fit head restraint.
13. Fit recline control knob.
14. Fit front seat.
☞ **SEATS, REPAIRS, Front seat.**

Latch - rear squab - RH

78.80.05

Remove

1. Remove rear seat squab cover.
☞ **SEATS, REPAIRS, Cover - squab - rear seat - RH.**



2. Remove 2 Torx screws from squab lock.
3. Remove 3 screws from lock button.
4. Release cable from lever abutment and remove latch assembly.

Refit

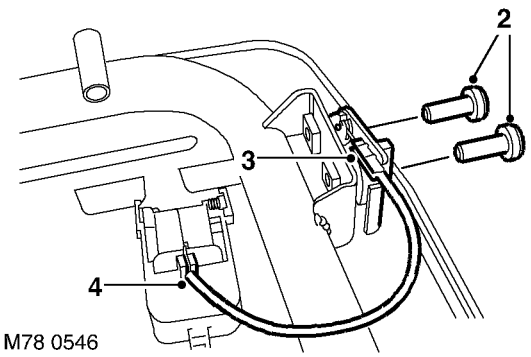
1. Position latch assembly to frame and locate cable in abutment.
2. Fit Torx screws to squab lock and tighten to 20 Nm (15 lbf.ft).
3. Fit screws to lock button.
4. Fit squab cover.
☞ **SEATS, REPAIRS, Cover - squab - rear seat - RH.**

Latch - rear squab - LH

78.80.16

Remove

1. Remove rear seat squab cover.
   SEATS, REPAIRS, Cover - squab - rear seat - side - LH.



M78 0546

2. Remove 2 Torx screws from squab lock.
3. Release cable from lever abutment.
4. Remove lock and cable from frame.

Refit

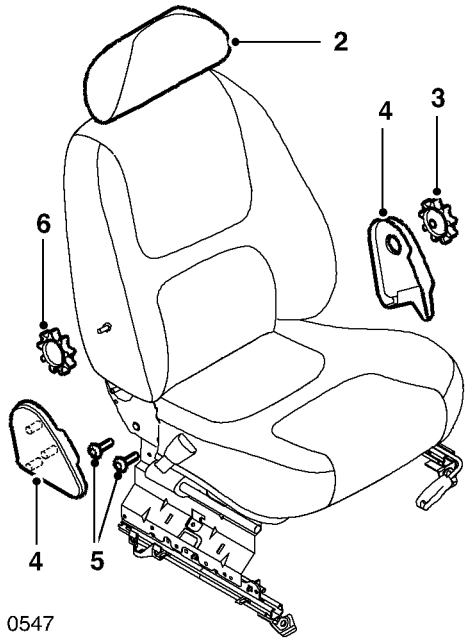
1. Position lock and cable to frame.
2. Fit and tighten Torx screws to lock.
3. Fit cable to lever abutment.
4. Fit squab cover.
   SEATS, REPAIRS, Cover - squab - rear seat - side - LH.

Cover - squab - front seat

78.90.08

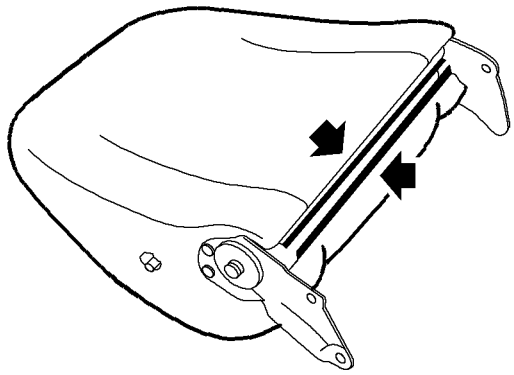
Remove

1. Remove front seat.
   SEATS, REPAIRS, Front seat.

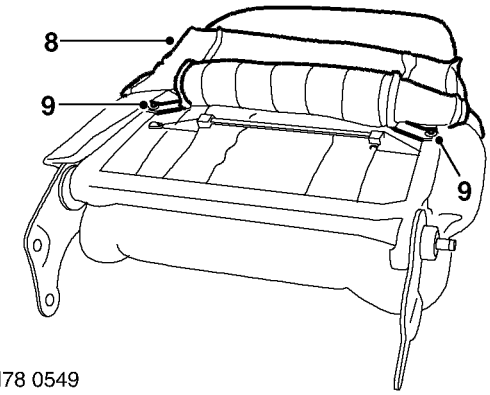


M78 0547

2. Release and remove head restraint.
3. Remove recline control knob.
4. Release retaining studs from side covers and remove covers.
5. Remove 4 Torx bolts from squab frame and remove squab frame from cushion frame.
6. Remove lumbar control knob.

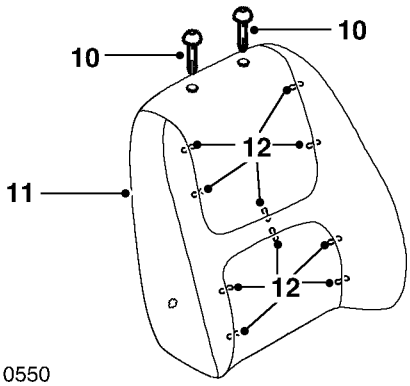

M78 0548

7. Release squab cover at base of seat frame.



M78 0549

8. Release squab cover from squab frame and squab pad.
9. Drill out 2 pop rivets from squab frame.



M78 0550

10. Remove both head restraint guide tubes.
11. Remove squab cover and pad from frame.
12. Remove and discard 10 hog rings holding cover to squab pad.
13. Remove squab cover.

Refit

1. Position squab cover to pad.
2. Pull cover into position and secure with NEW hog rings.
3. Fit squab cover and pad to frame.
4. Fit head restraint guide tubes.
5. Position straps and secure with pop rivets.
6. Fit squab cover to squab pad and squab frame.
7. Secure squab cover at base of squab frame.
8. Fit lumbar support control knob.
9. Fit squab frame to cushion frame and tighten Torx bolts to 45 Nm (33 lbf.ft).
10. Fit side covers and secure retaining studs.
11. Fit recline control knob.
12. Fit head restraint.
13. Fit front seat.

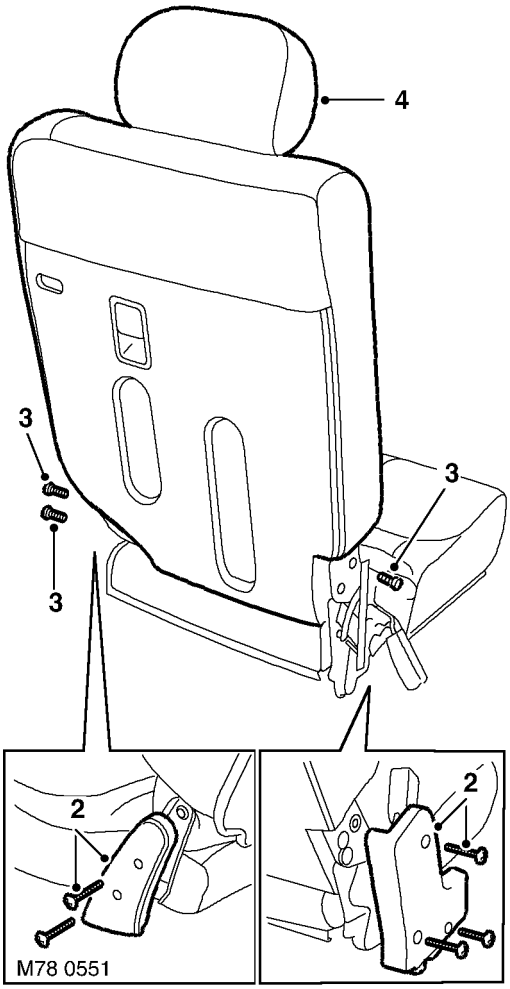
☞ **SEATS, REPAIRS, Front seat.**

Cover - squab - rear seat - side - LH

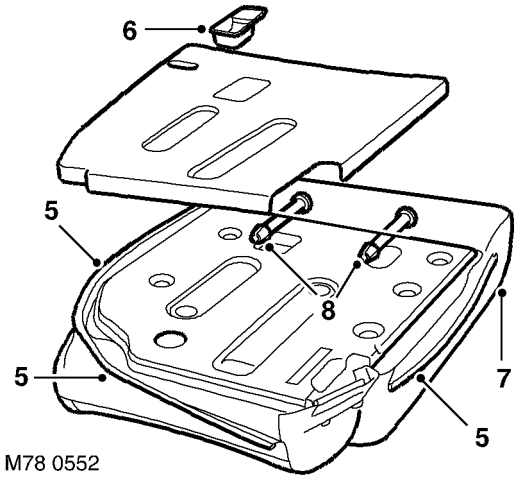
78.90.12

Remove

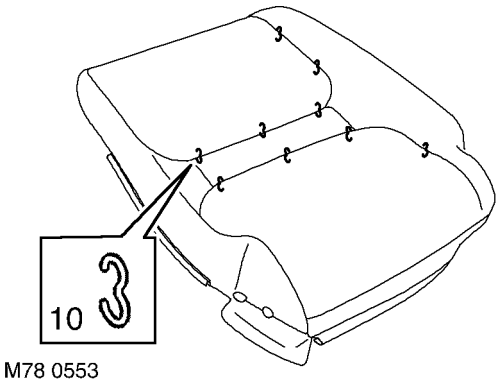
1. Fold LH rear seat forward.



2. Remove 5 screws and remove both end covers.
3. Remove 3 bolts from seat squab and remove squab from cushion.
4. Remove head restraint



5. Release squab cover from sides and bottom of frame.
6. Release latch escutcheon and remove seat frame back cloth.
7. Release cover from rear of frame.
8. Remove both head restraint guide tubes.
9. Remove squab cover and pad from frame.



10. Remove and discard 9 hog rings and remove cover from pad.

Refit

1. Position latch escutcheon to back cloth and fit to frame. Ensure that the latch escutcheon is secured correctly into latch housing.
2. Position squab cover to pad and secure hog rings.
3. Fit squab cover and pad to frame.

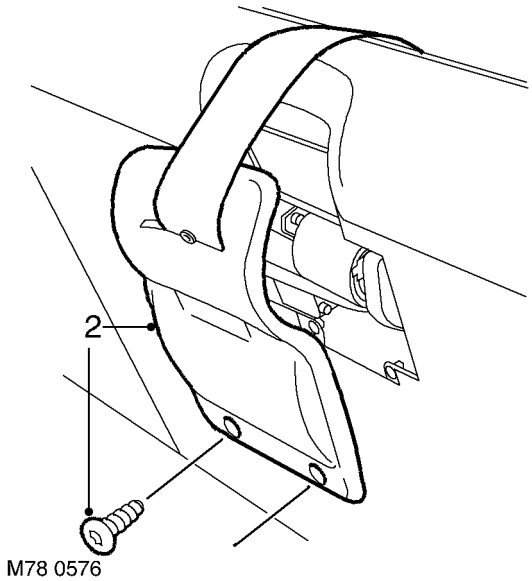
4. Fit head restraint guide tubes.
5. Fit cover to sides and bottom of frame.
6. Fit cover to rear of frame.
7. Fit head restraint.
8. Fit cushion to squab and tighten Torx bolts to 28 Nm (21 lbf.ft).
9. Fit side covers and tighten screws.
10. Secure rear seat in locked position.

Cover - squab - rear seat - RH

78.90.13

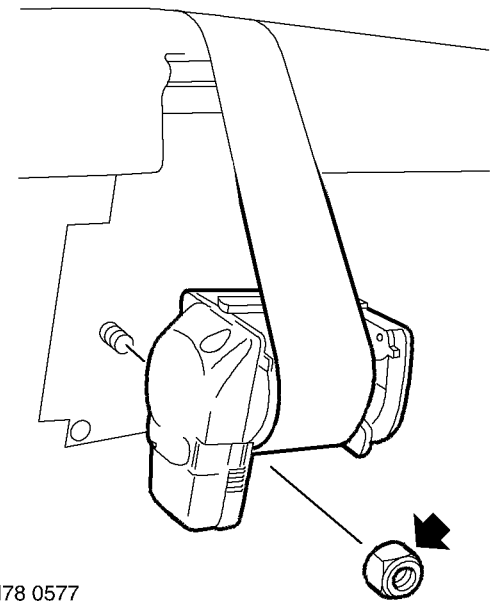
Remove

1. Fold RH rear seat forward.

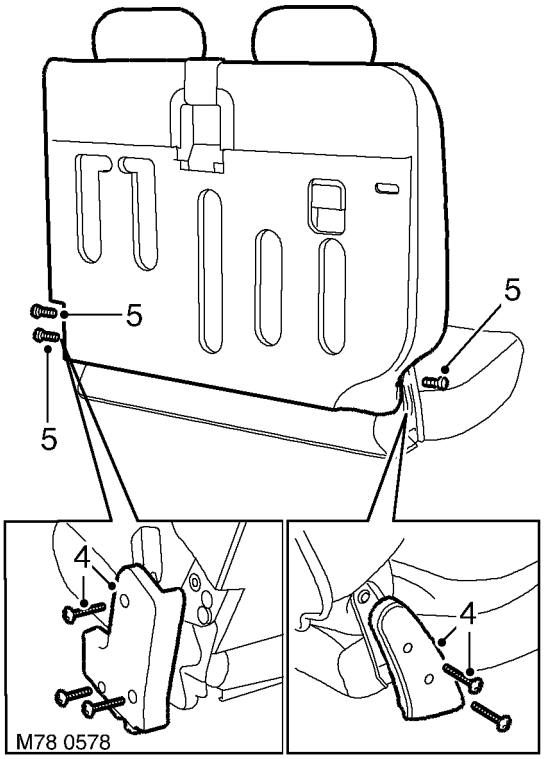


M78 0576

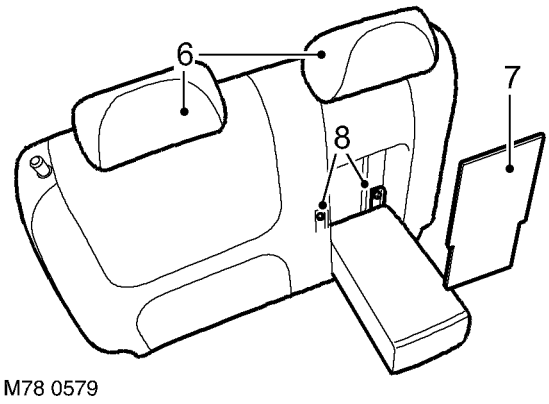
2. Remove 2 screws and remove seat belt reel cover.


M78 0577

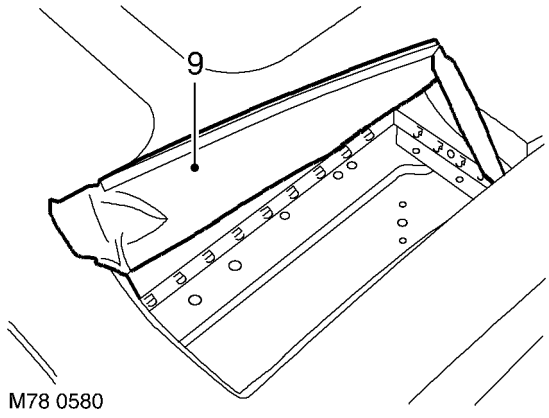
3. Remove nut and release seat belt reel.



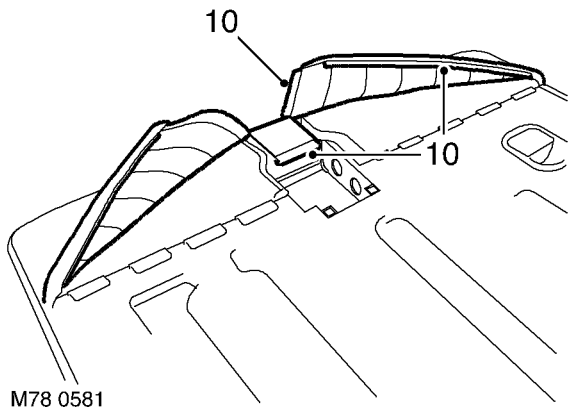
4. Remove 5 screws and remove both end covers.
5. Remove 3 bolts from seat squab and remove squab from cushion.



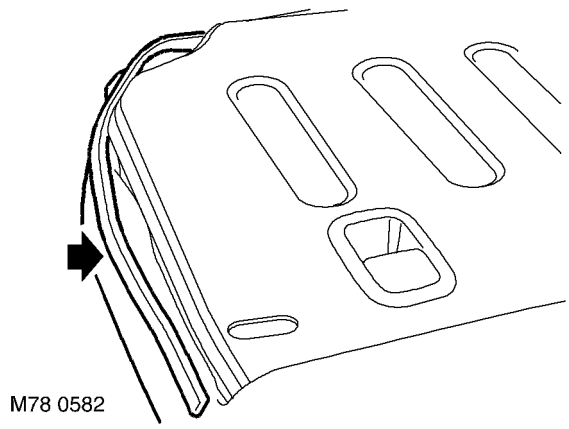
6. Remove both head restraints.
7. Remove arm rest aperture trim.
8. Remove 2 screws from arm rest and remove arm rest.



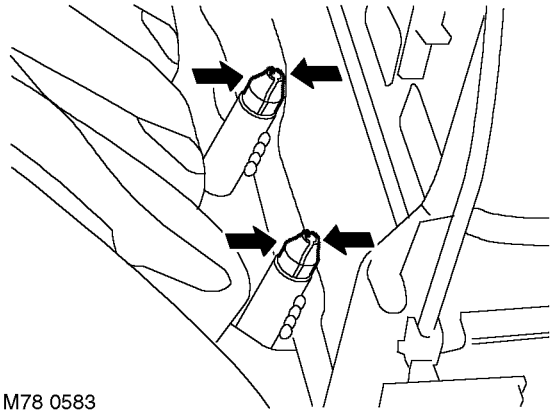
9. Release squab from arm rest aperture.



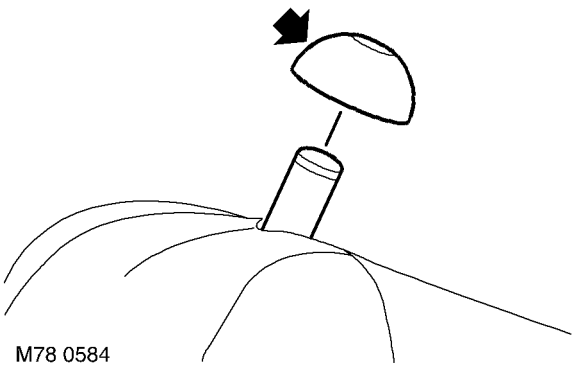
10. Release squab from seat belt aperture and rear of frame.



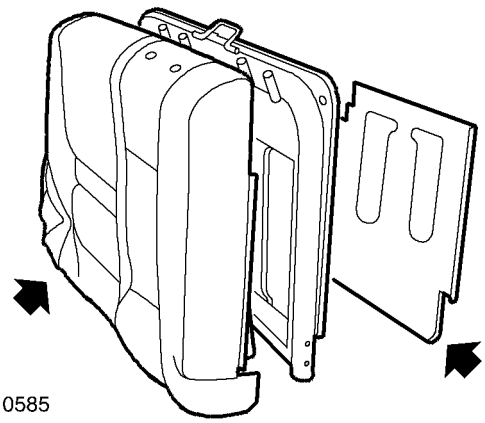
11. Release squab from sides and bottom of frame. Release latch escutcheon and remove back cloth.


M78 0583

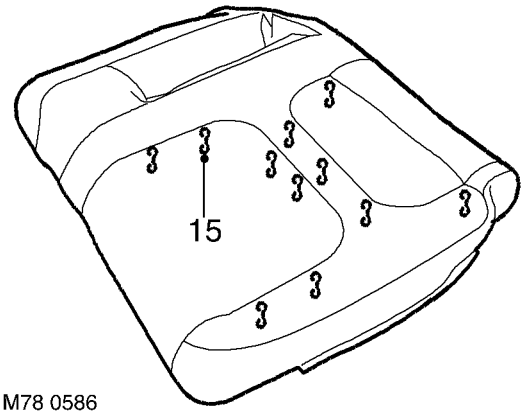
12. Release and remove 4 head restraint guide tubes.


M78 0584

13. Release squab lock warning button escutcheon.


M78 0585

14. Remove squab cover and pad from frame.



M78 0586

15. Remove and discard 12 hog rings and remove cover from pad.

Refit

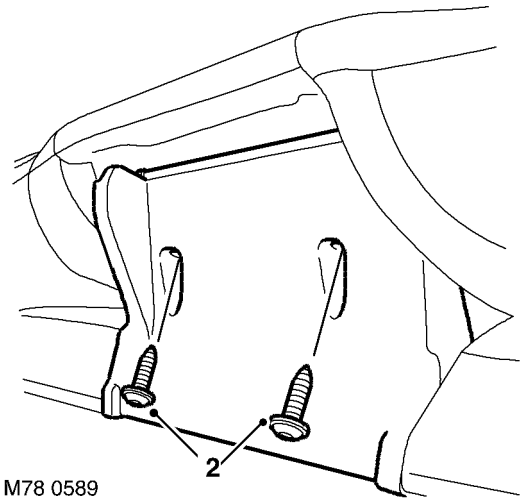
1. Position squab cover to pad and secure hog rings.
2. Fit squab cover and pad to frame.
3. Fit head restraint guide tubes and seat lock warning button escutcheon.
4. Fit cover to sides and bottom of frame.
5. Fit cover to rear of frame and seat belt aperture.
6. Position latch escutcheon to back cloth and fit to frame. Ensure that the latch escutcheon is secured correctly into latch housing.
7. Fit cover to arm rest aperture.
8. Fit arm rest and tighten screws.
9. Fit arm rest aperture trim.
10. Fit head restraints.
11. Fit cushion to squab and tighten Torx bolts.
12. Fit side covers and tighten screws.
13. Position seat belt reel in seat squab and tighten nut to 32 Nm (24 lbf.ft).
14. Fit seat belt reel cover and tighten screws.
15. Secure rear seat in locked position.

Cover - squab - rear single seat - 3 door

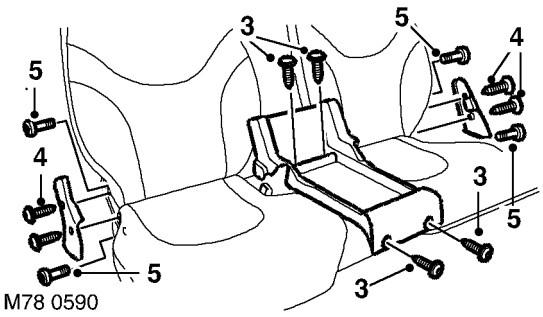
78.90.85

Remove

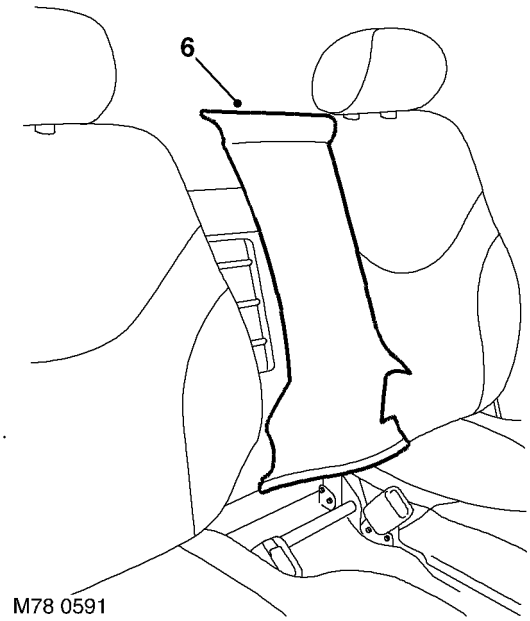
1. Remove rear seat assembly.
   SEATS, REPAIRS, Cushion & squab - rear seat - bench type - 3 door.



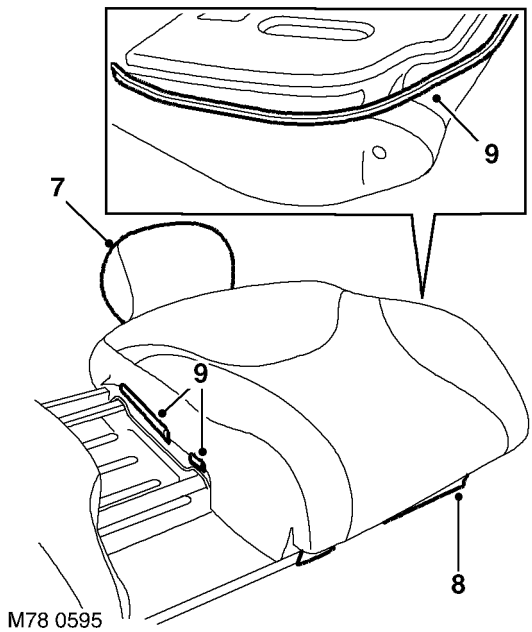
2. Remove 2 screws securing console cover and remove cover.



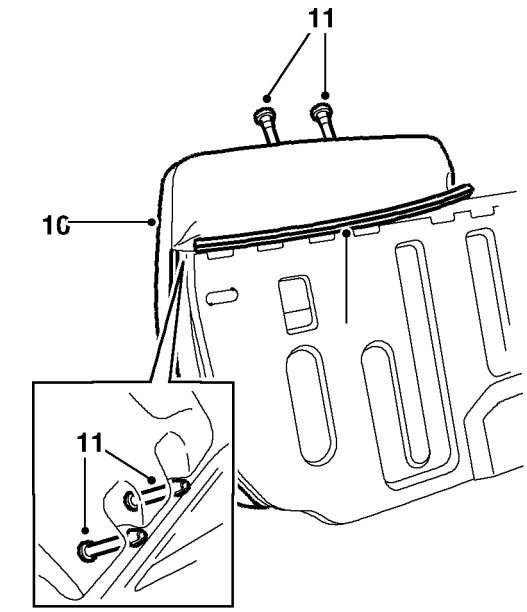
3. Remove 4 screws and remove rear seat centre console.
4. Remove 4 screws securing end covers and remove covers.
5. Remove 4 Torx bolts and remove squab assembly from cushion assembly.



6. Release back board assembly from squab frame and remove back board.

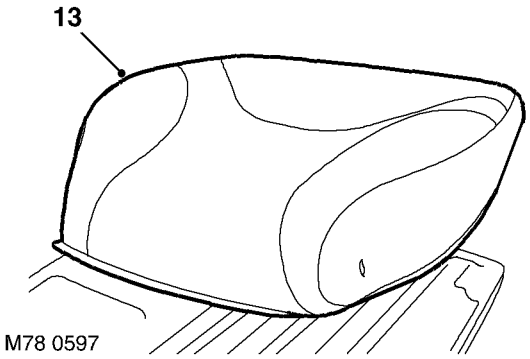


7. Remove head restraint
8. Release bottom of squab cover from frame.
9. Release sides of squab cover from frame.



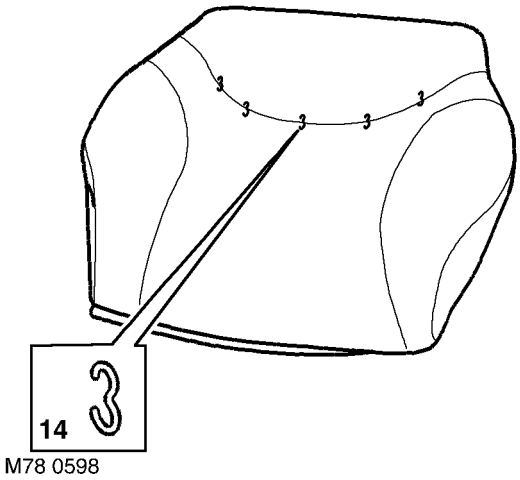
M78 0596

10. Raise cover and pad to access head restraint guide tubes.
11. Remove guide tubes.
12. Release cover from top of frame.



M78 0597

13. Remove cover and pad.



M78 0598

14. Release cover from pad, remove and discard 5 hog rings.
15. Remove cover from pad.

Refit

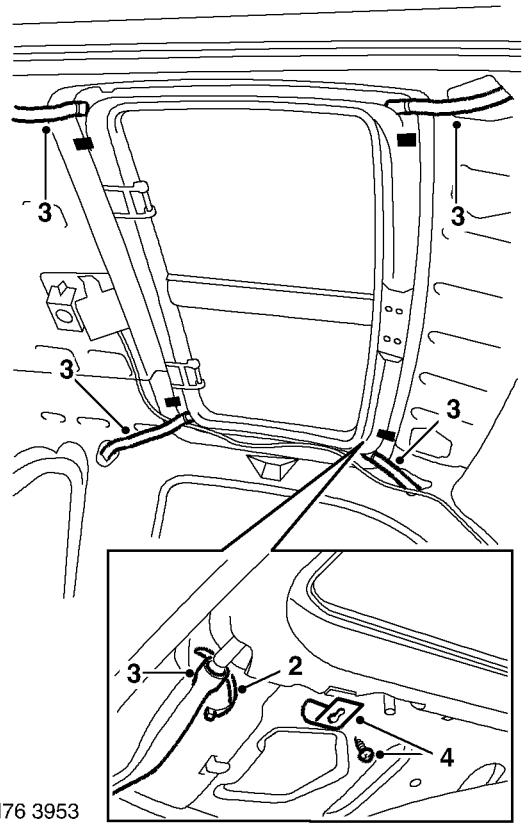
1. Position cushion cover to pad and secure with hog rings.
2. Fit cover to pad.
3. Secure cover to top of frame.
4. Fit guide tubes.
5. Secure sides and bottom of cover to frame.
6. Fit head restraint.
7. Fit cushion to squab and tighten Torx bolts to 28 Nm (21 lbf.ft).
8. Position back board and secure to frame.
9. Fit end covers and tighten screws.
10. Position rear seat console and secure with screws.
11. Position console cover and secure with screws.
12. Fit rear seat.
☞ **SEATS, REPAIRS, Cushion & squab - rear seat - bench type - 3 door.**

Sun/sliding roof - complete - front - 3 door

76.83.01

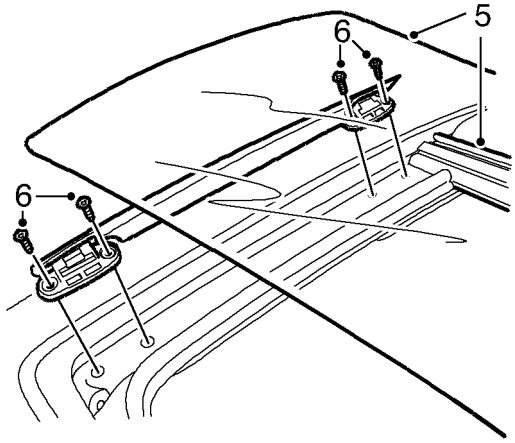
Remove

1. Remove headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.
   WARNING: Wear protective gloves when handling glass, solvents and primers.



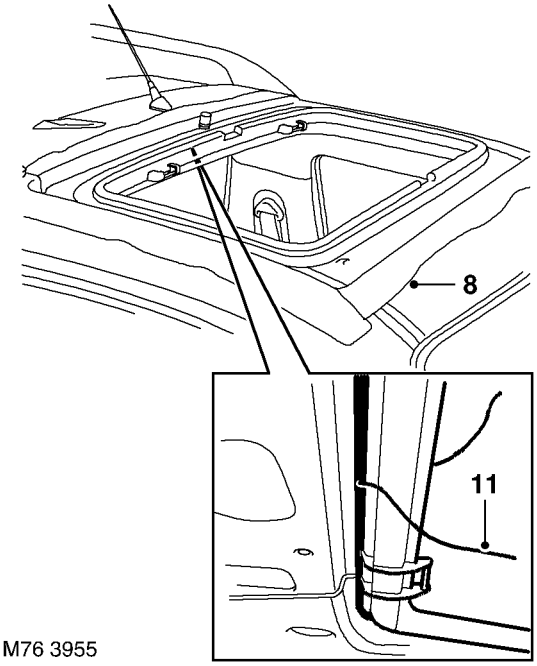
M76 3953

2. Remove and discard cable ties from drain tubes.
3. Disconnect drain tubes from sun roof.
4. Remove 4 Torx screws securing clamping plates and remove plates.



M76 3954

5. Remove glass panels and 'T' bar.
6. Remove 8 screws securing wind deflectors and remove wind deflectors.
7. Remove sun roof tray seal.
   SUNROOF, REPAIRS, Seal - tray - sun /sliding roof - front.



M76 3955

8. Mask up roof and sun roof aperture.
9. Cover interior of vehicle with protective sheet.
10. Make a cut through the sealer at the back of the sun roof, a 90° bend in the cutting tool will help.
    WARNING: Wear suitable eye protection when removing and refitting glass.
11. Using suitable cutting wire, cut through PU sealer securing sun roof to roof.
    NOTE: If multi-strand cutting wire is used, a sawing action can be used to cut through heavy sealant deposits around corners.
12. Remove sun roof.

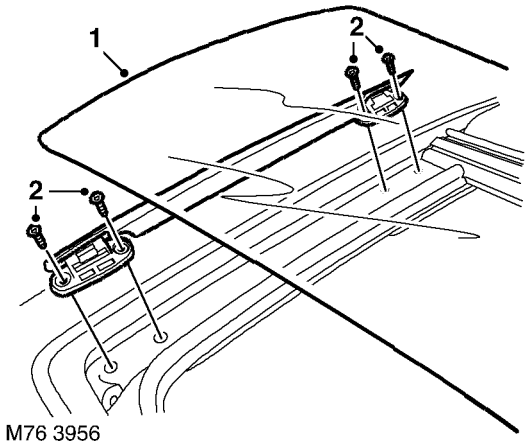
Refit

1. Clean surrounding area with solvent.
   WARNING: Wear protective gloves when handling glass, solvents and primers.
2. Use a vacuum cleaner to clear away any waste.
3. Cut sealer on roof flange down to a smooth even finish.
4. Etch prime and paint any damaged areas.
5. Apply primer over etch primer on flange.
6. Apply activator over old sealer on flange.
7. Allow activator to cure.
8. Fit pre-cut nozzle to sealer cartridge, remove lid, shake out crystals and fit cartridge to applicator gun. If necessary modify the nozzle to achieve required bead section.
9. Apply a continuous bead of sealer around roof flange. Make bead slightly thicker at the corners.
10. Check for breaks and air bubbles in sealer.
11. With assistance position sunroof and align to roof aperture.
12. Fit sunroof tray seal.
    ☞ **SUNROOF, REPAIRS, Seal - tray - sun /sliding roof - front.**
13. Position sunroof clamping plates, fit and tighten screws.
14. Connect drain tubes and secure with new cable ties.
15. Remove body and trim protection.
16. Position wind deflectors, fit and tighten screws.
17. Fit 'T' bar and glass panels.
18. Fit headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**

Wind deflector - sun/sliding roof - 3 door

76.83.28

Remove



1. Release and remove sun roof glass panel.
2. Remove 4 screws securing hinges, remove wind deflector and collect hinges.

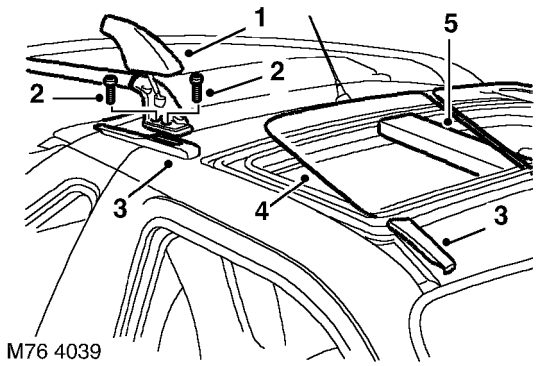
Refit

1. Locate hinges to wind deflector, position wind deflector, fit and tighten screws.
2. Position glass panel and secure catch.

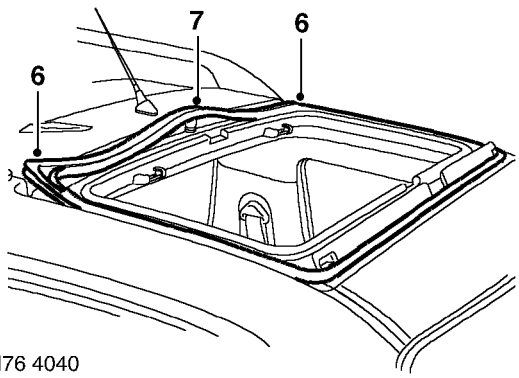
Seal - tray - sun /sliding roof - front

76.83.61

Remove



1. Remove side rail front end covers.
2. Remove 4 Torx bolts securing front of side rails.
3. Remove front and rear roof finishers.
4. Remove glass panels and 'T' bar.
5. Remove seal from inner part of tray.



6. Release seal from corners of tray and ease from between roof and tray.
7. Remove tray seal.

Refit

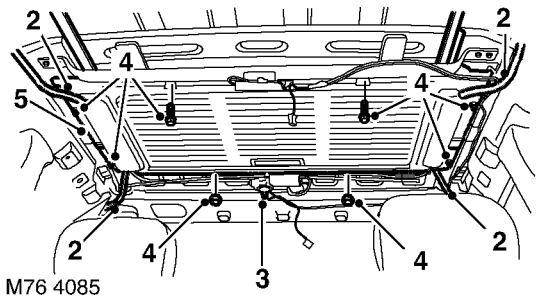
1. Position seal to roof.
2. Locate seal to corners of tray and fit between roof and tray.
3. Fit seal to inner part of tray.
4. Fit 'T' bar and roof glass.
5. Fit roof finishers.
6. Ensure gaskets and in position on side rails. Fit rails and secure Torx bolts to 22 Nm (16 lbf.ft).
7. Fit side rail end covers.

Sun/sliding roof - complete - front - 5 door

76.84.01

Remove

1. Remove headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.



2. Disconnect drain tubes from sun roof.
3. Disconnect multiplug from sun roof motor.
4. With assistance, remove 6 nuts and 2 bolts securing sun roof.
5. Remove sun roof.

Refit

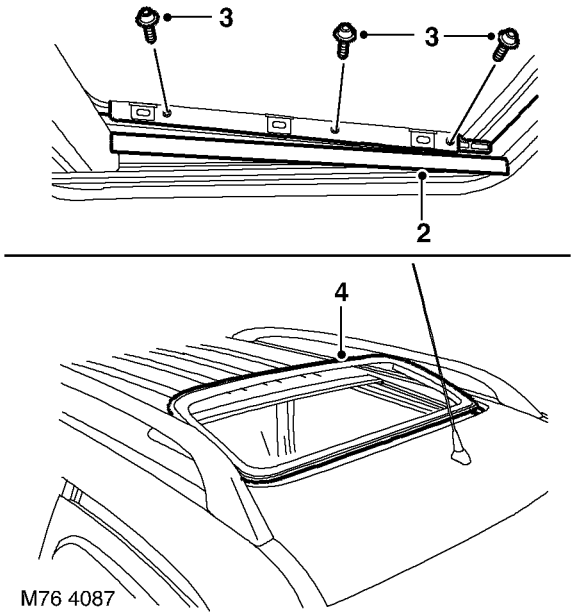
1. Ensure plastic washer and tray seal are in position.
2. With assistance position sun roof assembly, fit and tighten nuts and bolts.
3. Connect multiplug to sun roof.
4. Connect drain tubes to sun roof and secure with cable ties.
5. Fit headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.

Glass panel - sun/sliding roof - front - 5 door

76.84.03

Remove

1. Open sun roof blind.



2. Remove covers from glass securing screws.
3. Remove 6 screws securing glass.
4. Remove glass.

Refit

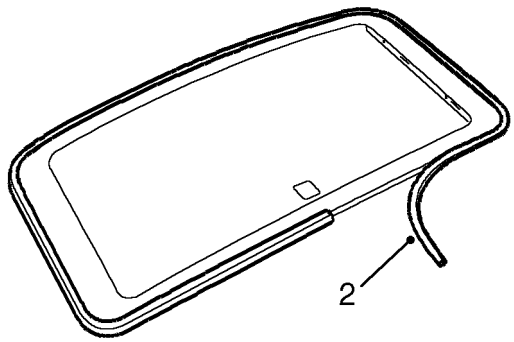
1. Position glass, fit screws but do not tighten at this stage.
2. Align glass to roof and tighten screws, alignment points should be measured 300 mm either side of the centre line.
3. Set front of glass, flush to roof panel to 1.0 mm down.
4. Set rear of glass, flush to roof panel to 1.0 mm up.
5. Fit screw covers.
6. Operate sunroof to check alignment.
7. Close sun roof blind.

Seal - panel glass - sun roof - 5 door

76.84.05

Remove

1. Remove glass panel.
   ☞ **SUNROOF, REPAIRS, Glass panel - sun/sliding roof - front - 5 door.**



2. Release ends of seal from glass and remove seal .

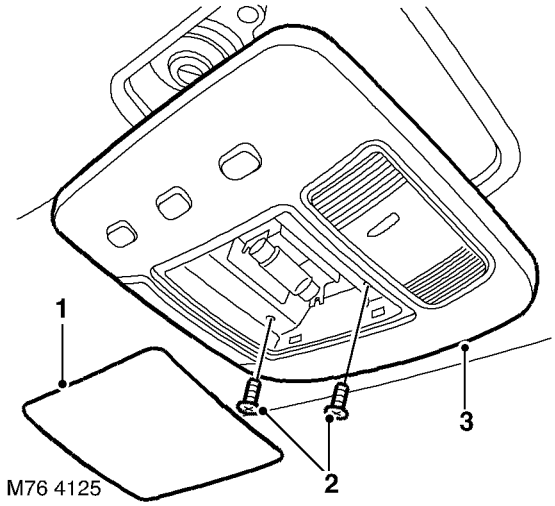
Refit

1. Clean adhesive from glass.
2. Position seal, apply adhesive to ends of seal and secure to glass panel.
3. Fit glass panel.
   ☞ **SUNROOF, REPAIRS, Glass panel - sun/sliding roof - front - 5 door.**

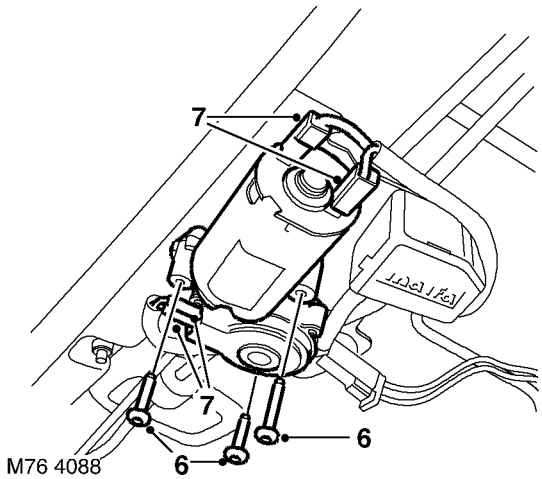
Motor - sun/sliding roof - front - 5 door

76.84.07

Remove



1. Remove lens from front interior lamp.
2. Remove 2 bolts securing front interior lamp to body.
3. Release interior lamp from headlining, disconnect multiplug and remove lamp.
4. Remove headlining to sun roof finisher.
   SUNROOF, REPAIRS, Finisher - flange to headlining - front.
5. Carefully lower front of headlining to access motor.



6. Remove 3 Torx screws securing motor.
7. Release motor from gearbox, lower through headlining, disconnect 4 Lucars and remove motor.

Refit

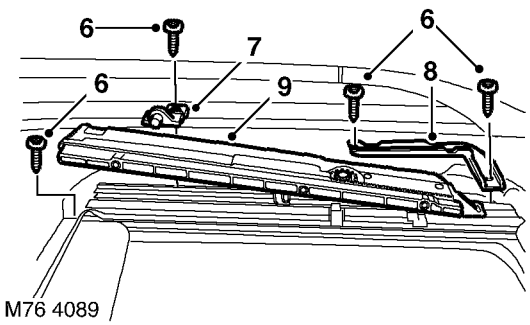
1. Position motor, connect Lucars and fit motor to gearbox.
2. Position sun roof in tilt mode, power motor forward to the first stop (motor and lifting assemblies are then timed together).
3. Fit and tighten Torx screws.
4. Carefully reposition headlining.
5. Fit sun roof finisher.
   SUNROOF, REPAIRS, Finisher - flange to headlining - front.
6. Position front interior lamp and connect multiplug.
7. Fit front interior lamp to headlining and secure with bolts.
8. Fit lens to front interior lamp.

Drive cables & slide assemblies - sun/ sliding roof - front - 5 door

76.84.09

Remove

1. Remove sun roof motor.
   SUNROOF, REPAIRS, Motor - sun/ sliding roof - front - 5 door.
2. Remove glass panel.
   SUNROOF, REPAIRS, Glass panel - sun/sliding roof - front - 5 door.
3. Open sun roof.
4. Release and remove wind deflector.
5. Position sun roof in tilt mode.



6. Remove 4 Torx screws securing lifting assembly to roof.
7. Collect rear cam guide.
8. Slide assembly forward, remove cable guide clamp.
9. Remove lifting assembly and cable.

Refit

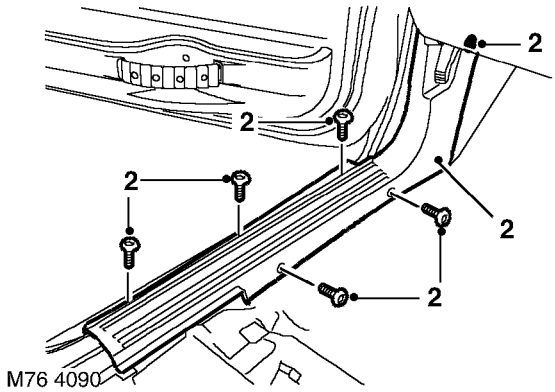
1. Ensure cable tubes are in position, lightly grease the end of cable tube.
2. Engage cable in tube and fit lifting assembly to roof.
3. Fit cable guide clamp, place lifting assembly in tilt mode.
4. Fit rear cam guide.
5. Fit and tighten Torx screws securing lifting assembly to roof.
6. Fit sun roof motor.
   SUNROOF, REPAIRS, Motor - sun/ sliding roof - front - 5 door.
7. Open sun roof.
8. Position wind deflector and secure to sun roof.
9. Fit glass panel.
   SUNROOF, REPAIRS, Glass panel - sun/sliding roof - front - 5 door.

Drain tube - sun/sliding roof - front - each - 5 door

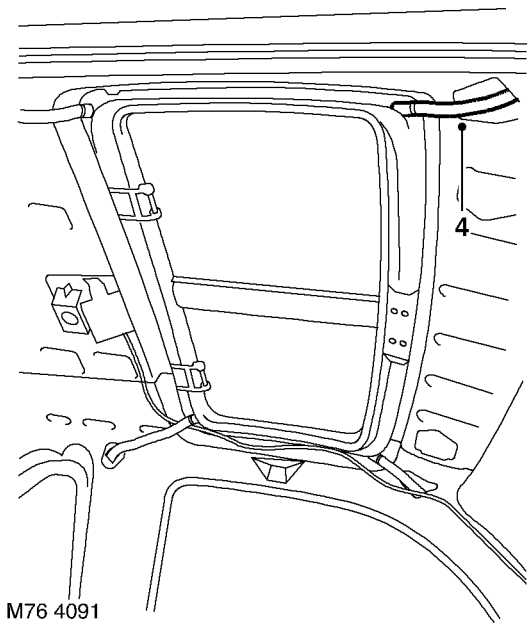
76.84.20

Remove

1. Remove headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.



2. Remove scrivet and 5 Torx screws securing front carpet retainer and remove carpet retainer.
3. Release drain tube from wheel arch grommet.



4. Disconnect drain tube from sun roof and discard cable tie.
5. Attach draw string and remove drain tube.

Refit

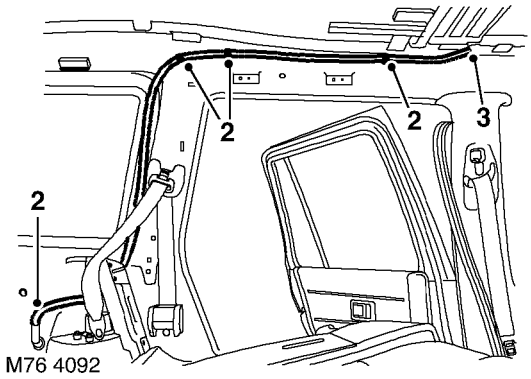
1. Attach draw string to drain tube and pull into position.
2. Connect drain tube to sun roof and secure with new cable tie.
3. Connect drain tube to wheel arch grommet.
4. Secure wheel arch grommet.
5. Fit carpet retainer and secure with Torx screws and scrivet.
6. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**

Drain tube - sun/sliding roof - rear - each - 5 door

🔧 ***76.84.21***

Remove

1. Remove headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**



2. Release drain tube from wheel arch grommet and 3 securing clips.
3. Disconnect drain tube from sun roof and discard cable tie.
4. Remove drain tube.

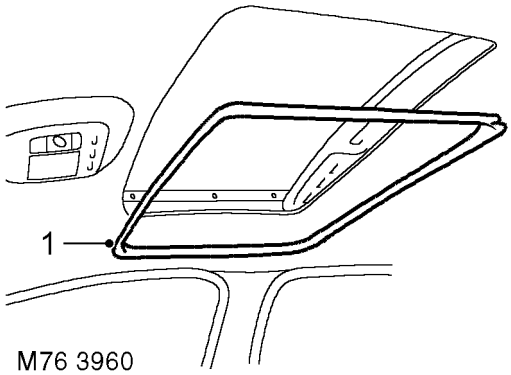
Refit

1. Position drain tube.
2. Connect drain tube to sun roof and secure with new cable tie.
3. Connect drain tube to wheel arch grommet and secure in clips.
4. Secure wheel arch grommet.
5. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**

Finisher - flange to headlining - front

76.84.25

Remove



1. Release sun roof surround finisher from sun roof aperture and remove finisher.

Refit

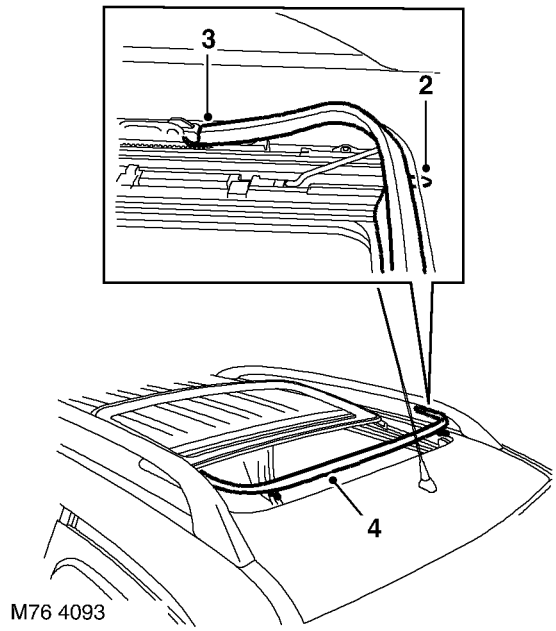
1. Position sun roof surround finisher and secure in position, ensure locating lug is in position at the front of finisher.

Wind deflector - sun/sliding roof - 5 door

76.84.28

Remove

1. Open sun roof.



2. Carefully release wind deflector retaining pegs from roof.
3. Release wind deflector from lifting assemblies.
4. Remove wind deflector.

Refit

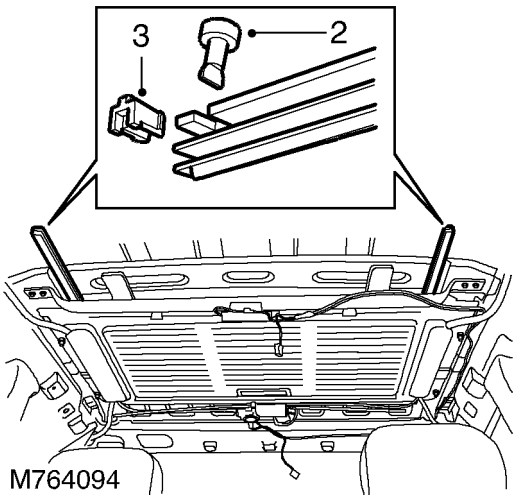
1. Position wind deflector to lifting assemblies and secure in position.
2. Carefully locate retaining pegs under roof.
3. Close sun roof.

Sun blind - front - one - 5 door

76.84.30

Remove

1. Remove headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**



2. Remove 2 blind stops.
3. Remove 2 rubber buffers.
4. Slide blind to the rear of sun roof and remove from guides.

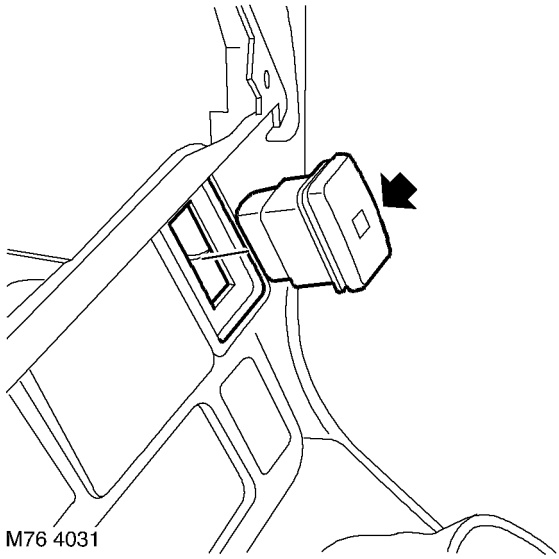
Refit

1. Lubricate guides with isoflex grease.
2. Fit blind to guides and slide into position.
3. Fit blind stops and rubber buffers.
4. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**

Switch - sun/sliding roof - front

76.84.40

Remove



1. Release switch from front console.
2. Disconnect multiplug and remove switch.

Refit

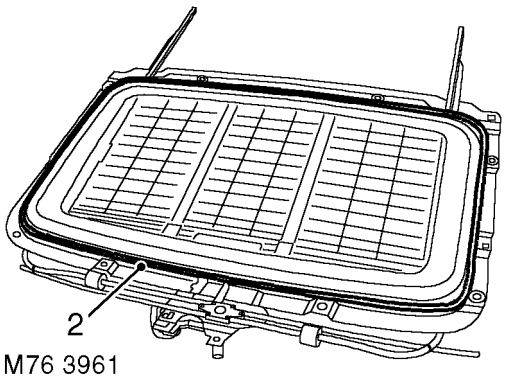
1. Position switch and connect multiplug.
2. Fit switch to front console.

Seal - tray - sun /sliding roof - front - 5 door

76.84.61

Remove

1. Remove sun roof assembly.
   SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 5 door.



M76 3961

2. Remove sun roof tray seal.

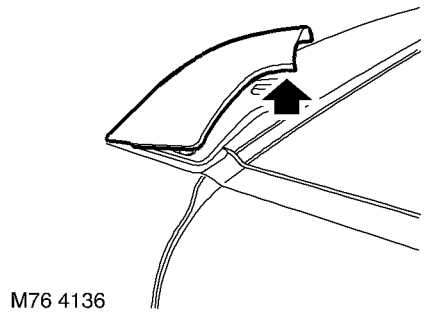
Refit

1. Clean old adhesive from tray.
2. Remove backing from new seal and fit seal to tray.
3. Fit sun roof assembly.
   SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 5 door.

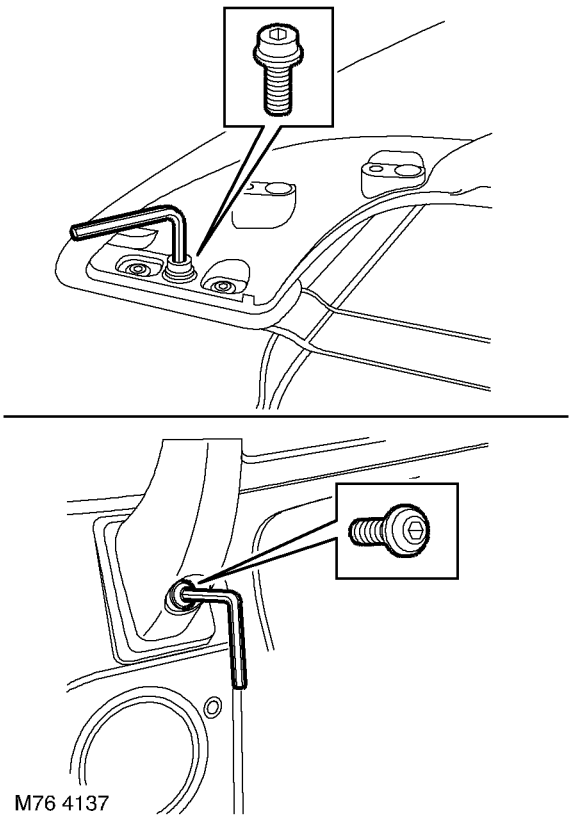
Hard top - remove for access & refit

76.61.01.99

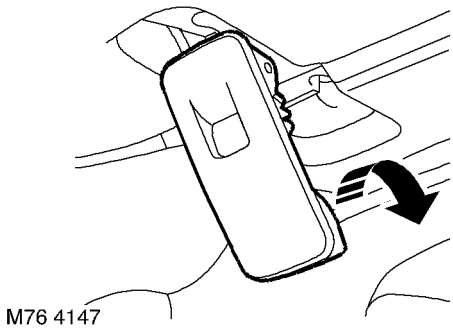
Remove


M76 4136

1. Remove covers from front of roof bars.


M76 4137

2. Remove 4 bolts securing roof bars and with assistance remove roof bars.


M76 4147

3. Release and disengage hard-back catches and with assistance remove hard-back.

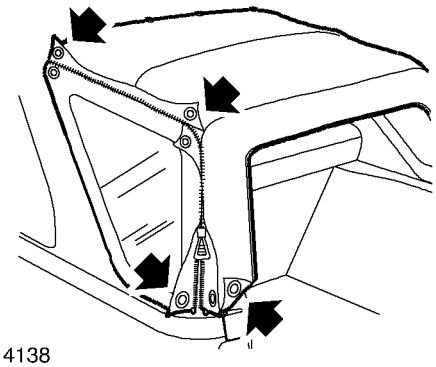
Refit

1. With assistance position hard-back and secure catches.
2. With assistance position roof bars, fit and tighten bolts.
3. Fit roof bar covers.

Frame & hood cover - assembly - remove for access & refit

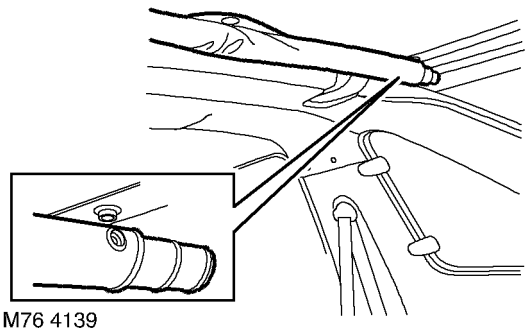
76.61.10.99

Remove



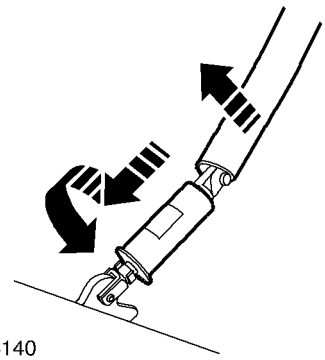
M76 4138

1. Remove both side screens, lift Velcro, release zips and press studs.



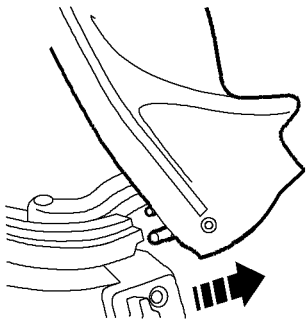
M76 4139

2. Release stowage cover.



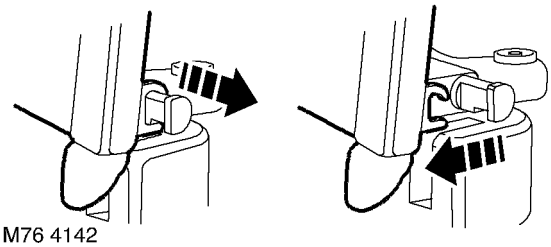
M76 4140

3. Release tension on side bars.



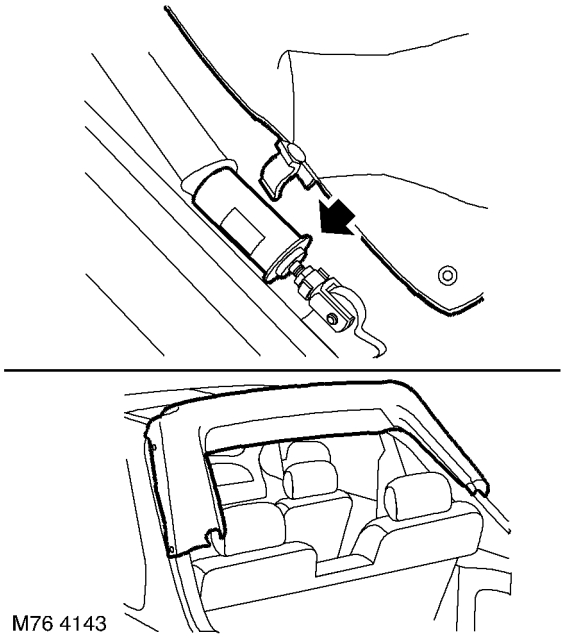
M76 4141

4. Release 'E' post fabric.



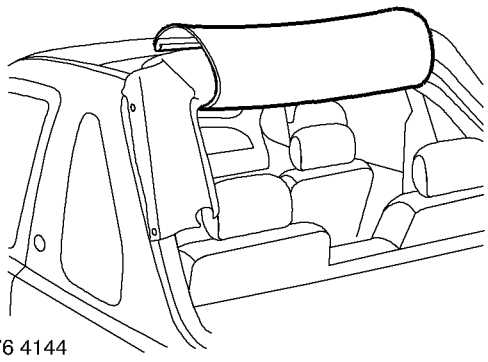
M76 4142

5. Release hood frame from rear lockbars.



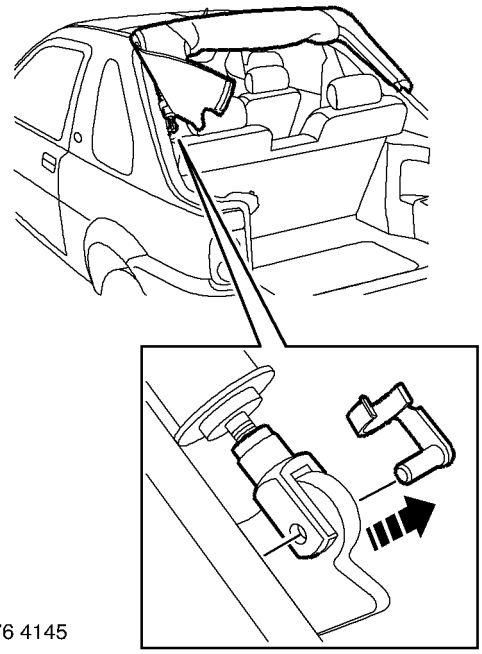
M76 4143

6. Push canvas forward and secure clips in bars.



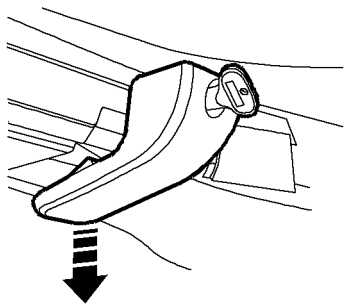
M76 4144

7. Wrap up tonneau and secure in place.



M76 4145

8. Release and remove hinge pins, release tension bars.



M76 4146

9. Loosen header clamp bolts and release header clamps.

10. Remove soft back assembly.

Refit

1. Position soft back assembly, secure in header clamps.
2. Tighten header clamps.
3. Align tension bars and fit hinge pins.
4. Release tonneau from securing tie.
5. Release clips in bars and pull canvas to the rear.
6. Secure tail door frame lock in lock bars.
7. Secure 'E' post fabric in position.
8. Tension side bars.
9. Position tonneau cover.
10. Fit side screens, secure zips and press studs and position Velcro covers.

Hood outer cover

76.61.11

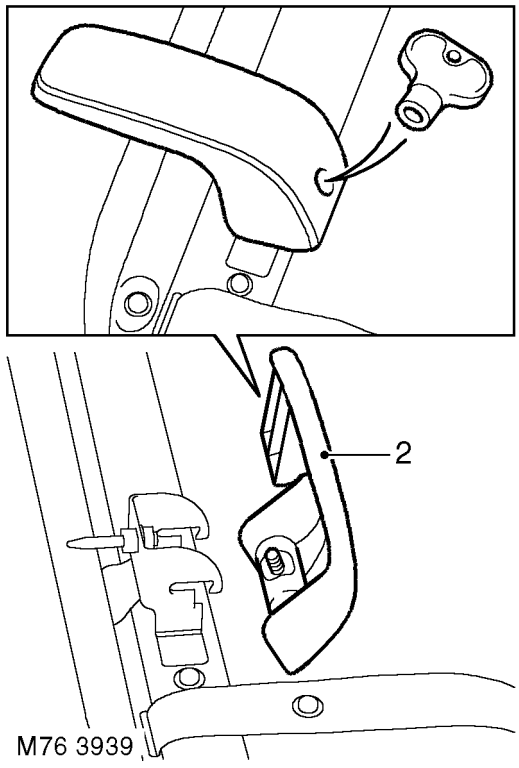
Always position trim components on a soft covered, clean work surface.

Where necessary, transfer witness marks from the old cover to aid assembly. New outer covers are supplied complete with the header rail.

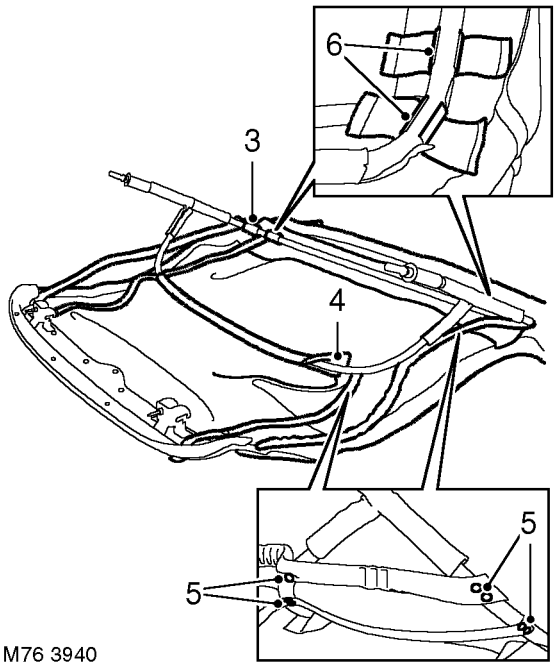
The following operation involves the bonding of fabric backed vinyl. If adhesive is to be applied to the fabric backing, Dunlop 758 adhesive or equivalant should be used. For direct application on vinyl surfaces, use Dunlop S1588 adhesive or equivalant. A thin coating of adhesive should be applied to both surfaces and then allowed to cure, until touch dry, for between 5 and 10 mins before bond is made.

Remove

1. Remove soft-back assembly.
   ☞ **HOOD, REPAIRS, Hard top - remove for access & refit.**



2. Loosen catch screws with special key, release catches from hood and remove both catches.



M76 3940

3. Release fabric flaps from rear of frame.
4. Release fabric flap from front of frame.
5. Remove 14 screws securing tension straps
6. Release frame from outer cover retainers.
7. Remove frame from outer cover.

Refit

1. Clean excess adhesive from frame using a suitable solvent.
2. Position frame to hood outer cover and locate in retainers.
3. Position tension straps and secure with screws.
4. Apply adhesive to fabric flap and secure to front of frame.
5. Apply adhesive to fabric flaps and secure to rear of frame.

   Ensure adhesive does not contact frame.

   The fabric flaps should be free to move on the frame.

6. Fit hood catches and secure with special key.
7. Fit soft back assembly.

   HOOD, REPAIRS, Hard top - remove for access & refit.

Glass - body side - hard back

76.61.29

Always position trim components on a soft covered, clean work surface.

Wear protective gloves when handling glass, solvents and primers.

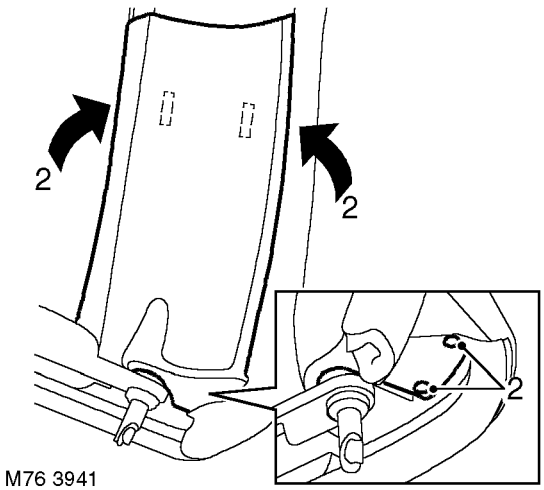
Wear suitable eye protection when removing and refitting glass.

The following equipment is required: ```Cutting wire and handles ```Sharp knife ```Windscreen repair kit ```Sealer applicator gun ```Suction cups

Remove

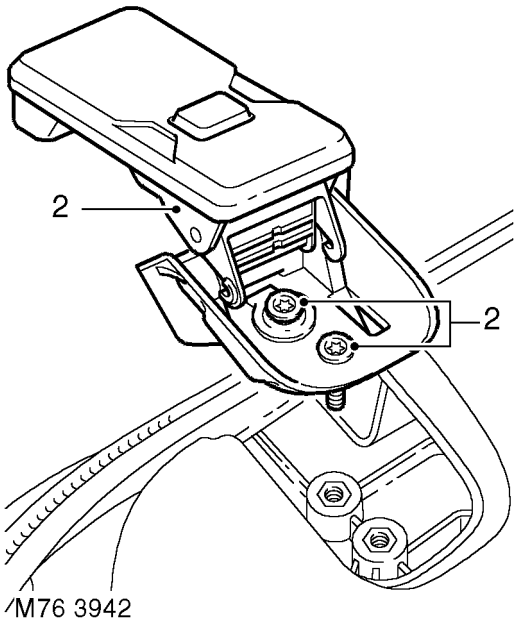
1. Remove hard-back.

   HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.

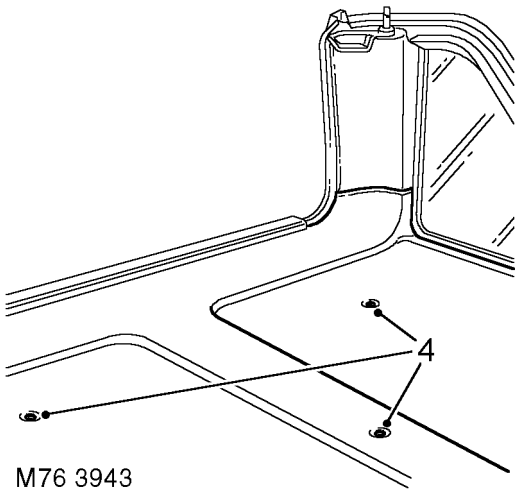


M76 3941

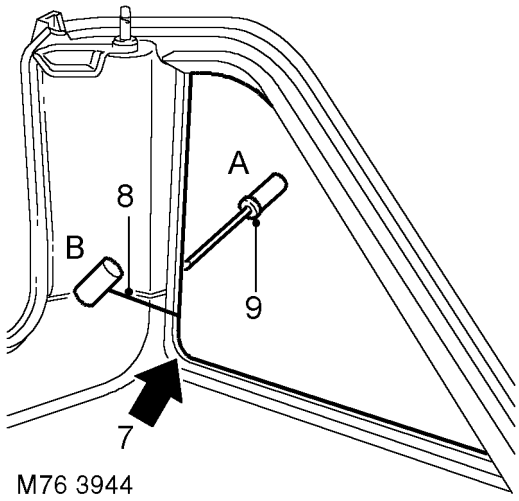
2. Remove 2 screws securing 'E' post finisher, release finisher from clips and remove finisher.



3. Remove 4 Torx screws securing hard-back catches, slide catches from position and remove catches.



4. Remove 3 Torx screws securing headlining release headlining from hard-back seal and remove headlining.
5. Cover interior of hard-back with protective sheet.
6. Apply masking tape to protect paintwork.



7. Make knife cut in sealant at bottom of 'E' post.
8. Insert cutting wire through previously made knife cut and fit handles as shown, with approximately 200 mm of wire between handles.
9. With assistance, wedge tube of handle **A** between glass and body, ahead of cutting position, and carefully cut sealer using a continuous pull on handle **B** from the outside. Ensure that glass is retained as last sealant is cut.

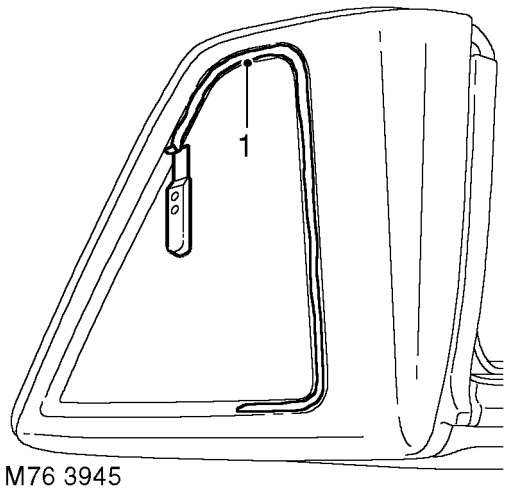
If multi-strand cutting wire is used, a sawing action can be used to cut through heavy sealant deposits around corners.

Use of a sawing action may overheat and break single strand wire.

10. Attach suction cup and remove glass body.

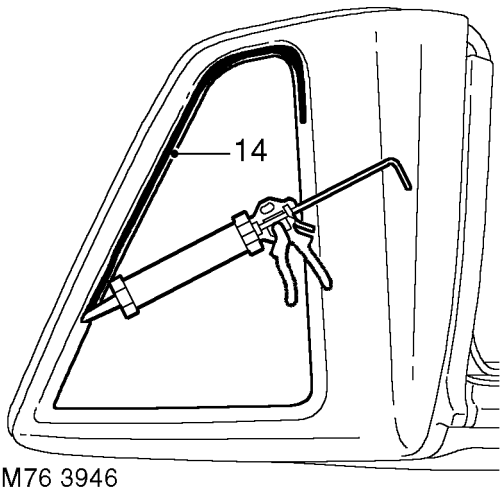
Lay glass on felt covered supports. Do not stand on edge. Any chipping of glass edge may develop into cracks.

Refit



M76 3945

1. Carefully remove excess sealer from body leaving a smooth surface.
2. Use a vacuum cleaner to clear away any waste.
3. Original glass: Carefully cut back old sealant to obtain a smooth surface without damaging obscuration band on glass.
4. With assistance, locate glass to body.
5. Apply masking tape reference marks to aid fitment.
6. Remove glass and place aside.
7. Clean frame and edge of glass with solvent.
   Do not touch cleaned or primed surfaces with fingers.
8. Repair any damaged paintwork as necessary.
9. Apply bonding agent to glass and allow to cure.
10. Apply activator over old sealer on frame.
11. Allow activator to cure.
12. Apply primer to frame.
13. Fit pre-cut nozzle to sealer cartridge, remove lid and shake out crystals, and install in applicator gun.
    Nozzle will need modification to achieve required bead section.



M76 3946

14. Apply a continuous bead of sealer around edge of frame as shown. Make bead slightly thicker at each corner.
15. Check for breaks and air bubbles in sealer.
16. Position glass to body and align to reference tape.
17. Lightly press glass to fully seat sealer.
18. Secure glass with tape until sealer has cured.
19. Remove protective covers and tape.
20. Test seal for leaks, apply additional sealer if necessary. If water is used, allow sealer to dry before testing. Spray water around glass and check for leaks. Dry affected area and apply additional sealer if necessary.
21. Position headlining and locate hardback seal.
22. Secure headlining with Torx screws.
23. Position catches, fit Torx screws and tighten to 10 Nm (7.5 lbf.ft).
24. Fit 'E post finishers, engage in clips and secure with screws.
25. Fit Hard-back.

☞ **HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.**

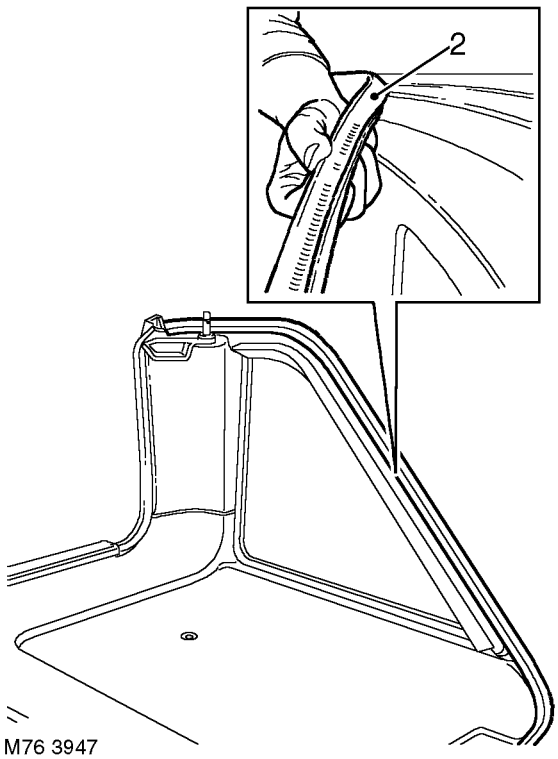
Seal - hard back - primary

76.61.34

Always position trim components on a soft covered, clean work surface.

Remove

1. Remove hard back.
   HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.



2. Release seal from flange around hard back frame and remove seal.

Refit

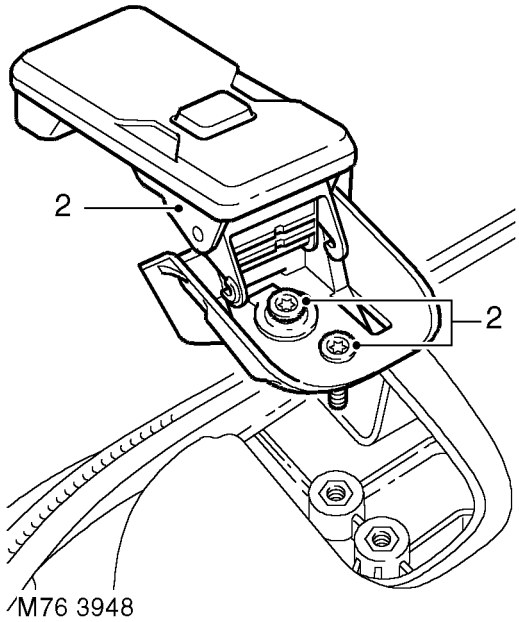
1. Clean seal flange.
2. Position seal and secure to flange.
3. Secure ends of seal to hard-back frame using Butyl Rubber adhesive if necessary.
4. Fit hard back.
   HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.

Catch and retainer - hard-back - front

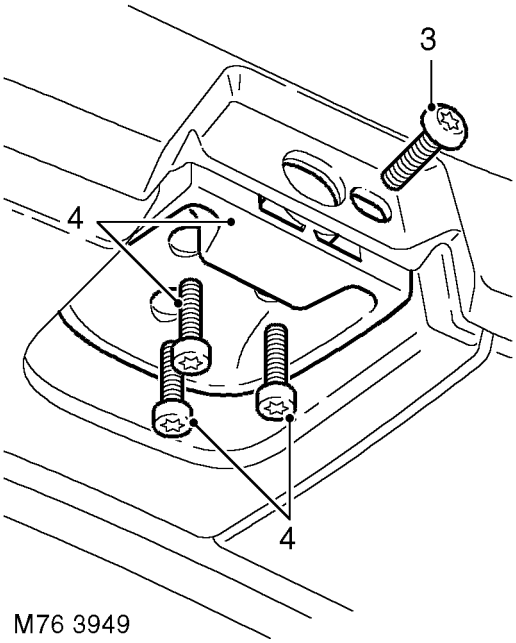
76.61.94

Remove

1. Remove hard-back.
   HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.



2. Remove 2 Torx screws securing catch, slide catch from position and remove catch.



M76 3949

3. Remove Torx screw securing roof finisher to hard-back retainer.
4. Remove 3 Torx screws securing hard-back retainer and remove retainer.

Refit

1. Position hard-back retainer, fit Torx screws and tighten to 10Nm (7.5 lbf.ft).
2. Fit Torx screw securing roof finisher.
3. Position catch, fit Torx screws and tighten to 10 Nm (7.5 lbf.ft).

   Ensure formed washer is correctly located in catch recess.

4. Fit hard-back.

   ☞ **HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.**

Catch and retainer - hard-back - rear

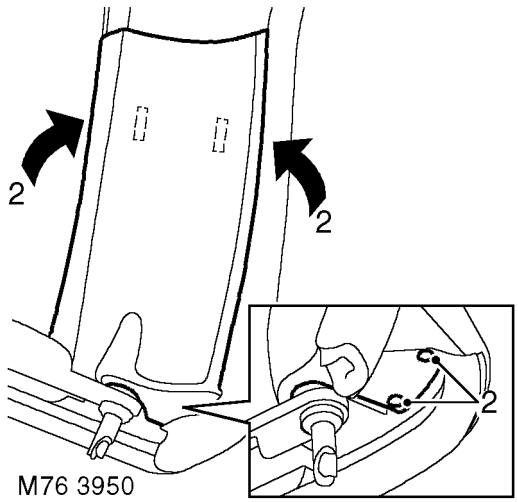
🔧 ***76.61.95***

Remove

1. Remove hard-back or soft-back.

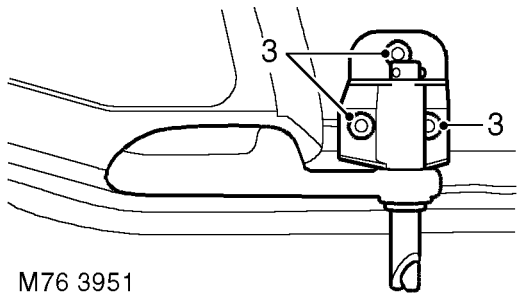
   ☞ **HOOD, REPAIRS, Hard top - remove for access & refit.**

   ☞ **HOOD, REPAIRS, Hard top - remove for access & refit.**



M76 3950

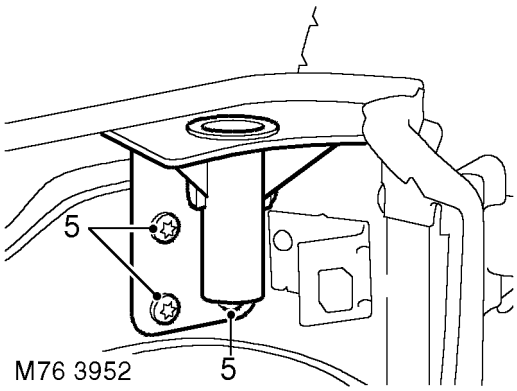
2. Remove 2 screws securing 'E' post finisher, release finisher from 2 clips and remove finisher.



M76 3951

3. Remove 3 Torx screws securing catch and remove catch.
4. Remove lower rear quarter trim casing.

   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**



5. Remove 3 Torx screws securing hard-back retainer and remove retainer.

Refit

1. Position catch, fit Torx screws and tighten to 10Nm (7.5 lbf.ft).
2. Position 'E' post finisher, engage in clips and secure with screws.
3. Position hard-back retainer, fit Torx screws and tighten to 10 Nm (7.5 lbf.ft).
4. Fit lower rear quarter trim casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
5. Fit hard-back or soft-back.
   ☞ **HOOD, REPAIRS, Hard top - remove for access & refit.**
   ☞ **HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.**

Dimensional Information

Measurement Types

The following dimensional information is shown so as to assist the technician in the diagnosis and repair of body panels. The information is shown in two different ways. There are X,Y,Z dimensions and actual point to point dimensions.

The X,Y,Z dimensions are the measuring planes used within Land Rover for the measurement of body panels. The whole bodyshell is within a parallel grid system, see illustrations below.

The X plane is an imaginary vertical plane starting at the front of the vehicle. It is at right angles to the centre line of the vehicle and measures distances along the length of the vehicle.

The Y plane is an imaginary plane through the centre of the vehicle. All Y dimensions start from this plane. As a rule, body dimensions are symmetrical about the centre line.

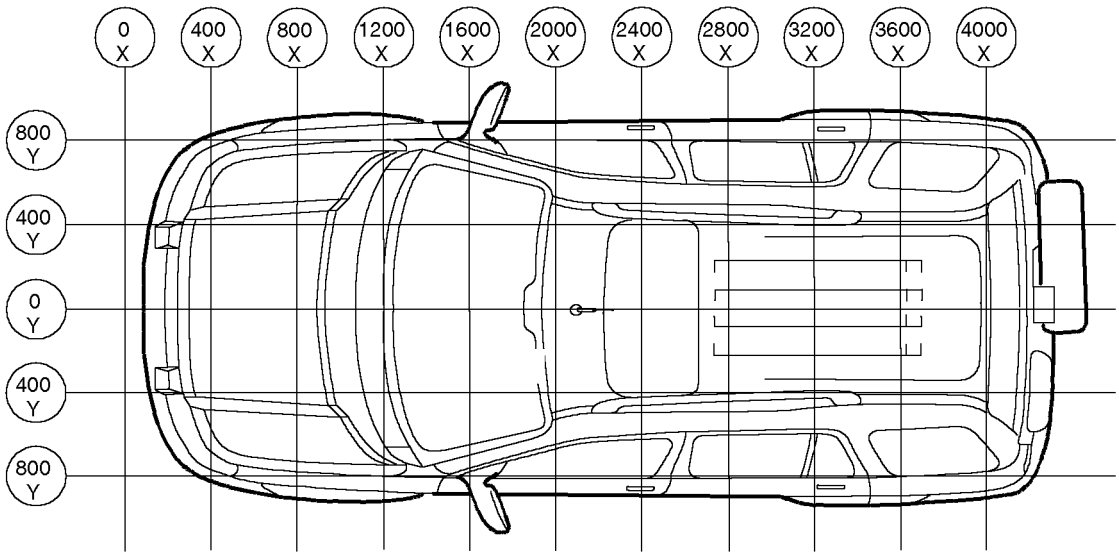
The Z plane is set at a fixed distance parallel to the underside of the vehicle. All Z dimensions start from this plane.

The point to point measurements are actual distances between two points. These points can be holes or intersection points. Where holes are taken, the point of measurement is always from the hole centre.

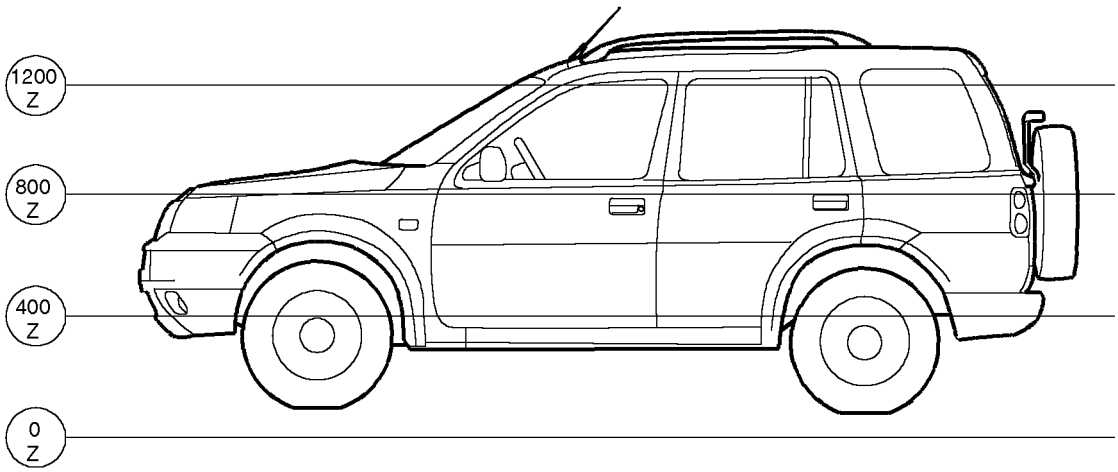
Measurements shown are in millimetres and inches. The measurements shown in brackets are in inches.

The **tolerance** for the basic geometry of the vehicle is ± 1.0 mm (0.040). This includes tooling holes, all fixing holes and apertures.

The tolerance for matching panel form and break lines is ± 0.5 mm (0.020).



M77 1904

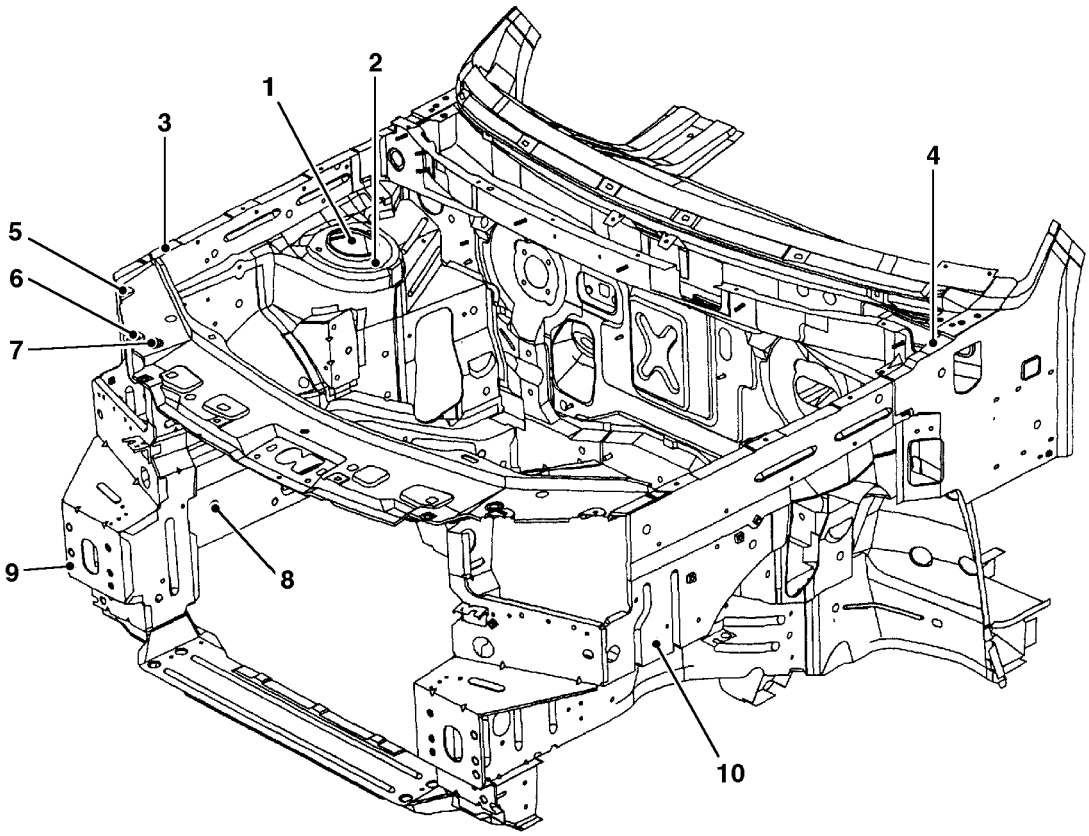


M77 1905

Dimensional Illustrations

X,Y,Z Dimensional Information

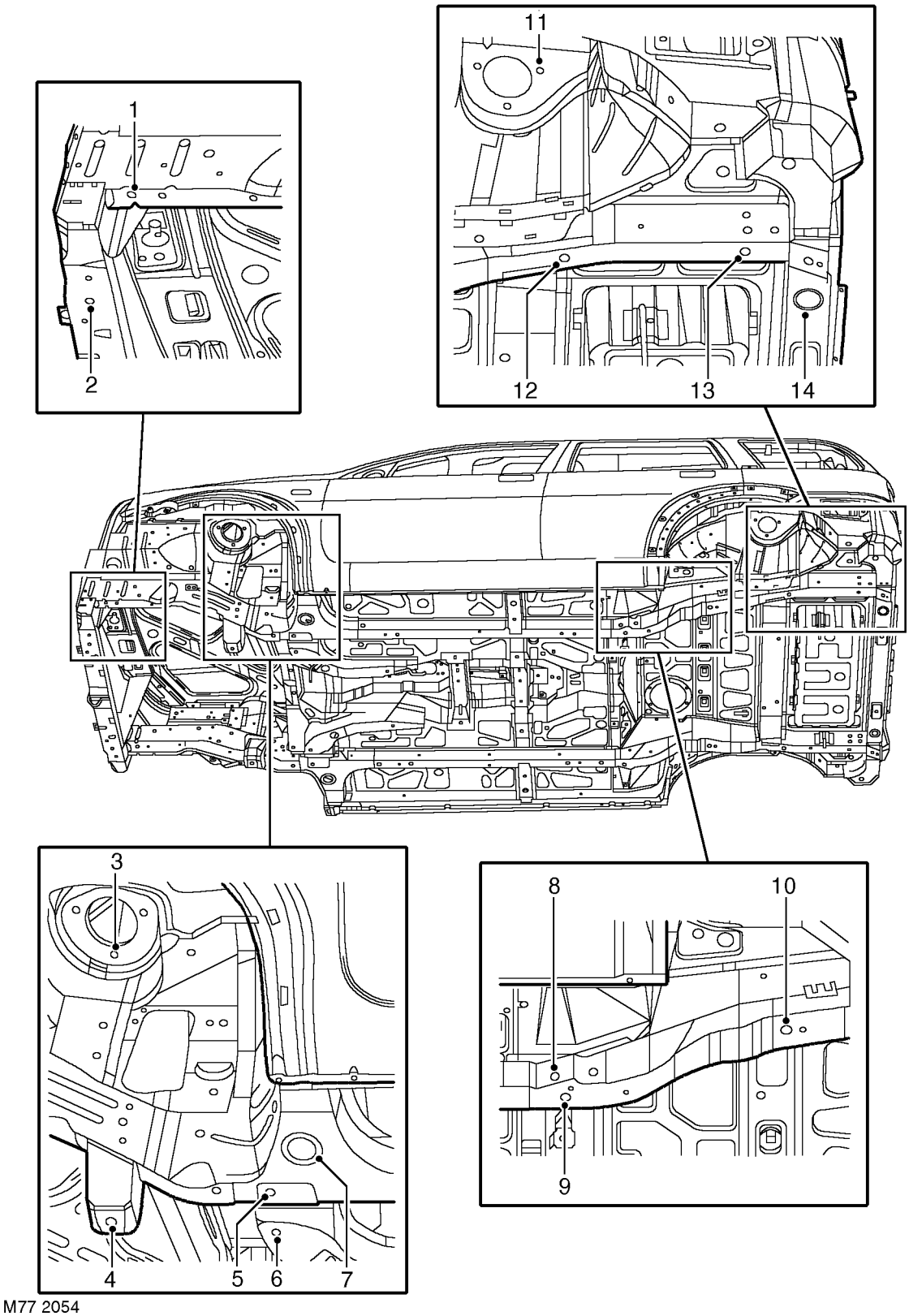
Front end dimensional information



M77 2035

No.	Description	X	Y	Z
1	Front damper large hole	977 (38.464)	578.5 (22.775)	718.5 (28.287)
2	Front damper, inboard fixing hole	975.4 (38.401)	514.9 (20.271)	693.7 (27.311)
3	Wing, front fixing	605 (23.818)	669 (26.338)	806 (31.732)
4	Wing, rear fixing,	1220 (48.031)	690 (27.165)	848.2 (33.393)
5	Outboard headlamp fixing hole	465 (18.307)	615 (24.212)	788 (31.023)
6	Inboard headlamp fixing hole	377 (14.842)	485 (19.094)	772 (30.393)
7	Bonnet locking platform, jig location hole	390 (15.354)	445 (17.519)	765 (30.118)
8	Sidemember, jig location hole	500 (19.685)	446 (17.559)	388 (15.275)
9	Headlamp mounting panel, jig location hole	239 (9.409)	536 (21.102)	335 (13.188)
10	Front valance, jig location hole	540 (21.259)	671.7 (26.444)	525 (20.669)

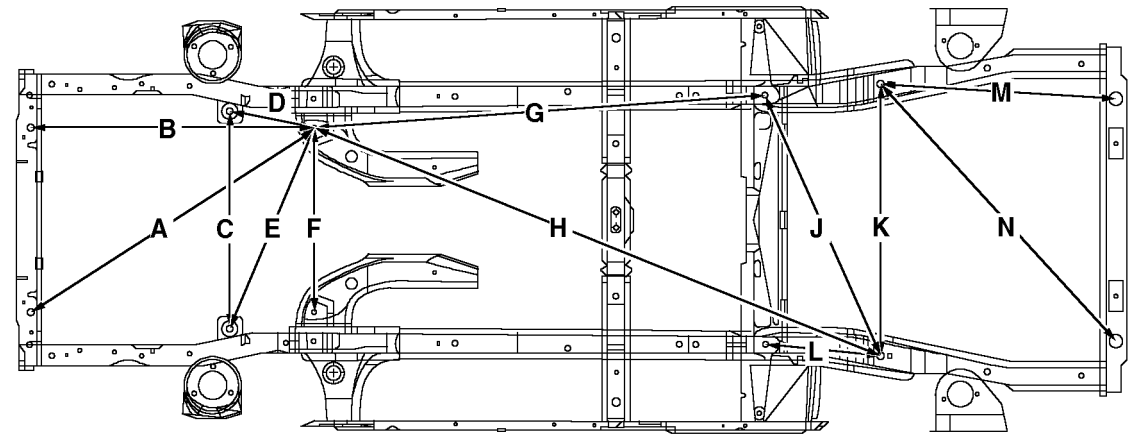
Underbody dimensional information



M77 2054

No.	Description	X	Y	Z
1	Front sidemember, jig location hole	420 (16.534)	481 (18.937)	312 (12.283)
2	Front crossmember, jig location hole	340.5 (13.405)	350 (13.779)	154 (6.062)
3	Front damper, inboard fixing hole	975.5 (38.405)	515 (20.275)	693.5 (27.303)
4	Front subframe, front fixing	1036 (40.787)	386 (15.196)	98 (3.858)
5	Front subframe, rear outboard fixing	1326 (52.204)	429.5 (16.909)	127 (5.0)
6	Front subframe, rear inboard fixing	1326 (52.204)	330 (12.992)	127 (5.0)
7	Outrigger panel, jig location hole	1395 (54.921)	535 (21.062)	125 (4.921)
8	Link arm fixing, centre hole	2765 (108.858)	463 (18.228)	160 (6.299)
9	Rear longitudinal front, jig location hole	2900 (114.173)	432 (17.007)	131.5 (5.177)
10	Rear subframe, front mounting hole	3302 (130.0)	465 (18.307)	274.5 (10.807)
11	Spring location, rear fixing hole	3636 (143.149)	610 (24.015)	728.5 (28.681)
12	Rear subframe, rear fixing	3671.5 (144.547)	515 (20.275)	305 (12.007)
13	Rear longitudinal rear, jig location hole	4000 (157.480)	527 (20.748)	305 (12.007)
14	Rear crossmember, jig location hole	4122.5 (162.303)	410 (16.141)	301 (11.850)

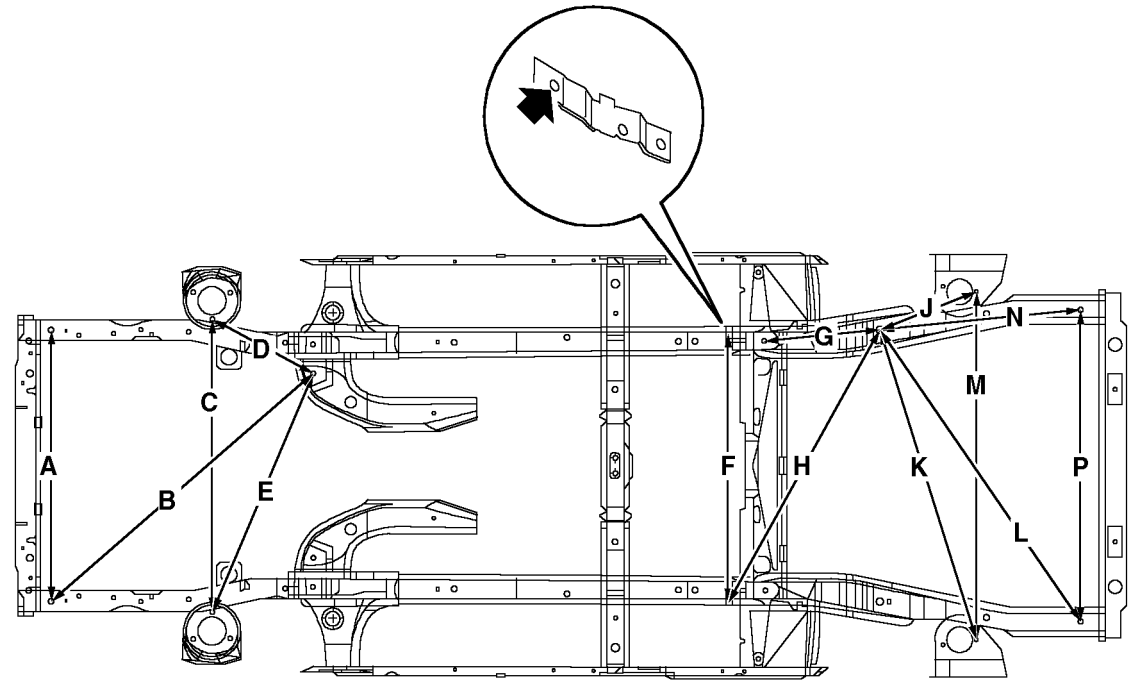
Under body information



M77 2059

Item	From	To	Length
A	Front crossmember, jig location hole	Front subframe, rear mounting hole	1197.3 (47.137)
B	Front crossmember, jig location hole	Front subframe, rear mounting hole	985.7 (38.807)
C	Front Subframe, front mounting hole `LH`	Front subframe, front mounting hole `RH`	772.0 (30.393)
D	Front subframe, front mounting hole	Front subframe, rear mounting hole	295.3 (11.625)
E	Front subframe, front mounting hole	Front subframe, rear mounting hole	772.5 (30.413)
F	Front subframe, rear mounting hole `RH`	Front subframe rear mounting hole `LH`	660.0 (25.984)
G	Front subframe, rear mounting hole	Rear longitudinal front, jig location hole	1577.3 (62.098)
H	Front subframe, rear mounting hole	Rear subframe, front mounting hole	2129.9 (83.854)
J	Rear longitudinal front, jig location hole	Rear subframe, front mounting hole	983.0 (38.700)
K	Rear subframe, front mounting hole `LH`	Rear subframe front mounting hole `RH`	930.0 (36.614)
L	Rear longitudinal front, jig location hole	Rear subframe, front mounting hole	403.4 (15.881)
M	Rear subframe, front mounting hole	Rear crossmember, jig location hole	822.3 (32.374)
N	Rear subframe, front mounting hole	Rear crossmember, jig location hole	1199.5 (47.224)

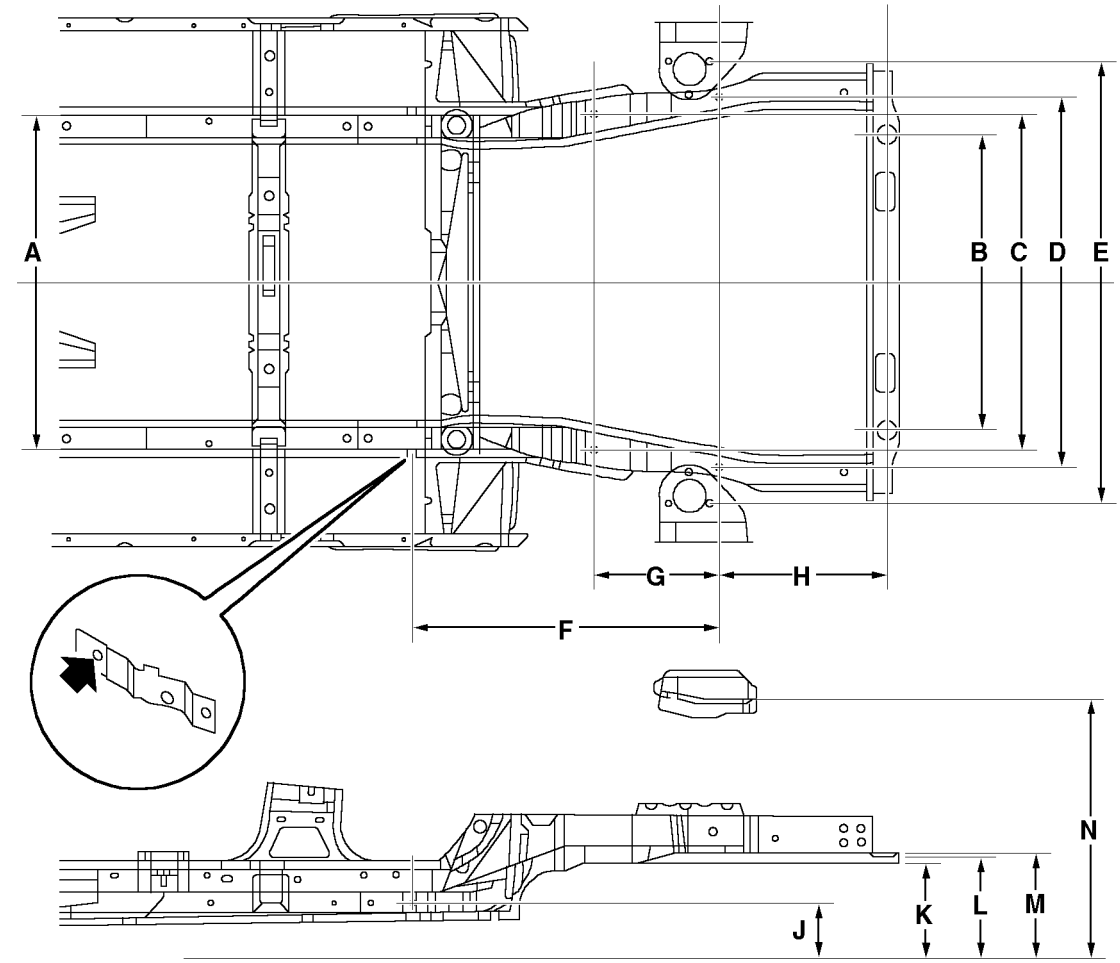
Under body information



M77 2060

Item	From	To	Length
A	Sidemember, forward jig location hole `LH`	Sidemember, forward jig location hole `RH`	962 (37.874
B	Sidemember, forward jig location hole	Front subframe, rear mounting hole	1216.0 (47.874
C	Spring location, inboard fixing hole `LH`	Spring location, inboard fixing hole `RH`	1029.8 (40.543)
D	Spring location, inboard fixing hole	Front subframe, rear mounting hole	396.4 (15.606)
E	Spring location, inboard fixing hole	Front subframe, rear mounting hole	914.8 (36.015)
F	Link arm fix, `LH`	Link arm fix, `RH`	926.2 (36.464)
G	Rear longitudinal front, jig location hole	Rear subframe, front mounting hole	403 (15.866)
H	Link arm fix	Rear subframe, front mounting hole	1072.2 (42.212)
J	Rear subframe, front mounting hole	Spring location, rear hole	364.2 (14.338)
K	Rear subframe, front mounting hole	Spring location, rear fixing hole	1125.7 (44.318)
L	Rear subframe, front mounting hole	Rear longitudinal rear, jig location hole	1213.0 (47.755
M	Spring location, rear fixing hole `LH`	Spring location, rear fixing hole `RH`	1220.0 (48.031
N	Rear subframe, front mounting hole	Rear longitudinal rear, jig location hole	700.7 (27.586)
P	Rear longitudinal rear, jig location hole `LH`	Rear longitudinal rear, jig location hole `RH`	1054.0 (41.496)

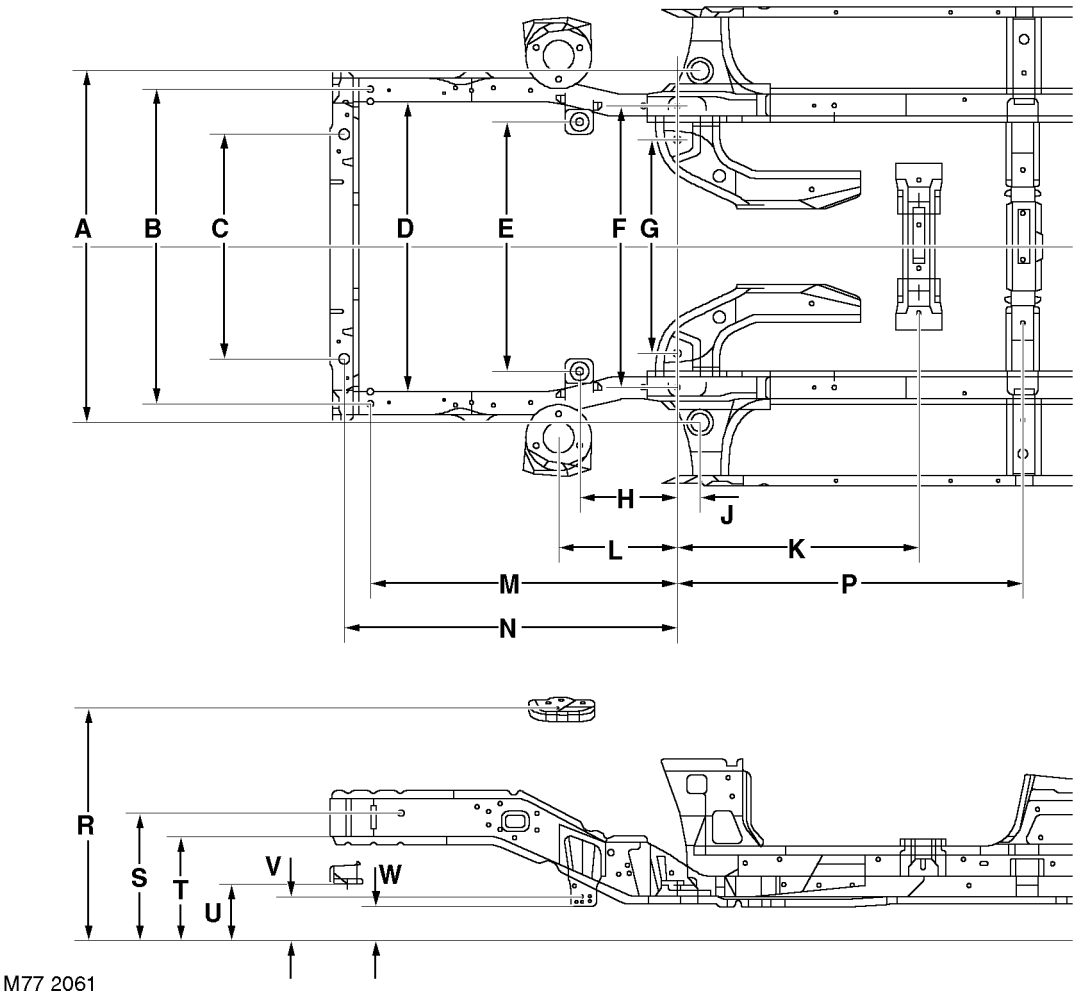
Under body information



M77 2028

Item	From	To	Length
A	Link arm fix, `LH`	Link arm fix, `RH`	926.2 (36.464)
B	Rear crossmember, jig location hole `LH`	Rear crossmember, jig location hole `RH`	820 (32.283)
C	Rear subframe, front mounting hole `LH`	Rear subframe, front mounting hole `RH`	930 (36.614)
D	Rear subframe, rear mounting hole `LH`	Rear Subframe, rear mounting hole `RH`	1030 (40.551)
E	Spring location, rear fixing hole `LH`	Spring location, rear fixing hole `RH`	1219.9 (48.027)
F	Link arm fix	Rear subframe, rear mounting hole	906.7 (35.696)
G	Rear Subframe, front mounting hole	Rear subframe, rear mounting hole	369.7 (14.555)
H	Rear subframe, rear mounting hole	Rear crossmember, jig location hole	450.8 (17.748)
J	Zero `Z` datum	Link arm fix	160 (6.299)
K	Zero `Z` datum	Rear longitudinal rear, jig location hole	272.8(10.740)
L	Zero `Z` datum	Rear crossmember, jig location hole	299.5 (11.791)
M	Zero `Z` datum	Rear longitudinal rear, jig location hole	303.5 (11.948)
N	Zero `Z` datum	Spring location, rear fixing hole	728.5 (28.681)

Under body information

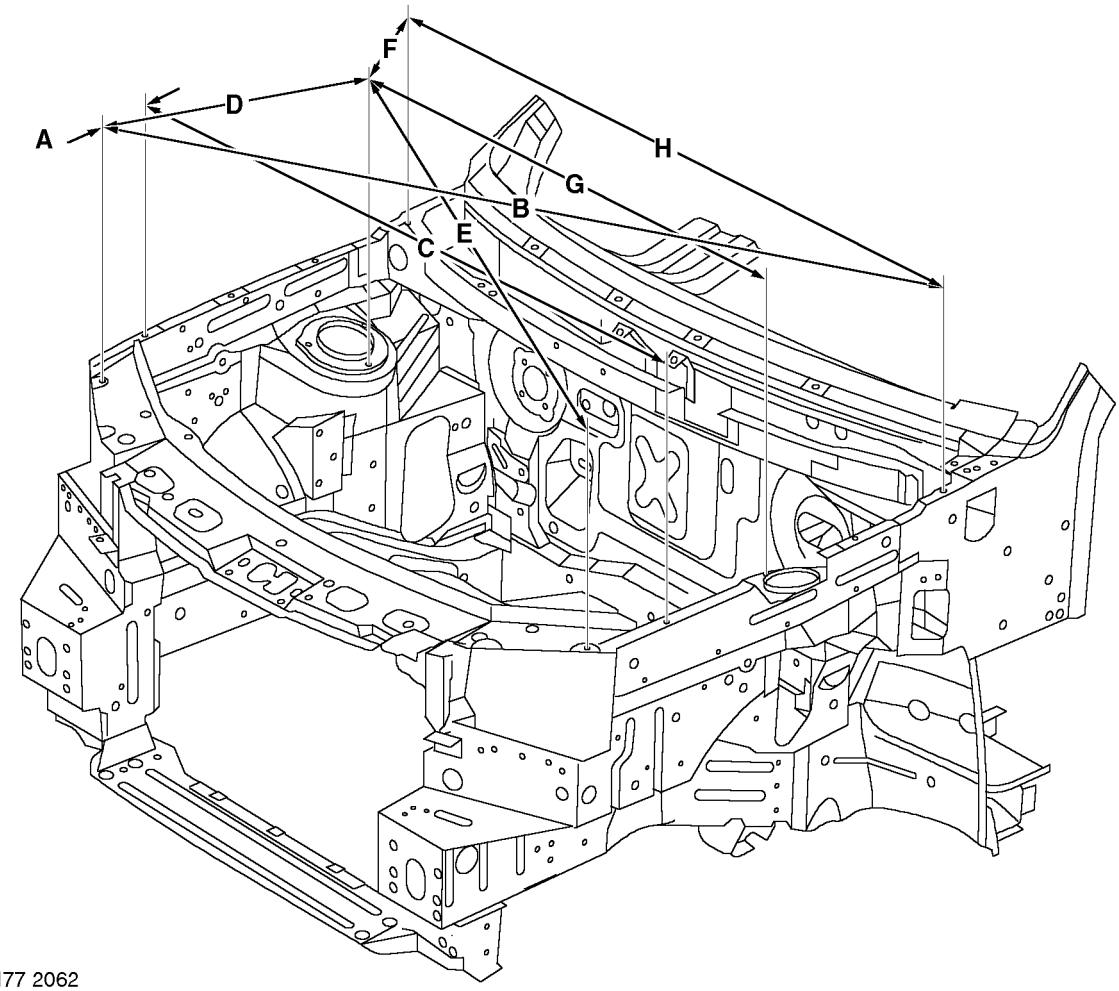


M77 2061

Item	From	To	Length
A	Outrigger panel, jig location hole 'LH'	Outrigger panel, jig location hole 'RH'	1070 (42.1250)
B	Sidemember, forward jig location hole 'LH'	Sidemember, forward jig location hole 'RH'	962 (37.874)
C	Front crossmember, jig location hole 'LH'	Front crossmember, jig location hole 'RH'	700 (27.559)
D	Sidemember, jig location hole 'LH'	Sidemember jig location hole 'RH'	892 (35.118)
E	Front subframe, front mounting hole 'LH'	Front subframe, front mounting hole 'RH'	772 (30.393)
F	Front subframe, rear outer mounting hole 'LH'	Front subframe, rear outer mounting hole 'RH'	859 (33.818)
G	Front subframe, rear inner mounting hole 'LH'	Front subframe, rear inner mounting hole 'RH'	660 (25.984)
H	Front subframe, front mounting hole	Front subframe, rear mounting hole	290 (11.417)
J	Outrigger panel, jig location hole	Front subframe, rear mounting hole	69 (2.716)
K	Front subframe, rear mounting hole	Tunnel front cross member, jig location hole	748 (29.448)
L	Spring location, hole	Front subframe, rear mounting hole	350.6 (13.803)
M	Sidemember, forward jig location	Front subframe, rear mounting hole	906 (35.669)
N	Front crossmember, jig location hole	Front subframe, rear mounting hole	985.5 (38.799)
P	Front subframe, rear mounting hole	Tunnel rear cross member, jig location	1051 (41.377)

R	Zero 'Z' datum	Spring location, inboard fixing hole	693.7 (27.311)
S	Zero 'Z' datum	Sidemember, jig location hole	388 (15.275)
T	Zero 'Z' datum	Sidemember, bottom jig location hole	312 (12.283)
U	Zero 'Z' datum	Front crossmember, jig location hole	154 (6.062))
V	Zero 'Z' datum	Front subframe, front mounting hole	125 (4.921)
W	Zero 'Z' datum	Front subframe, rear mounting hole	95.8 (3.771))

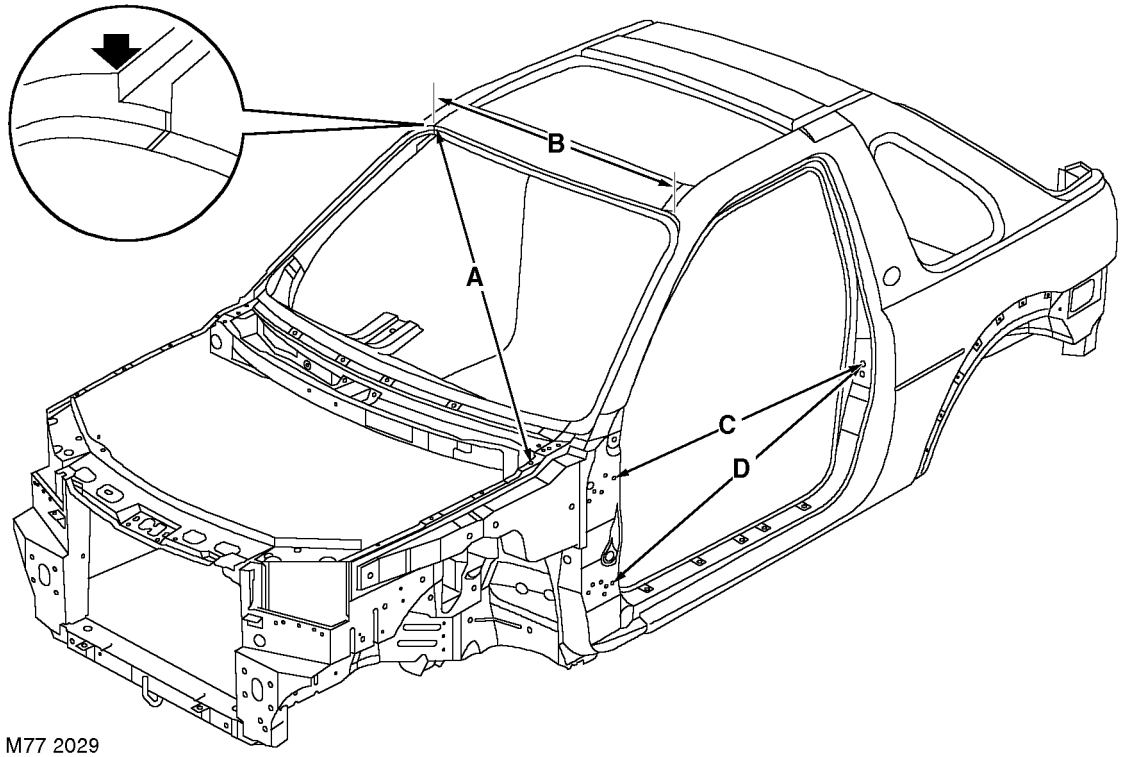
Front end point to point information



M77 2062

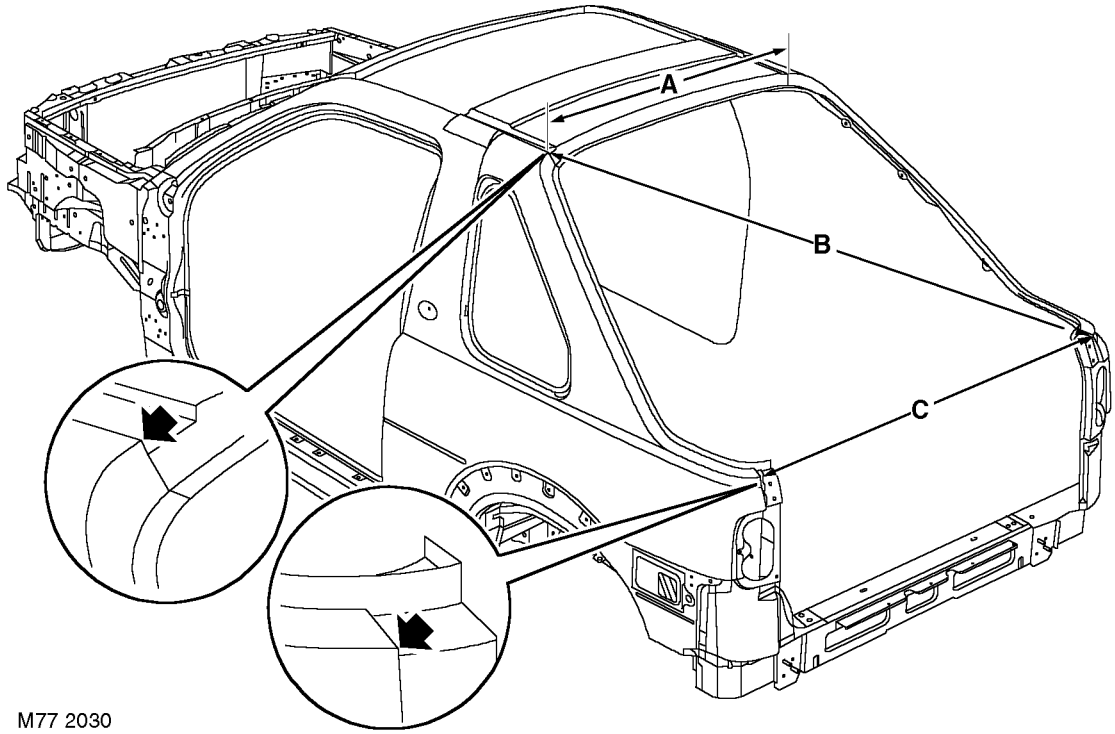
Item	From	To	Length
A	Headlamp fixing	Wing, forward fixing	150 (5.905)
B	Headlamp fixing	Wing, rear fixing	1507.7 (59.358)
C	Wing, forward fixing `LH`	Wing, forward fixing `RH`	1338 (13.307)
D	Headlamp fixing	Spring location, inboard hole	520.1 (20.476)
E	Spring location, inboard hole	Headlamp fixing	1239.9 (48.814)
F	Spring location, inboard hole	Wing, rear fixing	300.8 (11.842)
G	Spring location, inboard hole `LH`	Spring location, inboard hole `RH`	1029.8 (40.543)
H	Wing, rear fixing `LH`	Wing, rear fixing `RH`	1380 (54.330)

Front and side information



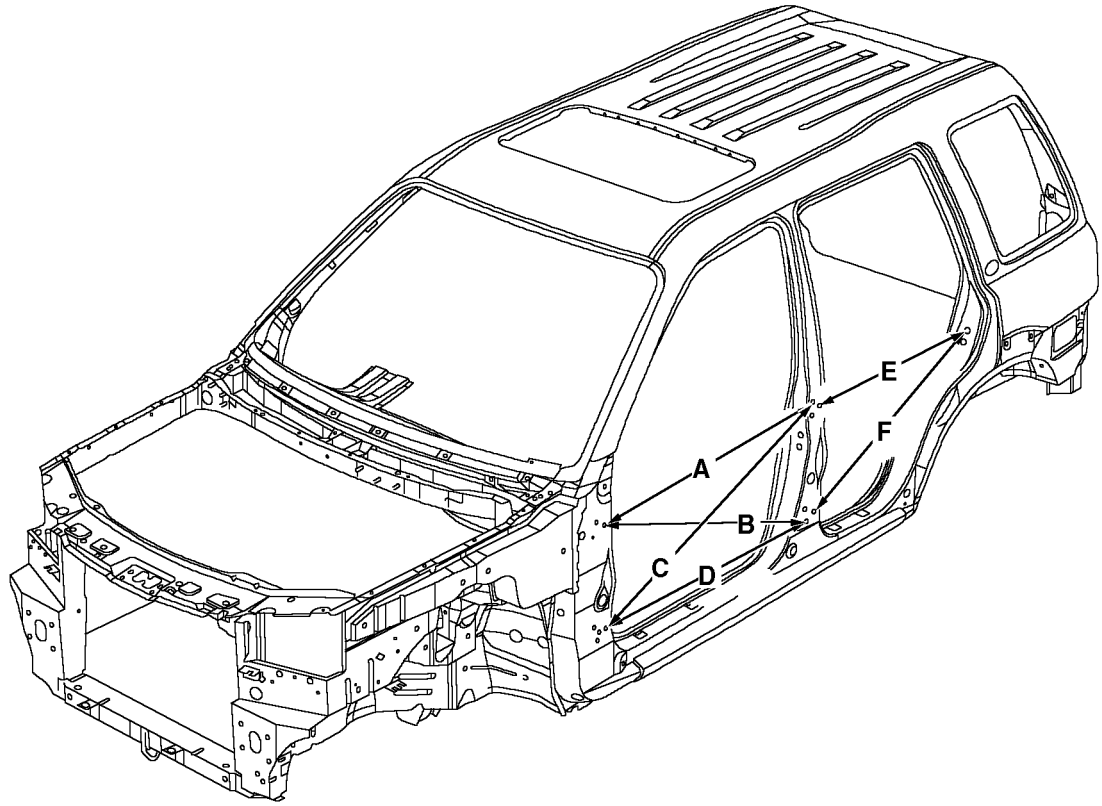
Item	From	To	Length
A	Wing, rear fixing	Top corner, on bodyside panel	1532.7 (60.342)
B	Top corner, on bodyside panel `LH`	Top corner, on bodyside panel `RH`	1045.8 (41.173)
C	Top hinge fixing, rear hole	Door striker, top fixing	1228.2 (48.354)
D	Bottom hinge fixing, rear hole	Door striker, top fixing	1268.1 (49.925)

Rear end information



Item	From	To	Length
A	Top corner, on bodyside panel `LH`	Top corner, on bodyside panel `RH`	980 (38.582)
B	Top corner, on bodyside panel	Bottom corner, on bodyside panel	1684.5 (66.318)
C	Bottom corner, on bodyside panel `LH`	Bottom corner, on bodyside panel `RH`	1349 (53.110)

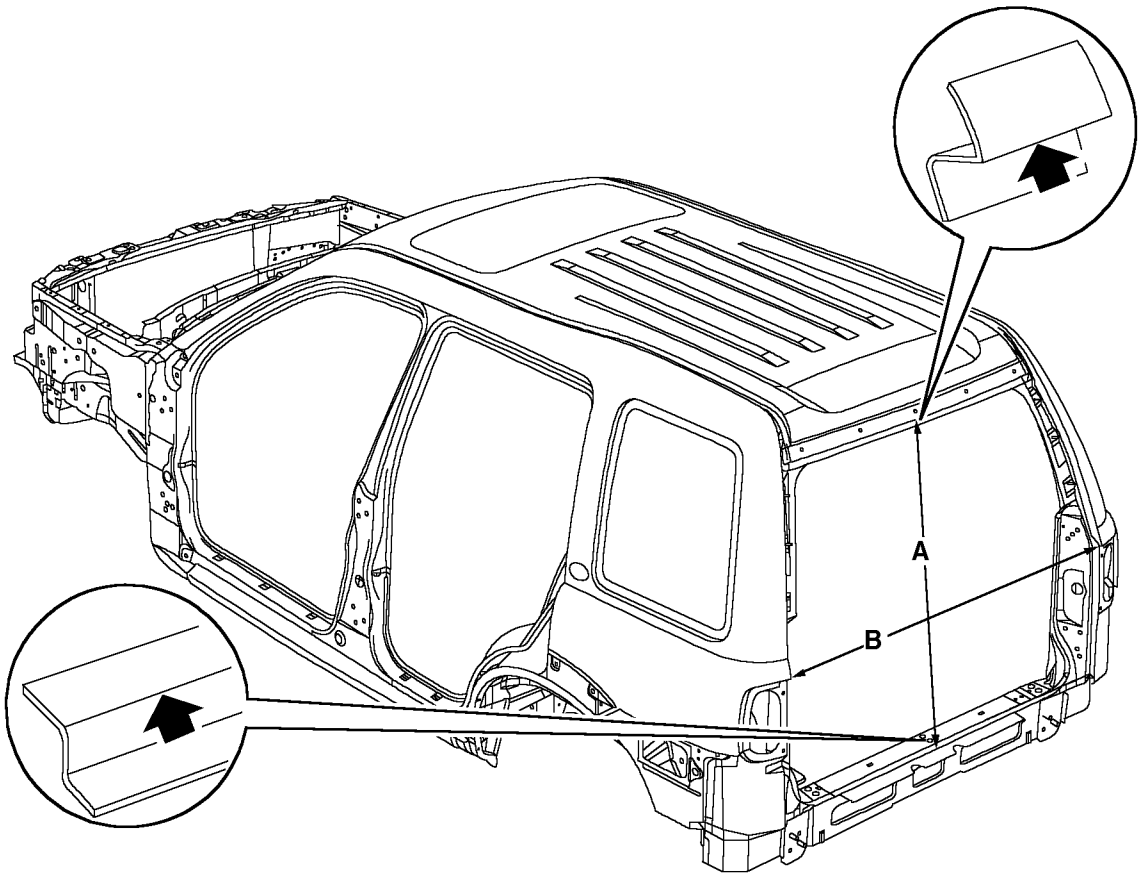
Side information



M77 2031

Item	From	To	Length
A	'A' post, top hinge, rear fixing hole	'B/C' post, top hinge, top fixing hole	1007.7 (39.673)
B	'A' post, top hinge, rear fixing hole	'B/C' post, bottom hinge, front fixing hole	1026.4 (40.409)
C	'A' post, bottom hinge, rear fixing hole	'B/C' post, top hinge, top fixing hole	1088.4 (42.850)
D	'A' post, bottom hinge, rear fixing hole	'B/C' post, bottom hinge, front fixing hole	980.4 (38.598)
E	'B/C' post, top hinge, rear fixing hole	'D' post, door striker, top fixing hole	828.7 (32.625)
F	'B/C' post, bottom hinge, rear fixing hole	'D' post, door striker, top fixing hole	916.5 (36.082)

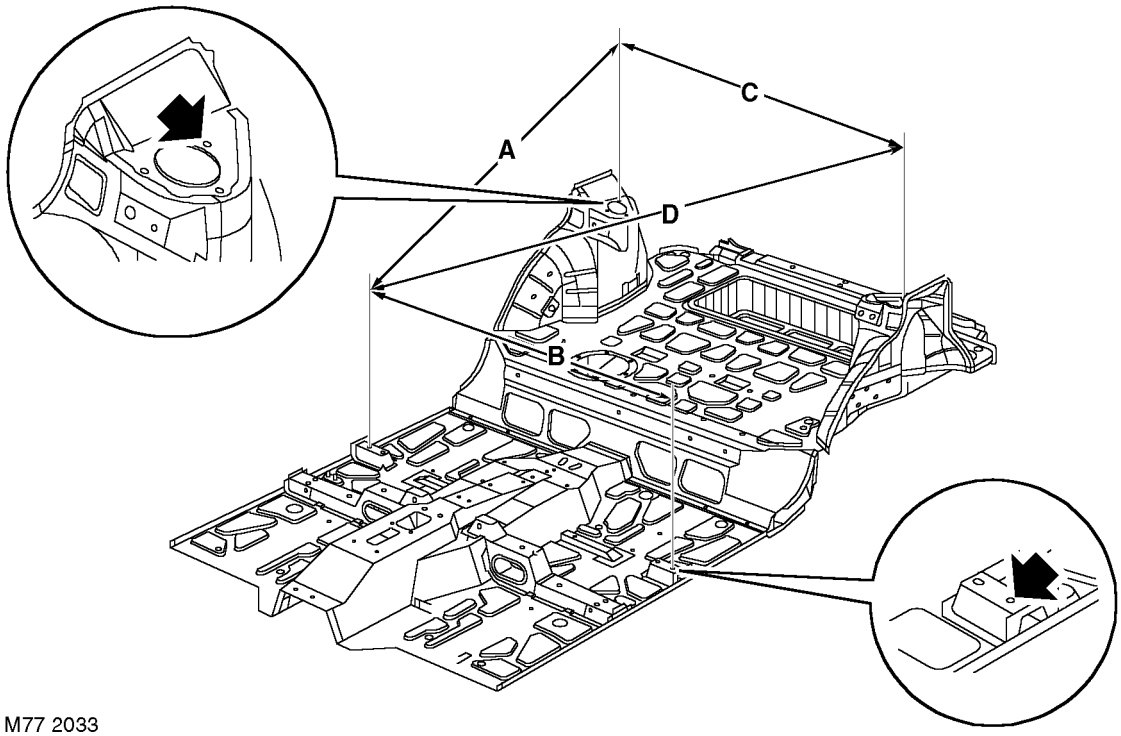
Rear end information



M77 2032

Item	From	To	Length
A	Waistrail reinforcement	Rear header	975.3 (38.397)
B	Rear bodyside `LH`	Rear bodyside `RH`	1258.1 (49.531)

Rear floor information



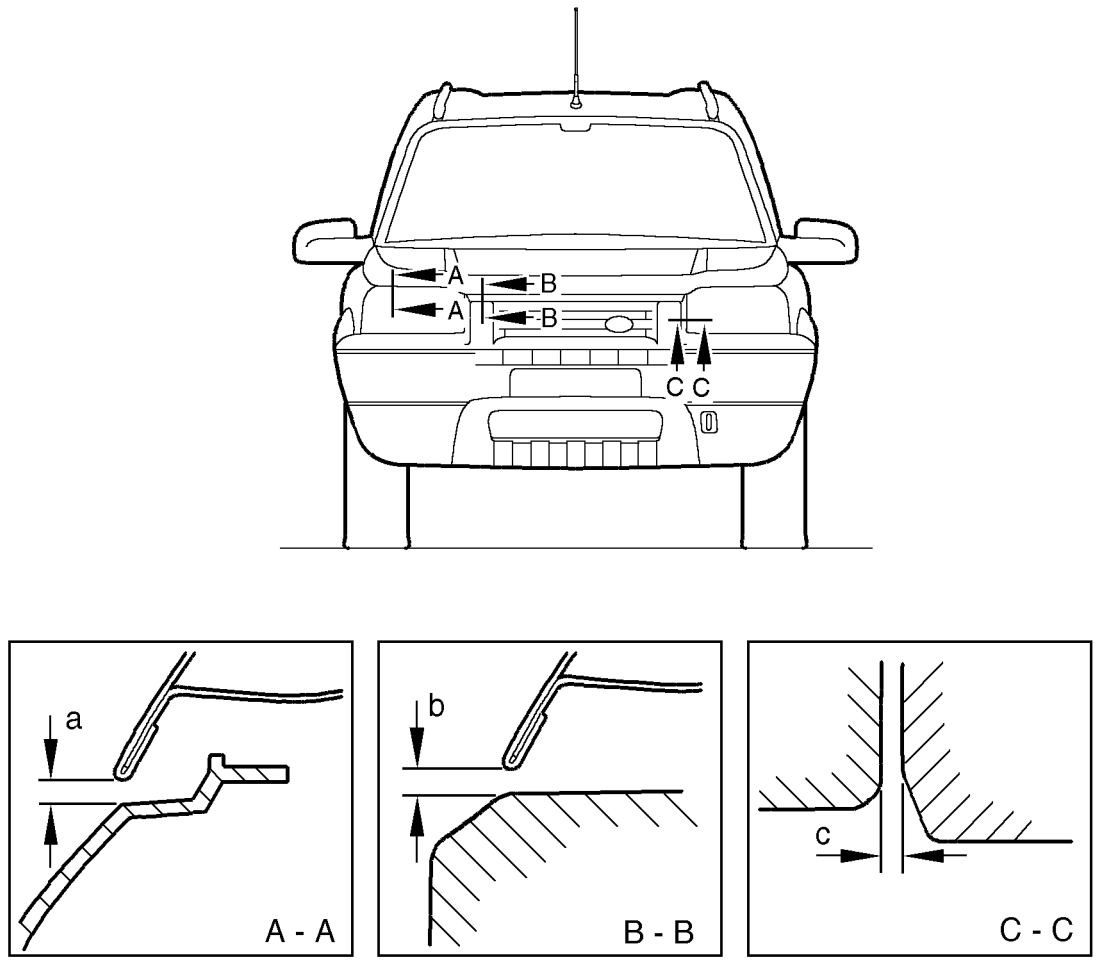
M77 2033

Item	From	To	Length
A	Front seat, rear mounting hole	Spring location, rear fixing hole	1350 (53.149)
B	Front seat, rear mounting hole `LH`	Front seat, rear mounting hole `RH`	1298 (51.102)
C	Spring location, rear fixing hole `LH`	Spring location, rear fixing hole `RH`	1220 (48.031)
D	Front seat, rear mounting hole `LH`	Front seat, rear mounting hole `RH`	1846 (72.677)

Gap and Profile Measurements

The following information is to be used as a guide to assist the technician in refitting exterior body panels and trim items so as to achieve a correctly aligned vehicle.

Measurements shown are in millimeters and inches. The measurements shown in brackets are in inches.

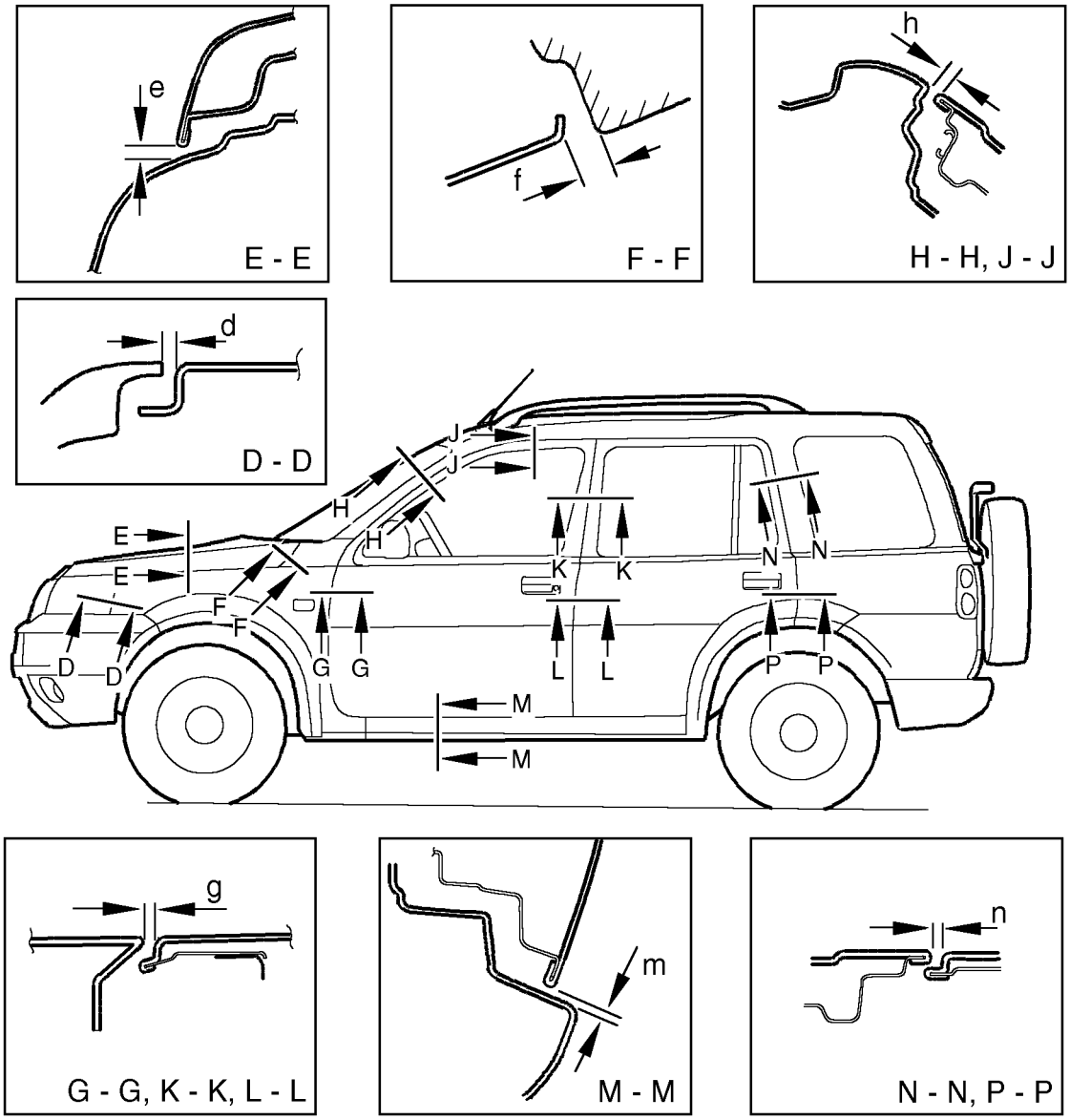


M77 2034

Gap a - Bonnet to headlamp. Even gaps side to side, tolerance ± 1.0 mm (0.040).

Gap b - Bonnet to bumper overrider. Even gaps side to side, tolerance ± 1.0 mm (0.040).

Gap c - Headlamp to bumper overrider. Visually even gaps within 2.0 mm (0.080).



M77 2025

Section	Gap	Description	Dimension
D-D	d	Headlamp to wing	3.0 (0.118)
E-E	e	Bonnet to wing	6.0 (0.236)
F-F	f	Rear edge bonnet to wing	6.0 (0.236)
G-G	g	Wing to front door	5.0 (0.196)
H-H, J-J	h	Front door frame to body	5.0 (0.196)
K-K, L-L	k	Front door to rear door	5.0 (0.196)
M-M	m	Bottom of door to sill	6.0 (0.236)
N-N, P-P	n	Rear door to body	5.0 (0.196)

The tolerance for sections E-E and F-F is ± 1.0 mm (0.040). The other dimensions all have a tolerance of ± 0.5 mm (0.020).

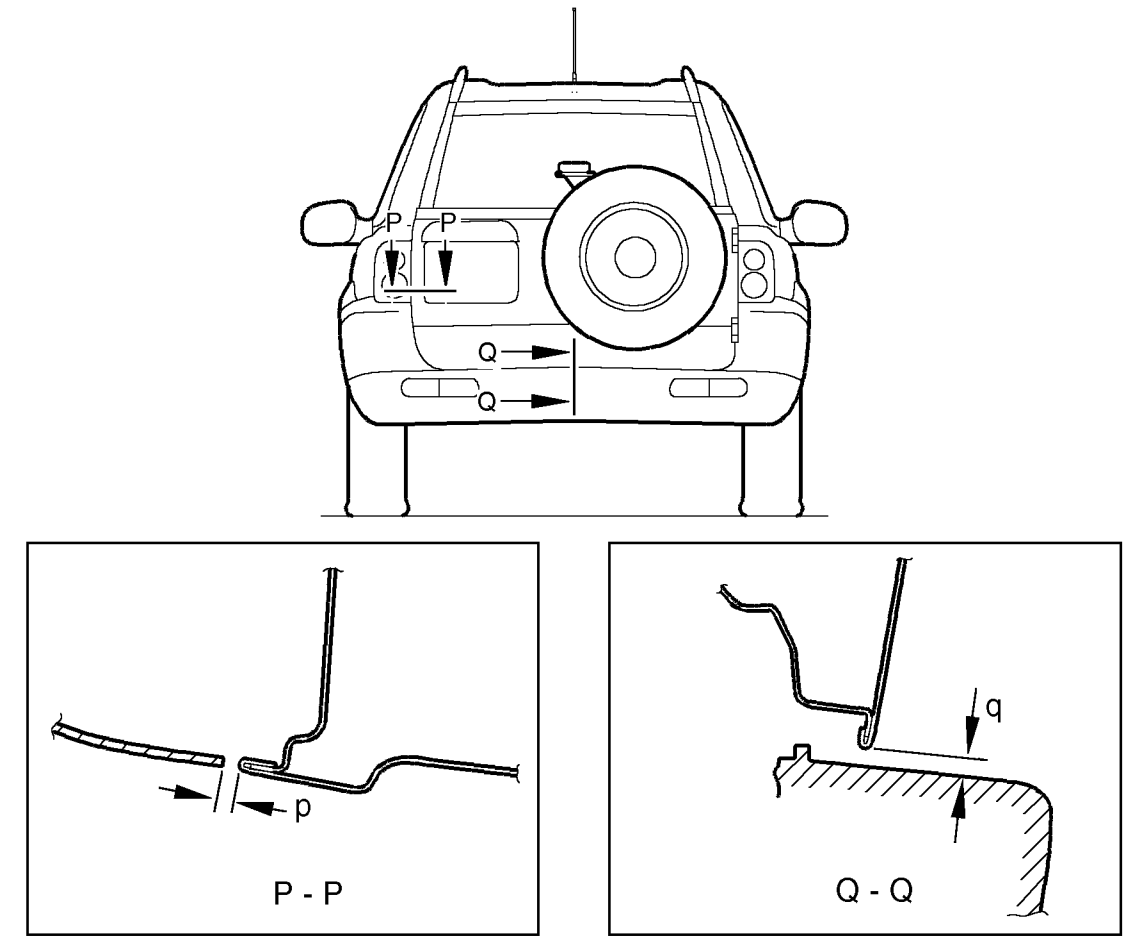
Section D-D, if the wing has been exposed to oven curing set gap to 4.4 mm (0.173) to enable subsequent expansion.

Section G-G, profile of wing to front door is 0.0 nominal, tolerance +1.0 (0.040) / -0.0.

Section H-H and J-J, profile of front door frame to body is -2.5 mm (0.098) nominal, tolerance +0.0 / -1.0 mm (0.040).

Section K-K and L-L, profile of front door to rear door is 0.0 nominal, tolerance +0.0 / -1.0 mm (0.040).

Section N-N and P-P, profile of rear door to body is 0.0 nominal, tolerance +1.0 (0.040) / -0.0.



M77 1920

Section	Gap	Description	Dimension
P-P	p	Taildoor to rear lamp	5.0 (0.196)
Q-Q	q	Taildoor to rear bumper	6.0 (0.236)

The tolerance for sections P-P and Q-Q is ± 0.5 mm (0.020).

General

Body shells are of monocoque construction. Front and rear sections of the shell are designed as 'energy absorbing' zones. This means they are designed to deform progressively when subjected to impact in order to minimise the likelihood of injury to vehicle occupants.

It is essential that design dimensions and strength are restored in accident rectification. It is important that neither structural weakness nor excessive local stiffness are introduced into the vehicle during body repair.

Repairs usually involve a combination of operations ranging from straightening procedures to renewal of individual panels or panel assemblies. The repairer will determine the repair method and this decision will take into account a balance of economics between labour and material costs and the availability of repair facilities in both equipment and skills. It may also involve considerations of the vehicles' downtime, replacement vehicle availability and repair turn-around time.

It is expected that a repairer will select the best and most economic repair method possible, making use of the facilities available. The instructions given are intended to assist a skilled body repairer by expanding approved procedures for panel replacement. The objective is to restore the vehicle to a safe running condition by carrying out a repair which is as close as is feasible to original standard. The results should not advertise to the experienced eye that the vehicle has been damaged, although the repair might not be identical in all respects to the original factory build. Commercial bodyshop repair facilities cannot always duplicate methods of construction used during production.

Operations covered in this Manual do not include reference to testing the vehicle after repair. It is essential that work is inspected and suspension geometry checked after completion. Where necessary a road test of the vehicle should be carried out, particularly where safety-related items are concerned.

Where major units have been disconnected or removed it is necessary to ensure that fluid levels are checked and topped up where necessary. It is also necessary to ensure that the repaired vehicle is in a roadworthy condition in respect of tyre pressures, lights, washer fluid etc.

Body repairs often involve the removal of mechanical and electrical units and associated wiring. Where necessary, refer to the relevant section of the Workshop Manual for removal and refitting instructions.

Body components

Taking into consideration the differences in body styles, suspension systems and engine and transmission layouts, the location of the following components as applicable to a particular vehicle is critical:

- Front suspension upper damper mountings.
- Front suspension or sub frame mountings.
- Rear suspension upper damper mountings.
- Rear suspension mountings or lower pivots.

Additional points which can be used to check alignment and assembly are:

- Inner holes in crossmember - side - main floor.
- Holes in front longitudinals.
- Holes in side members.
- Holes in rear longitudinals.
- Holes in rear lower panels or extension rear floor.

Apertures for windscreen, backlight, bonnet and doors can be measured and checked using the dimensional information provided and also by offering up an undamaged component as a gauge.

Straightening

Whenever possible, structural members should be cold straightened under tension. Do not attempt to straighten with a single pull but rework the damaged area using a series of pulls, releasing tension between each stage and using the opportunity to check alignment.

Body jig
Unless damage is limited to cosmetic panels, all repair work to body members must be carried out on a body jig, to ensure that impact damage has not spread into more remote parts of the structure. Mounting on a jig will also ensure that the straightening and panel replacement procedures do not cause further distortion.

If original dimensions cannot be satisfactorily restored by these methods, damaged structural members should be replaced. Damaged areas should be cut away using a high speed saw, **NOT** an oxy-acetylene torch.

As a rule, body dimensions are symmetrical about the centre line. A good initial check for distortion is therefore to measure diagonally and to investigate apparent differences in dimensions.

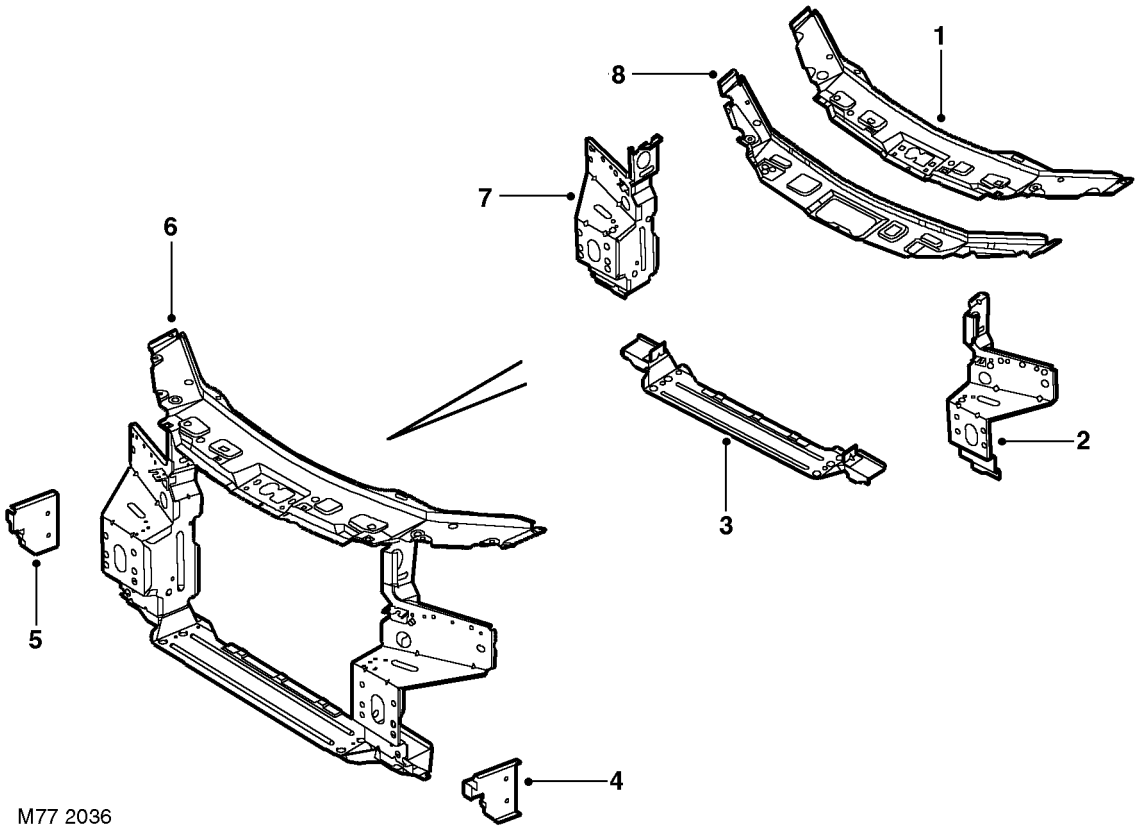
Inspection
Every accident produces individual variations in damage. Each repair is influenced by the extent of the damage and the facilities and equipment available for its rectification.

Most accident damage can be visually inspected and the approximate extent of damage assessed. Sometimes deformation will extend beyond the directly damaged area, and the severity of this must be accurately established so that steps can be taken to restore critical body components to their original dimensions. An initial check can be carried out by means of drop checks or, preferably, trammels. Gauges are available which will accurately check for body twist.

Where repairs necessitate renewal of a critical body component it is recommended that a body jig is used.

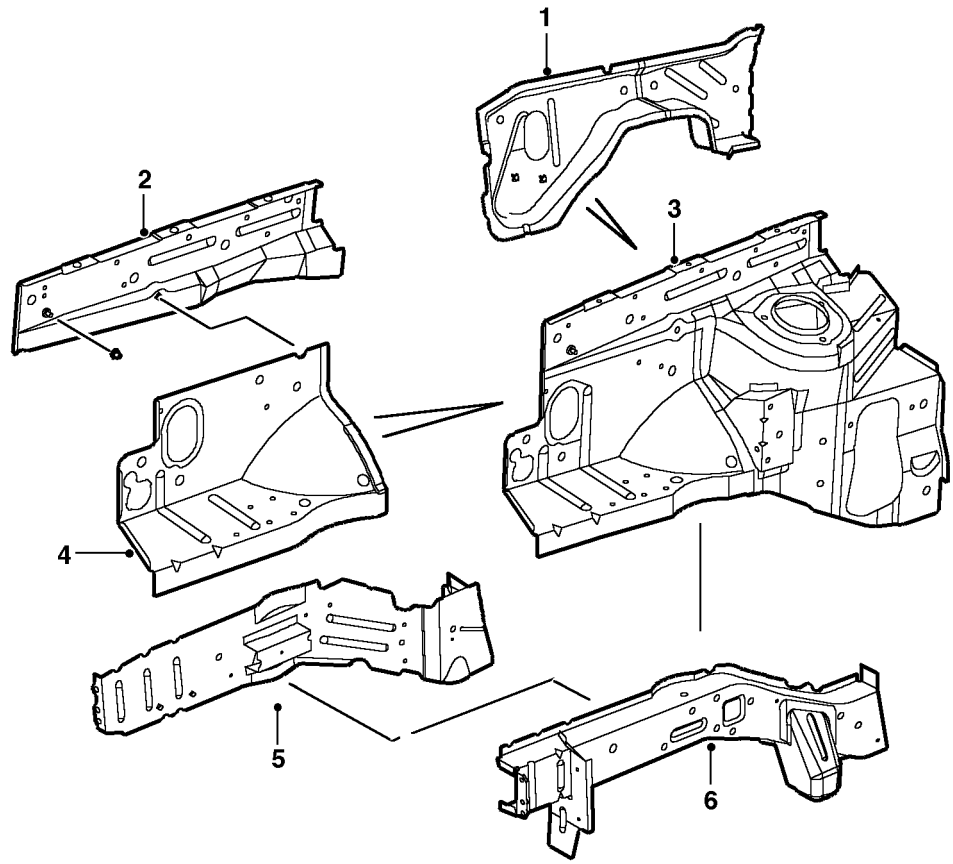
Serviceable Panels

Front end panels



1 Bonnet locking platform
2 LH headlamp mounting panel
3 Front lower crossmember assembly
4 LH crossmember gusset plate
5 RH crossmember gusset plate
6 Front bulkhead assembly
7 RH headlamp mounting panel
8 Bonnet locking platform reinforcement

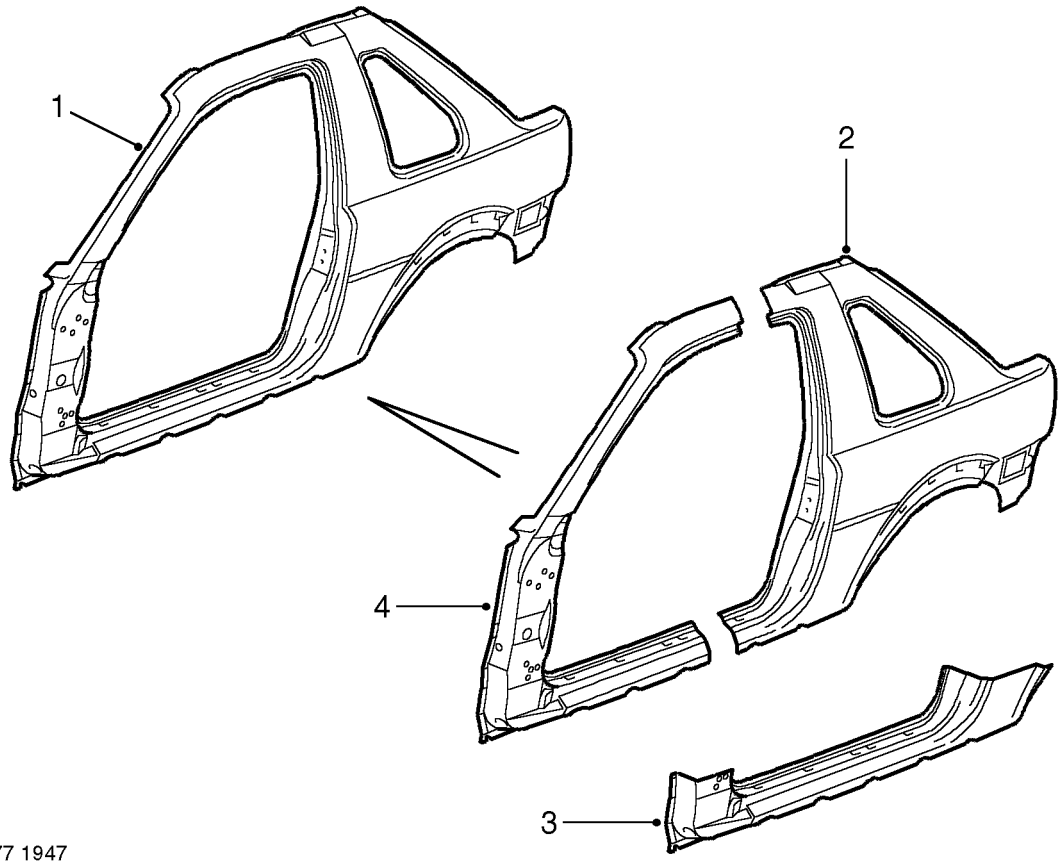
Inner front end panels



M77 2037

1 Valance outer reinforcement assembly
2 Valance upper front assembly
3 Front valance assembly
4 Valance front assembly
5 Front sidemember closing panel
6 Front sidemember assembly

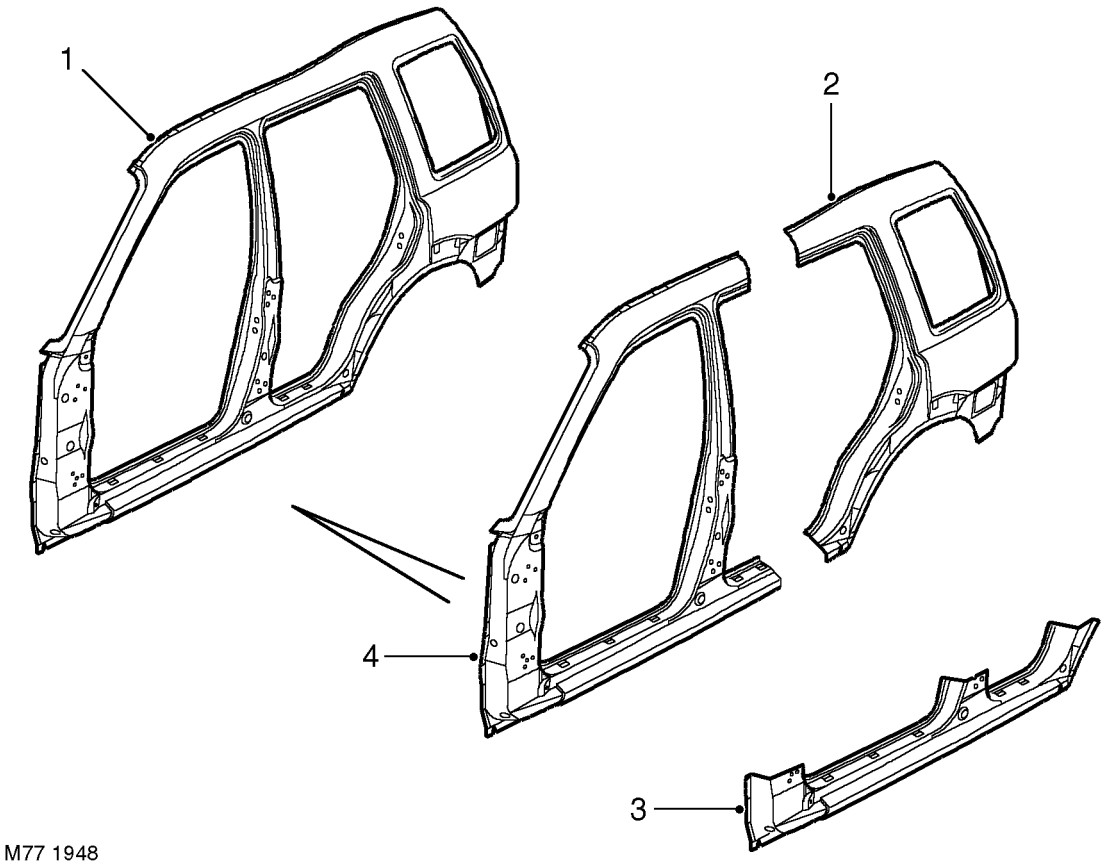
Outer body side panels - 3 door



M77 1947

1 Outer body side assembly
2 Rear outer body side panel
3 Lower outer body side panel
4 Front outer body side panel

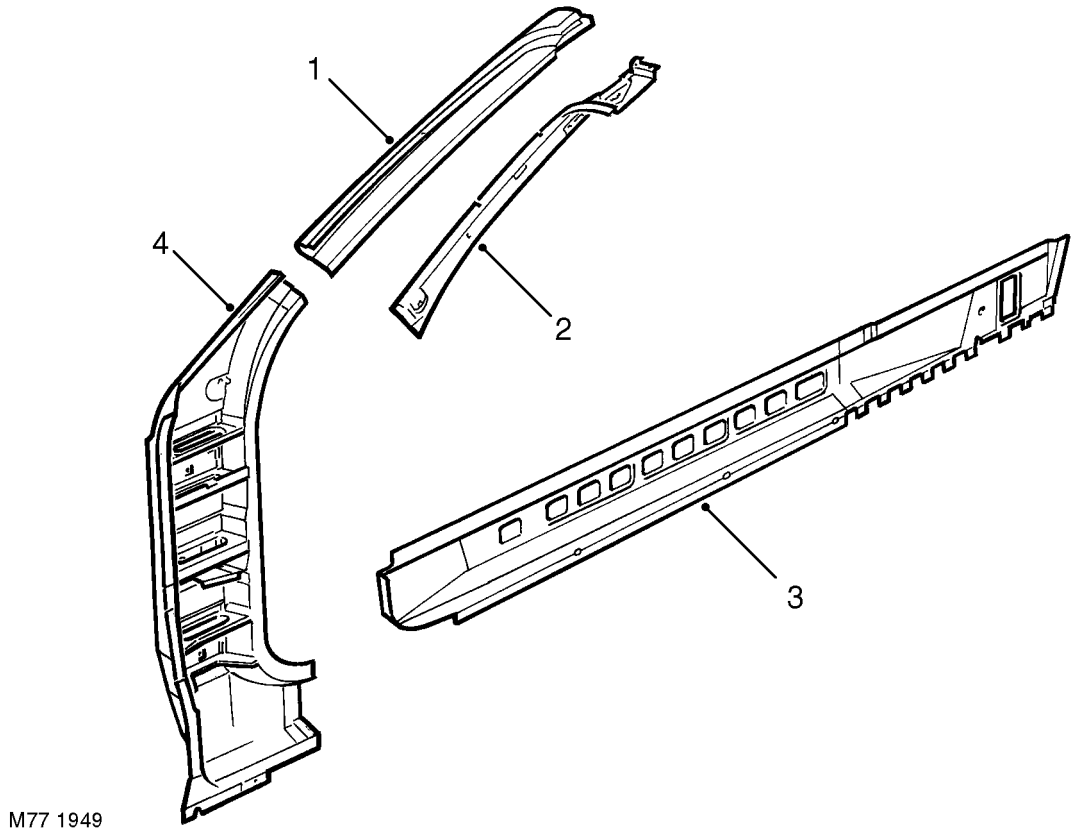
Outer body side panels - 5 door



M77 1948

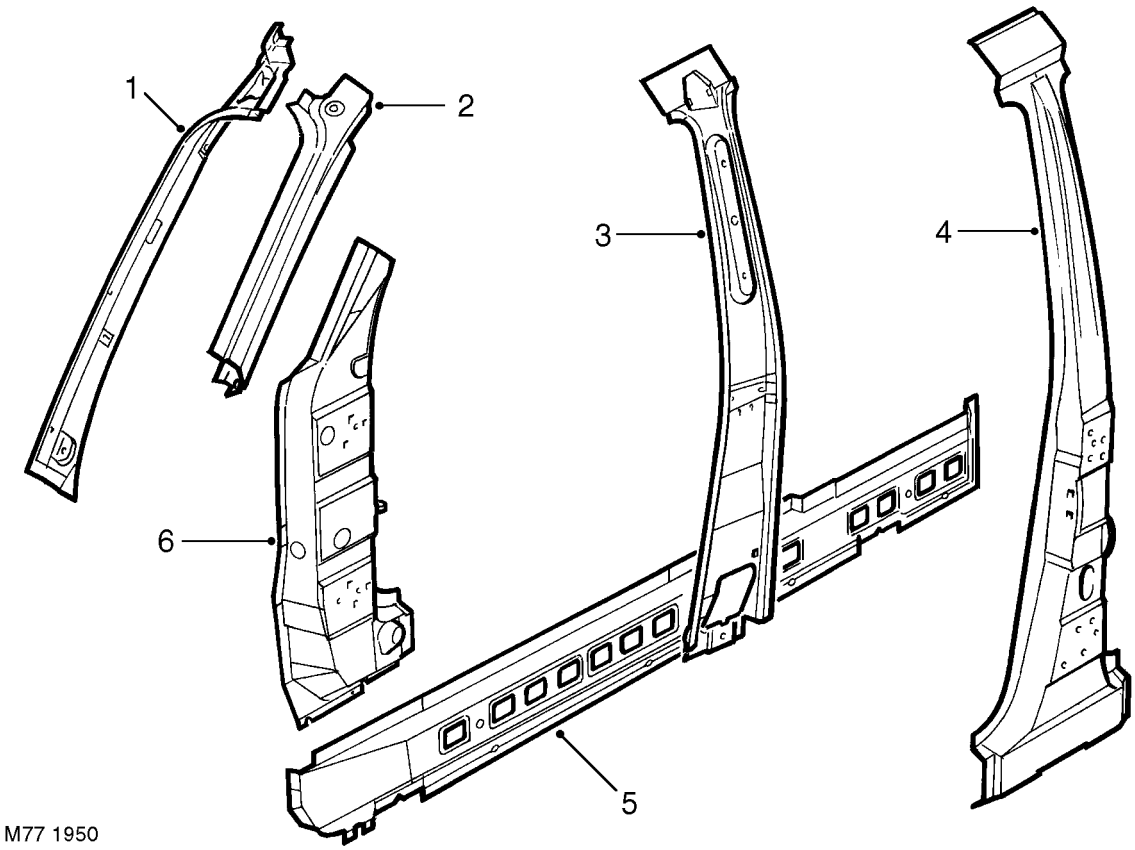
1 Outer body side assembly
2 Rear outer body side panel
3 Lower outer body side panel
4 Front outer body side panel

Front inner body side panels - 3 door



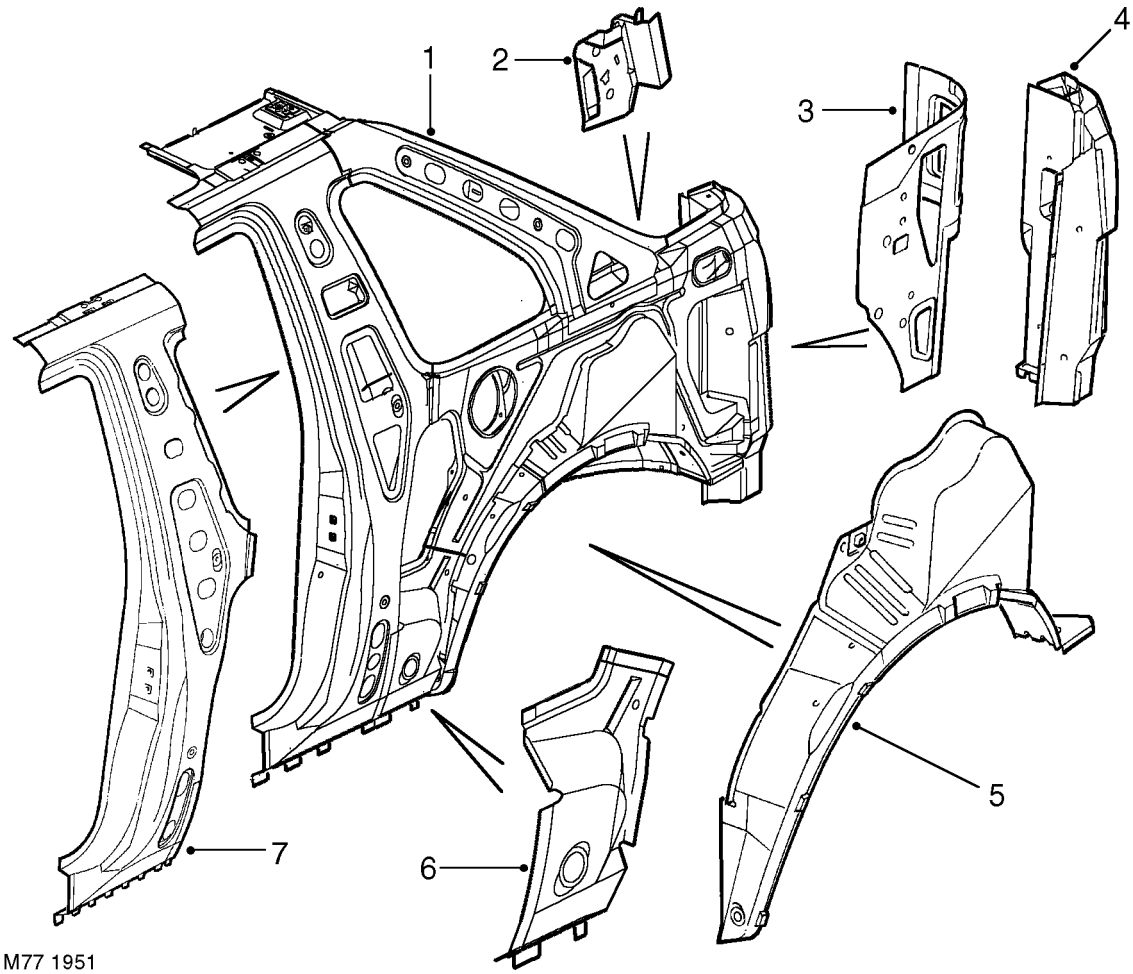
1 'A' post reinforcement
2 Inner 'A' post
3 Inner sill reinforcement
4 Lower 'A' post reinforcement

Front inner body side panels - 5 door



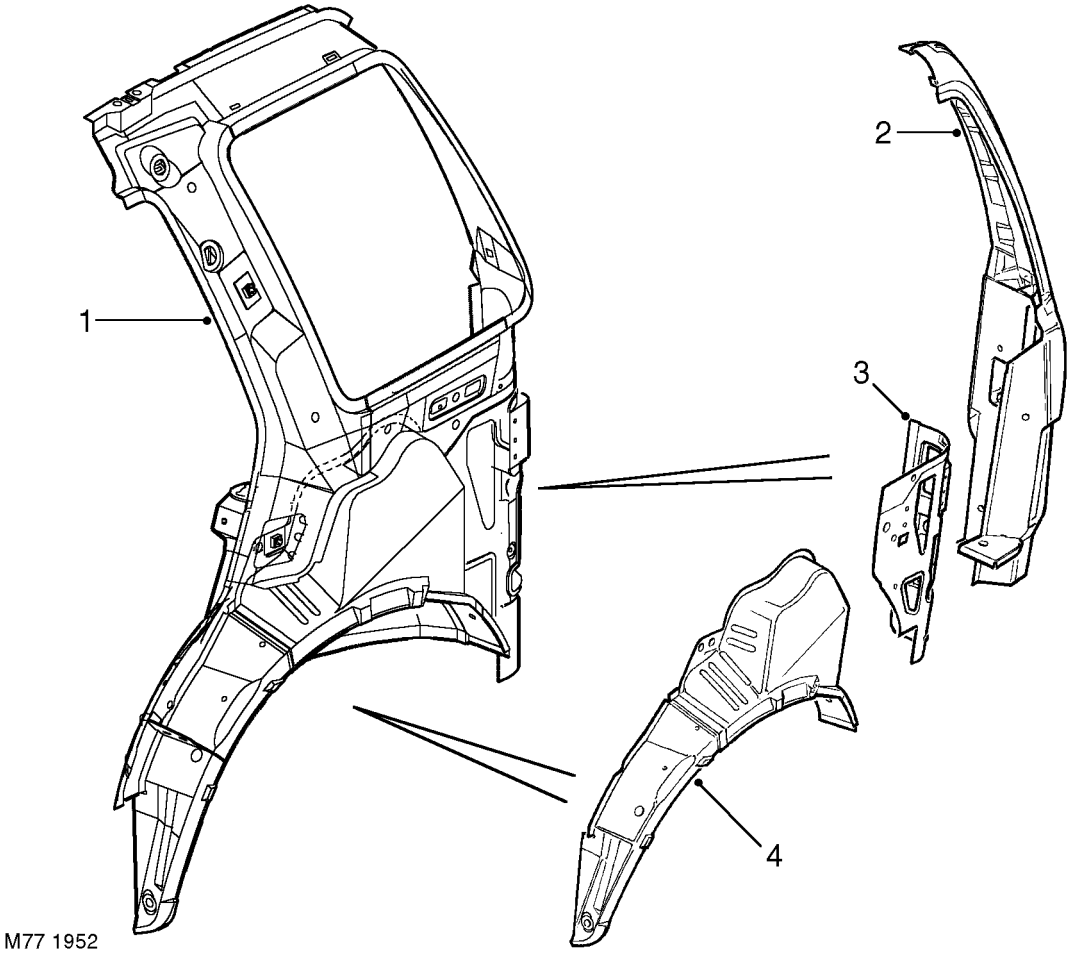
1 Inner `'A' post
2 'A' post reinforcement
3 Inner 'B/C' post panel
4 'B/C' post reinforcement
5 Inner sill reinforcement
6 Lower 'A' post reinforcement

Rear inner body side panels - 3 door



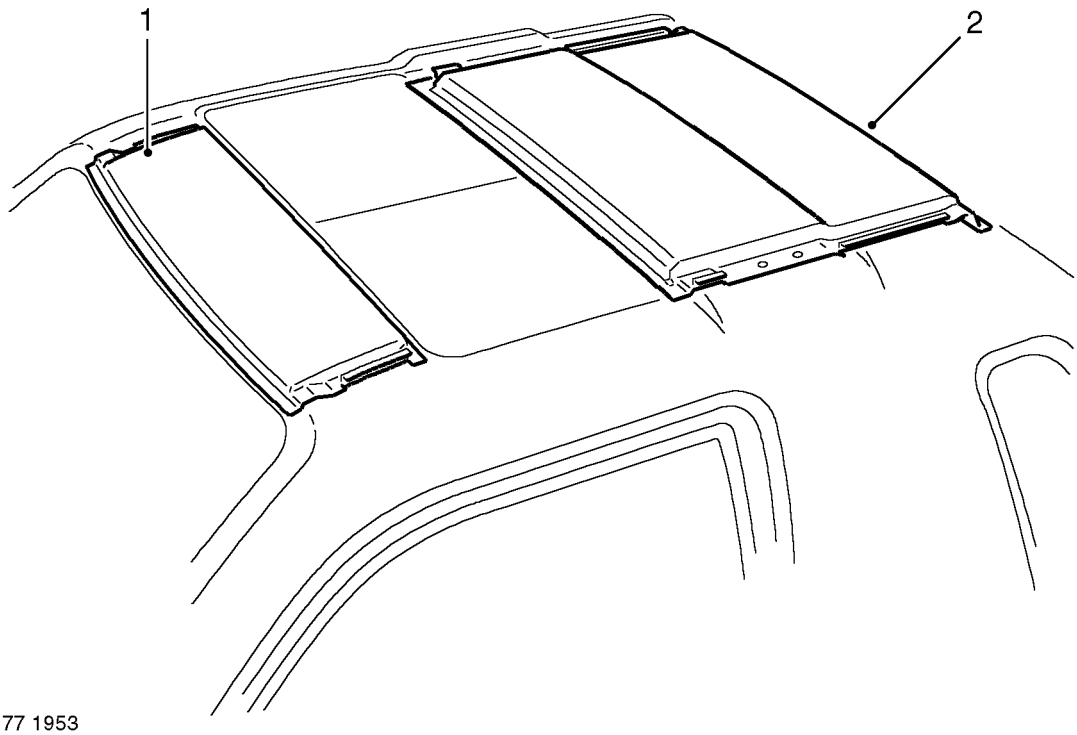
1 Complete rear quarter assembly
2 Squab side reinforcement
3 Rear body side reinforcement assembly
4 Lower inner 'E' post assembly
5 Outer rear wheelarch assembly
6 Rear quarter front lower reinforcement
7 'B/C' post reinforcement

Rear inner body side panels - 5 door



1 Complete rear quarter assembly
2 Inner 'E' post assembly
3 Rear body side reinforcement assembly
4 Outer rear wheelarch assembly

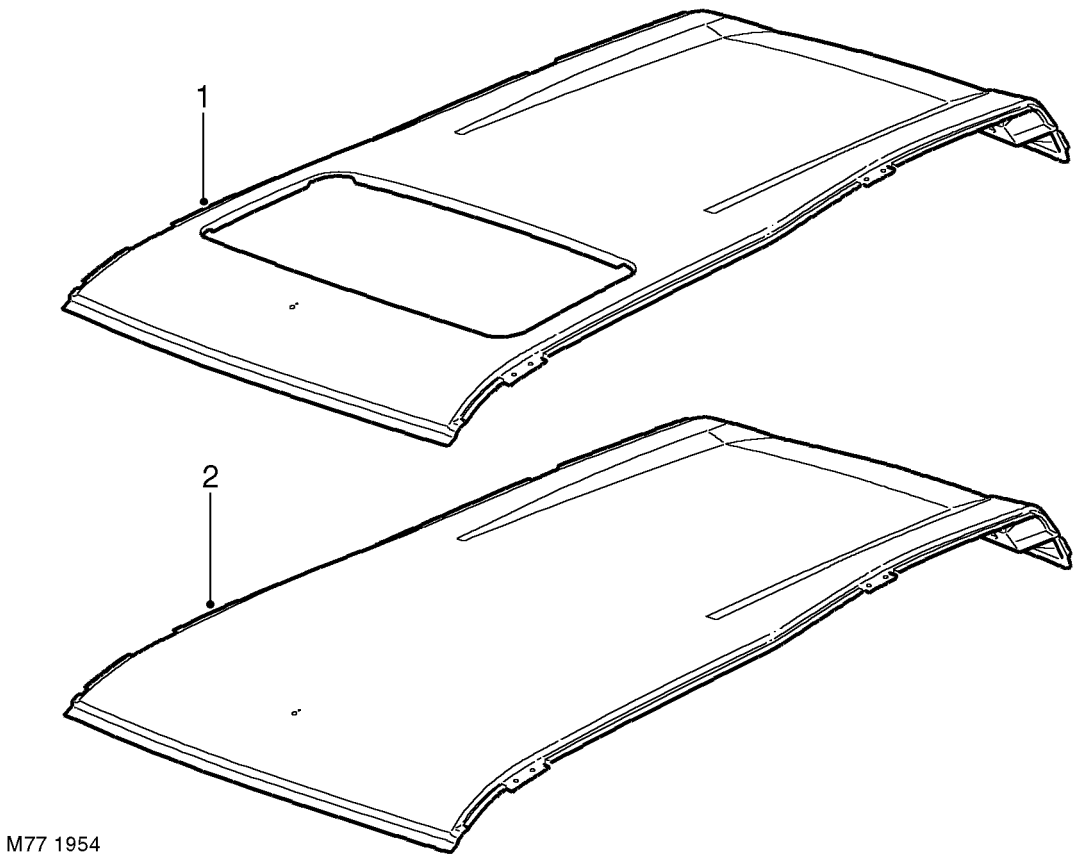
Roof assemblies - 3 door



M77 1953

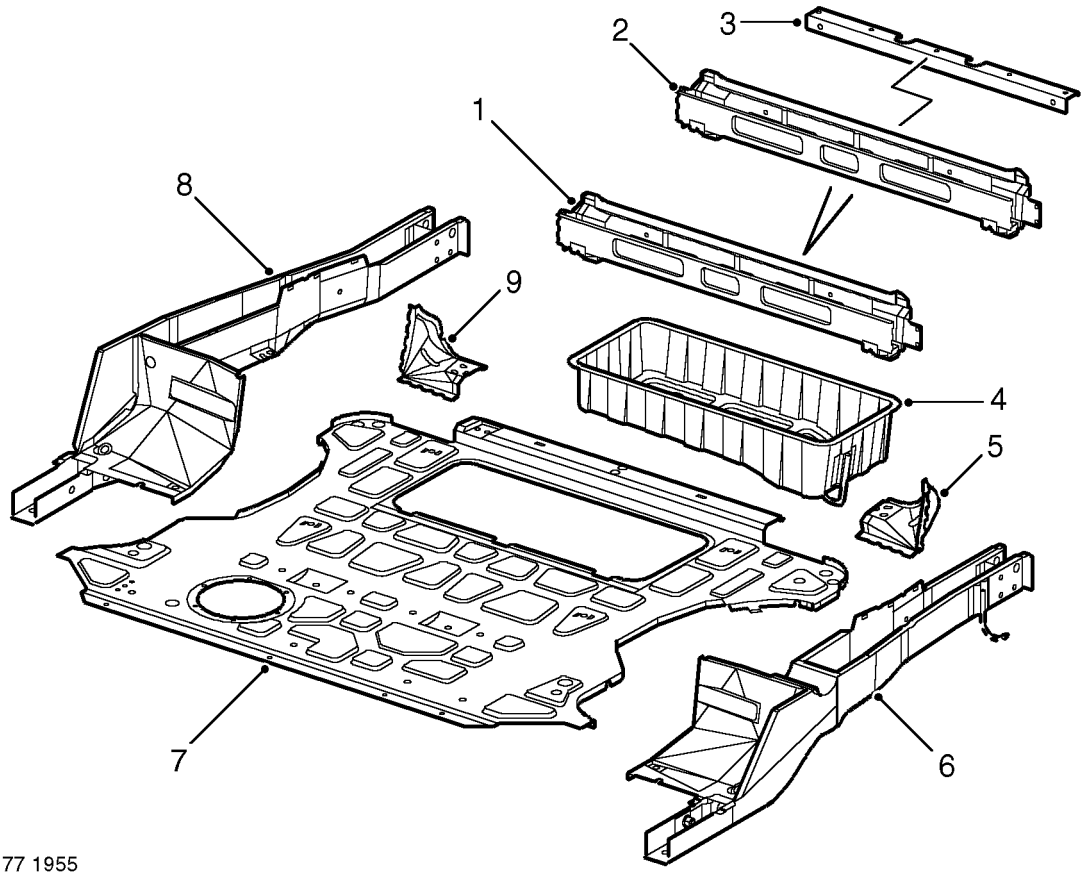
1 Front roof assembly
2 Rear roof assembly

Roof assembly - 5 door



1 Roof assembly (with sunroof)
2 Roof assembly (without sunroof)

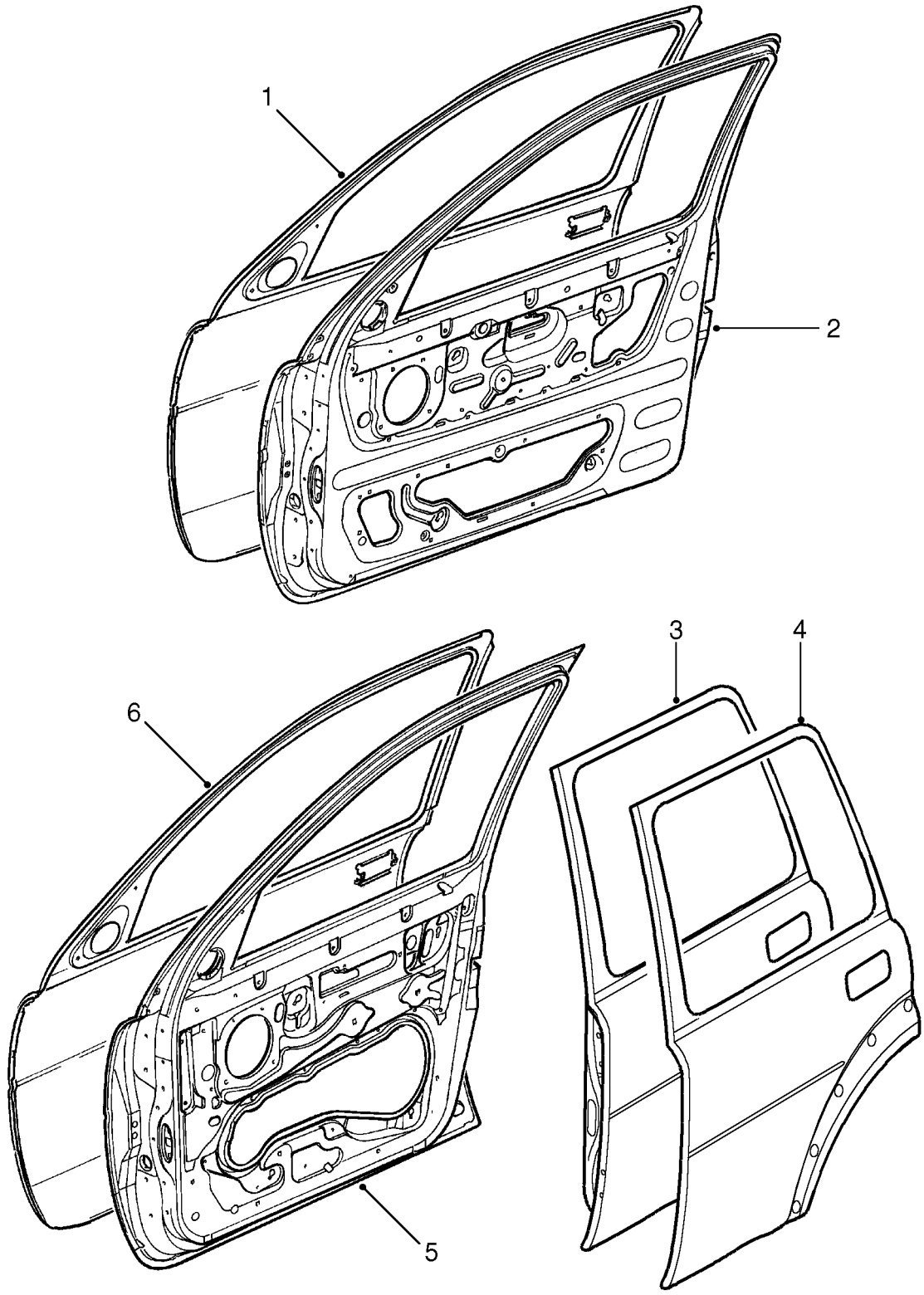
Rear end panels



M77 1955

1 Rear floor crossmember assembly
2 Inner panel
3 Bumper mounting bracket
4 Safe well assembly
5 Gusset, rear floor to quarter inner LH
6 LH floor longitudinal
7 Rear floor assembly
8 RH floor longitudinal
9 Gusset, rear floor to quarter inner RH

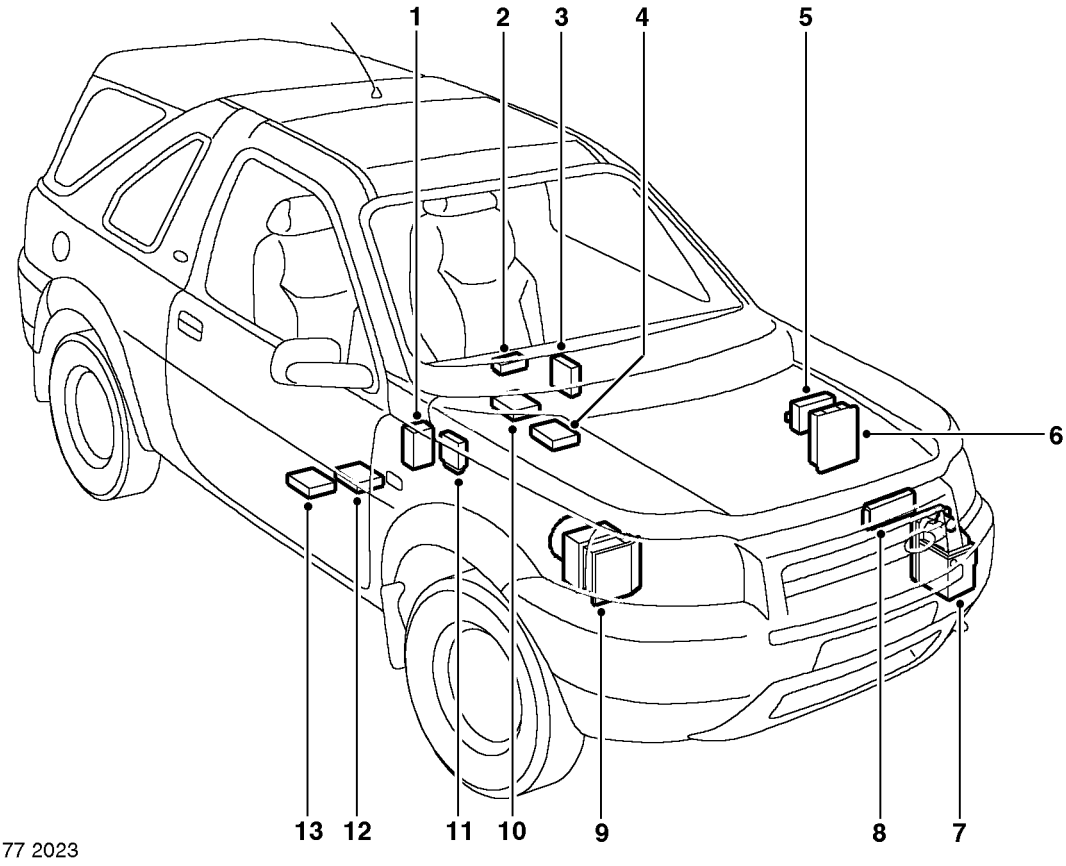
Door assemblies



M77 1956

1 Front door outer (3 door)
2 Front door assembly (3 door)
3 Rear door assembly
4 Rear door outer
5 Front door assembly (5 door)
6 Front door outer (5 door)

ECU locations (3 door model shown, 5 door model similar)

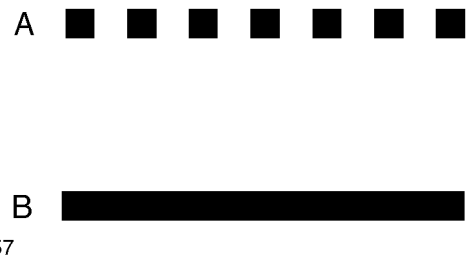


1 Central control unit (on forward side of passenger compartment fusebox, behind driver's glove box)
2 RF Receiver (on top of instrument pack)
3 Immobiliser ECU (rear of fascia)
4 DCU (SRS on transmission tunnel below heater)
5 EAT ECU (inside Environmental 'E' box)
6 ECM (inside 'E' box)
7 Fuel Burning Heater (behind wheelarch liner) 'Diesel only'
8 Cooling Fan Ecu (rear of radiator housing) all models except 1.8
9 ABS ECU (RH side front of engine compartment)
10 Folding door mirror ECU (on transmission tunnel under centre console)
11 Window lift ECU (on driver `A` post)
12 Cruise Control Interface ECU (under R/H seat)
13 Cruise control ECU (under R/H seat)

General Welding Precautions

General
For ease of reference, the diagrams on the following pages show only the type of weld used in repair where it varies from that used in production.

The replacement welds in the welding diagrams are denoted by the following symbols:



M77 1957

a = Single/Multiple thickness plug welds
b = MIG seam weld

When carrying out welding operations the following criteria must be observed:

- Where resistance spot welds have been used in production, these must be reproduced with new spot welds in replacement where possible. All such reproduction spot welds must be spaced 30 mm (1.181) apart;
- When spot welding, it is recommended that test coupons of the same metal gauges and materials are produced to carry out peel tests to ensure that welding equipment being used can produce a satisfactory joint. Plug welds must be used if a satisfactory spot weld cannot be produced;
- The electrode arms on hand-held spot welding guns must not exceed 300 mm (11.811) in length;
- Single-side spot welding is not acceptable;
- Brazing and gas welding are not acceptable EXCEPT where they have been specified in production;
- Where 3 metal thicknesses or more are to be welded together it is imperative to use MIG plug welds to ensure joint strength;
- MIG plug welds must be used in repair joints where there is no access for a resistance spot welder. To replace each production spot weld, an 8 mm (0.314) approx hole must be drilled and/or punched, and a MIG plug weld then made in its place. The number of plug welds must match exactly the number of spot welds which have been removed;
- Where holes are left in an existing panel after removal of the spot welds, a single MIG plug weld will be made in each hole as appropriate.

Electronic Control Units
The electronic control units (ECU) fitted to vehicles make it advisable to follow suitable precautions prior to carrying out welding repair operations. Harsh conditions of heat and vibration may be generated during these operations which could cause damage to the units.

In particular, it is essential to follow the appropriate precautions when disconnecting or removing the airbag DCU.

Equipment
Prior to commencing any test procedure on the vehicle, ensure that the relevant test equipment is working correctly and any harness or connectors are in good condition. This particularly applies to electronic control units.

Seat belt anchorages
Seat belt anchorages are safety critical. When making repairs in these areas, it is essential to follow design specifications. Note that High Strength Low Alloy (HSLA) steel may be used for seat belt anchorages.

Where possible, the original production assembly should be used, complete with its seat belt anchorages, or the cut line should be so arranged that the original seat belt anchorage is not disturbed.

All welds within 250mm (9.842) of seat belt anchorages must be carefully checked for weld quality, including spacing of spot welds.

warn : Body parts incorporating seat belt anchorages MUST be renewed completely if damaged beyond repair, as the welds in these areas are safety critical and cannot be disturbed.

High Strength Steels
Body panels are being increasingly manufactured in high strength steels to meet design requirements for safety and weight saving. As panels in high strength steels cannot be visually identified by the repairer, and as they can be more sensitive to excess heat than would be the case with low carbon steels, it is advisable that the following procedure be observed at all times.

While individual repairs will differ in detail, the following Panel Replacement Procedure has been devised placing emphasis on ease of repair and the elimination of unnecessary work. Where replacement of a particular panel involves departure from the Panel Replacement Procedure, a note to that effect is included in the relevant panel replacement operation.

Straightening
Whenever possible, structural members should be cold straightened under tension. Do not attempt to straighten with a single pull but rework the damaged area using a series of pulls, releasing tension between each stage and using the opportunity to check alignment

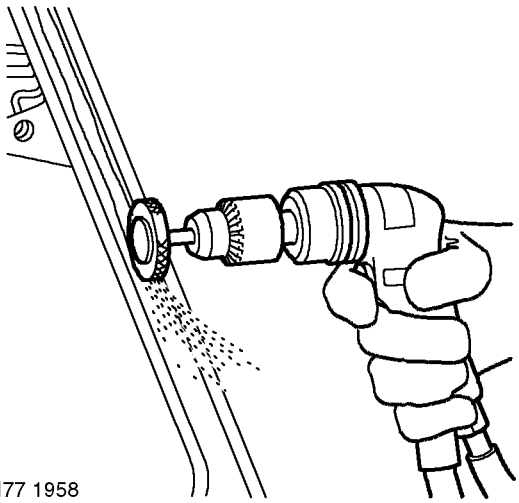
Body jig
Unless damage is limited to cosmetic panels, all repair work to body members must be carried out on a body jig, to ensure that impact damage has not spread into more remote parts of the structure. Mounting on a jig will also ensure that the straightening and panel replacement procedures do not cause further distortion. If original dimensions cannot be satisfactorily restored by these methods, damaged structural members should be replaced. Damaged areas should be cut away using a high speed saw, NOT an oxy-acetylene torch. As a rule, body dimensions are symmetrical about the centre line. A good initial check for distortion is therefore to measure diagonally and to investigate apparent differences in dimensions.

Inspection
Every accident produces individual variations in damage. Each repair is influenced by the extent of the damage and the facilities and equipment available for its rectification. Most accident damage can be visually inspected and the approximate extent of damage assessed. Sometimes deformation will extend beyond the directly damaged area, and the severity of this must be accurately established so that steps can be taken to restore critical body components to their original dimensions. An initial check can be carried out by means of drop checks or, preferably, trammels. Gauges are available which will accurately check for body twist. Where repairs necessitate renewal of a critical body component it is recommended that a body jig is used.

Panel replacement procedure

This information is designed to explain the basic panel removal and replacement method. This standard method might vary slightly from one vehicle to another. The main criterion in removable and replacement of body panels is that Land Rover`s original standard is maintained as far as possible.

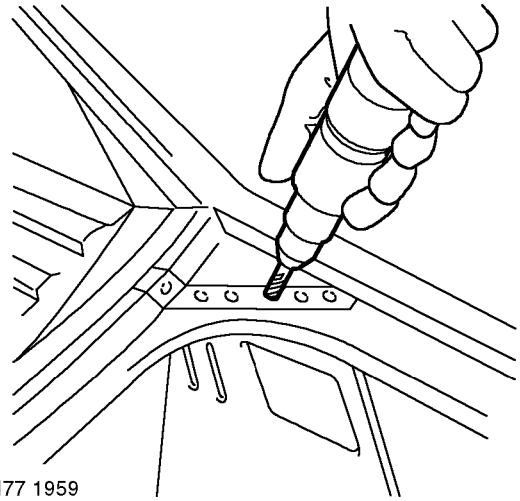
Remove panel



M77 1958

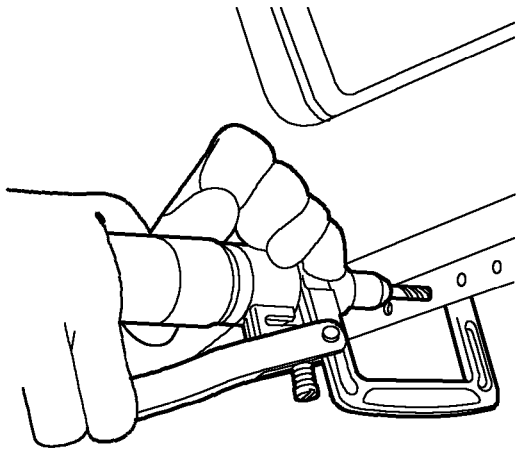
1. Expose resistance spot welds. For those spot welds which are not obviously visible, use a rotary drum sander or wire brush fitted to an air drill, or alternatively a hand held wire brush.

NOTE: In wheel arch areas it may be necessary to soften underbody coating, using a hot air gun, prior to exposing spot welds.



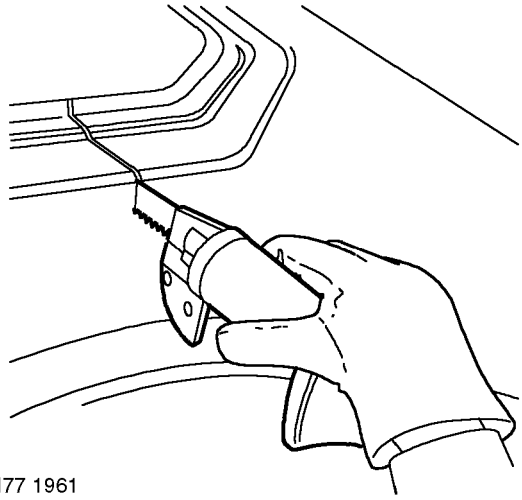
M77 1959

2. Cut out welds using a cobalt drill.



M77 1960

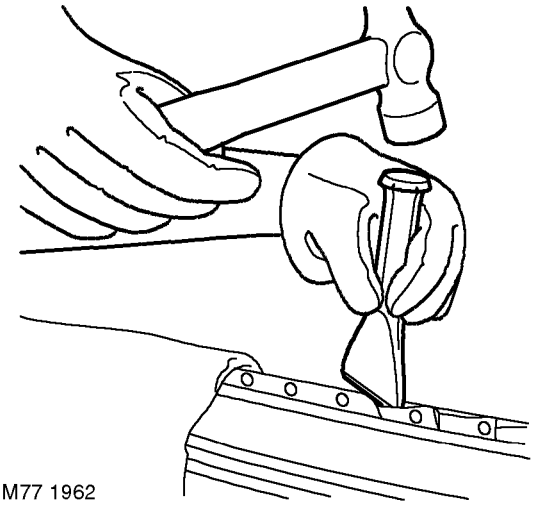
3. Alternatively, use a clamp-type spot weld remover.



M77 1961

4. Cut away the bulk of the panel as necessary using an air saw.

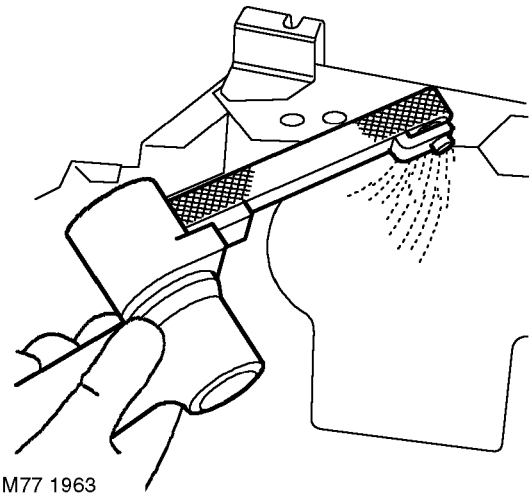
NOTE: On certain panel joints MIG welds and braze should be removed using a sander where possible, before cutting out the panel bulk.



M77 1962

5. Separate spot welded joints and remove panel remnants using hammer, bolster, chisel and pincers.

Prepare old surfaces

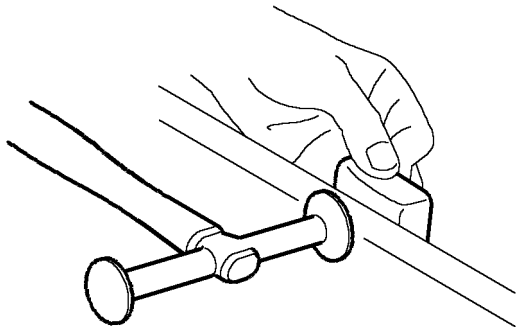


M77 1963

1. Clean all panel joint edges to a bright smooth finish, using a belt-type sander.

NOTE: Prior to sanding, remove remaining sealant using a hot air gun to minimise the risk of toxic fumes caused by generated heat.

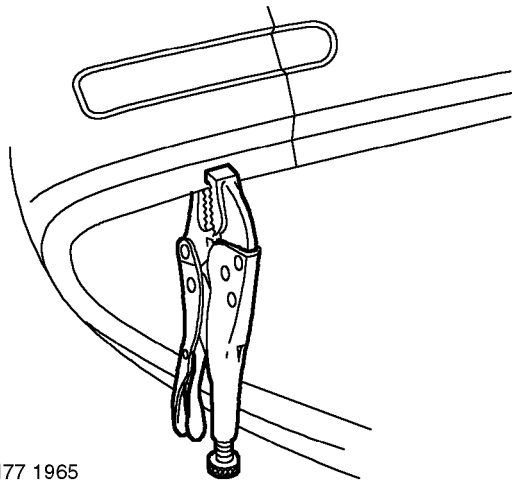
Caution: Care must be taken to avoid excessive heat build up when using this equipment.



M77 2065

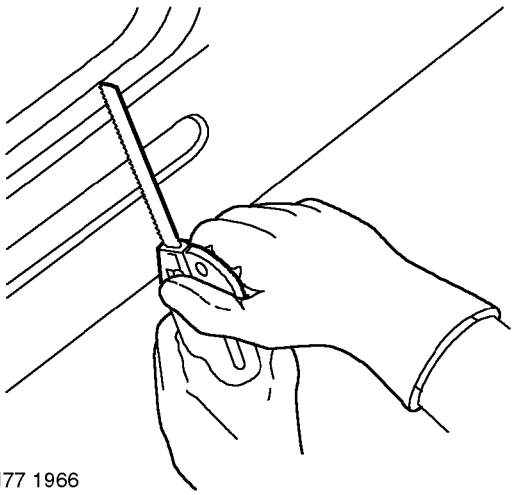
2. Straighten existing panel joint edges using a shaping block and hammer.

Prepare new surfaces



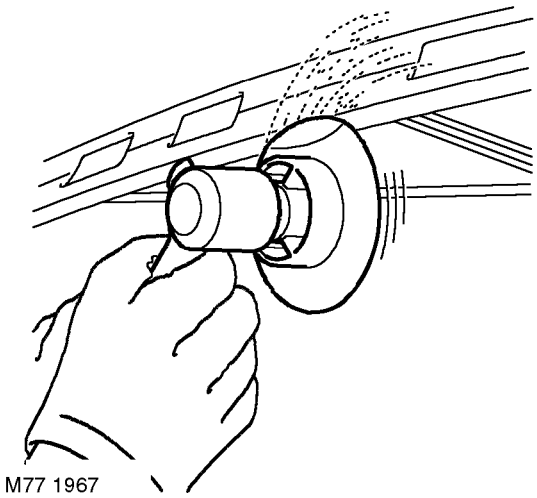
M77 1965

1. Mark out bulk of new panel and trim to size, leaving approximately 50 mm (1.968 ins) overlap with existing panel. Offer up new panel/ section, align with associated panels (e.g. new body side panel aligned with door and trunklid). Clamp into position.



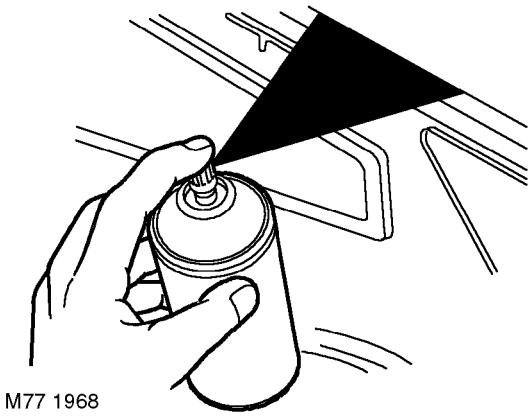
M77 1966

2. Cut new and existing panels as necessary to form butt, joggle or brace joint as required. Remove all clamps and metal remnants.



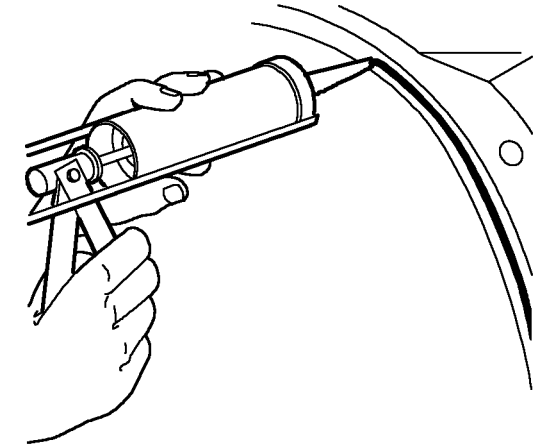
M77 1967

3. Prepare new panel joint edges for welding by sanding to a bright finish. This must include inner as well as outer faces.



M77 1968

4. Apply suitable weld-through primer, to panel joint surfaces to be welded, using brush or aerosol can.



M77 1969

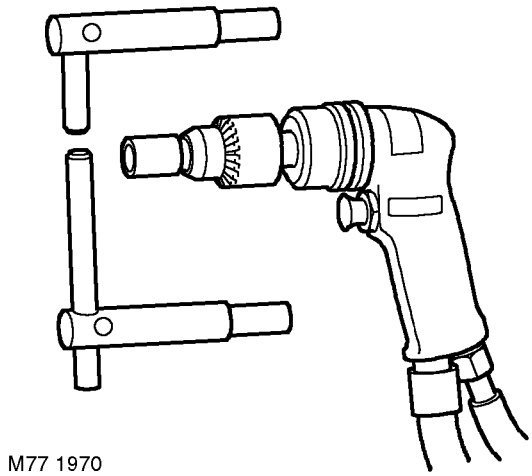
5. Apply adhesive sealant to panel joint surfaces.

Offer up and align

1. Offer up new panel and align with associated panels. Clamp into position using welding clamps or Mole grips. Where a joggle or brace joint is being adopted, make a set in the original panel joint edge or insert a brace behind the joint.

   NOTE: In cases where access for welding clamps is difficult, it may be necessary to use tack welds.

Welding

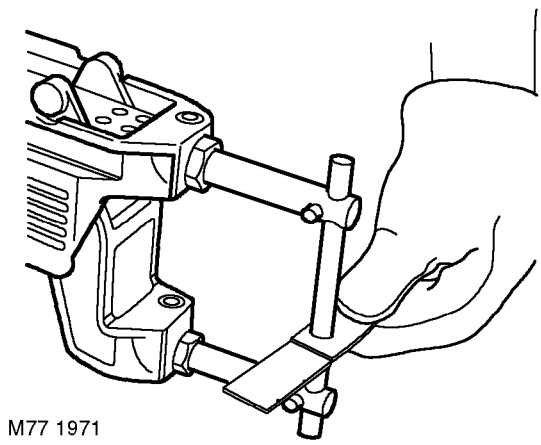


M77 1970

1. Select arms for resistance spot welding and shape electrode tips using a tip trimmer. Tips should be dressed so the diameter is equal to twice the thickness of the metal to be welded plus 3.0 mm (0.118 ins).

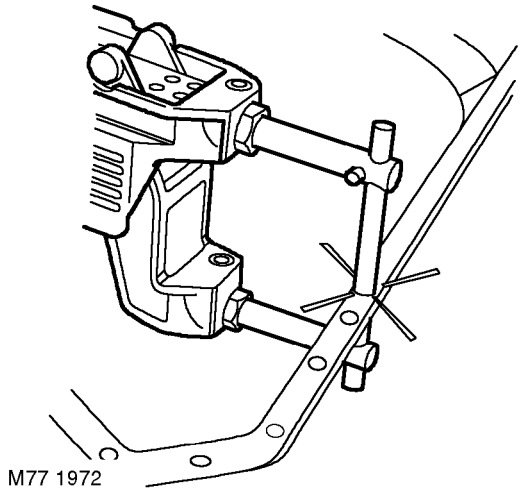
   CAUTION: Use arms not exceeding 300 mm (11.811ins) in length.

   NOTE: To maintain weld efficiency, the tips will require regular cleaning and dressing.



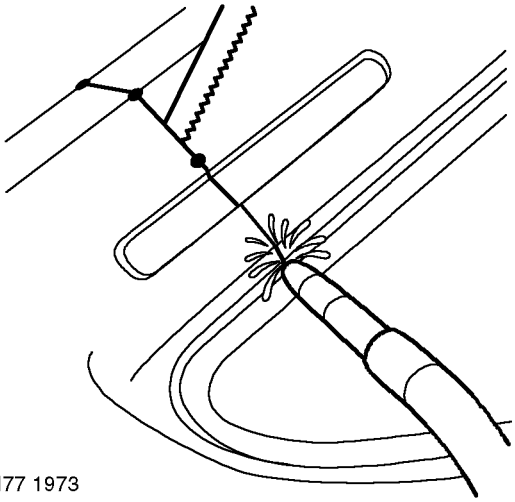
M77 1971

2. Fit resistance spot welding arms and test equipment for satisfactory operation, using test coupons. Where monitoring equipment is not available, verify weld strength by checking that metal around the weld puddle pulls apart under tension during pulling.



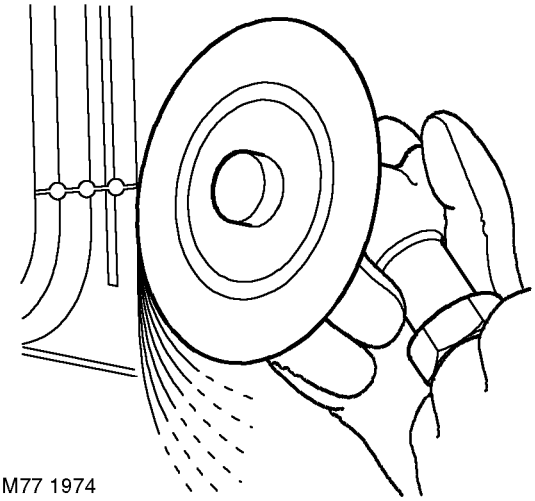
M77 1972

3. Use a resistance spot welder where access permits. Try to ensure weld quality by using a welding monitor where possible.



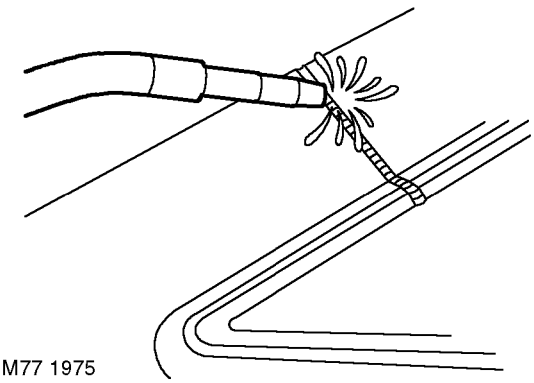
M77 1973

4. MIG tack weld butt joints and re-check alignment and panel contours where necessary. Ensure that a gap is maintained to minimise welding distortion, by inserting a hacksaw blade as an approximate guide.



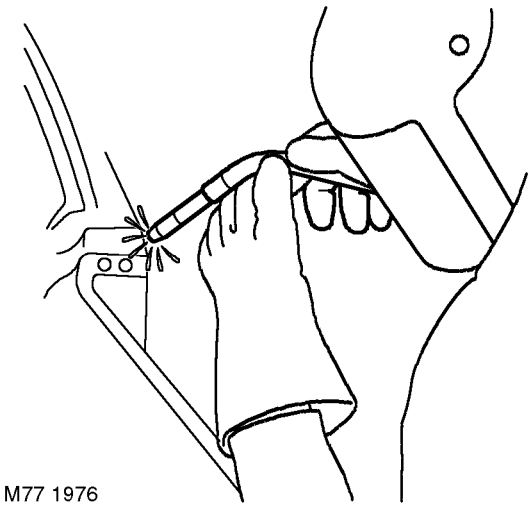
M77 1974

5. Dress MIG tack welds using a sander with 36 grit disc, or a belt-type sander where access is limited.



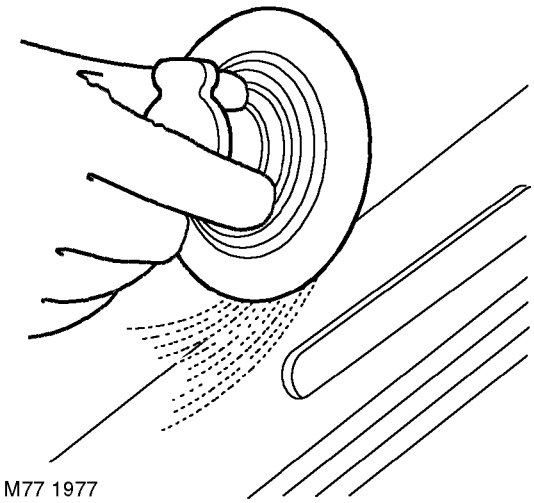
M77 1975

6. MIG seam weld butt joints.



M77 1976

7. Always use MIG plug welds where excessive metal thickness or limited access make resistance spot welding impractical. Make plug welds either by using holes left by the spot weld cutter, or through holes punched and drilled for the purpose, approximately 8mm (0.134 ins) diameter.



M77 1977

8. Dress all welds using either a sander with 36 grit disc, or a belt-type sander and/or wire brush. When dressing welds ensure an area as small as possible is removed to protect the zinc coating.

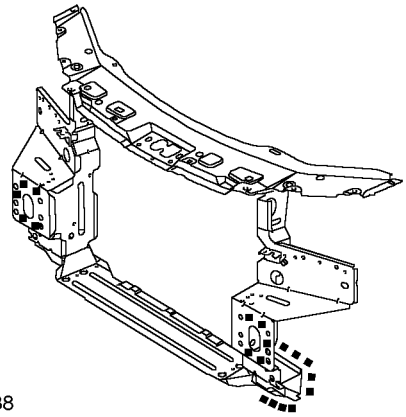
Front bulkhead assembly

In this procedure, the crossmember gusset plates are replaced in conjunction with the front bulkhead assembly.

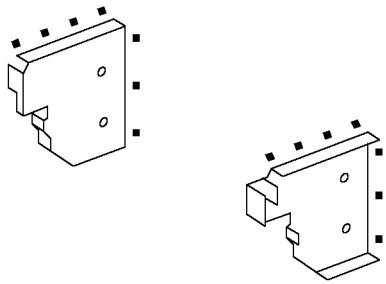
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
5. Remove front bumper armature.
6. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
7. Remove PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
8. Remove LH and RH headlamps.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
9. Release wiring to headlamps and position aside.
10. Remove LH and RH engine bay shields.
11. Remove bumper valance LH and RH attachment brackets.
12. Remove battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
13. Remove air intake hose.
14. Remove horn.
    ☞ **SECURITY, REPAIRS, Horn.**
15. Remove windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
16. Remove bonnet lock.
17. Support bonnet in open position.
18. Remove bonnet stay.

Repair



M77 2038



M77 2039

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Fit bonnet stay.
2. Fit bonnet lock.
3. Fit windscreen washer reservoir.
   ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
4. Fit horn.
   ☞ **SECURITY, REPAIRS, Horn.**
5. Fit air intake hose.
6. Fit battery. Do not connect earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
7. Fit bumper valance LH and RH attachment brackets.
8. Fit LH and RH engine bay shields.
9. Fit LH and RH headlamps.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.** Secure headlamps wiring.

10. Fit PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
11. Fit radiator.
    ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
12. Fit front bumper armature.
13. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
14. Connect all ECUs.
15. Connect alternator.
16. Connect battery earth lead.

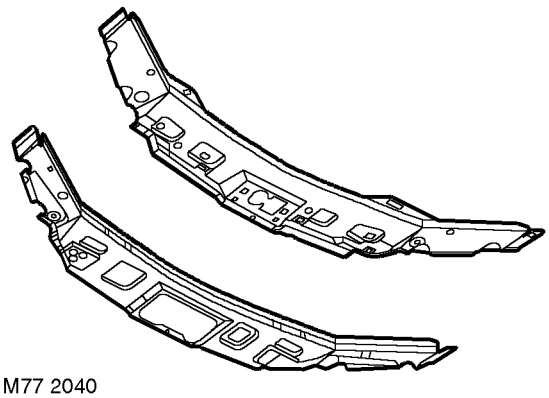
Bonnet locking platform

In this procedure the bonnet locking platform reinforcement is also replaced in conjunction with the bonnet locking platform.

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
5. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
6. Remove both headlamp assemblies.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
7. Remove horn.
   ☞ **SECURITY, REPAIRS, Horn.**
8. Remove battery.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
9. Remove air intake hose.
10. Remove bonnet lock.
11. Support bonnet in open position.
12. Remove bonnet stay.

Repair



M77 2040

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure.

Refit

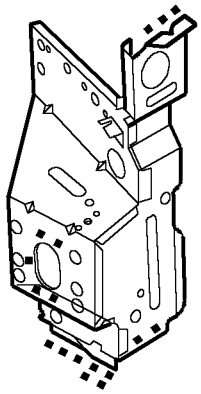
1. Fit bonnet stay.
2. Fit bonnet lock.
3. Fit air intake hose.
4. Fit battery. Do not connect earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
5. Fit horn.
   ☞ **SECURITY, REPAIRS, Horn.**
6. Fit both headlamp assemblies.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
7. Fit radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
8. Fit front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
9. Connect all ECUs.
10. Connect alternator.
11. Connect battery earth lead.

Headlamp mounting panel

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
5. Remove front bumper armature.
6. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
7. Remove headlamp assembly.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
8. Release wiring to headlamp and position aside.
9. **LH side:** Remove front bumper LH support bracket.
10. **LH side:** Remove battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
11. **LH side:** Remove horn.
    ☞ **SECURITY, REPAIRS, Horn.**
12. **LH side:** Remove air intake hose.
13. **RH side:** Remove front bumper RH support bracket.
14. **RH side:** Remove windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
15. **RH side:** Remove PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**

Repair



M77 2064

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **LH side:** Fit air intake hose.
2. **LH side:** Fit horn.
3. **LH side:** Fit battery. Do not connect earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
4. **LH side:** Fit front bumper LH support bracket.
5. **RH side:** Fit PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
6. **RH side:** Fit windscreen washer reservoir.
   ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
7. **RH side:** Fit front bumper LH support bracket.
8. Fit headlamp assembly.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**Secure headlamp wiring.
9. Fit radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
10. Fit front bumper armature.
11. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
12. Connect all ECUs.
13. Connect alternator.
14. Connect battery earth lead.

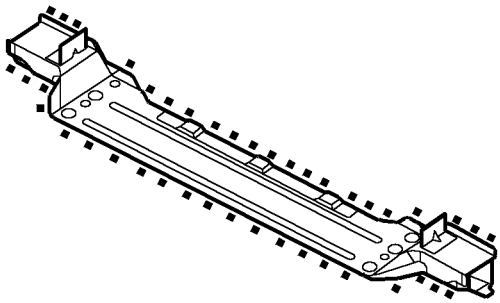
Front lower crossmember

In this procedure, the crossmember gusset plates are replaced in conjunction with the front lower crossmember.

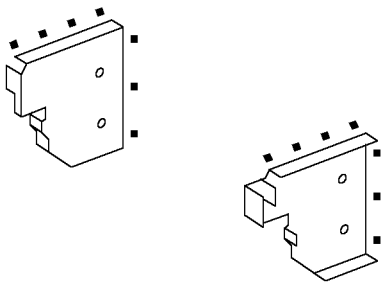
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove LH and RH engine bay shields.
5. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
6. Remove front bumper armature.
7. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
8. Remove PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
9. Release wiring for LH and RH headlamps and position aside.

Repair



M77 2063



M77 2039

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown. The front lower crossmember assembly is only supplied with a limited amount of spotwelds. Ensure that the correct amount of plug welds are put onto the assembly as a substitute for the spotwelds, see illustration below.

Refit

1. Secure wiring to LH and RH headlamps.
2. Fit PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
3. Fit radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
4. Fit front bumper armature.
5. Fit front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
6. Fit LH and RH engine bay shields.
7. Connect all ECUs.
8. Connect alternator.
9. Connect battery earth lead.

Front sidemember (complete)

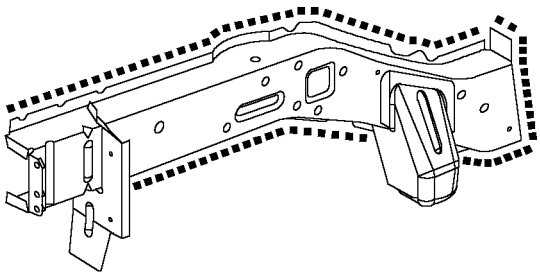
In this procedure, the front sidemember closing panel and the related crossmember to sidemember gusset plate are replaced in conjunction with the front sidemember.

Remove

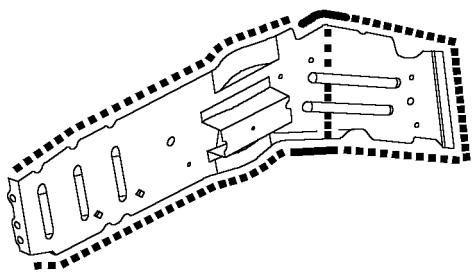
1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
6. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
7. Remove front bumper armature.
8. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
9. Remove PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
10. Remove headlamp.
    ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
11. Release wiring to headlamp and position aside.
12. Remove engine bay shield.
13. Remove front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
14. Remove front suspension rear beam.
15. Remove engine and gearbox.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Engine and automatic gearbox.**
16. Remove PAS rack.
    ☞ **STEERING, REPAIRS, Power steering rack.**
17. Remove fascia.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
18. **LH side:** Remove front bumper LH support bracket.
19. **LH side:** Remove LH engine mounting from body.
20. **LH side:** Remove battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
21. **LH side:** Remove air intake hose.
22. **LH side:** Remove horn.
    ☞ **SECURITY, REPAIRS, Horn.**
23. **RH side:** Remove front bumper RH support bracket.

24. **RH side:** Remove RH engine mounting from body.
25. **RH side:** Remove windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
26. **Driver's side:** Remove passenger compartment fuse box.
27. **Driver's side:** Remove brake pedal box and brake servo.
28. **Driver's side:** Remove clutch pedal box.
29. Remove treadplate from front door aperture. Release front carpet and position aside.
30. Remove insulation pads from engine bulkhead.

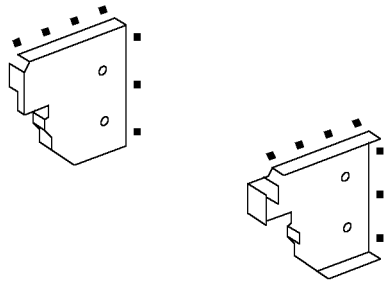
Repair



M77 2043



M77 2044



M77 2039

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Fit insulation pads to engine bulkhead.
2. Position front carpet and fit treadplate to front door aperture.
3. **Driver's side:** Fit clutch pedal box.
4. **Driver's side:** Fit brake pedal box and brake servo.
5. **Driver's side:** Fit passenger compartment fuse box.
6. **LH side:** Fit horn.
   ☞ **SECURITY, REPAIRS, Horn.**
7. **LH side:** Fit air intake hose.
8. **LH side:** Fit battery. Do not connect battery earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
9. **LH side:** Fit LH engine mounting to body.
10. **LH side:** Fit front bumper LH support bracket.
11. **RH side:** Fit windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
12. **RH side:** Fit RH engine mounting to body.
13. **RH side:** Fit front bumper RH support bracket.
14. Fit fascia.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
15. Fit PAS rack.
    ☞ **STEERING, REPAIRS, Power steering rack.**
16. Fit engine and gearbox.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Engine and automatic gearbox.**
17. Fit front suspension rear beam.
18. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**

19. Fit engine bay shield.
20. Fit headlamp.
    ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
21. Secure headlamp wiring.
22. Fit PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
23. Fit radiator.
    ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
24. Fit front bumper armature.
25. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
26. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
27. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
28. Connect all ECUs.
29. Connect alternator.
30. Connect battery earth lead.

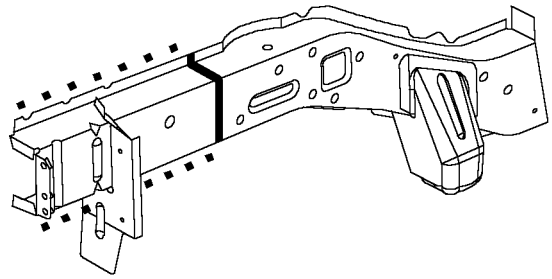
Front sidemember (front section)

In this procedure, the front section of the front sidemember closing panel and the related crossmember to sidemember gusset plate are replaced in conjunction with the front sidemember.

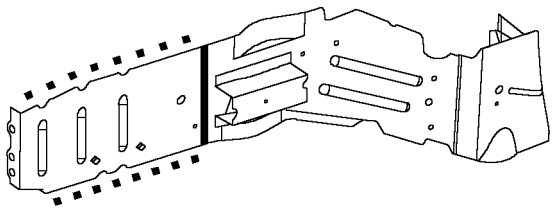
Remove

1. Disconnect battery earth lead.
2. Disconnect all ECUs.
3. Remove road wheel(s).
4. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
5. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
6. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
7. Remove PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
8. Remove headlamp.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
9. Release wiring to headlamp and position aside.
10. Remove engine bay shield.
11. Remove front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
12. **LH side:** Remove front bumper LH support bracket.
13. **LH side:** Remove ECM.
14. **LH side:** Remove battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
15. **LH side:** Remove air cleaner.
16. **LH side:** Remove air intake hose.
17. **LH side:** Remove horn.
    ☞ **SECURITY, REPAIRS, Horn.**
18. **RH side:** Remove front bumper RH support bracket.
19. **RH side:** Remove windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
20. **RH side:** Remove alternator.
    ☞ **CHARGING AND STARTING, REPAIRS, Alternator - KV6.**
21. **RH side:** Remove PAS pump.
    ☞ **STEERING, REPAIRS, Pump - steering - KV6.**

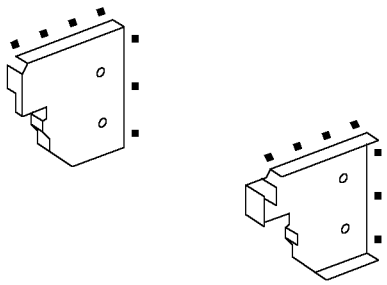
Repair



M77 2045



M77 2046



M77 2039

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

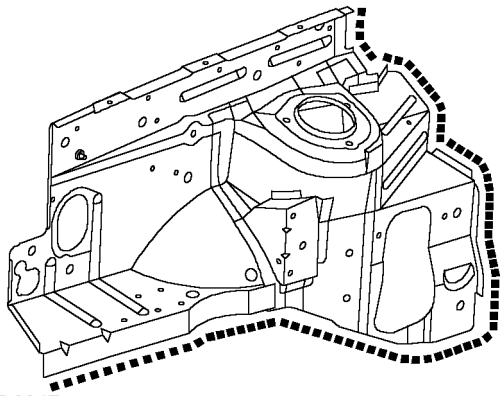
1. **LH side:** Fit horn.
   ☞ **SECURITY, REPAIRS, Horn.**
2. **LH side:** Fit air intake hose.
3. **LH side:** Fit air cleaner.
4. **LH side:** Fit battery carrier. Do not connect battery earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
5. **LH side:** Fit ECM.
6. **LH side:** Fit front bumper LH support bracket.
7. **RH side:** Fit PAS pump.
   ☞ **STEERING, REPAIRS, Pump - steering - KV6.**
8. **RH side:** Fit alternator.
   ☞ **CHARGING AND STARTING, REPAIRS, Alternator - KV6.**
9. **RH side:** Fit windscreen washer reservoir.
   ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
10. **RH side:** Fit front bumper RH support bracket.
11. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
12. Fit engine bay shield.
13. Fit headlamp.
    ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
14. Secure headlamp wiring.
15. Fit PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
16. Fit radiator.
    ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
17. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
18. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
19. Connect all ECUs.
20. Connect battery earth lead.

Front valance assembly

Remove

1. Disconnect battery earth lead.
2. Disconnect all ECUs.
3. Remove road wheel(s).
4. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
5. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
6. Remove front bumper armature.
7. Remove radiator.
   ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
8. Remove PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
9. Remove headlamp.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
10. Release wiring to headlamp and position aside.
11. Remove engine bay shield.
12. Remove front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
13. Remove front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
14. Remove front suspension rear beam.
15. Remove engine and gearbox.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Engine and automatic gearbox.**
16. Remove front damper.
    ☞ **FRONT SUSPENSION, REPAIRS, Damper.**
17. Remove PAS rack.
    ☞ **STEERING, REPAIRS, Power steering rack.**
18. Remove fascia.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
19. **LH side:** Remove front bumper LH support bracket.
20. **LH side:** Remove air cleaner.
21. **LH side:** Remove air intake hose.
22. **LH side:** Remove ECM.
23. **LH side:** Remove engine compartment fusebox.
24. **LH side:** Remove battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
25. **LH side:** Remove engine compartment fuse box and related wiring.
26. **LH side:** Remove LH engine mounting from body.
27. **LH side:** On models with Diesel engines, remove fuel filter.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Filter - main.**
28. **LH side:** Remove LH front brake pipe.
29. **RH side:** Remove front bumper RH support bracket.
30. **RH side:** Remove windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
31. **RH side:** Remove coolant expansion tank.
32. **RH side:** Remove RH engine mounting from body.
33. **RH side:** Remove PAS fluid reservoir.
34. **RH side:** Remove RH front brake pipe.
35. **Driver's side:** Remove passenger compartment fuse box.
36. Remove brake pedal box and brake servo.
37. Remove clutch pedal box.
38. Release vehicle harness from valance and position aside.
39. Remove treadplate from front door aperture. Release front carpet and position aside.
40. Remove insulation pads from engine bulkhead.

Repair



M77 2047

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

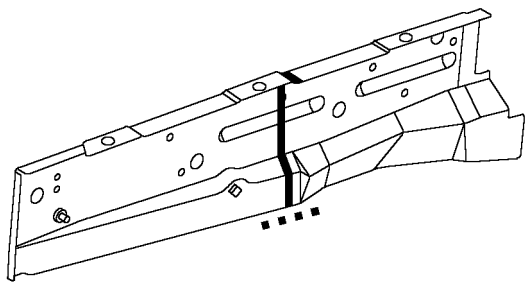
1. Fit insulation pads to front and rear sides of engine bulkhead.
2. Position front carpet and fit treadplate to front door aperture.
3. Secure vehicle harness to valance.
4. **Driver's side:** Fit clutch pedal box.
5. Fit brake pedal box and brake servo.
6. Fit passenger compartment fuse box.
7. **LH side:** Fit LH front brake pipe. Bleed brake system.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
8. **LH side:** On models with Diesel engines, fit fuel filter.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Filter - main.**
9. **LH side:** Fit LH engine mounting to body.
10. **LH side:** Fit engine compartment fuse box and related wiring.
11. **LH side:** Fit battery carrier. Do not connect battery earth lead.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
12. **LH side:** Fit engine compartment fusebox.
13. **LH side:** Fit ECM.
14. **LH side:** Fit air intake hose.
15. **LH side:** Fit air cleaner.
16. **LH side:** Fit front bumper LH support bracket.
17. **RH side:** Fit RH front brake pipe. Bleed brake system.
    ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
18. **RH side:** Fit PAS fluid reservoir.
19. **RH side:** Fit RH engine mounting to body.
20. **RH side:** Fit coolant expansion tank.
21. **RH side:** Fit windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
22. **RH side:** Fit front bumper RH support bracket.
23. Fit fascia.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
24. Fit PAS rack.
    ☞ **STEERING, REPAIRS, Power steering rack.**
25. Fit front damper.
    ☞ **FRONT SUSPENSION, REPAIRS, Damper.**
26. Fit engine and gearbox.
    ☞ **ENGINE - K SERIES KV6, REPAIRS, Engine and automatic gearbox.**
27. Fit front suspension rear beam.
28. Fit front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
29. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
30. Fit engine bay shield.
31. Fit headlamp.
    ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
32. Secure headlamp wiring. Fit PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
33. Fit radiator.
    ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
34. Fit front bumper armature.
35. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
36. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
37. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
38. Connect all ECUs.
39. Connect battery earth lead.

Valance upper front

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
6. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
7. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
8. Remove headlamp.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
9. Release wiring from valance and position aside.
10. **LH side:** Remove ECM.
11. **LH side:** Remove battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
12. **RH side:** Remove PAS fluid reservoir.
13. **RH side:** Remove brake pipes from valance.

Repair



M77 2048

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

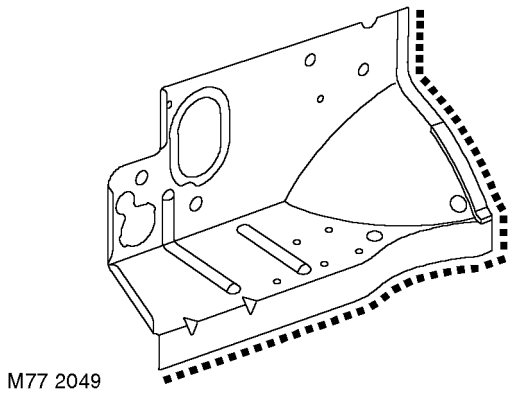
1. **LH side:** Fit battery. Do not connect earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
2. **LH side:** Fit ECM.
3. **RH side:** Fit PAS fluid reservoir.
4. **RH side:** Fit brake pipes to valance. Bleed brakes.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
5. Secure wiring to valance.
6. Fit headlamp.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
7. Fit front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
8. Fit front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
9. Fit front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
10. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
11. Connect all ECUs.
12. Connect alternator.
13. Connect battery earth lead.

Valance front

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
6. Remove engine bay shield.
7. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
8. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
9. Remove front bumper support bracket.
10. Remove radiator.
    ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**
11. Remove headlamp.
    ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
12. Release wiring to headlamp and position aside.
13. **LH side:** Remove air cleaner.
14. **LH side:** Remove air intake hose.
15. **LH side:** Remove ECM.
16. **LH side:** Remove battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
17. **LH side:** Remove engine compartment fuse box and related wiring.
18. **LH side:** Remove LH front brake pipe.
19. **RH side:** Remove PAS fluid reservoir.
20. **RH side:** Remove RH front brake pipe.
21. **RH side:** Remove windscreen washer reservoir.
    ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
22. **RH side:** Remove PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**

Repair



M77 2049

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **LH side:** Fit LH front brake pipe. Bleed brake system.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
2. **LH side:** Fit engine compartment fuse box and related wiring.
3. **LH side:** Fit battery carrier. Do not connect battery earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
4. **LH side:** Fit ECM.
5. **LH side:** Fit air intake hose.
6. **LH side:** Fit air cleaner.
7. **RH side:** Fit PAS fluid cooler.
   ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
8. **RH side:** Fit windscreen washer reservoir.
   ☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
9. **RH side:** Fit RH front brake pipe. Bleed brake system.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
10. **RH side:** Fit PAS fluid reservoir.
11. Fit headlamp.
    ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
12. Secure headlamp wiring.
13. Fit PAS fluid cooler.
    ☞ **STEERING, REPAIRS, Oil cooler - Td4 & K1.8 models.**
14. Fit radiator.
    ☞ **COOLING SYSTEM - K SERIES KV6, REPAIRS, Radiator assembly.**

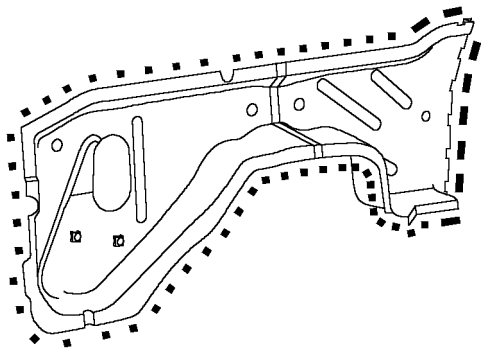
15. Fit front bumper support bracket.
16. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
17. Fit front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
18. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
19. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
20. Connect all ECUs.
21. Connect alternator.
22. Connect battery earth lead.

Valance outer reinforcement

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
6. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
7. Remove front bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
8. Remove headlamp.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
9. Release wiring from valance and position aside.
10. **LH side:** Remove battery.
    ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
11. **LH side:** Remove ECM.
12. **LH side:** Remove relay module.
13. **LH side:** Remove battery carrier.
    ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
14. **LH side:** Remove engine compartment fuse box and related wiring.
15. **RH side:** Remove PAS fluid reservoir.
16. **RH side:** Remove brake pipes from valance.

Repair



M77 2058

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **LH side:** Fit engine compartment fuse box and related wiring.
2. **LH side:** Fit battery carrier.
   ☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
3. **LH side:** Fit relay module.
4. **LH side:** Fit ECM.
5. **LH side:** Fit battery. Do not connect earth lead.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**
6. **RH side:** Fit PAS fluid reservoir.
7. **RH side:** Fit brake pipes to valance. Bleed brakes.
   ☞ **BRAKES, ADJUSTMENTS, Brake bleed.**
8. Secure wiring to valance.
9. Fit headlamp.
   ☞ **LIGHTING, REPAIRS, Headlamp assembly.**
10. Fit front bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
11. Fit front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
12. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
13. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
14. Connect all ECUs.
15. Connect alternator.
16. Connect battery earth lead.

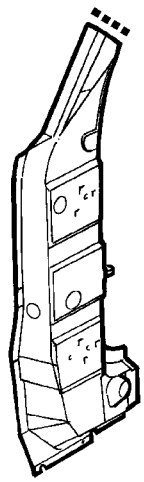
'A' post - 3 door

In this procedure, the front outer body side panel is replaced in conjunction with the inner 'A' post and the 'A' post reinforcements.

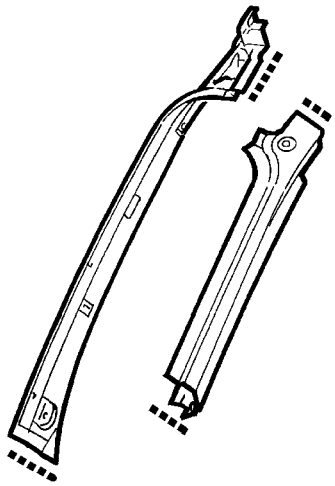
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
6. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
7. Remove front door.
   ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
8. Remove front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
9. Remove fascia.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
10. Remove duct of outboard face level ventilator.
11. Remove headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
12. Remove windscreen.
    ☞ **SCREENS, REPAIRS, Windscreen.**
13. Remove treadplate from front door aperture. Release front carpet and position aside.
14. Remove front door aperture seal.
15. Remove engine bulkhead insulation.
16. **Driver's side:** Remove passenger compartment fuse box.

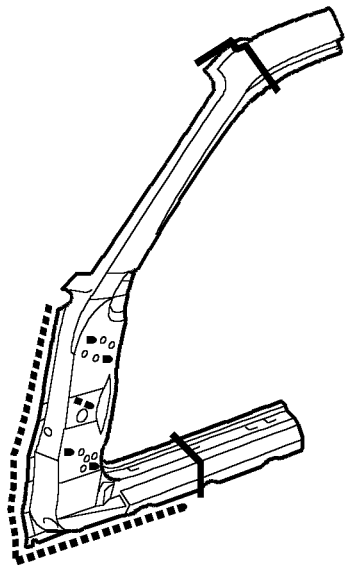
Repair



M77 1994



M77 1995



M77 1996

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **Driver's side:** Fit passenger compartment fuse box.
2. Fit insulation pads to engine bulkhead.
3. Fit front door aperture seal.
4. Position front carpet and fit treadplate to front door aperture.
5. Fit windscreen.
   ☞ **SCREENS, REPAIRS, Windscreen.**
6. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
7. Fit duct of outboard face level ventilator.
8. Fit fascia.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
9. Fit front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
10. Fit front door.
    ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
11. Fit front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
12. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
13. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
14. Connect all ECUs.
15. Connect alternator.
16. Connect battery earth lead.

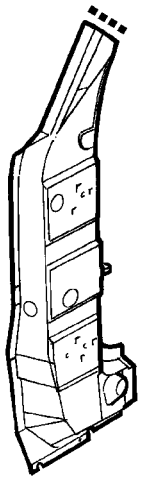
'A' post - 5 door

In this procedure, the front outer body side panel is replaced in conjunction with the inner 'A' post and the 'A' post reinforcements.

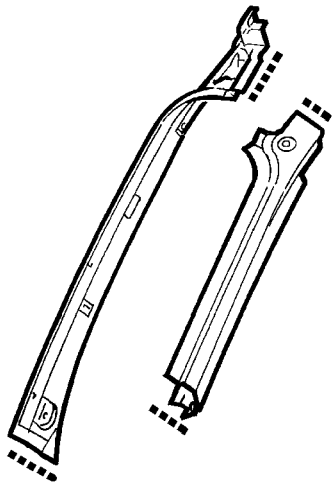
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wheel arch liner.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
6. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
7. Remove front door.
   ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
8. Remove front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
9. Remove fascia.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
10. Remove duct of outboard face level ventilator.
11. Remove headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
12. Remove windscreen.
    ☞ **SCREENS, REPAIRS, Windscreen.**
13. Remove treadplate from front door aperture. Release front carpet and position aside.
14. Remove front door aperture seal.
15. Remove engine bulkhead insulation.
16. **Driver's side:** Remove passenger compartment fuse box.

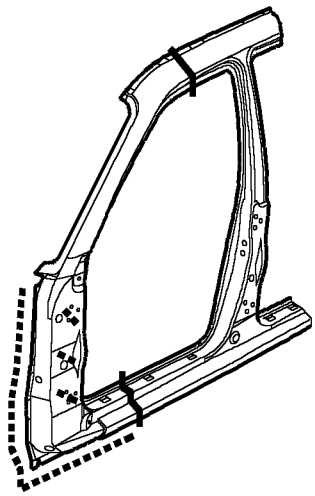
Repair



M77 1994



M77 1995



M77 1999

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **Driver's side:** Fit passenger compartment fuse box.
2. Fit insulation pads to engine bulkhead.
3. Fit front door aperture seal.
4. Position front carpet and fit treadplate to front door aperture.
5. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
6. Fit windscreen.
   ☞ **SCREENS, REPAIRS, Windscreen.**
7. Fit duct of outboard face level ventilator.

8. Fit fascia.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
9. Fit front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
10. Fit front door.
    ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
11. Fit front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
12. Fit front wheel arch liner.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Liner - front wheel arch.**
13. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
14. Connect all ECUs.
15. Connect alternator.
16. Connect battery earth lead.

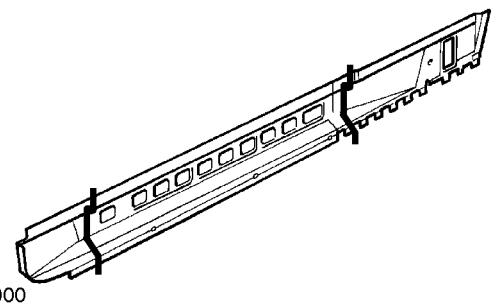
Sill reinforcement - 3 door

In this procedure, the lower outer body side panel is replaced in conjunction with the sill reinforcement.

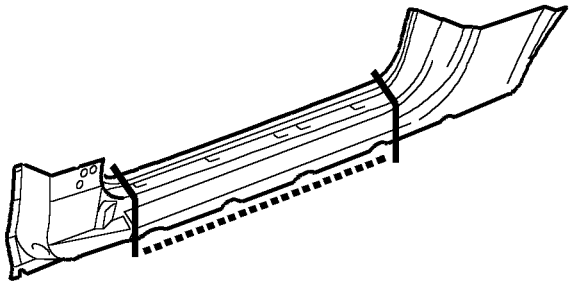
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
6. Remove front door.
   ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
7. Remove front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
8. Remove rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
9. Remove treadplate from front door aperture.
10. Remove side door aperture seal.
11. Remove rear body side casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
12. Release carpet from inner sill and position aside.
13. Release vehicle harness from inner sill and position aside.

Repair



M77 2000



M77 2001

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Secure vehicle harness to inner sill.
2. Position carpet to inner sill.
3. Fit rear body side casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
4. Fit side door aperture seal(s).
5. Fit treadplate to side door aperture(s).
6. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
7. Fit front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
8. Fit front door.
   ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
9. Fit front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
10. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
11. Connect all ECUs.
12. Connect alternator.
13. Connect battery earth lead.

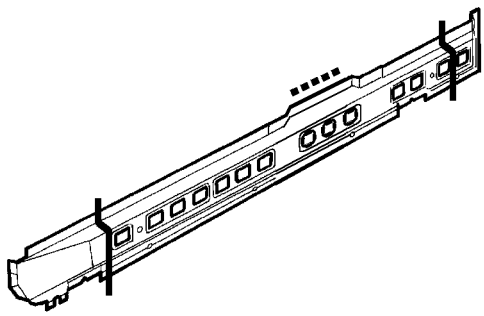
Sill reinforcement - 5 door

In this procedure, the lower outer body side panel is replaced in conjunction with the sill reinforcement.

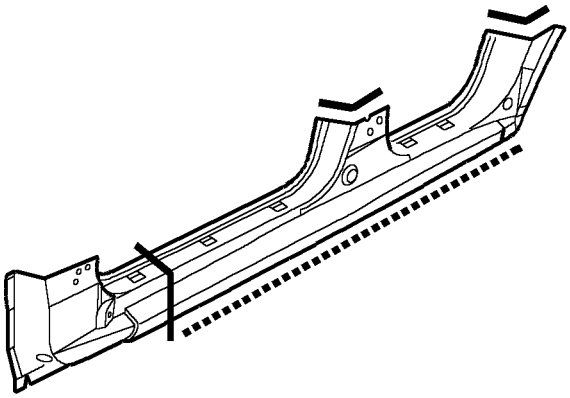
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove front wing.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
6. Remove front door.
   ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
7. Remove rear door.
   ☞ **DOORS, REPAIRS, Door assembly - rear - remove for access & refit.**
8. Remove 'B/C' post lower finisher.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'B' post - lower - 5 door.**
9. Remove front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
10. Remove rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - LH.**
    ☞ **SEATS, REPAIRS, Rear seat - RH.**
11. Remove treadplate from side door apertures.
12. Remove side door aperture seals.
13. Release carpet from inner sill and position aside.
14. Release vehicle harness from inner sill and position aside.

Repair



M77 2002



M77 2003

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Secure vehicle harness to inner sill.
2. Position carpet to inner sill.
3. Fit side door aperture seals.
4. Fit treadplate to side door apertures.
5. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
6. Fit front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
7. Fit 'B/C' post lower finisher.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'B' post - lower - 5 door.**
8. Fit rear door.
   ☞ **DOORS, REPAIRS, Door assembly - rear - remove for access & refit.**
9. Fit front door.
   ☞ **DOORS, REPAIRS, Door assembly - front - remove for access & refit.**
10. Fit front wing.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wing - front.**
11. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
12. Connect all ECUs.
13. Connect alternator.
14. Connect battery earth lead.

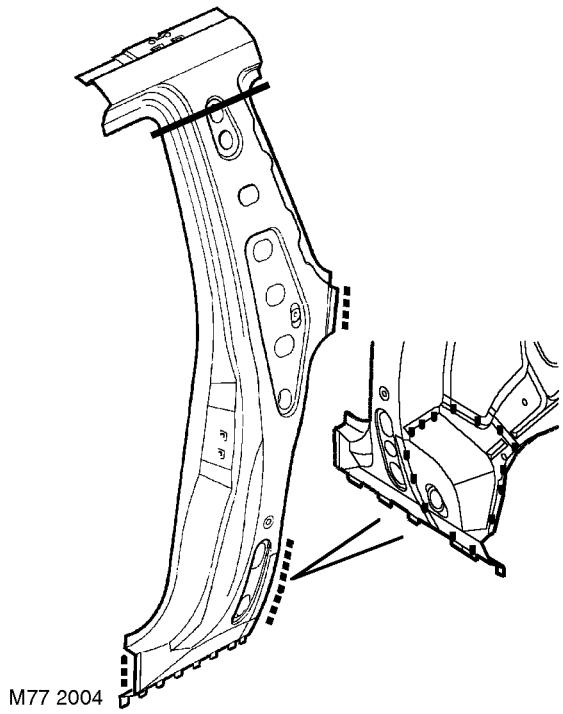
'B/C' post reinforcement - 3 door

In this procedure, the rear outer body side panel and the rear quarter front lower reinforcement are replaced in conjunction with the 'B/C' post reinforcement.

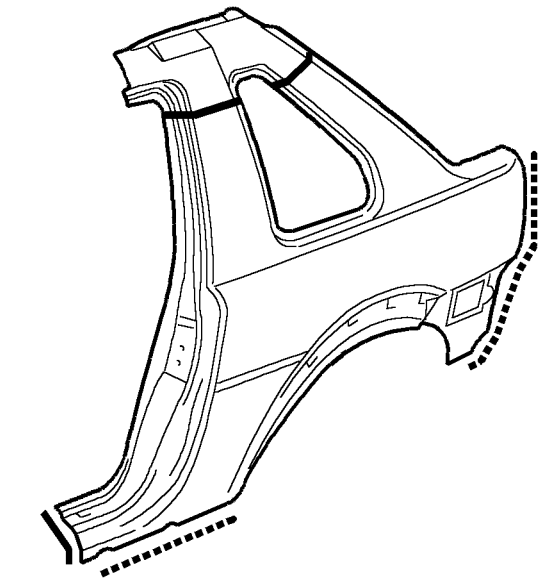
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove rear wheel arch extension.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Wheelarch extension - rear wing part.**
6. Remove rear wheel arch liner.
7. Remove front seat belt.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Automatic belt assembly - front - 3 door.**
8. Remove front door striker from 'B/C' post.
9. Remove rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
10. Remove rear body side casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
11. Remove treadplate from side door aperture.
12. Remove side door aperture seal.
13. Release carpet from inner sill and position aside.
14. Remove rear quarter vent and seal.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Body quarter vent assembly - 3 door.**
15. Remove rear roof panel finisher.
16. Remove headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
17. Release vehicle harness from inner sill and position aside.

Repair



M77 2004



M77 2005

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Secure vehicle harness to inner sill.
2. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
3. Fit rear roof panel finisher.
4. Fit seal and rear quarter vent.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Body quarter vent assembly - 3 door.**
5. Secure carpet to inner sill.
6. Fit side door aperture seal.
7. Fit treadplate from side door aperture.
8. Fit rear body side casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
9. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
10. Fit front door striker to 'B/C' post.
11. Fit front seat belt.
    ☞ **RESTRAINT SYSTEMS, REPAIRS, Automatic belt assembly - front - 3 door.**
12. Fit rear wheel arch liner.
13. Fit rear wheel arch extension.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Wheelarch extension - rear wing part.**
14. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
15. Connect all ECUs.
16. Connect alternator.
17. Connect battery earth lead.

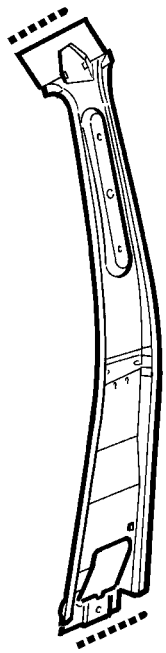
'B/C' post reinforcement - 5 door

In this procedure, the rear outer body side panel and the inner panel are replaced in conjunction with the 'B/C' post reinforcement.

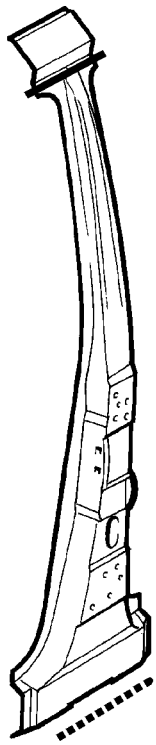
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove rear door.
   ☞ **DOORS, REPAIRS, Door assembly - rear - remove for access & refit.**
5. Remove headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
6. Remove front seat belt.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Automatic belt assembly - front - 5 door.**
7. Remove 'B/C' post lower finisher.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'B' post - lower - 5 door.**
8. Remove front door striker from 'B/C' post.
9. Remove front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
10. Remove rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - LH.**
    ☞ **SEATS, REPAIRS, Rear seat - RH.**
11. Remove treadplate from side door aperture(s).
12. Remove side door aperture seal(s).
13. Release carpet from inner sill and position aside.
14. Release vehicle harness from inner sill and position aside.

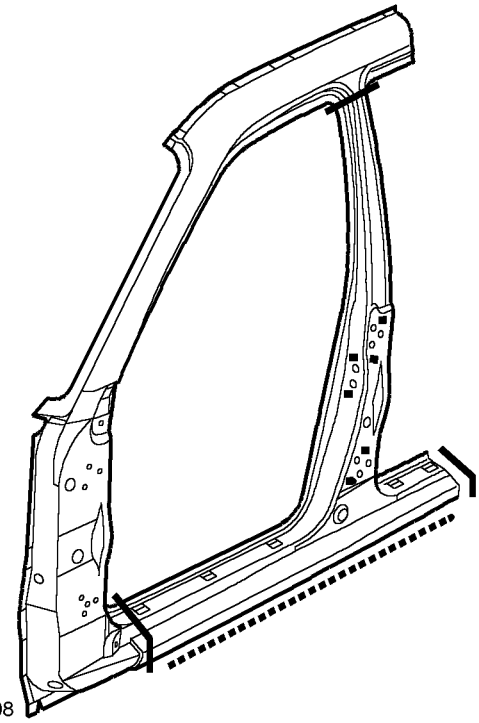
Repair



M77 2006



M77 2007


M77 2008

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Secure vehicle harness to inner sill.
2. Position carpet to inner sill.
3. Fit side door aperture seal(s).
4. Fit treadplate from side door aperture(s).
5. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
6. Fit front seat.
   ☞ **SEATS, REPAIRS, Front seat.**
7. Fit front door striker to 'B/C' post.
8. Fit 'B/C' post lower finisher.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'B' post - lower - 5 door.**
9. Fit front seat belt.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Automatic belt assembly - front - 5 door.**
10. Fit headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
11. Fit rear door.
    ☞ **DOORS, REPAIRS, Door assembly - rear - remove for access & refit.**
    ☞ **SEATS, REPAIRS, Rear seat - RH.**
12. Connect all ECUs.
13. Connect alternator.
14. Connect battery earth lead.

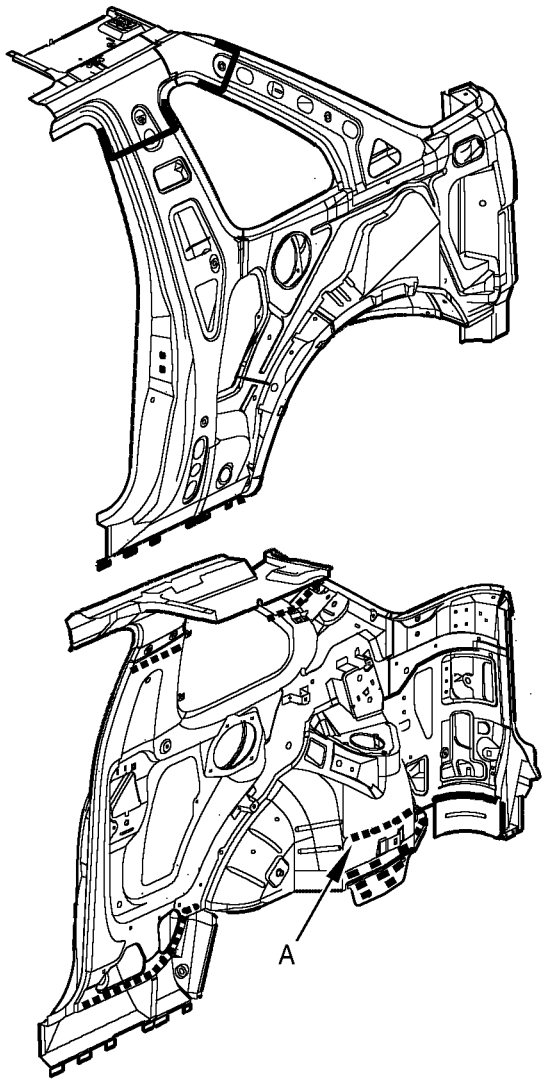
Complete rear quarter - 3 door

In this procedure, the rear outer body side panel is replaced in conjunction with the complete rear quarter.

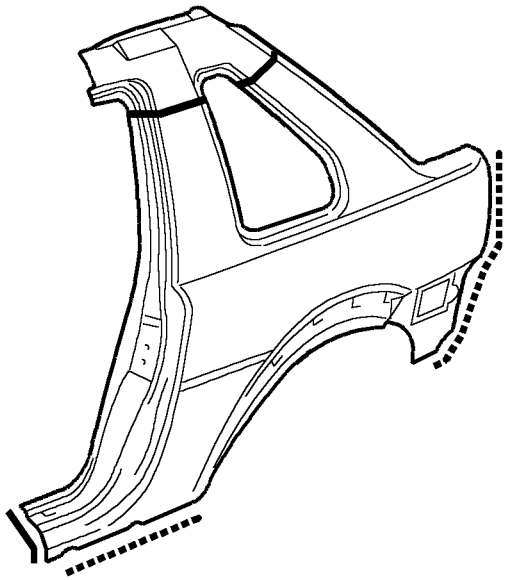
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove sill lower finisher.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Finisher - sill - lower.**
6. Remove rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
7. Remove rear wheel arch liner.
8. Remove door striker from 'B' post.
9. Remove treadplate from front door aperture.
10. Remove front door aperture seal.
11. Release carpet from inner sill and rear heelboard and position aside.
12. Remove soft/hard top.
13. Remove tail door aperture seal.
14. Remove rear roof panel finisher.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Moulding - roof - 5 door.**
15. Remove tail lamp.
    ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
16. Remove rear quarter lower casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
17. Remove rear quarter upper casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 3 door.**
18. Remove rear side seat belt.
    ☞ **RESTRAINT SYSTEMS, REPAIRS, Seat belt - rear - LH.**
19. Remove loadspace carpet.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
20. Remove rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - LH.**
    ☞ **SEATS, REPAIRS, Rear seat - RH.**
21. Remove rear body side casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
22. Remove headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
23. Remove rear quarter vent and seal.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Body quarter vent assembly - 3 door.**
24. Remove rear damper.
    ☞ **REAR SUSPENSION, REPAIRS, Damper.**
25. Release vehicle harness from rear quarter and position aside.
26. **LH side:** Remove tail door striker from 'E' post.
27. **RH side:** Remove tail door.
    ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
28. **RH side:** Remove fuel filler neck.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
29. **RH side:** Remove fuel tank.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**

Repair



M77 2009



M77 2005

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.
2. Arrow A is shown to highlight the fact that there are plug welds on the other side of the inner wheel arch as well. These are to weld the rear longitudinal to the inner wheel arch.

Refit

1. **LH side:** Fit tail door striker to 'E' post.
2. **RH side:** Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
3. **RH side:** Fit fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
4. **RH side:** Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
5. Secure vehicle harness to rear quarter.
6. Fit rear damper.
   ☞ **REAR SUSPENSION, REPAIRS, Damper.**
7. Fit seal and rear quarter vent.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Body quarter vent assembly - 3 door.**
8. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
9. Fit rear body side casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
10. Fit rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - LH.**
    ☞ **SEATS, REPAIRS, Rear seat - RH.**
11. Fit loadspace carpet.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
12. Fit rear side seat belt.
    ☞ **RESTRAINT SYSTEMS, REPAIRS, Seat belt - rear - LH.**
13. Fit rear quarter upper casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 3 door.**
14. Fit rear quarter lower casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
15. Fit tail lamp.
    ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
16. Fit rear roof panel finisher.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Moulding - roof - 5 door.**
17. Fit tail door aperture seal.
18. Fit soft/hard top.
19. Secure carpet to inner sill and rear heelboard.
20. Fit front door aperture seal.
21. Fit treadplate to front door aperture.
22. Fit door striker to 'B' post.
23. Fit rear wheel arch liner.
24. Fit rear bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
25. Fit sill lower finisher.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Finisher - sill - lower.**
26. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
27. Connect all ECUs.
28. Connect alternator.
29. Connect battery earth lead.

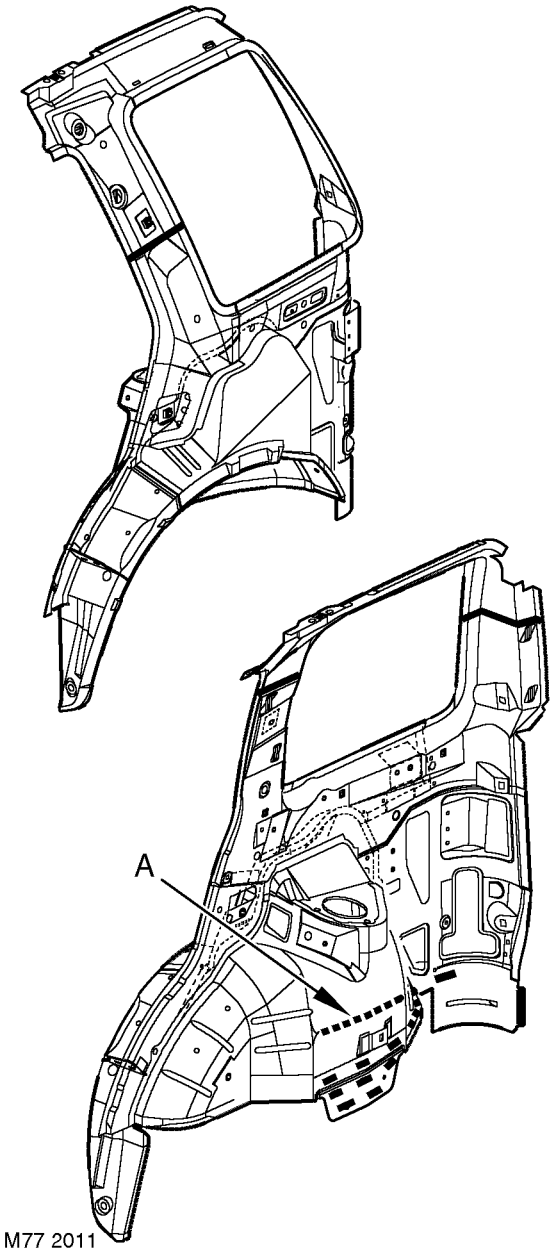
Complete rear quarter - 5 door

In this procedure, the rear outer body side panel is replaced in conjunction with the complete rear quarter.

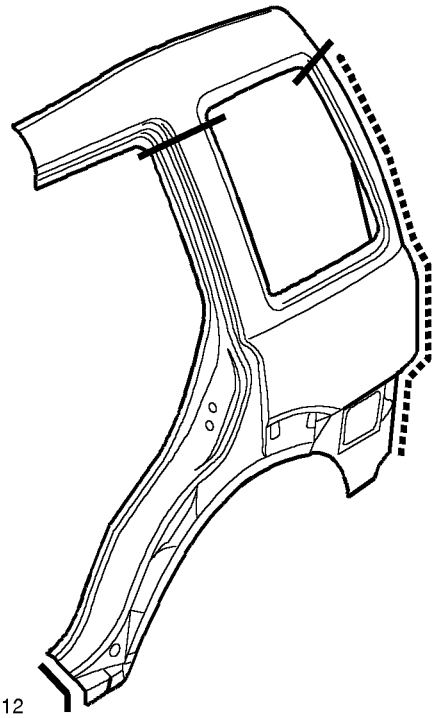
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove sill lower finisher.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Finisher - sill - lower.**
6. Remove rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
7. Remove rear wheel arch liner.
8. Remove rear door striker from 'D' post.
9. Remove treadplate from rear door aperture.
10. Remove rear door aperture seal.
11. Release carpet from inner sill and rear heelboard and position aside.
12. Remove tail door glass upper finisher.
13. Remove tail door glass side finisher.
    ☞ **DOORS, REPAIRS, Finisher - rear screen - side - 5 door.**
14. Remove tail door aperture seal.
15. Remove roof panel finisher.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Moulding - roof - 5 door.**
16. Remove tail lamp.
    ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
17. Remove rear quarter lower casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
18. Remove rear quarter upper casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**
19. Remove rear side seat belt.
    ☞ **RESTRAINT SYSTEMS, REPAIRS, Seat belt - rear - LH.**
20. Remove loadspace carpet.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
21. Remove rear seat.
    ☞ **SEATS, REPAIRS, Rear seat - LH.**
    ☞ **SEATS, REPAIRS, Rear seat - RH.**
22. Remove headlining.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
23. Remove rear body side glass.
    ☞ **SCREENS, REPAIRS, Glass - body side - rear.**
24. Remove rear damper.
    ☞ **REAR SUSPENSION, REPAIRS, Damper.**
25. Release vehicle harness from rear quarter and position aside.
26. **LH side:** Remove tail door striker from 'E' post.
27. **RH side:** Remove tail door.
    ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
28. **RH side:** Remove fuel filler neck.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
29. **RH side:** Remove fuel tank.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**

Repair



M77 2011


M77 2012

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.
2. Arrow A is shown to highlight the fact that there are plug welds on the other side of the inner wheel arch as well. These are to weld the rear longitudinal to the inner wheel arch.

Refit

1. **LH side:** Fit tail door striker to 'E' post.
2. **RH side:** Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
3. **RH side:** Fit fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
4. **RH side:** Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
5. Secure vehicle harness to rear quarter.
6. Fit rear damper.
   ☞ **REAR SUSPENSION, REPAIRS, Damper.**
7. Fit rear body side glass.
   ☞ **SCREENS, REPAIRS, Glass - body side - rear.**
8. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**

9. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
10. Fit loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
11. Fit rear side seat belt.
   ☞ **RESTRAINT SYSTEMS, REPAIRS, Seat belt - rear - LH.**
12. Fit rear quarter upper casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**
13. Fit rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
14. Fit tail lamp.
   ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
15. Fit roof panel finisher.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Moulding - roof - 5 door.**
16. Fit tail door aperture seal.
17. Fit tail door glass side finisher.
   ☞ **DOORS, REPAIRS, Finisher - rear screen - side - 5 door.**
18. Fit tail door glass upper finisher.
19. Secure carpet to inner sill and rear heelboard.
20. Fit rear door aperture seal.
21. Fit treadplate to rear door aperture.
22. Fit rear door striker to 'D' post.
23. Fit rear wheel arch liner.
24. Fit rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
25. Fit sill lower finisher.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Finisher - sill - lower.**
26. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
27. Connect all ECUs.
28. Connect alternator.
29. Connect battery earth lead.

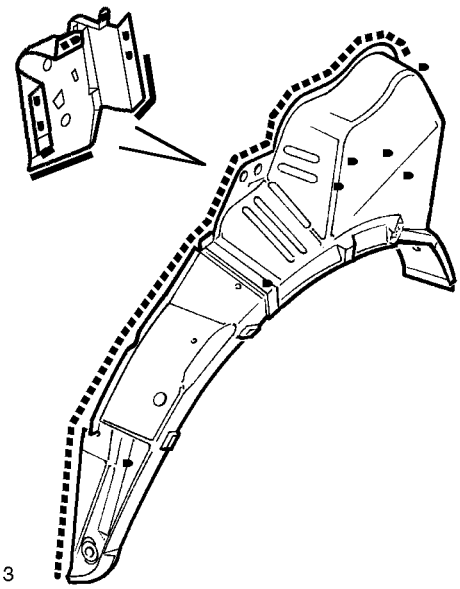
Outer rear wheel arch - 3 door

In this procedure, the squab side reinforcement is replaced in conjunction with the outer rear wheel arch.

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
6. Remove rear wheel arch liner.
7. Remove rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
8. Remove rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
9. Remove rear body side casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
10. Remove rear damper.
   ☞ **REAR SUSPENSION, REPAIRS, Damper.**
11. **RH side:** Remove fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
12. **RH side:** Remove fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**

Repair


M77 2013

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

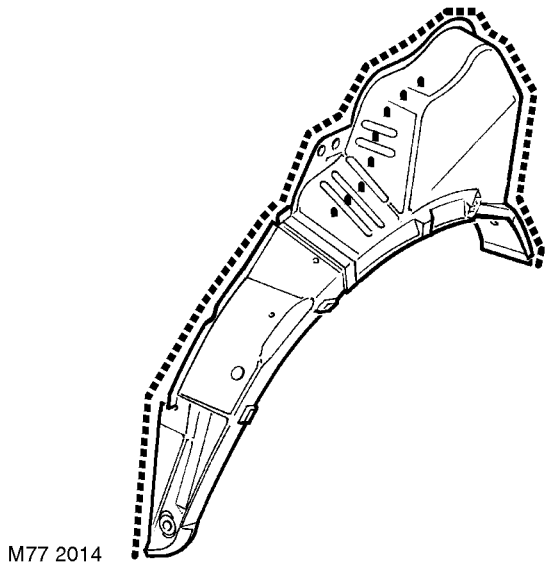
1. **RH side:** Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
2. **RH side:** Fit fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
3. Fit rear damper.
   ☞ **REAR SUSPENSION, REPAIRS, Damper.**
4. Fit rear body side casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.**
5. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
6. Fit rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
7. Fit rear wheel arch liner.
8. Fit rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
9. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
10. Connect all ECUs.
11. Connect alternator.
12. Connect battery earth lead.

Outer rear wheel arch - 5 door

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
6. Remove rear wheel arch liner.
7. Remove rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
8. Remove rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
9. Remove rear damper.
   ☞ **REAR SUSPENSION, REPAIRS, Damper.**
10. **RH side:** Remove fuel filler neck.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
11. **RH side:** Remove fuel tank.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**

Repair



M77 2014

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **RH side:** Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
2. **RH side:** Fit fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
3. Fit rear damper.
   ☞ **REAR SUSPENSION, REPAIRS, Damper.**
4. Fit rear seat.
   ☞ **SEATS, REPAIRS, Rear seat - LH.**
   ☞ **SEATS, REPAIRS, Rear seat - RH.**
5. Fit rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
6. Fit rear wheel arch liner.
7. Fit rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
8. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
9. Connect all ECUs.
10. Connect alternator.
11. Connect battery earth lead.

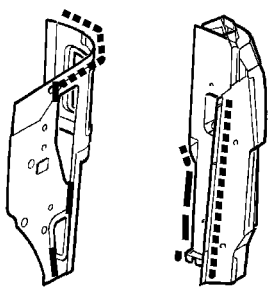
Inner 'e' post - 3 door

In this procedure, the rear outer body side panel and the rear body side reinforcement assembly is replaced in conjunction with the inner 'E' post assembly.

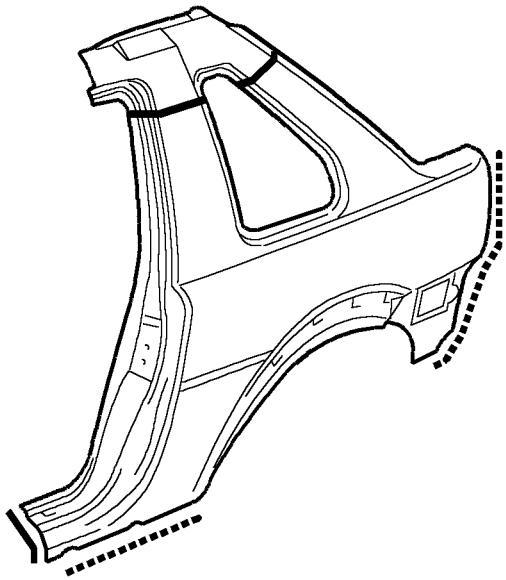
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
6. Remove rear wheel arch liner.
7. Remove tail lamp.
   ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
8. Remove soft/hard top.
9. Remove tail door aperture seal.
10. Remove rear quarter lower casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
11. Remove loadspace carpet.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
12. Release vehicle harness from 'E' post and position aside.
13. **LH side:** Remove tail door striker.
14. **RH side:** Remove tail door.
    ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
15. **RH side:** Remove fuel filler neck.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
16. **RH side:** Remove fuel tank.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**

Repair



M77 2015



M77 2005

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. **LH side:** Fit tail door striker.
2. **RH side:** Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
3. **RH side:** Fit fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
4. **RH side:** Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
5. Secure vehicle harness to 'E' post.
6. Fit loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
7. Fit rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.**
8. Fit tail door aperture seal.
9. Fit soft/hard top.
10. Fit tail lamp.
    ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
11. Fit rear wheel arch liner.
12. Fit rear bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
13. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).

14. Connect all ECUs.
15. Connect alternator.
16. Connect battery earth lead.

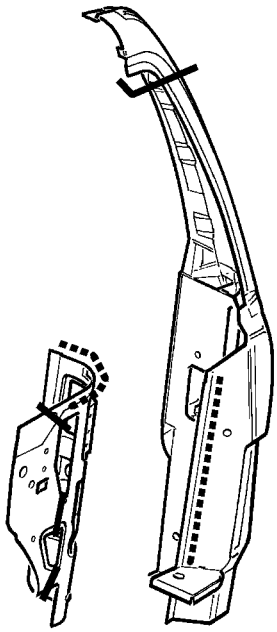
Inner 'e' post - 5 door

In this procedure, the rear outer body side panel and the rear body side reinforcement assembly is replaced in conjunction with the inner 'E' post assembly.

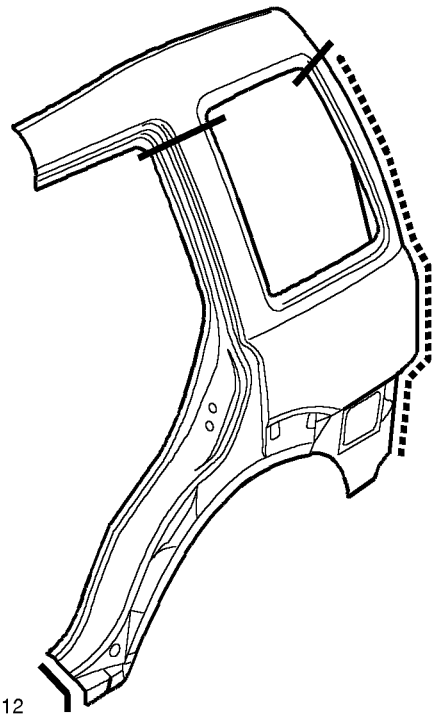
Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove road wheel(s).
5. Remove rear bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
6. Remove rear wheel arch liner.
7. Remove tail lamp.
   ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
8. Remove roof panel finisher.
   ☞ **DOORS, REPAIRS, Finisher - rear screen - side - 5 door.**
9. Remove tail door glass upper finisher.
10. Remove tail door glass side finisher.
    ☞ **DOORS, REPAIRS, Finisher - rear screen - side - 5 door.**
11. Remove tail door aperture seal.
12. Remove rear quarter lower casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
13. Remove rear quarter upper casing.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**
14. Remove loadspace carpet.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
15. Remove rear body side glass.
    ☞ **SCREENS, REPAIRS, Glass - body side - rear.**
16. Release vehicle harness from 'E' post and position aside.
17. **LH side:** Remove tail door striker.
18. **RH side:** Remove tail door.
    ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
19. **RH side:** Remove fuel filler neck.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
20. **RH side:** Remove fuel tank.
    ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**

Repair



M77 2017



M77 2012

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

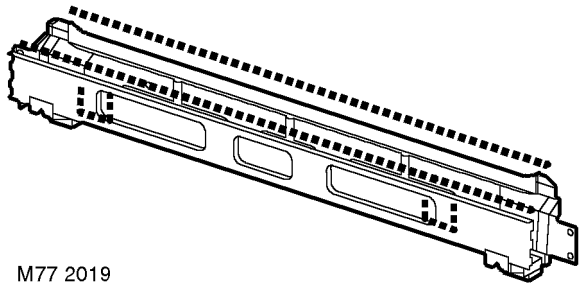
1. **LH side:** Fit tail door striker.
2. **RH side:** Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
3. **RH side:** Fit fuel filler neck.
   ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Filler neck.**
4. **RH side:** Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
5. Secure vehicle harness to 'E' post.
6. Fit rear body side glass.
   ☞ **SCREENS, REPAIRS, Glass - body side - rear.**
7. Fit loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
8. Fit rear quarter upper casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**
9. Fit rear quarter lower casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
10. Fit tail door aperture seal.
11. Fit tail door glass side finisher.
    ☞ **DOORS, REPAIRS, Finisher - rear screen - side - 5 door.**
12. Fit tail door glass upper finisher.
13. Fit roof panel finisher.
    ☞ **DOORS, REPAIRS, Finisher - rear screen - side - 5 door.**
14. Fit tail lamp.
    ☞ **LIGHTING, REPAIRS, Lamp assembly - tail.**
15. Fit rear wheel arch liner.
16. Fit rear bumper valance.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper valance - rear.**
17. Fit road wheel(s) and tighten nuts to 115 Nm (85 lbf.ft).
18. Connect all ECUs.
19. Connect alternator.
20. Connect battery earth lead.

Rear floor crossmember assembly

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
5. Remove tail door aperture seal.
6. Remove LH and RH rear quarter lower casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
7. Remove loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
8. Release vehicle harness from rear body lower closing and position aside.

Repair



M77 2019

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Secure vehicle harness to rear body lower closing.
2. Fit loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
3. Fit LH and RH rear quarter lower casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
4. Fit tail door aperture seal.
5. Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
6. Connect all ECUs.
7. Connect alternator.
8. Connect battery earth lead.

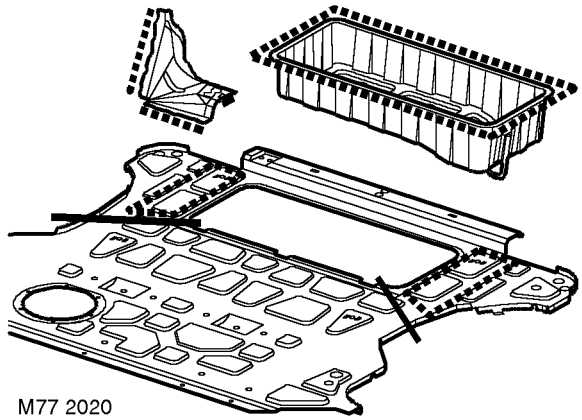
Rear floor

In this procedure, the inner quarter to rear floor gussets are replaced in conjunction with the rear floor. If required, the safe well can be replaced separately.

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove tail exhaust pipe.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Tail pipe & silencer.**
5. Remove tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
6. Remove tail door aperture seal.
7. Remove LH and RH rear quarter lower casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
8. Remove loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
9. Remove fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
10. Release vehicle harness from rear body lower closing and position aside.

Repair



1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

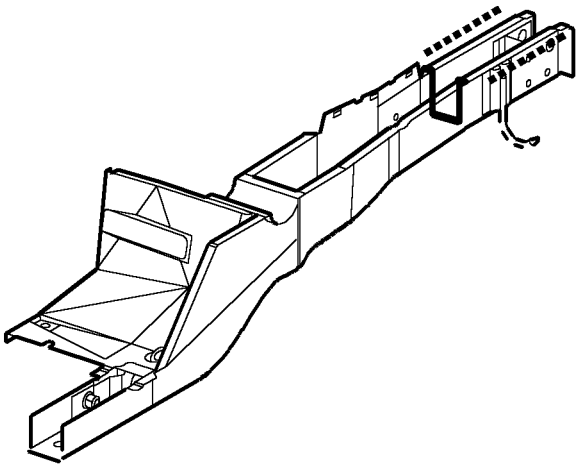
1. Secure vehicle harness to rear body lower closing.
2. Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
3. Fit loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
4. Fit LH and RH rear quarter lower casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
5. Fit tail door aperture seal.
6. Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
7. Fit tail exhaust pipe.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Tail pipe & silencer.**
8. Connect all ECUs.
9. Connect alternator.
10. Connect battery earth lead.

Floor longitudinal

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove tail exhaust pipe.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Tail pipe & silencer.**
5. Remove tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
6. Remove tail door aperture seal.
7. Remove LH and RH rear quarter lower casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
8. Remove loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
9. Remove fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
10. Release vehicle harness from rear body lower closing and position aside.

Repair



M77 2021

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Secure vehicle harness to rear body lower closing.
2. Fit fuel tank.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Tank.**
3. Fit loadspace carpet.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
4. Fit LH and RH rear quarter lower casings.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
5. Fit tail door aperture seal.
6. Fit tail door.
   ☞ **DOORS, REPAIRS, Door - tail assembly - remove for access & refit.**
7. Fit tail exhaust pipe.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - Td4, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Exhaust pipe - tail.**
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES KV6, REPAIRS, Tail pipe & silencer.**
8. Connect all ECUs.
9. Connect alternator.
10. Connect battery earth lead.

Front roof assembly - 3 door

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove LH and RH front roof panel finishers.
5. Remove headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
6. Remove sunroof assembly.
   ☞ **SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 3 door.**
7. Remove windscreen.
   ☞ **SCREENS, REPAIRS, Windscreen.**

Repair

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. There are no plug welds used in this procedure, spot welds only.

Refit

1. Fit windscreen.
   ☞ **SCREENS, REPAIRS, Windscreen.**
2. Fit sunroof.
   ☞ **SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 3 door.**
3. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
4. Fit LH and RH front roof panel finishers.
5. Connect all ECUs.
6. Connect alternator.
7. Connect battery earth lead.

Rear roof assembly - 3 door

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove soft/hard top.
5. Remove LH and RH rear roof panel finishers.
6. Remove headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
7. Remove sunroof.
   ☞ **SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 3 door.**
8. Remove aerial.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 3 door.**

Repair

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. There are no plug welds used in this procedure, spot welds only.

Refit

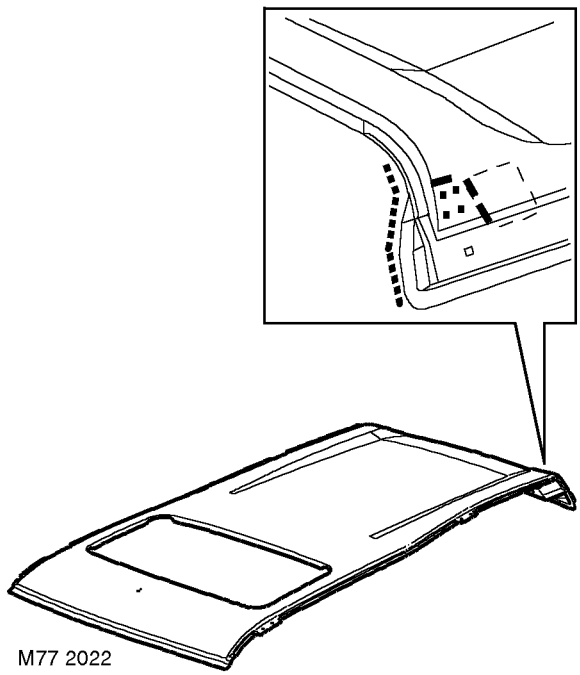
1. Fit aerial.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 3 door.**
2. Fit sunroof.
   ☞ **SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 3 door.**
3. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.**
4. Fit LH and RH rear roof panel finishers.
5. Fit soft/hard top.
6. Connect all ECUs.
7. Connect alternator.
8. Connect battery earth lead.

Roof assembly - 5 door

Remove

1. Disconnect battery earth lead.
2. Disconnect alternator.
3. Disconnect all ECUs.
4. Remove tail door glass upper finisher.
5. Remove LH and RH roof panel finishers.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Moulding - roof - 5 door.**
6. Remove headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
7. If applicable, remove sunroof.
   ☞ **SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 5 door.**
8. Remove aerial.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 5 door.**
9. Remove windscreen.
   ☞ **SCREENS, REPAIRS, Windscreen.**

Repair


M77 2022

1. Remove existing panel(s), prepare panel joint faces and install new panel(s) in accordance with Panel Replacement Procedure. Punch or drill holes in new panel for plug welding as shown.

Refit

1. Fit windscreen.
   ☞ **SCREENS, REPAIRS, Windscreen.**
2. Fit aerial.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 5 door.**
3. If applicable, fit sunroof.
   ☞ **SUNROOF, REPAIRS, Sun/sliding roof - complete - front - 5 door.**
4. Fit headlining.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.**
5. Fit LH and RH roof panel finishers.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Moulding - roof - 5 door.**
6. Fit tail door glass upper finisher.
7. Connect all ECUs.
8. Connect alternator.
9. Connect battery earth lead.

TIME SCHEDULES

The following information shows the total time taken to replace single panels and complete assemblies. This time includes removal of Mechanical, Electrical and Trim (MET) items, plus paint times based on Metallic Clear Over Base Paint.

The times shown were generated by Thatcham (the Motor Insurance Repair and Research Centre) and are to be used as a guide only.

Panel/assembly panel replacement times 5 Door

Panel Description	Total time
Body side LH	29.4
Body side RH	31.5
Bonnet	7.2
Bonnet locking platform	7.0
Door front - each	8.4
Door rear - each	8.1
Door skin front - each	12.2
Door skin rear - each	11.2
Front bulkhead assembly	12.7
Front lower crossmember	8.5
Headlamp mounting panel	6.4
Rear floor crossmember assembly	9.5
Roof assembly	23.5
Bodyside lower outer LH	16.8
Bodyside lower outer RH	16.9
Taildoor	9.0
Wing	6.9
Bodyside rear outer LH	19.3
Bodyside rear outer RH	21.5

Combination panel replacement times

The following panel combination times show the total time to remove/refit body panels, MET items and any paint processes.

5 Door - Front end combination panel times

Panel Description	Total Time
Bonnet locking platform Bumper front Headlamp mounting panel Wing	15.3
Bumper front Front Panel assembly Wing RH & LH	20.6
Bonnet locking platform Bumper front Sidemember closing panel Sidemember front section Front crossmember lower Headlamp mounting panel	

Wing Valance upper assembly section Valance outer reinforcement section	 35.7 LH 37.9 RH
Bumper front Sidemember closing panel LH front Sidemember closing panel RH front Sidemember complete assembly LH Sidemember complete assembly RH Front bulkhead assembly Wing LH & RH Valance upper assembly LH & RH Valance outer reinforcement section LH & RH	 49.1
Bonnet locking platform Bumper front Sidemember closing panel section Sidemember front section Front crossmember lower Headlamp mounting panel Valance front section Wing Valance upper assembly section Valance outer reinforcement section	 27.1 LH 27.7 RH

5 door - Bodyside combination panel times

Panel description	Total time
Front door Wing	11.6
Rear door Rear outer bodyside panel	23.4 LH 25.7 RH
Front door Rear door Lower outer bodyside panel	26.1 LH 26.2 RH
Front door Rear door Bodyside assembly Wing	40.5 LH 42.9 RH
Front door Front outer bodyside panel A-post reinforcement Windscreen Wing Valance outer reinforcement rear section	34.1 LH 35.5 RH

5 door - Rear end combination panel times

Panel description	Total time
Rear bumper Rear outer bodyside panel E-post inner assembly Gusset rear floor Crossmember assembly rear floor	31.2 LH 33.4 RH
Rear bumper Rear outer bodyside panel LH & RH E-post inner assembly LH & RH Gusset rear floor LH & RH Crossmember assembly rear floor	51.2
Rear bumper Rear outer bodyside panel E-post inner assembly Quarter complete rear assembly Gusset rear floor Crossmember assembly rear floor Longitudinal rear section Rear floor panel	44.7 LH 46.8 RH
Rear bumper Rear outer bodyside panel LH & RH E-post inner assembly LH & RH Quarter complete rear assembly LH & RH Gusset rear floor LH & RH Crossmember assembly rear floor Longitudinal rear section LH & RH Rear floor panel	69.2

Panel/assembly replacement times 3 Door

Panel Description	Total time
Body side LH	30.1
Body side RH	31.9
Door front - each	8.9
Door rear - each	8.1
Door skin front - each	12.9
Front bulkhead assembly	12.6
Crossmember assembly rear floor	12.1
Roof assembly	19.9
Bodyside lower outer LH	14
Bodyside lower outer RH	14.1
Bodyside rear outer LH	22.4
Bodyside rear outer RH	24.3

Combination panel replacement times (3 door)

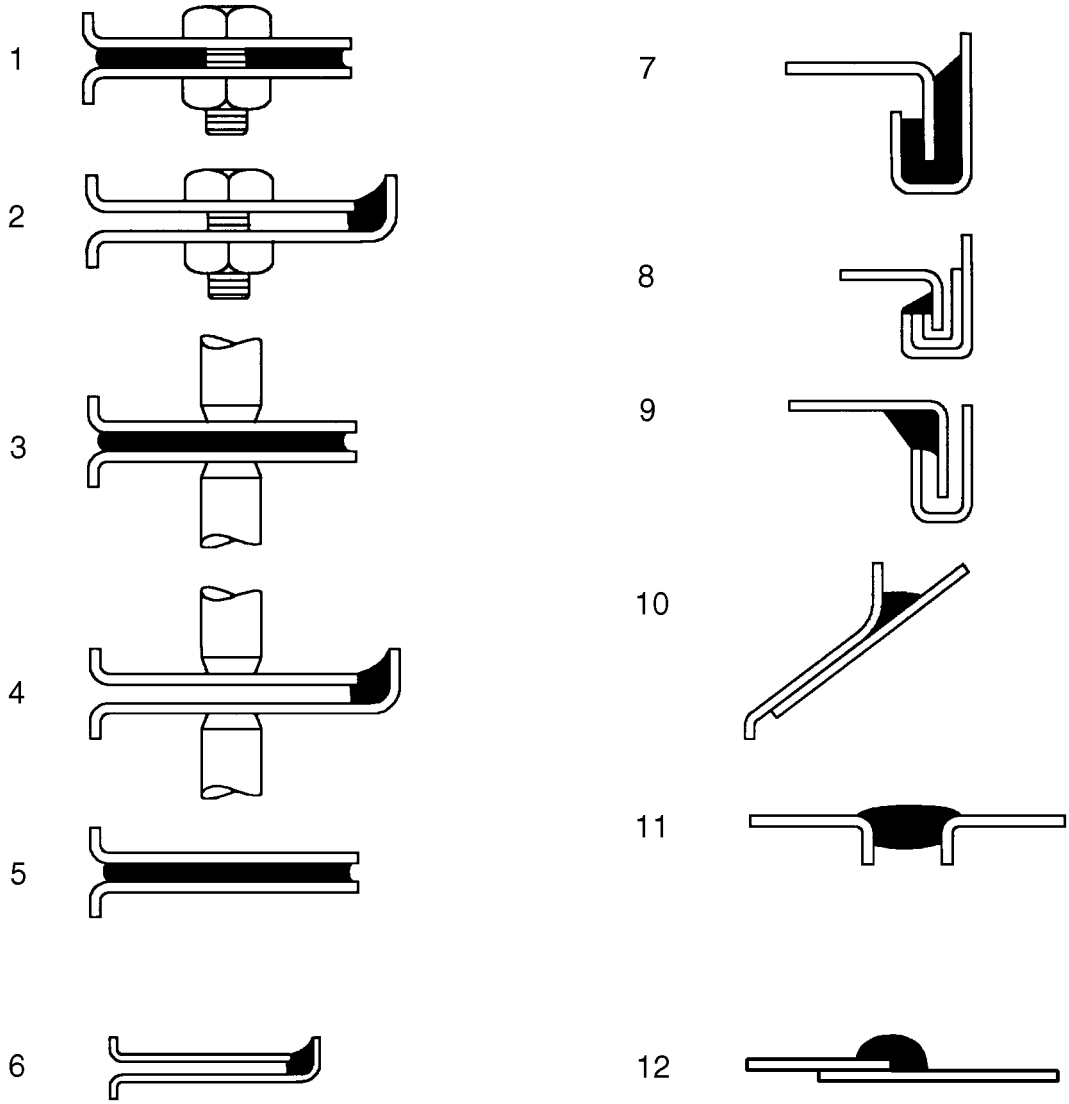
The following panel combination times show the total time to remove/refit body panels, MET items and any paint processes. Times for 3 door front end combination panel replacement will be the same as 5 door.

3 Door - Bodyside combination panel times

Panel description	Total time
Front door Wing	12.2
Front door Rear outer bodyside panel	27.2 LH 29.7 RH
Front door Bodyside assembly	34.6 LH 36.4 RH
Front door Bodyside assembly Wing	37.7 LH 40.2 RH
Front door Front outer bodyside panel A-post reinforcement Windscreen Wing Valance outer reinforcement rear section	33.8 LH 35.1 RH

3 Door - Rear end combination panel times

Panel description	Total time
Rear bumper Rear outer bodyside panel E-post inner assembly Gusset rear floor Crossmember assembly rear floor	34.4LH 36.7 RH
Rear bumper Rear outer bodyside panel LH & RH E-post inner assembly LH & RH Gusset rear floor LH & RH Crossmember assembly rear floor	54.8
Rear bumper Rear outer bodyside panel E-post inner assembly Quarter complete rear assembly Gusset rear floor Crossmember assembly rear floor Longitudinal rear section Rear floor panel	49 LH 50.6 RH
Rear bumper Rear outer bodyside panel LH & RH E-post inner assembly LH & RH Quarter complete rear assembly LH & RH Gusset rear floor LH & RH Crossmember assembly rear floor Longitudinal rear section LH & RH Rear floor panel	75.3



M77 1921

1 Between panels - bolted
2 Panel edges - bolted
3 Between panels - spot welded
4 Panel edges - spot welded
5 Between panels - bonded
6 Panel edges - bonded
7 Clinch joints - type (a)
8 Clinch joints - type (b)
9 Clinch joints - type (c)
10 Gaps between panels - type (a)
11 Gaps between panels - type (b)
12 Lap joint

Description - Usage	Supplier	Part Number
Cavity waxes		
Inner Cavity Wax (Amber)	3M	08901/11/21
Inner Cavity Wax (Transparent)	3M	08909/19/29
Cavity Wax	Croda	PW57
Engine bay waxes/lacquers		
Astrolan Engine Bay Wax and Cosmetic Wax	Astors	DA3243/1
Engine Bay and Cosmetic Wax/Lacquer	Croda	PW197
Engine Bay Cosmetic Wax/Lacquer	Dinol	4010
Miscellaneous materials		
Aerosol Auto Adhesive (Trim) - impact adhesive for trim parts	3M	08080
Flexible Parts Repair Material - rubber modified polypropylene parts	3M	05900
Sound Dampening Foam	Gurit-Essex	Betacore 7999
Sound Dampening Pillar Foam	Duramix	4330
Flexible Foam (anti-flutter) - used between panels, allows for a degree of movement	Duramix	4320
Water Shedder Repair (Aerosol)	Teroson	-
Seam sealers		
Body Caulking - type (b) gaps between panels	3M	08568
Drip Chek Clear - bolted, spot welded and bonded panel edges; type(a) and (b) gaps between panels; type (c) clinch joints	3M	08401
Drip Chek Heavy - type (b) gaps between panels; type (c) clinch joints	3M	08531

Description - Usage	Supplier	Part Number
Seam sealers (continued)		
Polyurethane Seam Sealer - bolted, spot welded and bonded panel edges; type (a) and (b) gaps between panels; type (b) clinch joints	3M	08684/89/94
Polyurethane Sealer (Sachet) - bolted panel edges; type (b) clinch joints	3M	08703/83/88
Sprayable Sealer - lap joints	3M	08800/23
Super Seam Sealer - lap joints; type (b) clinch joints	3M	08537
Weld Thru' Sealer - between spot welded panels	3M	08626
Betafill Clinch and Brushable Sealer - type (b) clinch joints	Gurit-Essex	10211/15/20
Clinch, Joint and Underbody Coating - lap joints	Gurit-Essex	10101/10707
Leak Chek Clear - between bolted panels; spot welded and bonded panel edges; type (c) clinch joints; type (a) gaps between panels	Kent Industries	10075
Putty - type (b) gaps between panels	Kent Industries	-
Polyurethane Seam Sealer - bolted, spot welded and bonded panel edges; between bonded panels; type (a) and (b) gaps between panels	PPG	6500
Polyurethane Seam Sealer - bolted, spot welded and bonded panel edges; between bonded panels; type (b) gaps between panels	Teroson	92
Terolan Light Seam Sealer - bolted, spot welded and bonded panel edges; type (a) and (b) gaps between panels; between bonded panels; type (c) clinch joints	Teroson	-
Terolan Special Brushable Seam Sealer - lap joints	Teroson	-
Terostat Sprayable Seam Sealer - bolted, spot welded and bonded panel edges; between bonded panels; type (b) gaps between panels	Teroson	9320
Terostat 1K PU Seam Sealer (SE 20) - type (a) and (b) gaps between panels; spot welded and bonded panel edges	Teroson	-
Sealing Compound - bolted, spot welded and bonded panel edges; between bonded panels; type (b) gaps between panels	Wurths	8901001/-/6

Description - Usage	Supplier	Part Number
Structural adhesives		
Automotive Structural Adhesive - between bonded panels; type (a) clinch joints	3M	08122
Two Part Structural Epoxy - between bonded and spot welded panels; type (a) clinch joints	Ciba-Geigy	XB5106/7
Underbody sealers		
Body Schutz	3M	08861
Spray Schutz	3M	08877
Crodapol Brushable Underbody Sealer	Croda	PV75
Terotex Underseal (CP 02)	Teroson	9320
Underbody waxes		
Stone-chip coating (smooth)	3M	08158/9
Underbody Wax	Croda	PW61
Underbody Wax	Dinol	Tectacote 205
Weld-through primers		
Weld Thru' Coating	3M	05913
Zinc Spray	3M	09113
Zinc Rich Primer	ICI	P-565 634

Application Equipment

Suitable application equipment is available from the following manufacturers and suppliers:

3M
Automotive Trades Group
3M UK Plc
3M House
PO Box 1
Market Place
Bracknell
Berks.
RG12 1JU
☎ (01344) 858611

Cooper Pegler
Burgess Hill
Sussex
RH15 9LA
☎ (014 446) 42526

SATA Spray Equipment
Minden Industrial Ltd.
16 Greyfriars Road
Moreton Hall
Bury St. Edmunds
Suffolk
IP32 7DX
☎ (01284) 760791

3M Body Schutz Pistol Spraygun 08996
A pistol type spraygun constructed from case and machined light alloy and designed for use with 3M screw fit Body Schutz containers.

3M Pneumatic Cartridge Gun 08012
Air line-fed gun for applying 3M cartridge products. Excellent for ease of application to obtain a smooth bead. Regulator valve for additional control.

3M Pneumatic Applicator Guns 08006/7
Air line-fed gun for application of 3M sachet sealers (Part Number 08006 for 200ml and 310ml sachet applications, and Part Number 08007 for all size sachets including 600ml).

Also available: **Heavy Duty Manual Gun 08013.**

3M Applicator Gun 08190.
For the application of 3M Structural Adhesive 08120.

3M Inner Cavity Wax Applicator Gun 08997
This equipment accepts 1-litre canisters and has a 750mm flexible tube.

The approved system is available from all 3M refinishing factors.

Cooper Pegler Falcon Junior Pneumatic Gun (Airless)
Intended primarily for applying transit wax, this pneumatic sprayer has a 5-litre container with integral hand pump and provides an effective means of wax spraying without the need for compressed air or additional services.

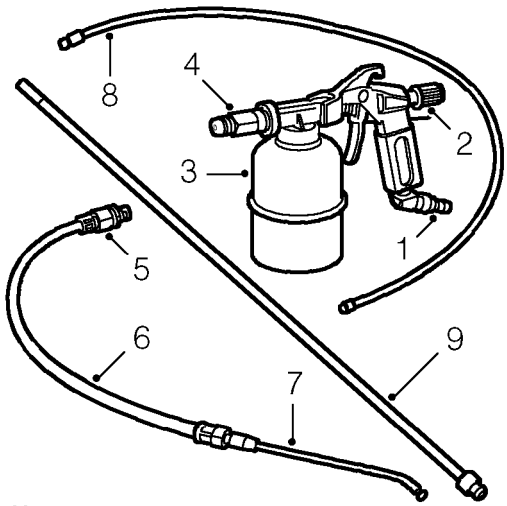
A selection of nozzles, lances, hose lengths and a trigger valve assembly with integral filter allows flexibility in use. Additional applications include general maintenance, wax injection and paint application. Heavy-bodied materials may also be applied. All parts are fully replaceable and a wide range of nozzle configurations is available.

SATA Schutz Gun Model UBE
The SATA Schutz Gun is approved for the retreatment of vehicle underbody areas with protective coatings as supplied in 1 litre, purpose-designed 'one-way' containers. The screw thread fitting (female on the gun) is standard to most Schutz-type packs.

Full operating details are supplied with the equipment.

SATA HKD1 Wax Injection Injection Equipment
This equipment is approved for carrying out cavity wax re-treatment. The SATA HKD1 set comprises a high quality forged gun with 1-litre pressure feed container, a flexible nylon lance, a straight 1100mm steel lance and hooked-wand lance. A quick-change coupling is provided as a standard fitting to allow lances to be easily interchanged. Each lance has an integral, machined nozzle with specialised spray characteristics to suit the type of box section to be treated.

Cavity wax application equipment and techniques



M77 1922

1 Air inlet
2 Flow control (spray pattern adjustment)
3 Pressure cup (1 litre capacity). Maximum pressure 140PSI (9.7 bar, 9.84kg/cm3)
4 Gun connector
5 Lance nipple connection
6 Flexible lance
7 Rigid directional hook wand (forward cone spray pattern)
8 Flexible nylon lance (1100mm) with 360° spray pattern
9 Rigid lance (1100mm) with 360° spray pattern

When re-treating wax-injected areas which have been disturbed during repairs, it is necessary to use a compressed air spray gun with integral pressure cup and a selection of interchangeable lances.

The following points must be observed during use, according to the attachments fitted:

- Use the rigid or flexible lance attachments with 360° spray dispersal when treating enclosed areas, to ensure maximum coverage.
- Where openings are restricted, use the hook nozzle to provide a more directional spray (e.g. inside narrow or short box sections).
- Spray exposed underbody surfaces directly from the gun less lance attachment and without disconnecting the fluid coupling.

1100mm flexible nylon lance

This lance is similar in pattern to the rigid version, but provides the additional penetration required for curved sections or in places where access is difficult. Its main limitation is a lack of positional accuracy inside box sections.

Carry out all spraying on the outward stroke of the lance. Withdraw the lance slowly to ensure sufficient coverage. Do not withdraw the lance too quickly.

Ensure that the nylon tube of the lance is kept away from the edges of the access hole to eliminate abrasion and extend the life of the tube. Take care to ensure that spraying ceases just before the nozzle emerges from the access hole. To assist in this process paint the final 30mm of the nozzle with RED paint.

Hook nozzle on flexible lance

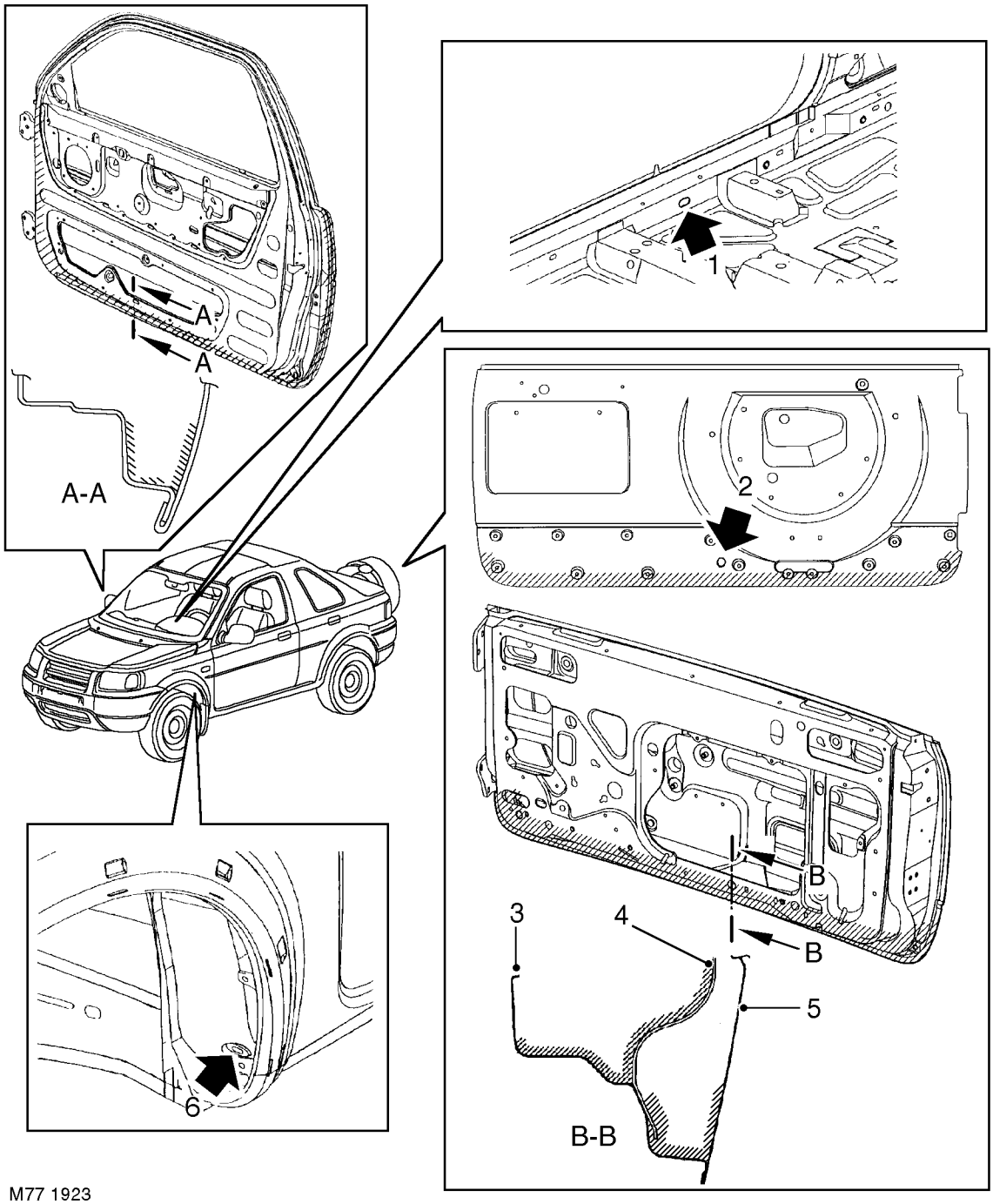
The rigid hook produces a highly atomised, forward-directed, fully conical spray pattern having long range and good dispersion characteristics. This combination has good directional capabilities for treating short, narrow sections, and may also be used for direct spraying of inner wheel arches etc.

In use, position the flat area at the end of the lance at 180° to the nozzle spray direction. This will help to guide the spray more accurately when it is concealed in a box section or access hole.

For general spraying, move the nozzle in an arc from side to side as required, to ensure full coverage.

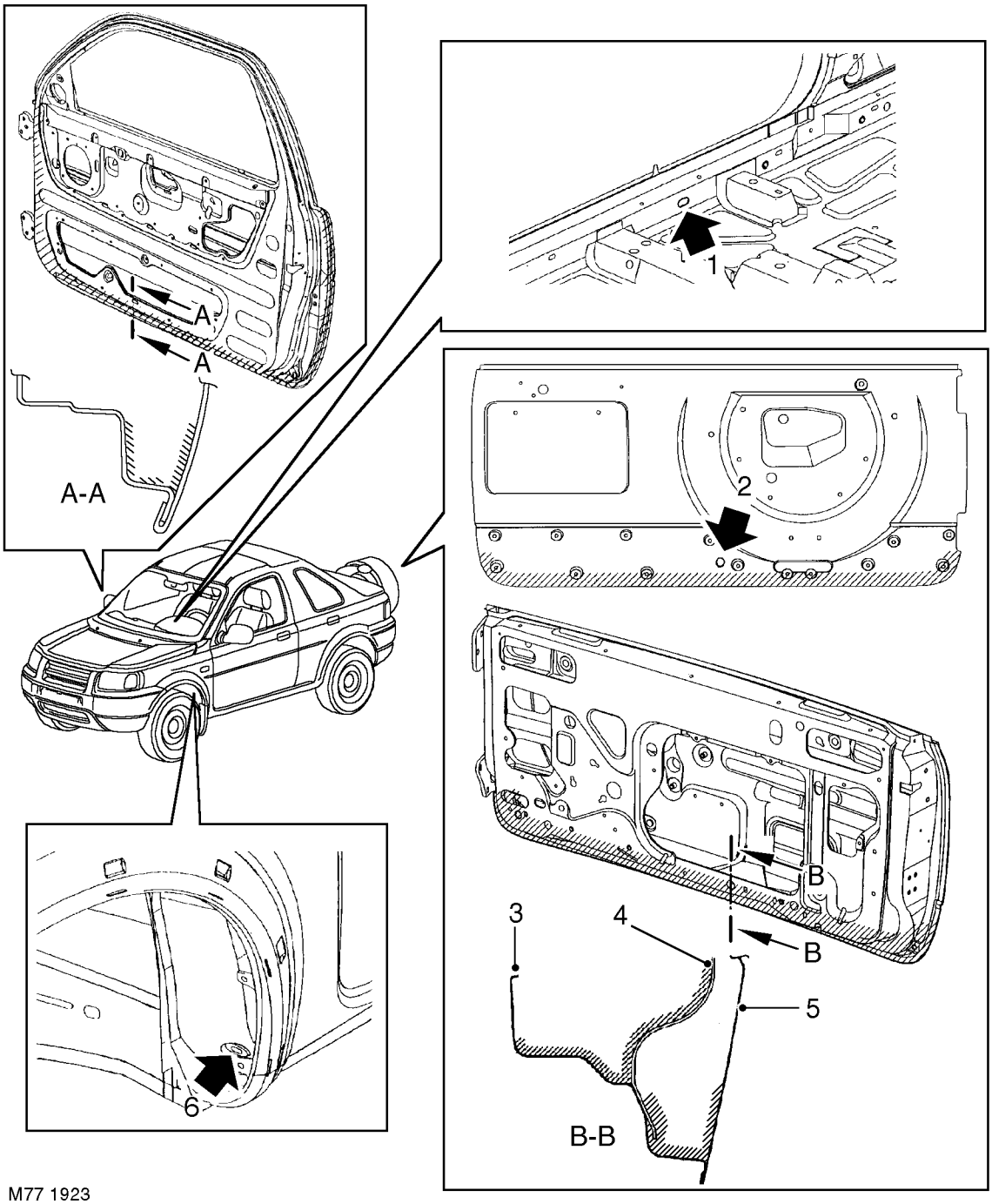
Ensure that all wax injection/application equipment is kept clean. Use white spirit for this purpose immediately after wax injection operations.

Cavity wax treatment areas and injection holes - 3 door



All areas symmetrically opposite to those shown are also treated.

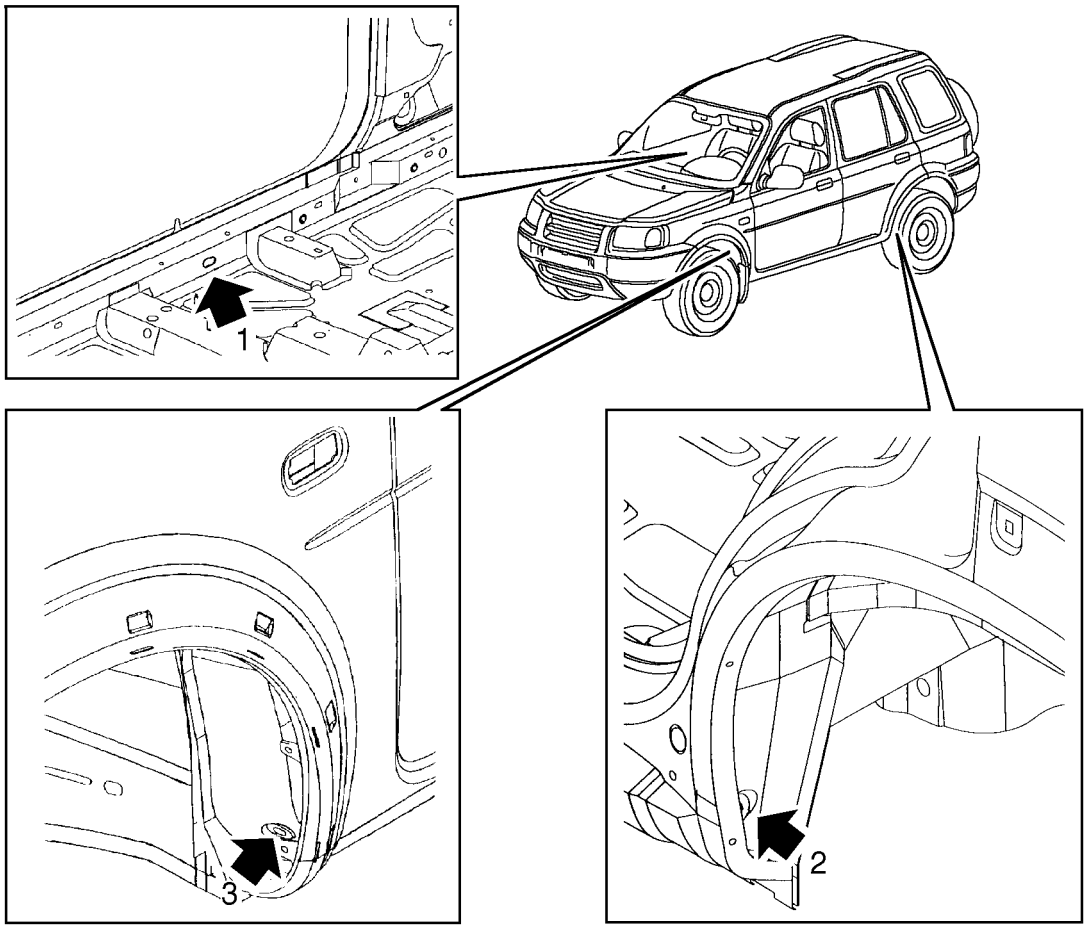
Key to Figure, cavity wax treatment areas and injection holes - 3 door



M77 1923

1 Injection hole for inner sill
2 Injection hole for area between tail door outer panel and reinforcing panel
3 Tail door inner panel
4 Tail door reinforcing panel
5 Tail door outer panel
6 Injection hole for sill

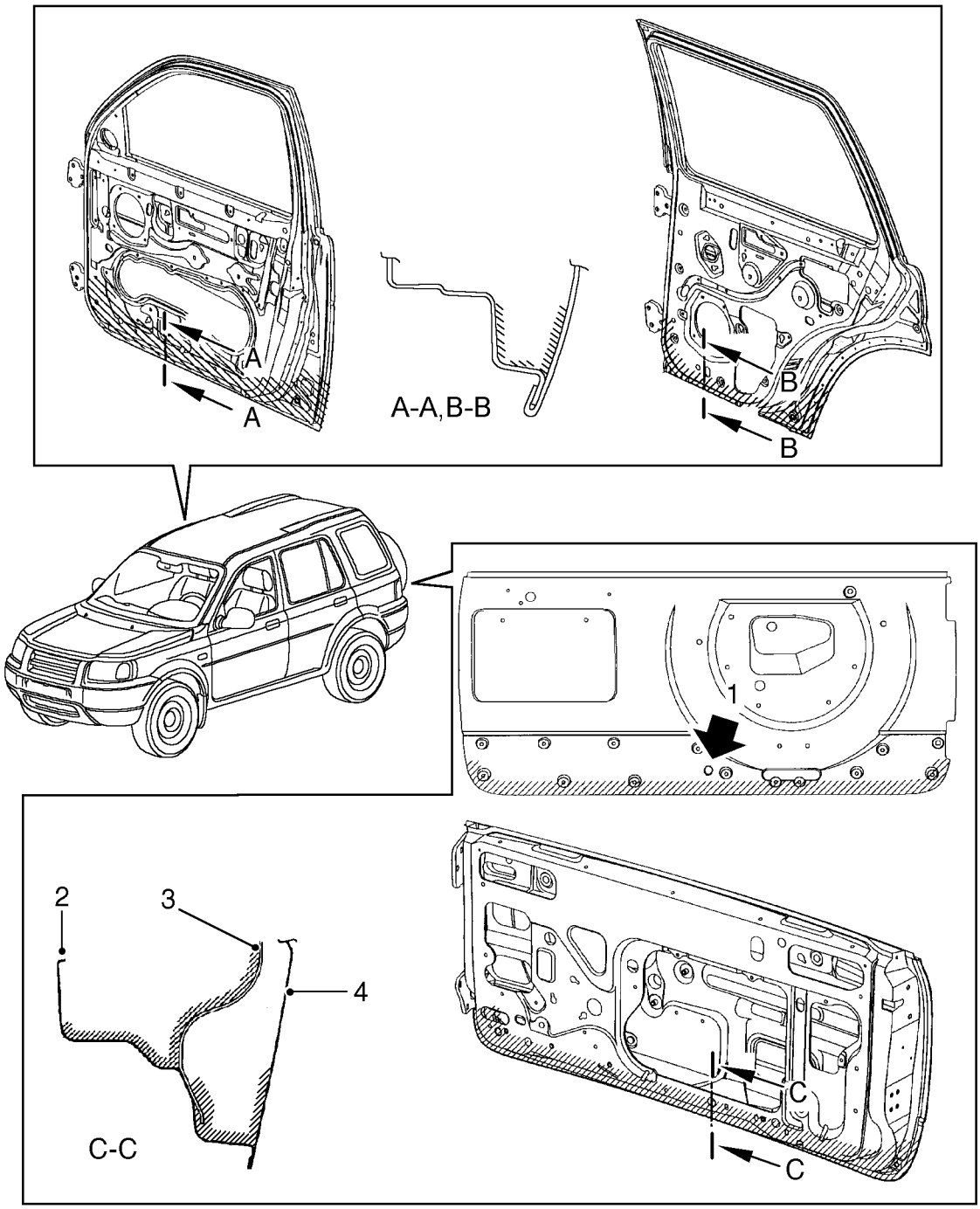
Sill cavity wax injection holes - 5 door



M77 1924

1 Injection hole for inner sill
2 Rear injection hole for sill
3 Front injection hole for sill

Door cavity wax treatment areas and injection hole - 5 door



M77 1925

All areas symmetrically opposite to those shown are also treated.

Key to figure, door cavity wax treatment - 5 door

1 Injection hole for area between tail door outer panel and reinforcing panel
2 Tail door inner panel
3 Tail door reinforcing panel
4 Tail door outer panel

Corrosion Prevention
The following information details Corrosion Prevention treatments.

Factory treatments
During production, vehicle bodies are treated with the following anti-corrosion materials:
- An application of cavity wax which is sprayed into the sill panels and the lower areas of the door panels.
- A PVC-based underbody sealer which is sprayed onto the underside of the main floor and sills, the exterior of the safe well and the forward face of the lower dash crossmember.
- A coating of underbody wax which is applied to the entire underbody inboard of the sill vertical flanges, and covers all moving and flexible components EXCEPT for wheels, tyres, brakes and exhaust.
- A coat of protective wax applied to the engine bay area.

Whenever body repairs are carried out, ensure the anti-corrosion materials in the affected area are repaired or renewed as necessary using the approved materials.

Cavity wax injection
Areas treated with cavity wax are shown in the following Figures. After repairs, always re-treat these areas with an approved cavity wax. In addition, treat all interior surfaces which have been disturbed during repairs whether they have been treated in production or not. This includes all box members, cavities and door interiors. It is permissible to drill extra holes for access where necessary, provided these are not positioned in load-bearing members. Ensure that such holes are treated with a suitable zinc rich primer, brushed with wax and then sealed with a rubber grommet.

Before wax injection, ensure that the cavity to be treated is free from any contamination or foreign matter. Where necessary, clear out any debris using compressed air.

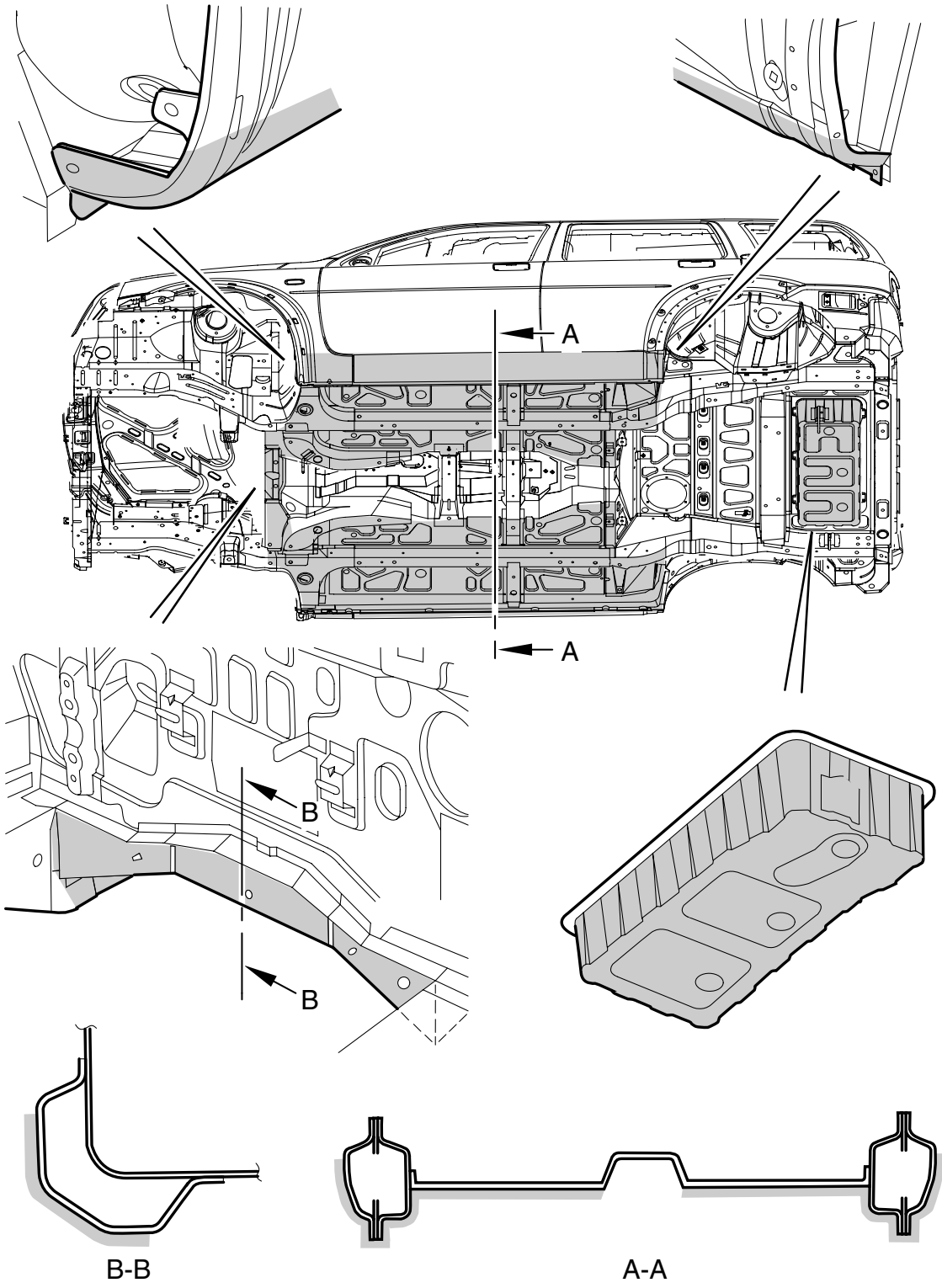
Ensure that cavity wax is applied AFTER the final paint process and BEFORE refitting any trim components.

During application, ensure that the wax covers all flange and seam areas and that it is adequately applied to all repaired areas of both new and existing panels.

It should be noted that new panel assemblies and complete body shells are supplied without wax injection treatment. Ensure that such treatment is carried out after repairs.

Effective cavity wax protection is vital. Always observe the following points:
- Complete all paint refinish operations before wax application.
- Clean body panel areas and blow-clean cavities if necessary, before treatment.
- Maintain a temperature of 18°C during application and drying.
- Check the spray pattern of injection equipment.
- Mask off all areas not to be wax coated and which could be contaminated by wax overspray.
- Remove body fixings, such as seat belt retractors, if contamination is at all likely.
- Move door glasses to fully closed position before treating door interiors.
- Treat body areas normally covered by trim before refitting items.
- Check that body and door drain holes are clear after the protective wax has dried.
- Keep all equipment clean, especially wax injection nozzles.

Underbody sealer treatment areas



M77 1926

Underbody sealer
Underfloor areas and sill outer panels are treated with a Plastisol PVC underbody sealer. This material is not suitable for re-treatment. When repairing areas of underbody sealer, strip the factory-applied underbody sealer back to a suitable break point. Ensure that a clean metal surface is exposed and that the edge of the existing sealer adheres soundly to the panel.

Apply new underbody sealer between primer and surfacer paint operations. Apply seam sealer as necessary before application of underbody sealer. Ensure that blanking plugs and grommets in the floor pan (except those used for wax injection) are fitted before underbody sealer application. Refit any heat-fusible plugs which have been disturbed in repair with the aid of a hot air blower, or replace with rubber grommets.

caut : Ensure that suspension units, wheels, tyres, power unit, driveshafts, exhaust and brakes (including all mounting points) are shielded prior to application of fresh underbody sealer.

Underbody wax
The underbody wax must be reinstated following all repairs affecting floor panels. The wax is applied over paints and underbody sealers.

caut : Remove old underbody wax completely from a zone extending at least 200mm beyond the area where new underbody sealer is to be applied.

Engine bay wax
Reinstate all protective engine bay wax disturbed during repairs using an approved material.

Where repairs have involved replacement of engine bay panels, treat the entire engine compartment including all components, clips and other fixtures with an approved underbonnet lacquer or wax.

Precautions during body repairs and handling
Take care when handling the vehicle in the workshop. Underbody sealers, seam sealers, underbody wax and body panels may be damaged if the vehicle is carelessly lifted.

Proprietary anti-corrosion treatments
The application of proprietary anti-corrosion treatments in addition to the factory-applied treatment could invalidate the Corrosion Warranty and should be discouraged. This does not apply to approved, compatible, preservative waxes which may be applied on top of existing coatings.

Fitting approved accessories
When fitting accessories ensure that the vehicle's corrosion protection is not affected, either by breaking the protective coating or by introducing a moisture trap.

Do not screw self-tapping screws directly into body panels. Fit suitable plastic inserts to the panel beforehand. Always ensure that the edges of holes drilled into panels, chassis members and other body parts are protected with a suitable zinc rich or acid etch primer, and follow with a protective wax coating brushed onto the surrounding area.

Do not attach painted metal surfaces of any accessory directly to the vehicle's bodywork unless suitably protected. Where metal faces are bolted together always interpose a suitable interface material such as weldable zinc rich primer, extruded strip, or zinc tape.

Steam cleaning and dewaxing
Due to the high temperatures generated by steam cleaning equipment, there is a risk that certain trim components could be damaged and some adhesives and corrosion prevention materials softened or liquified.

Adjust the equipment so that the nozzle temperature does not exceed 90°C (194°F). Take care not to allow the steam jet to dwell on one area, and keep the nozzle at least 300mm from panel surfaces.

DO NOT remove wax or lacquer from underbody or underbonnet areas during repairs. Should it be necessary to steam clean these areas, apply a new coating of wax or underbody protection as soon as possible.

Inspections during maintenance servicing

It is a requirement of the Corrosion Warranty that the vehicle body is checked for corrosion by an authorised Land Rover Dealer at least once a year, to ensure that the factory-applied protection remains effective.

Service Job Sheets include the following operations to check bodywork for corrosion:

- With the vehicle on a lift, carry out visual check of underbody sealer for damage.
- With the vehicle lowered, inspect exterior paintwork for damage and body panels for corrosion.

The vehicle must be washed and free from deposits prior to inspection. It is part of the owner's responsibility to ensure that the vehicle is kept free of accumulations of mud which could accelerate the onset of corrosion. It will be necessary for the vehicle to be washed by the Dealer prior to inspection of bodywork if the customer has offered the vehicle in a dirty condition. Particular attention should be paid to areas where access is difficult.

The checks described above are intended to be visual only. It is not intended that the operator should remove trim panels, finishers, rubbing strips or sound-deadening materials when checking the vehicle for corrosion and paint damage.

With the vehicle on a lift, and using an inspection or spot lamp, visually check for the following:

- Corrosion damage and damaged paintwork, condition of underbody sealer on front and rear lower panels, sills and wheel arches.
- Damage to underbody sealer. Corrosion in areas adjacent to suspension mountings and fuel tank fixings.

The presence of small blisters in underbody sealer is acceptable, providing they do not expose bare metal.

Pay special attention to signs of damage caused to panels or corrosion protection material by incorrect jack positioning.

caut : It is essential to follow the correct jacking and lifting procedures.

With the vehicle lowered, visually check for evidence of damage and corrosion on all visible painted areas, in particular the following:

- Front edge of bonnet.
- Visible flanges in engine compartment.
- Lower body and door panels.

Rectify any bodywork damage or evidence of corrosion found during inspection as soon as is practicable, both to minimise the extent of the damage and to ensure the long term effectiveness of the factory-applied corrosion prevention treatment. Where the cost of rectification work is the owner's responsibility, the Dealer must advise the owner and endorse the relevant documentation accordingly.

Where corrosion has become evident and is emanating from beneath a removable component (e.g. trim panel, window glass, seat etc.), remove the component as required to permit effective rectification.

Underbody protection repairs

Whenever body repairs are carried out, ensure that full sealing and corrosion protection treatments are reinstated. This applies both to the damaged areas and also to areas where protection has been indirectly impaired, as a result either of accident damage or repair operations.

Remove corrosion protection from the damaged area before straightening or panel beating. This applies in particular to panels coated with wax, PVC underbody sealer, sound deadening pads etc.

warn : DO NOT use oxy-acetylene gas equipment to remove corrosion prevention materials. Large volumes of fumes and gases are liberated by these materials when they burn.

Equipment for the removal of tough anti-corrosion sealers offers varying degrees of speed and effectiveness. The compressed air-operated scraper (NOT an air chisel) offers a relatively quiet mechanical method using an extremely rapid reciprocating action. Move the operating end of the tool along the work surface to remove the material.

The most common method of removal is by means of a hot air blower with integral scraper.

High temperatures can be generated with this equipment which may cause fumes. Take care during its use.

Another tool, and one of the most efficient methods, is the rapid-cutting 'hot knife'. This tool uses a wide blade and is quick and versatile, able to be used easily in profiled sections where access is otherwise difficult.

Use the following procedure when repairing underbody coatings:

1. Remove existing underbody coatings.
2. After panel repair, clean the affected area with a solvent wipe, and treat bare metal with an etch phosphate material.
3. Re-prime the affected area.

caut: DO NOT, under any circumstances, apply underbody sealer directly to bare metal surfaces.

- Replace all heat-fusible plugs which have been disturbed. Where such plugs are not available use rubber grommets of equivalent size, ensuring that they are embedded in sealer.
- Mask off all mounting faces from which mechanical components, hoses and pipe clips, have been removed. Underbody sealer must be applied **before** such components are refitted.
- Brush sealer into all exposed seams.
- Spray the affected area with an approved service underbody sealer.
- Remove masking from component mounting faces, and touch-in where necessary. Allow adequate drying time before applying underbody wax.

After refitting mechanical components, including hoses and pipes and other fixtures, mask off the brake discs and apply a coat of approved underbody wax.

note : Where repairs include the application of finish paint coats in the areas requiring underbody wax, carry out paint operations before applying wax.

STRUCTURAL ADHESIVES

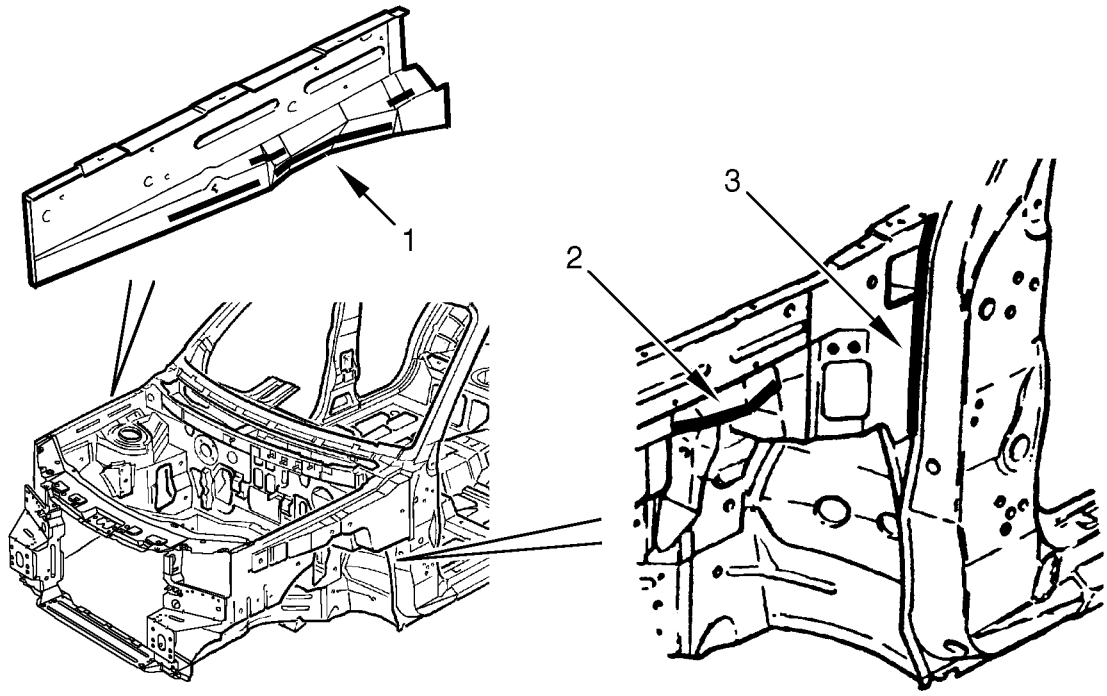
Metal-to-metal adhesive is applied to critical joint areas during factory assembly. The material used is a high-temperature, heat cured, nitrile phenolic which serves to bond two metal surfaces and also to seal the joint against ingress of dust, moisture and fumes. This material is not suitable for service use and, during repair, should be substituted by an approved Structural Adhesive.

Those joints which require the application of structural adhesive are detailed in the following Figures. Only joints applicable to service panels are included. Apply structural adhesive where indicated or to the mating panel surface.

caut : When separating a joint treated with metal-to-metal adhesive, it is important to avoid distortion. Heat the joint gradually until the bond weakens sufficiently to permit panel separation.

note : When spot welding through metal-to-metal adhesive, take particular care to adjust the transformer setting to ensure a reliable weld.

Adhesive on front valance

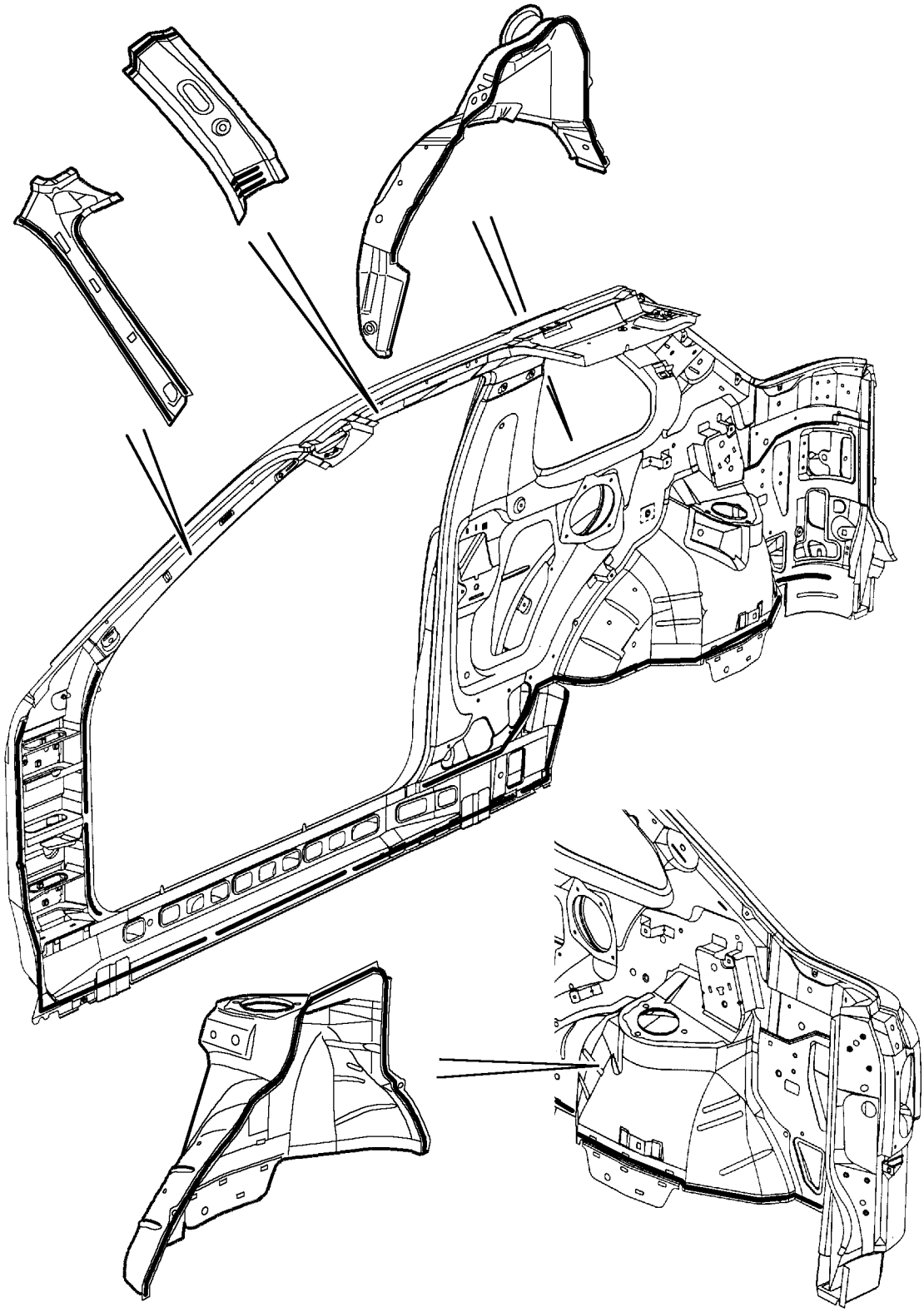


M77 2050

1 Apply 3 mm diameter beads
2 Apply with brush
3 Apply with brush

Joints symmetrically opposite to those shown are also treated

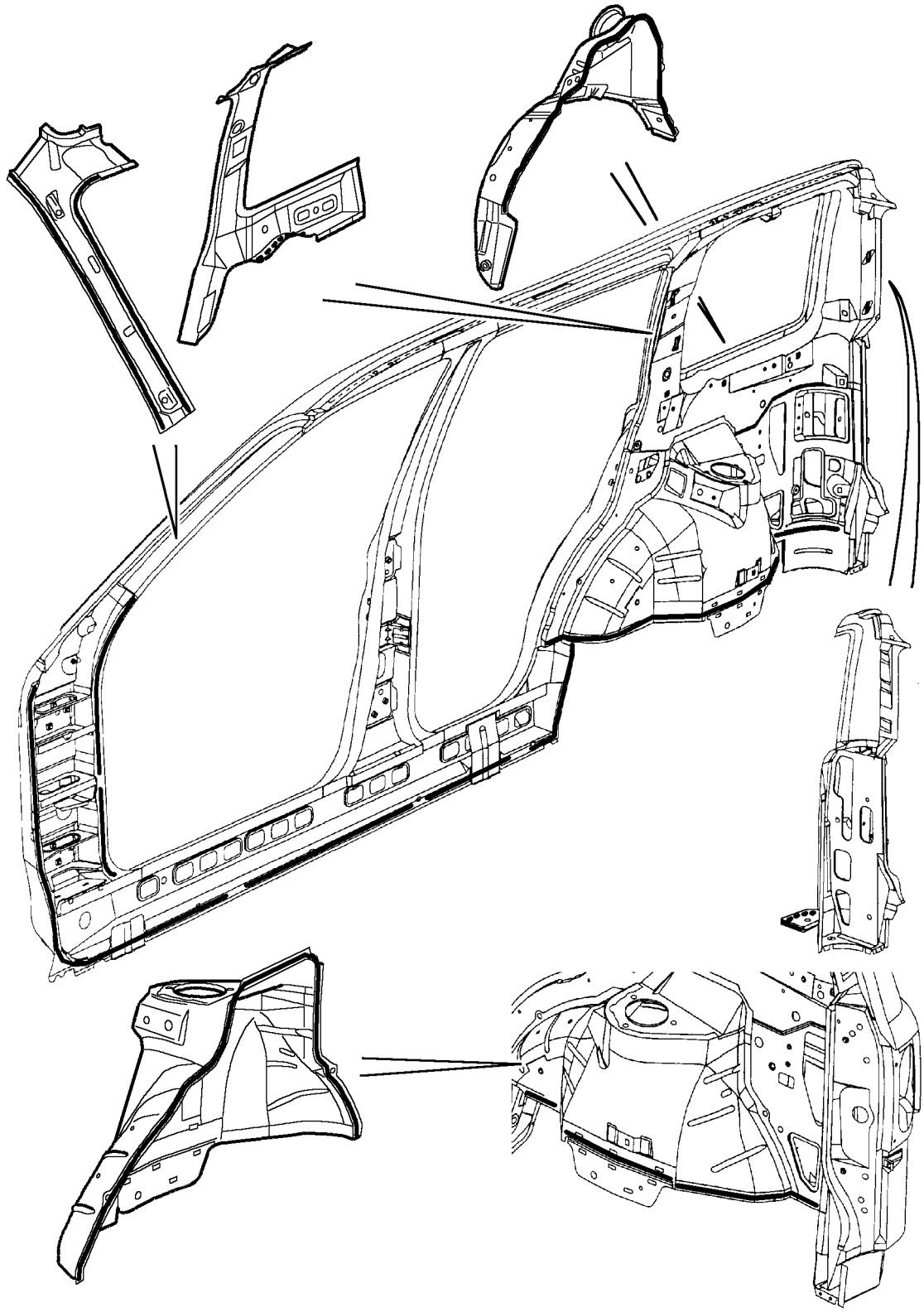
Adhesive on 'A' post, sill and rear quarter - 3 door



M77 1928

Joints symmetrically opposite to those shown are also treated. Apply 3 mm diameter beads to all joints shown. Leave sill drain points free of adhesive.

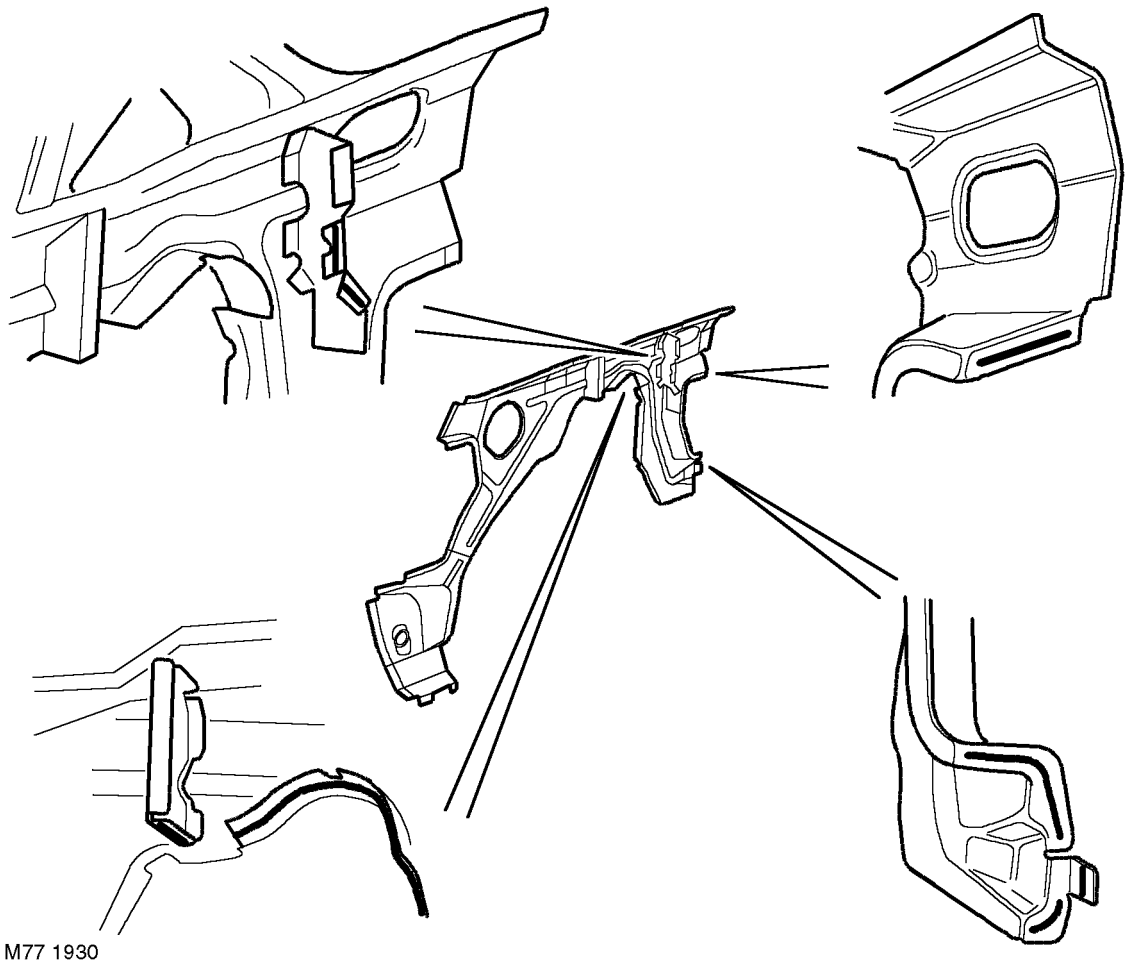
Adhesive on 'A' post, sill and rear quarter - 5 door



M77 1929

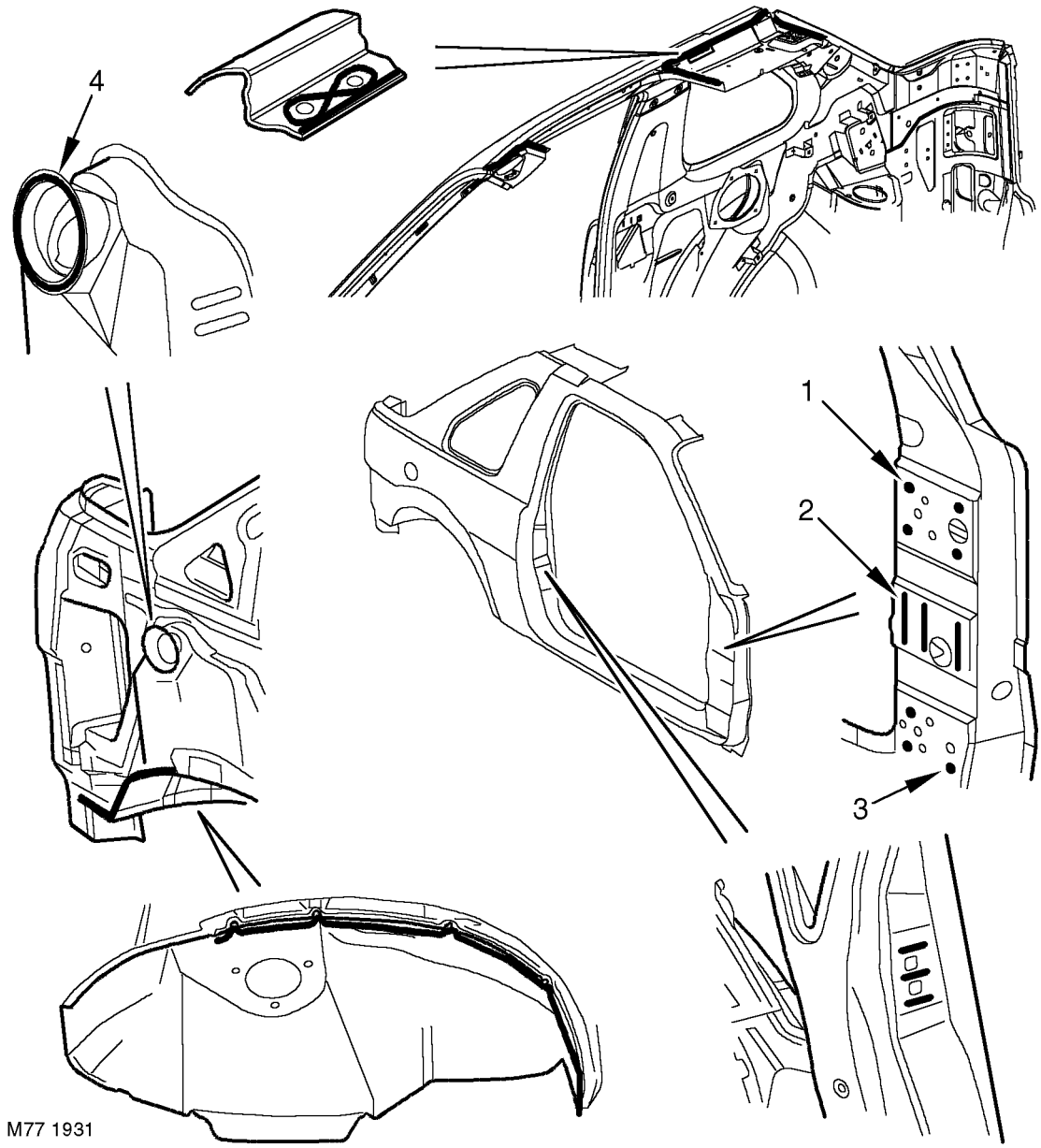
Joints symmetrically opposite to those shown are also treated. Apply 3 mm diameter beads to all joints shown. Leave sill drain points free of adhesive.

Adhesive on rear wheel arch reinforcement - 3 door



Joints symmetrically opposite to those shown are also treated. Apply 3 mm diameter beads to all joints shown.

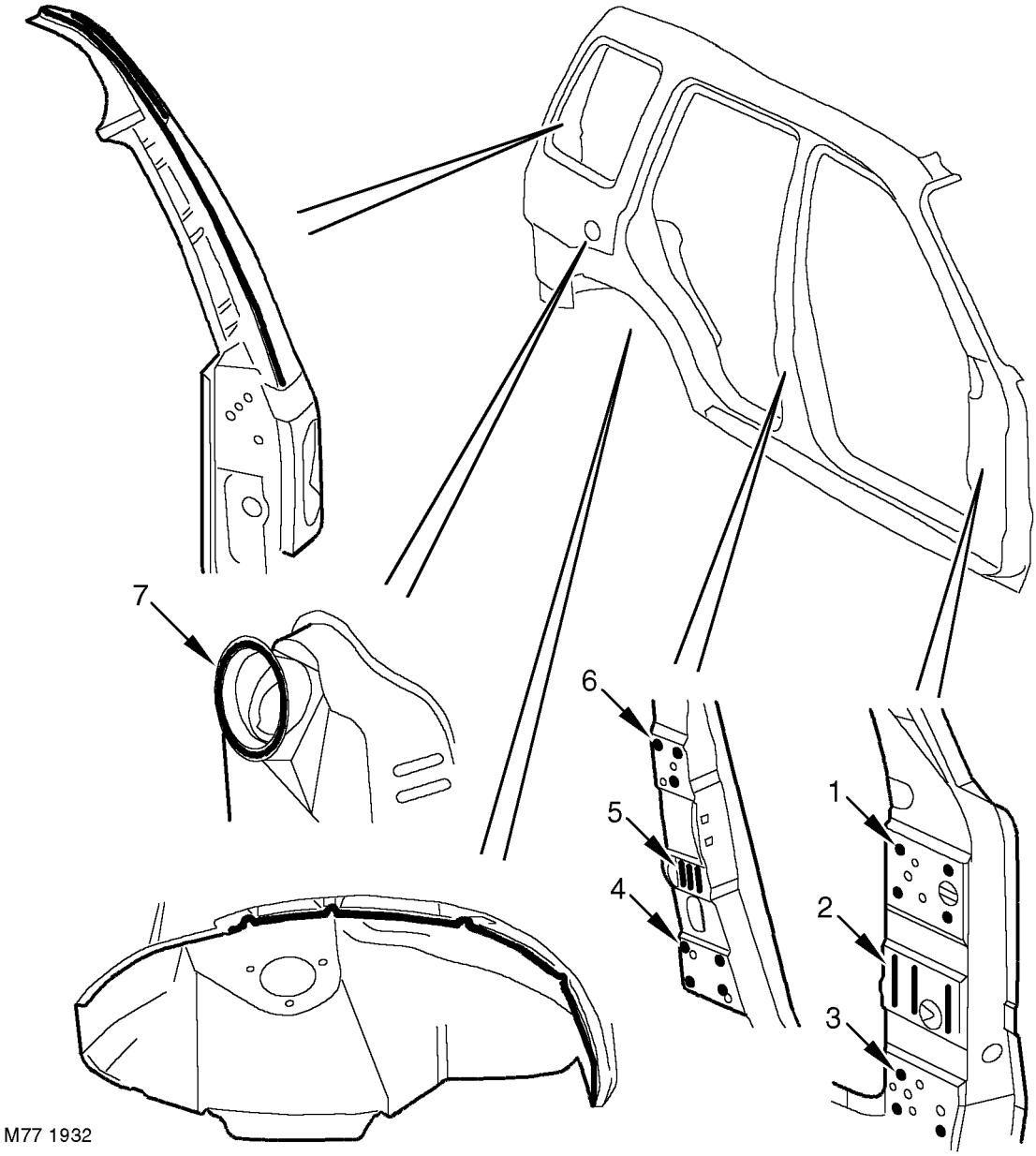
Adhesive on body side and roof - 3 door



Joints symmetrically opposite to those shown are also treated. Apply 3 mm diameter beads except where detailed otherwise (below).

1 Apply 4 x 10 mm diameter spots
2 Apply 3 x 4 mm diameter beads
3 Apply 3 x 10 mm diameter spots
4 Apply 6 mm diameter bead (fuel resistant seam sealer)

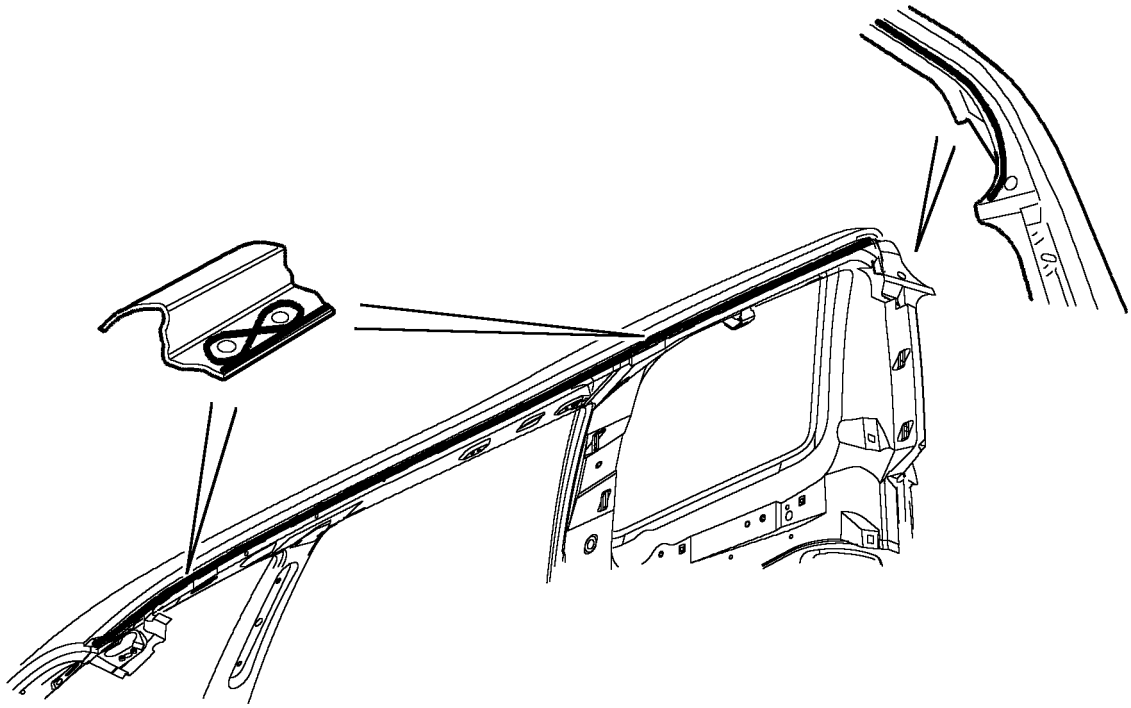
Adhesive on body side - 5 door



Joints symmetrically opposite to those shown are also treated. Apply 3 mm diameter beads except where detailed otherwise (below).

1 Apply 4 x 10 mm diameter spots
2 Apply 3 x 4 mm diameter beads
3 Apply 3 x 10 mm diameter spots
4 Apply 4 x 10 mm diameter spots
5 Apply 3 x 4 mm diameter beads
6 Apply 3 x 10 mm diameter spots
7 Apply 6 mm diameter bead (fuel resistant seam sealer)

Adhesive on roof - 5 door



M77 1933

Joints symmetrically opposite to those shown are also treated. Apply 3 mm diameter beads to all joints shown.

Seam Sealers

A heat cured, PVC based sealant is applied to specific joint seams during factory assembly. This material is not suitable for service use and, during repair, should be substituted by an approved Seam Sealer.

Seams to which seam sealer is applied during factory assembly are detailed in the following Figures.

Apply seam sealers after the application of primer and before the application of surfacer and top coat. The seam sealer must form a continuous bead, with the profile of the bead dependant on the type of seam. If seam sealer is applied with a brush, take particular care to maintain the required coverage of the seam. Where shaping of the seam sealer is required, use a cloth soaked with solvent such as white spirit or Shell SBP3 to achieve the required finish.

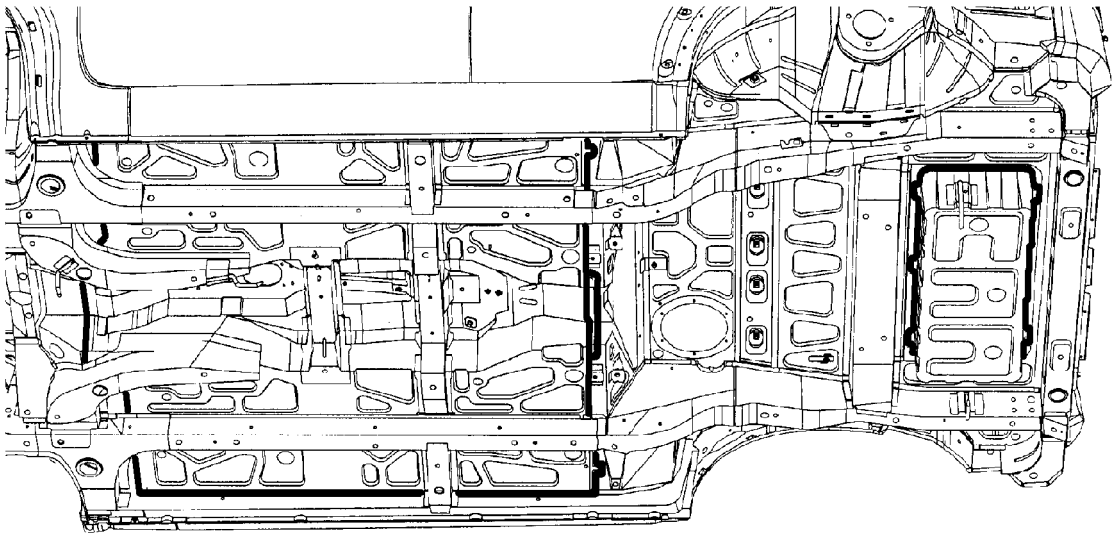
Ensure that ALL accessible repair seams are sealed following a repair. Damage to a vehicle often flexes areas of the body remote from the impact. As a result, the seam sealer in these areas may be disturbed by subsequent straightening and repair operations. Check all seams in the vicinity of the area undergoing repair for evidence of cracked seam sealer, then clean out as required and apply fresh seam sealer using the following procedure:

- Clean the affected seam and re-treat any exposed metal areas with a suitable etch phosphate primer.
- Treat affected area with an etch-acid primer.
- Apply appropriate seam sealer as necessary.
- Apply appropriate colour coat (and underbody sealer as applicable).

Where seams are inaccessible following the reassembly or fitting of components, ensure that a paste-type seam sealer is applied to such seams. Certain seams also become inaccessible after the completion of panel repairs. In such instances apply seam sealer and paint before final assembly.

Provided access is adequate, apply seam sealer to both sides of a repair joint. Where access is limited to one side only (e.g. box sections), treat the affected box member with cavity wax.

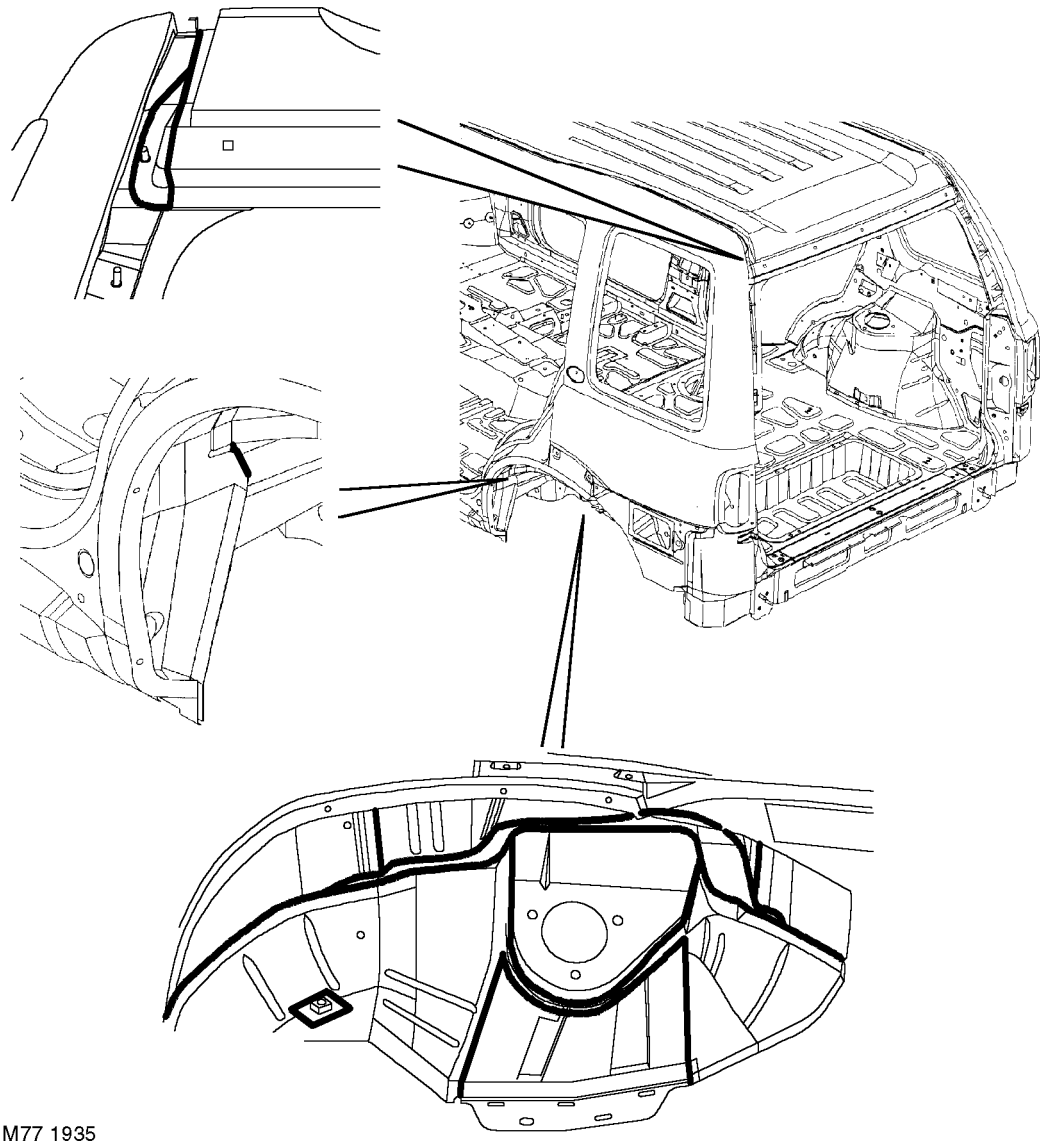
Seam sealer on underside



M77 1934

Seams symmetrically opposite to those shown are also treated.

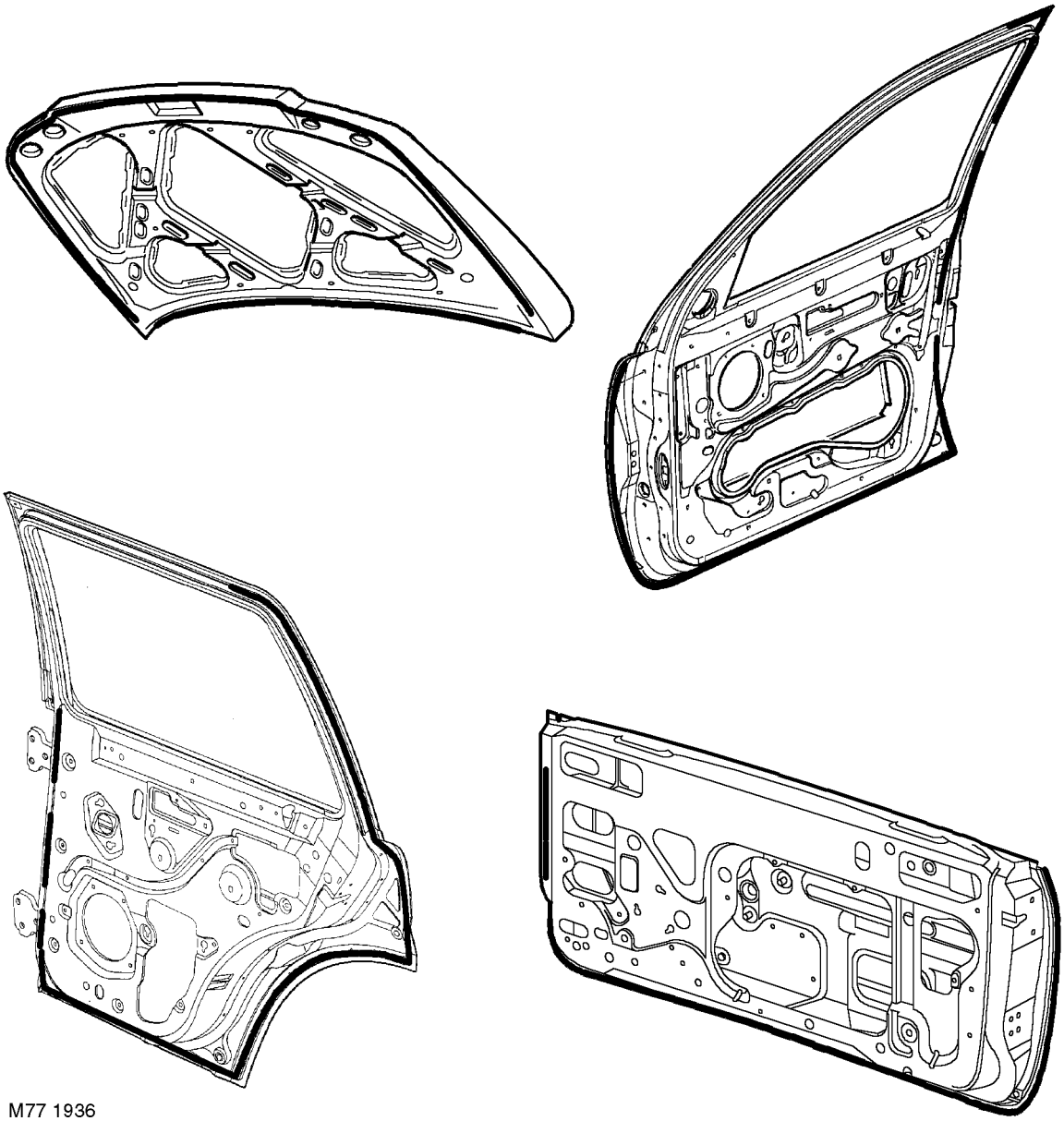
Seam sealer on rear wheelarch



M77 1935

Seams symmetrically opposite to those shown are also treated.

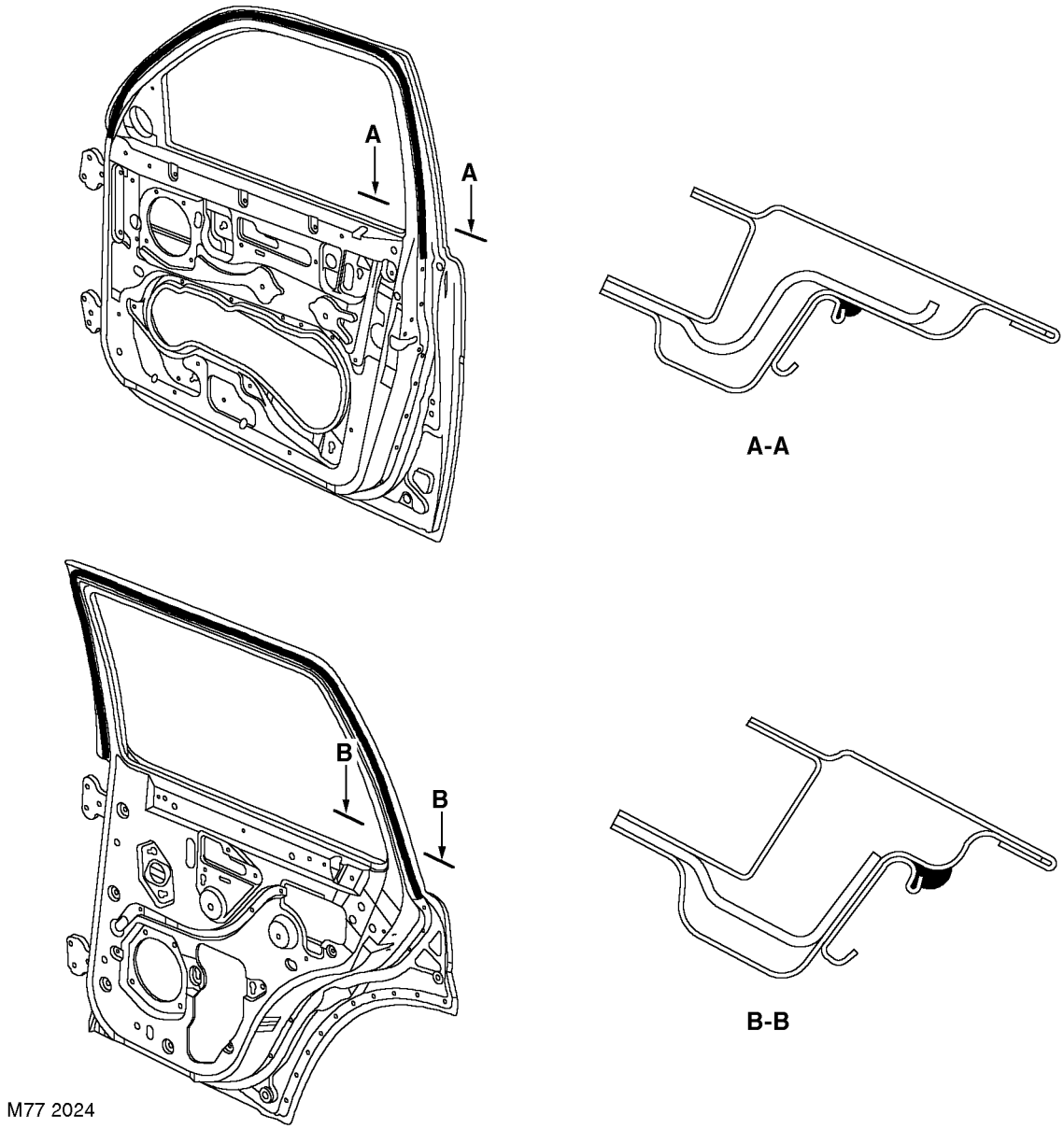
Seam sealer on bonnet and doors



M77 1936

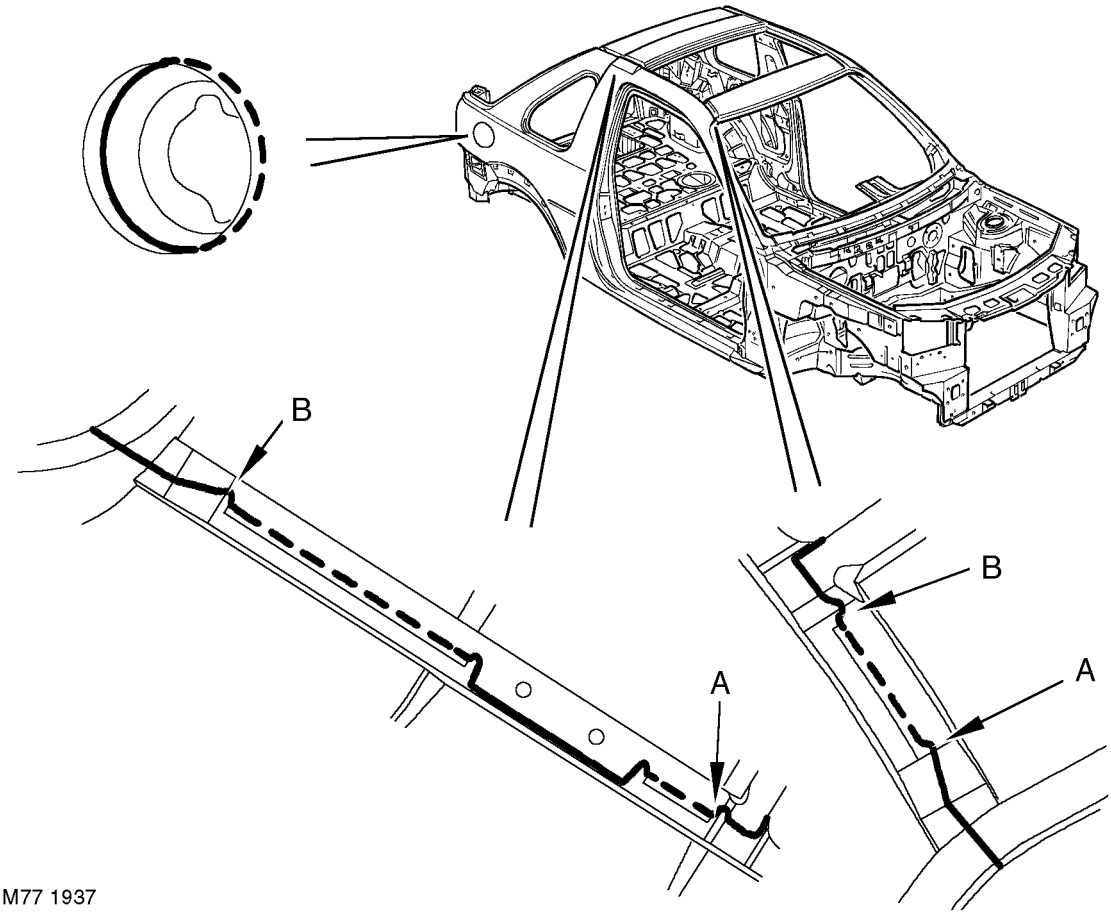
Seams symmetrically opposite to those shown are also treated. Front door of 5 door model shown, front door of 3 door model similar. Ensure drain holes in doors are not blocked by sealant.

Seam sealer on door seal retainers



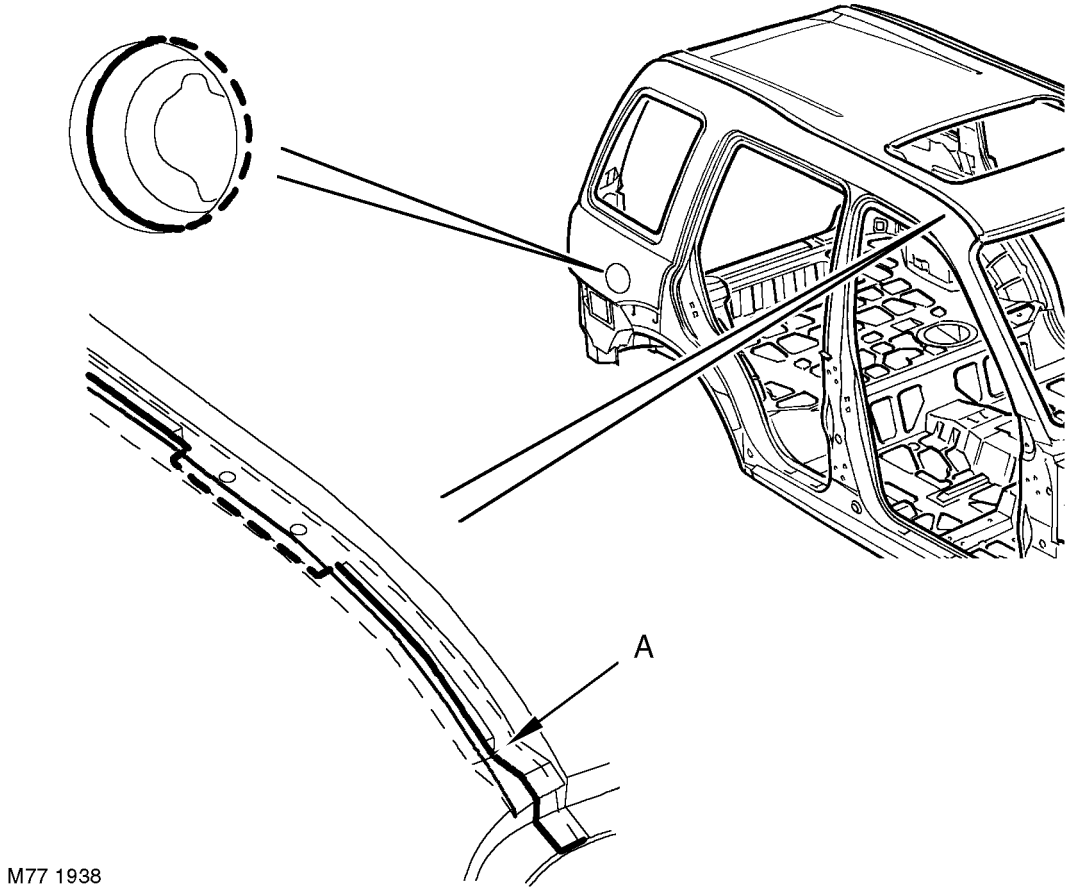
Seams symmetrically opposite to those shown are also treated.

Seam sealer on fuel filler and roof - 3 door



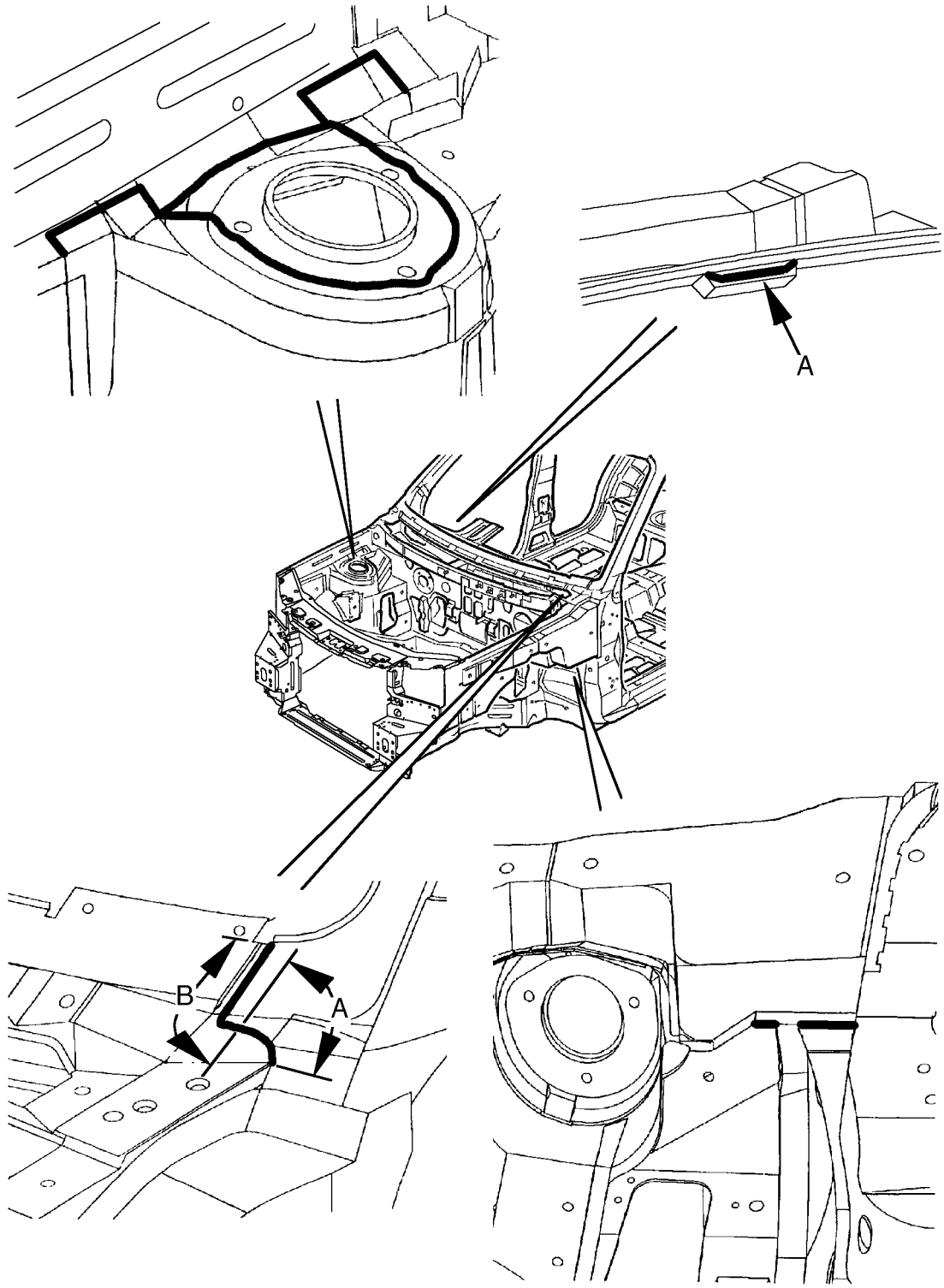
Seams symmetrically opposite to those shown are also treated. On roof seams, sealant to be finished flush to surface forward of points 'A' and rearward of points 'B'.

Seam sealer on fuel filler and roof - 5 door



Seams symmetrically opposite to those shown are also treated. On roof seam, sealant to be finished flush to surface forward of point 'A'.

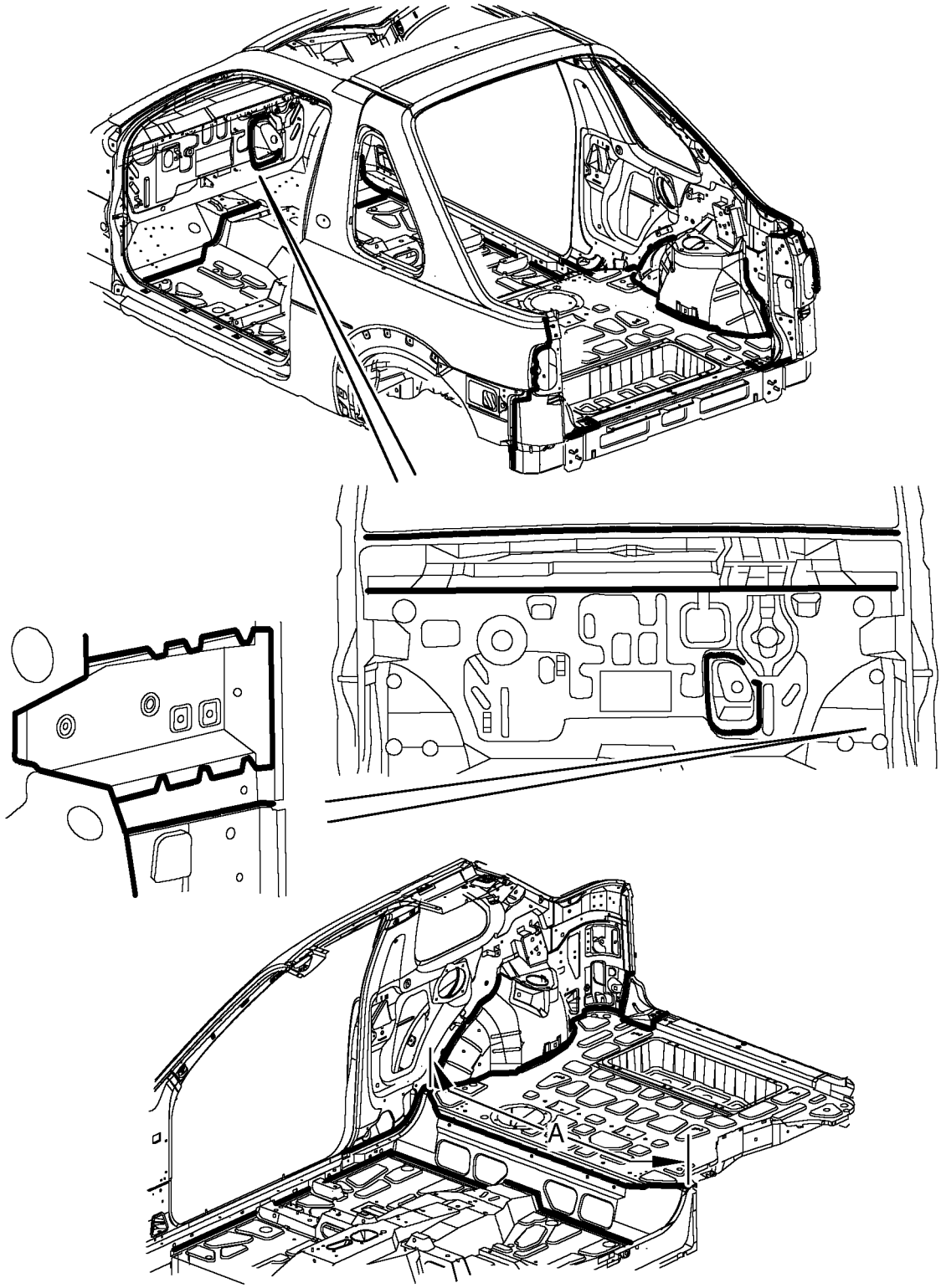
Sealed seams in front wheelarch, engine compartment and screen rail



M77 2051

Seams symmetrically opposite to those shown are also treated. Use putty on seams marked 'A'. On windscreen rail, sealant to be finished flush to adjacent surfaces over length 'B'. On front suspension turrets, ensure damper mounting holes are kept free of sealant.

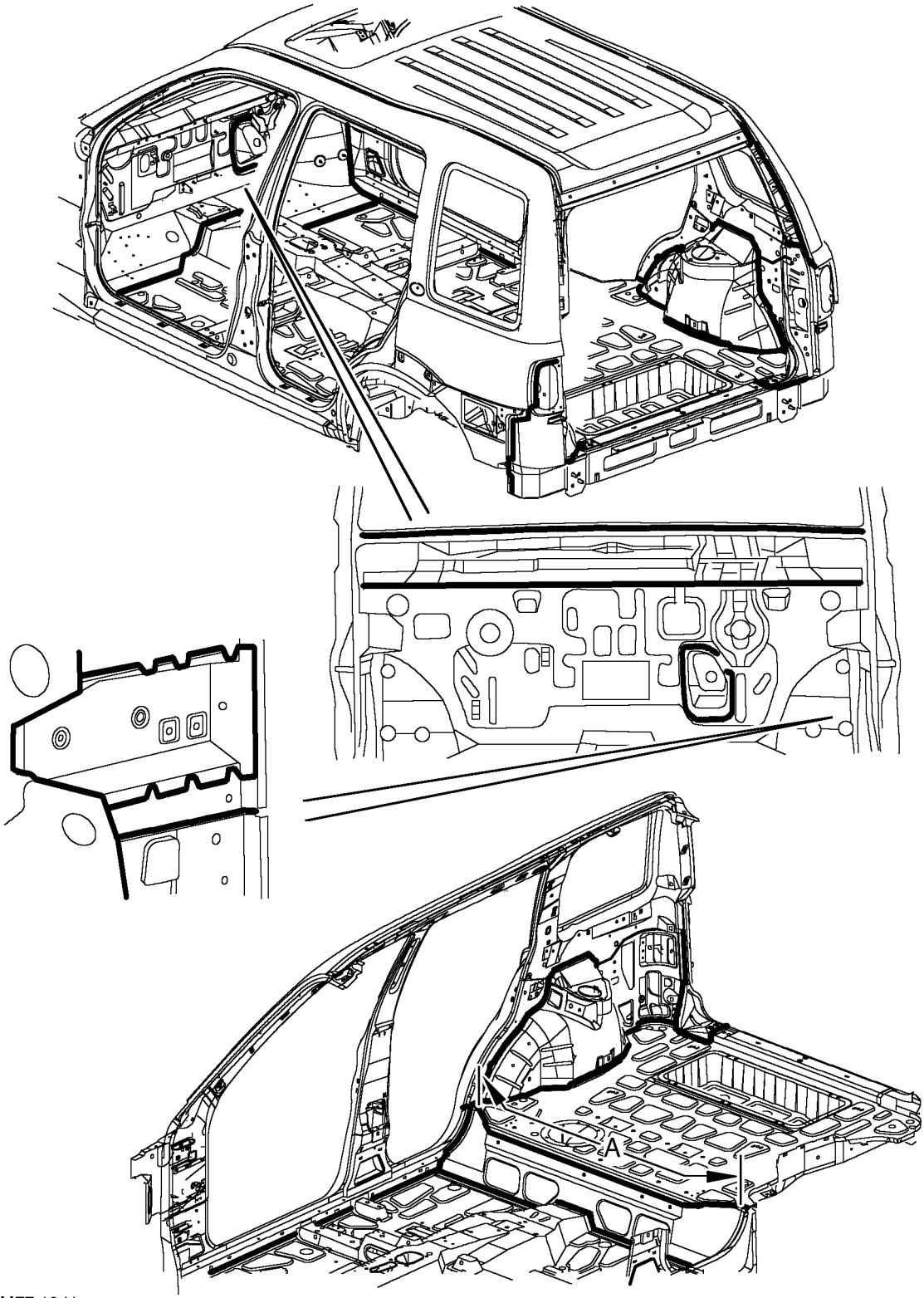
Seam sealer on vehicle interior and rear quarter - 3 door



M77 1940

Seams symmetrically opposite to those shown are also treated. Sealant to be wiped to a smooth finish over length 'A' (rear load floor to rear heelboard underframe).

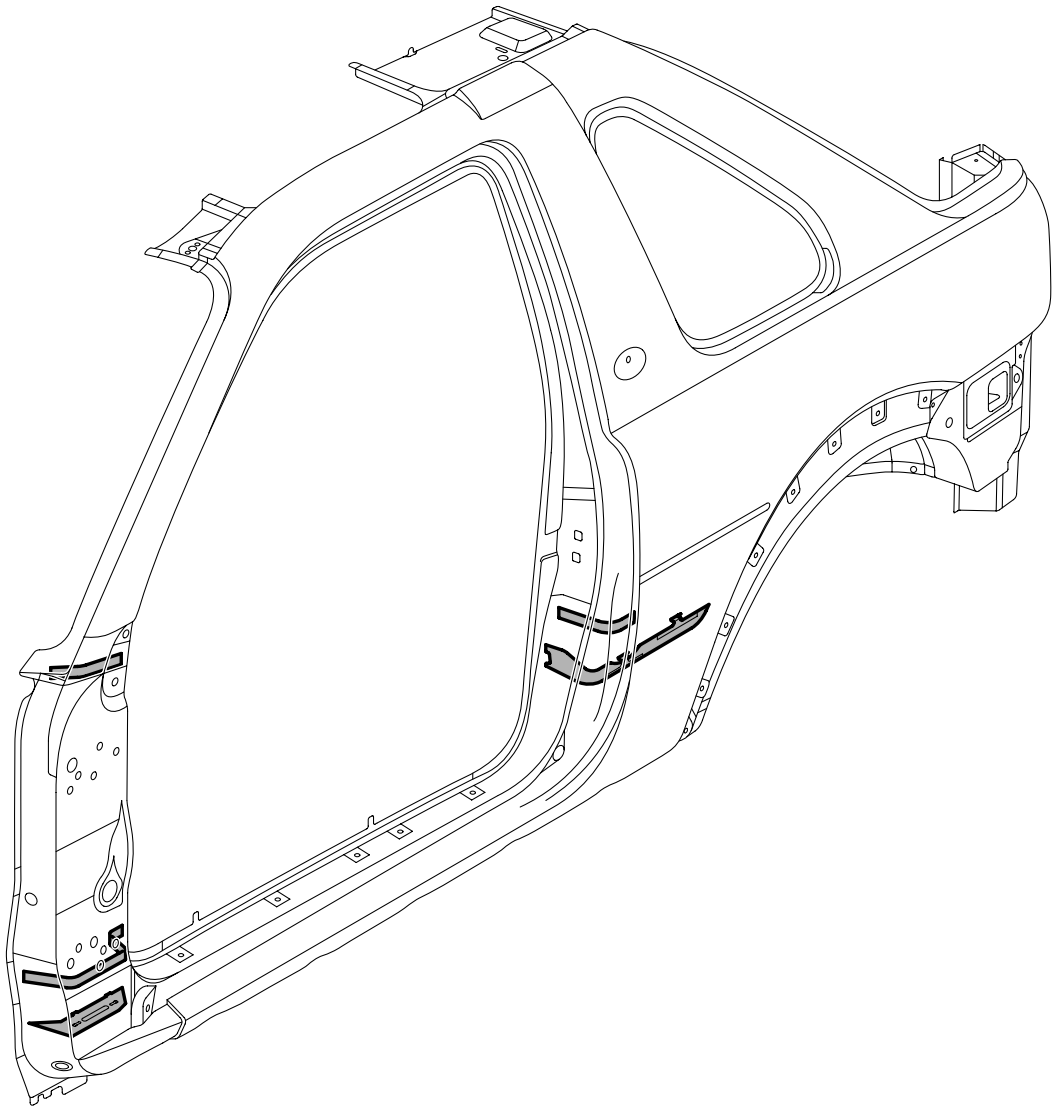
Seam sealer on vehicle interior and rear quarter - 5 door



M77 1941

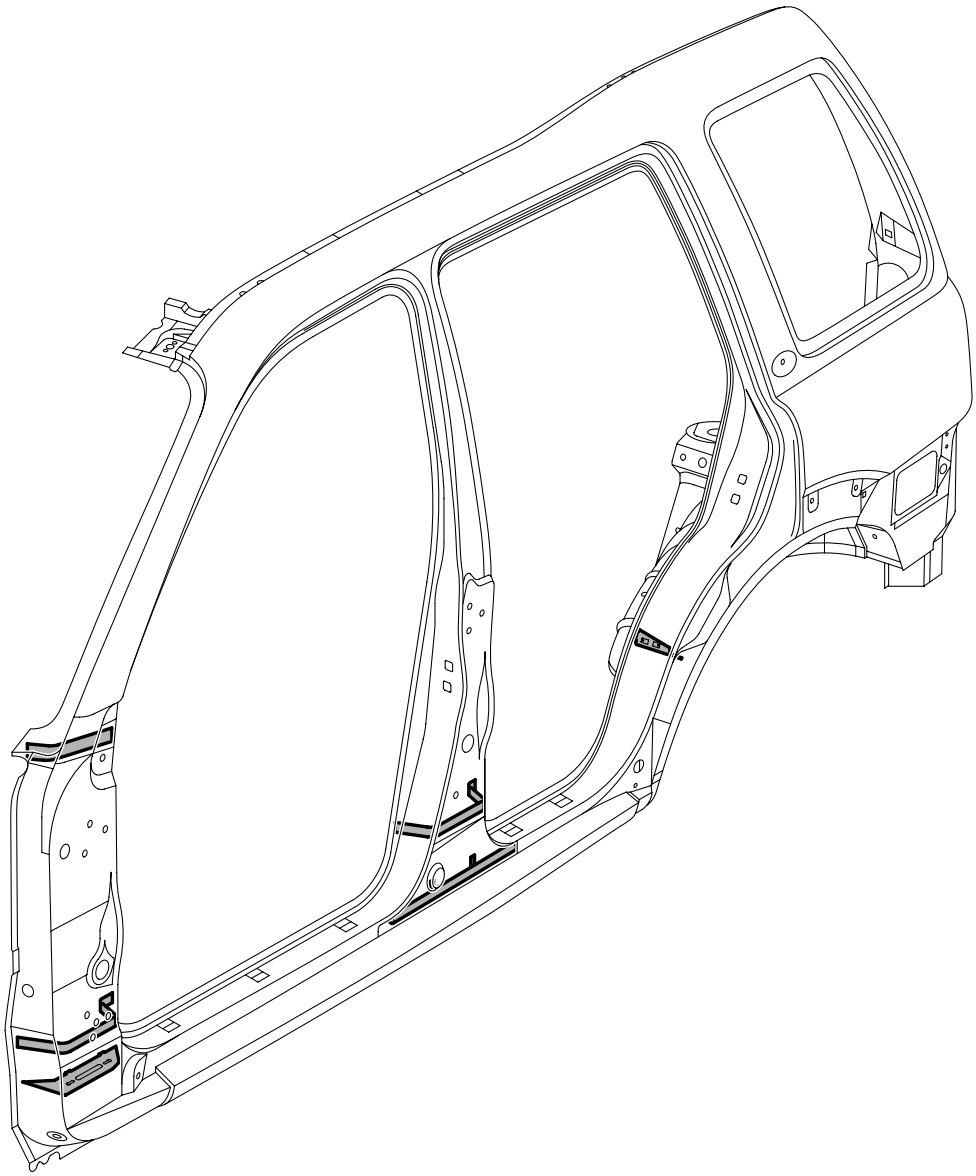
Seams symmetrically opposite to those shown are also treated. Sealant to be wiped to a smooth finish over length 'A' (rear load floor to rear heelboard underframe).

Expanding foam acoustic seals



M77 2056

3 Door shown



M77 2057

5 Door shown

Expanding foam acoustic seals

Expanding foam acoustic seals are used in various closed sections of the body to improve vehicle refinement. The seals expand during the factory paint process, thus locking them into position. The seals are used in various locations throughout the vehicle.

The main function of the seals is to insulate the cabin from noise and vibrations, particularly road noise. They are located such that they prevent noise accentuation along a section and also reflect air borne noise away from the cabin.

A secondary function of the seals is that the internal sections are sealed from the infiltration of water, air, dust and gases.

Another advantage of the seals is that they marginally increase the overall stiffness of the body and its structural performance in case of a crash.

The seals are manufactured from an expandable synthetic rubber, `Betacore 4300`.

All the seals are fitted in the body-in-white areas, and after going through the paint baking process expand up to eight times original size.

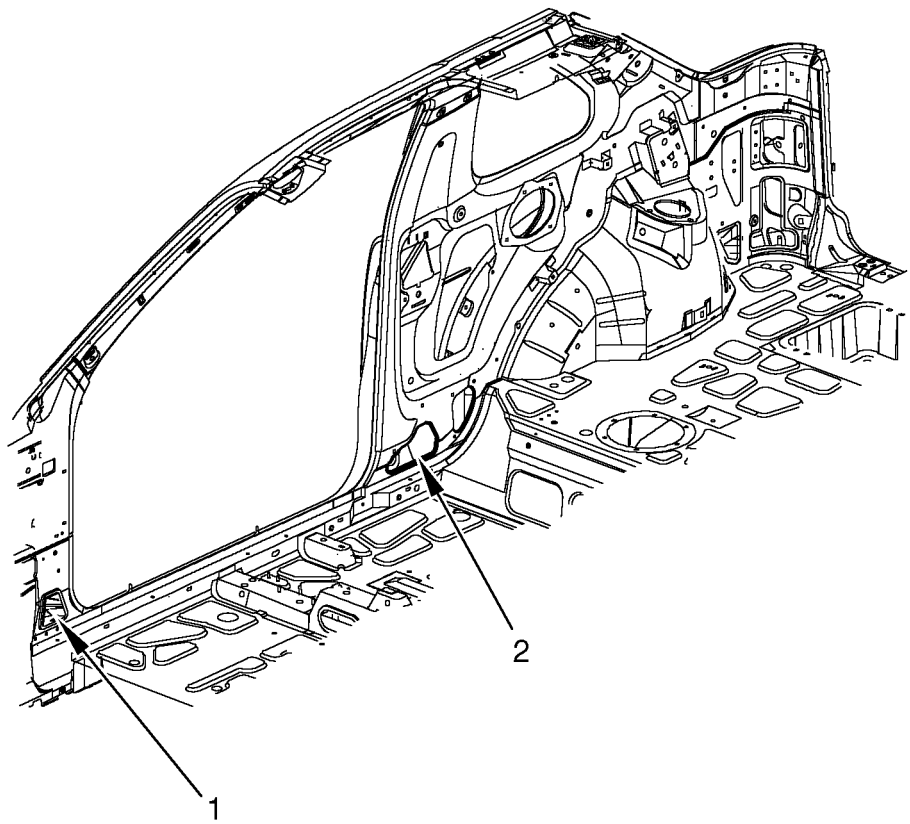
Replacing seals

As paint oven temperatures used in a repair workshop are significantly lower than those that are used during manufacture of the vehicle, a different process is required to replace the seals in service. When replacing a seal, the following procedure must be followed.

After a repair that involves replacement of a section containing expanded foam, the new section must be injected with an approved sound dampening foam. The sound dampening foam should be injected after paint refinishing and application of cavity wax.

Accessible cavities that must be injected with sound dampening foam are detailed in the following Figures. When injecting the foam, ensure the foam fills a complete cross section of the cavity.

Sound dampening foam injection points - 3 door



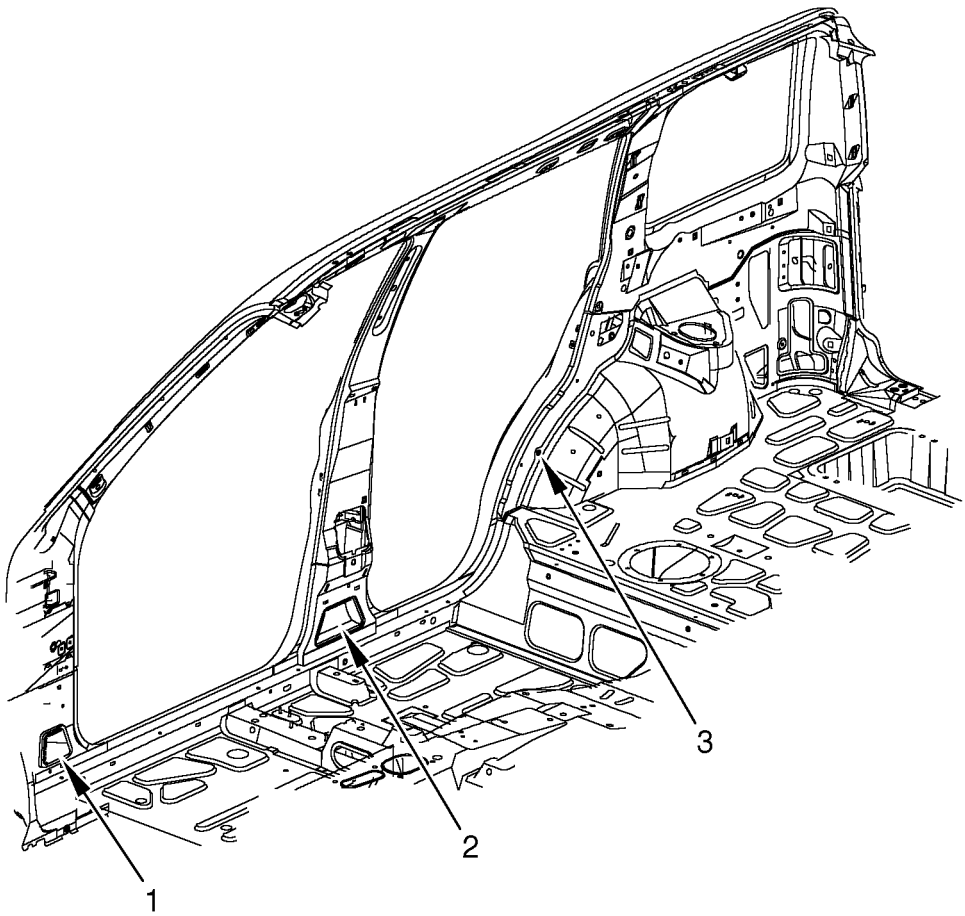
M77 2053

Cavities symmetrically opposite to those shown must also be treated.

1 'A' post reinforcement to sill reinforcement/inner sill

2 'B' post reinforcement to sill reinforcement/inner sill

Sound dampening foam injection points - 5 door



M77 2052

Cavities symmetrically opposite to those shown must also be treated.

1 'A' post reinforcement to sill reinforcement/inner sill
2 'B/C' post reinforcement to sill reinforcement/inner sill
3 Outer wheelarch to outer body side

Water Leaks

Where water leakage is involved, always adopt a logical approach to the problem using a combination of skill, experience and intuition. Do not reach a conclusion based only on visual evidence, such as assuming that a wet footwell is caused by a leak emanating from the windscreen. It will often be found that the source of the leak is elsewhere. Use of the correct procedure will increase the chance of locating a leak, however obscure it may seem.

Tools and equipment

The following tools and equipment are recommended for the purpose of detection and rectification of water leaks:

1. Garden sprayer (hand-operated).
2. Wet/dry vacuum cleaner.
3. Dry, absorbent cloths.
4. Battery torch.
5. Small mirror.
6. Weatherstrip locating tool.
7. Trim panel remover.
8. Small wooden or plastic wedges.
9. Dry compressed air supply.
10. Hot air blower.
11. Sealer applicators.
12. Ultrasonic leak detector.

During leak detection, the vehicle should be considered in three basic sections:

- The front interior space.
- The rear passenger space.
- The loadspace or boot.

Testing

From the information supplied by the customer it should be possible for the bodyshop operator to locate the starting point from which the leak may be detected. After the area of the leak has been identified, find the actual point of entry into the vehicle.

A simple and effective means in the first instance is an ordinary garden spray with provision for pressure and jet adjustment, which will allow water to be directed in a jet or turned into a fine spray. Use a mirror and a battery-powered torch (NOT a mains voltage inspection lamp) to see into dark corners.

The sequence of testing is particularly important. Start at the lowest point and work slowly upwards, to avoid testing in one area while masking the leak in another. For example, if testing started at the level of the windscreen, any water cascading into the plenum chamber could leak through a bulkhead grommet and into the footwells. Even at this point it could still be wrongly assumed that the windscreen seal was at fault.

Another important part of identifying a water leak is by visual examination of door aperture seals, grommets and weatherstrips for damage, deterioration or misalignment, together with the fit of the door itself against the seals.

Sealing

When the point of the leak has been detected, it will then be necessary to rectify it using the following procedure:

1. Renew all door aperture seals and weatherstrips which have suffered damage, misalignment or deterioration.
2. Check all body seals to ensure that they are correctly located on their mounting flanges/faces using a lipping tool if necessary.
3. Dry out body seams to be treated using compressed air and/or a hot air blower as necessary.
4. Apply sealant on the outside of the joint wherever possible to ensure the exclusion of water.
5. When rectifying leaks between a screen glass and its weatherstrip (or in the case of direct glazing, between the glass and bodywork), avoid removing the glass if possible. Apply the approved material at the appropriate location (i.e. glass to weatherstrip or glass to body).

Panel Preparation

General
Replacement panels are supplied with a cathodic primer coating as part of the panel protection and in compliance with the vehicle's Corrosion Warranty, where applicable. **DO NOT remove the primer before paint refinishing. In the event of localized surface damage or imperfections, ensure that only the minimum of primer is removed during rectification work for effective repair.**

Rectify damage as far as possible by panel beating or straightening. To remove corrosion or paint runs on outer surfaces, abrade the primer coat in the affected area as necessary using the following procedure:

1. Clean the panel using a solvent wipe.
2. Treat exposed areas of metal with an etch phosphate process.
3. Re-treat the affected area using either a separate acid-etch primer and two-pack surfacer, or an integrated etch primer/filler.

Panel Preparation
The following procedures should be applied when repairing panels.

Welded panels

1. Remove primer from the immediate vicinity of new and existing panel flanges, cleaning to bright metal finish.
2. On joints to be spot welded, apply weld-through zinc rich primer to joint faces of both flanges. Make spot welds while primer is still wet or according to the manufacturer's instructions.
3. Dress accessible weld joints.
4. Clean panel using solvent wipe.
5. Treat bare metal with an etch phosphate process.
6. Re-treat repaired areas.

Sectioned panels
When replacing part or sectioned panels, the basic procedure is the same as for welded panels described above, with the following variations:

1. Remove primer from both new and existing joint faces, cleaning to a bright metal finish.
2. Where an overlap joint with the existing panel is to be spot welded, apply weld-through, zinc rich primer to both joint faces and spot weld while the primer is still wet, or according to the manufacturer's instructions.
3. MIG weld butt joints where applicable.
4. Clean the panel with a solvent wipe.
5. Treat bare metal areas using an etch phosphate process.
6. Re-prime affected areas as necessary as for rectifying transit damage.
7. Treat the inner faces of lap or butt joints with a suitable cavity wax.

Clinched panels

1. Abrade primer on new and existing panel joint faces, and clean using a solvent wipe.
2. Apply metal-to-metal adhesive where applicable.
3. Where joints are to be spot welded, apply suitable weld-through, zinc rich primer to weld areas.
4. Where joints are to be MIG, arc or gas welded, apply zinc rich primer in adjacent areas **but leave the welded area untreated.**
5. To retain the panel while clinching the flanges, tack spot weld or plug weld as appropriate.
6. Clean the panel with a solvent wipe.
7. Treat bare metal areas with a suitable etch phosphate process.
8. Re-prime affected areas as necessary as for rectifying transit damage.

Paint preparation

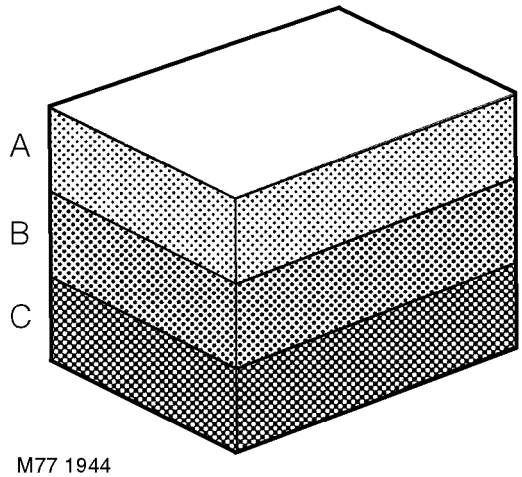
Paint refinishing
The following process must be adhered to for paint refinishing operations.

1. Seal required exterior and interior seams with an approved seam sealer
   ☞ , , .
2. Repair any damage to underbody sealers
   ☞ , , **Corrosion Prevention.**
3. Apply a two-pack paint refinishing system
4. Apply cavity wax to all interior surfaces which have not received refinish paint

Paint repairs
Before carrying out paintwork repairs, clean the vehicle thoroughly using either a steam cleaner or high-pressure washer.

Wash locally repaired areas using a mild water-mixable detergent and wipe them clean with solvent, immediately before paint application.

Ensure that damaged paintwork which has led to exposed metal is abraded until the metal is clean, extending beyond the area of the original damage. Treat the bare metal with an etch phosphate to remove all traces of rust and to provide a key for new paint coats. Re-treat the affected area using either a separate acid-etch primer and two-pack surfacer or an integrated etch primer/filler, and follow with a two-pack paint system. Treat those surfaces not receiving paint using an approved cavity wax, following paint operations.



M77 1944

a Two-pack top coat
b Two-pack primer filler and etch primer
c Etch phosphate

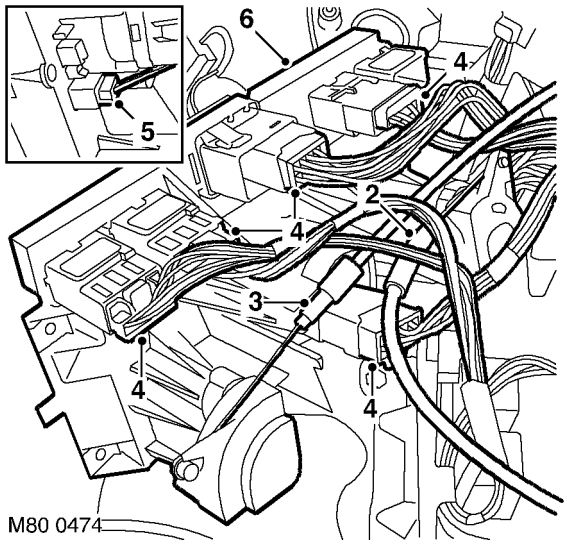
When heat curing paint repairs, the temperature must not exceed 65°C (149°F). Temperatures above this figure will cause the reflective elements within the headlamps and tail lamps to distort and may damage other components.

Controls - heater

80.10.02

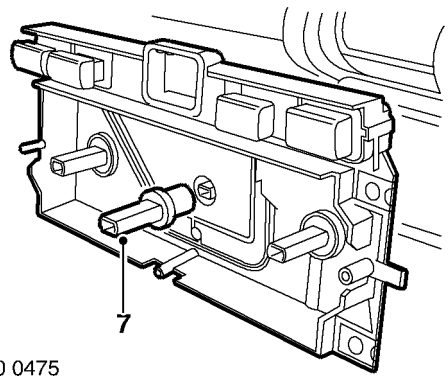
Remove

1. Remove front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.



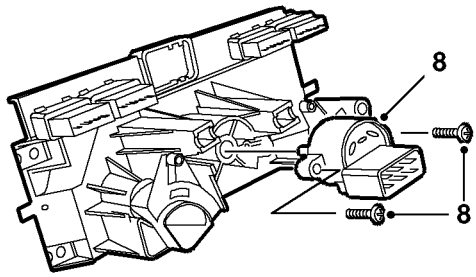
M80 0474

2. Release air blend control cable from control knob and abutment.
3. Release air distribution control cable from control knob and abutment.
4. Disconnect multiplugs from all switches.
5. Disconnect illumination multiplug.
6. Remove heater controls.



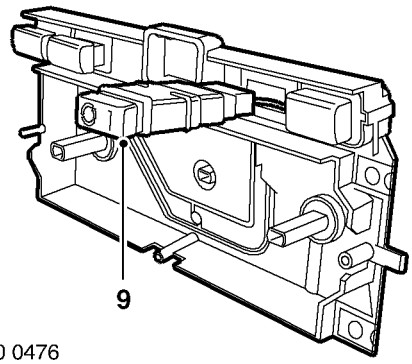
M80 0475

7. Remove fan speed switch drive shaft.



M80 0494

8. Remove 2 screws securing fan speed switch and remove switch.



M80 0476

9. Remove 5 switches from heater controls.

Refit

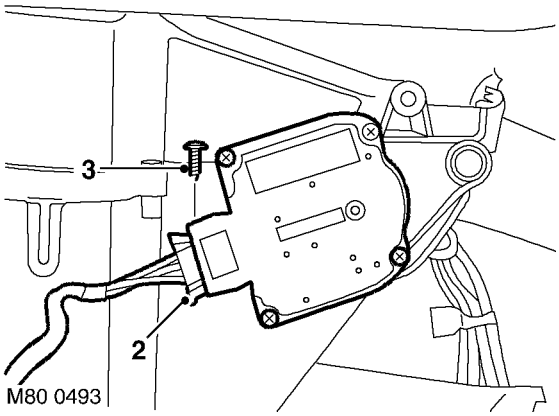
1. Fit switches to heater control housing.
2. Fit fan speed switch and secure with screws.
3. Fit drive shaft to fan speed switch.
4. Fit heater control assembly to vehicle.
5. Connect switch and illumination multiplugs.
6. Connect air blend control cable to control knob and abutment.
7. Connect air distribution control cable to control knob and abutment.
8. Fit front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.

Servo - air recirculation

80.10.18

Remove

1. Remove glove box.
   INTERIOR TRIM COMPONENTS, REPAIRS, Glove box.



2. Disconnect multiplug from servo.
3. Remove screw securing servo to evaporator and remove servo.

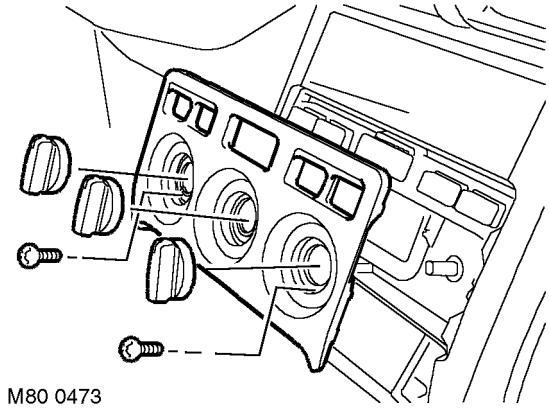
Refit

1. Fit servo to evaporator and secure with screw.
2. Connect multiplug to servo.
3. Fit glove box.
   INTERIOR TRIM COMPONENTS, REPAIRS, Glove box.

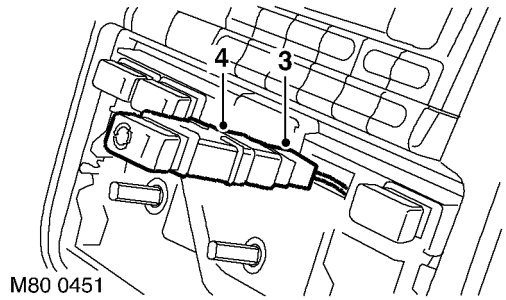
Switch - recirculation control

80.10.21

Remove



1. Remove 3 heater control knobs.
2. Remove 2 screws securing heater control finisher to heater controls and remove finisher.



3. Release switch and disconnect multiplug.
4. Remove switch.

Refit

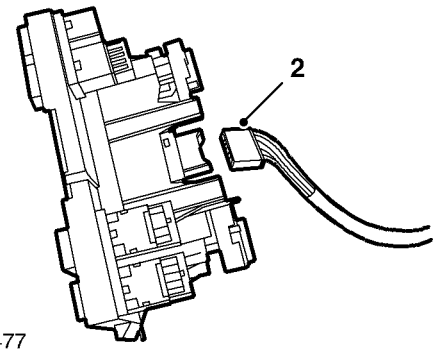
1. Fit recirculation switch to heater control panel and connect multiplug.
2. Fit heater control finisher to heater controls and secure with screws.
3. Fit heater control knobs.

Switch - fan - front heater

80.10.22

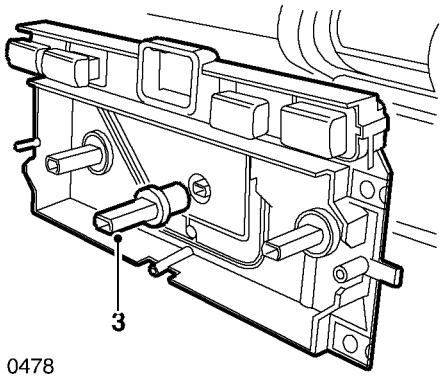
Remove

1. Remove front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.



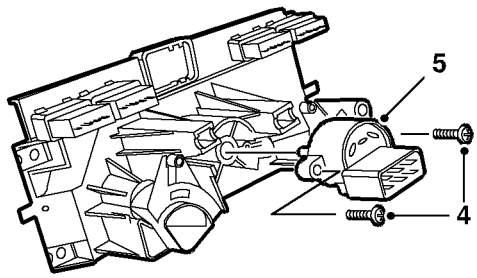
M80 0477

2. Disconnect multiplug from switch.



M80 0478

3. Remove drive shaft from switch.



M80 0479

4. Remove 2 screws securing switch to heater controls.
5. Remove switch.

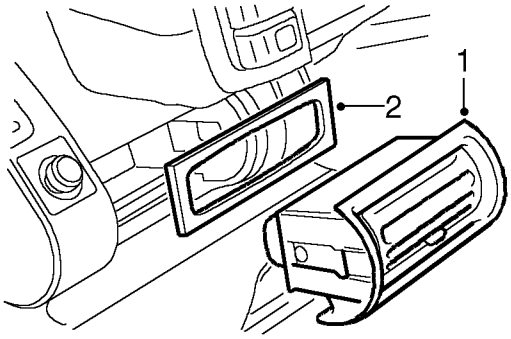
Refit

1. Fit switch to heater controls and secure with screws.
2. Fit drive shaft to switch.
3. Connect multiplug to switch.
4. Fit front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.

Ventilator - face level - LH

80.15.05

Remove



M80 0452

1. Protect fascia and carefully lever vent from fascia.
2. Remove and discard seal.

Refit

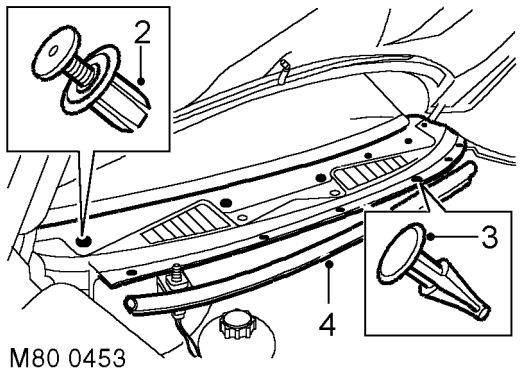
1. Fit new seal to vent.
2. Fit vent to fascia.

Plenum - air intake

80.15.62

Remove

1. Remove both wiper arms.
   WIPERS AND WASHERS, REPAIRS, Arm - wiper - each.

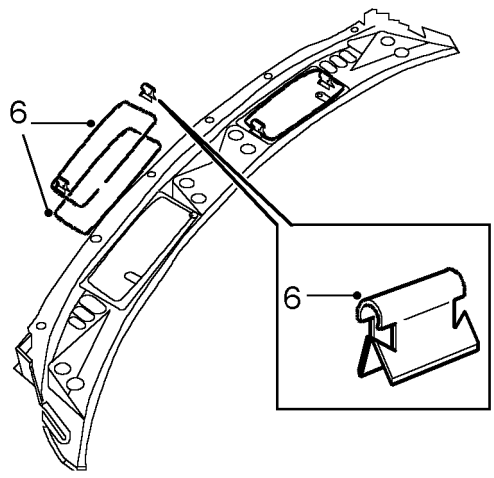


M80 0453

2. Remove 6 studs securing rear edge of air intake moulding.
3. Remove 6 studs securing front edge of moulding and bonnet sealing rubber to engine bulkhead.
4. Remove air intake moulding and bonnet sealing rubber.

   NOTE: Do not carry out further dismantling if component is removed for access only.

5. Remove bonnet sealing rubber from air intake moulding.



M80 0454

6. Remove 4 clips securing air intake filter retainers. Remove retainers and filters.

Refit

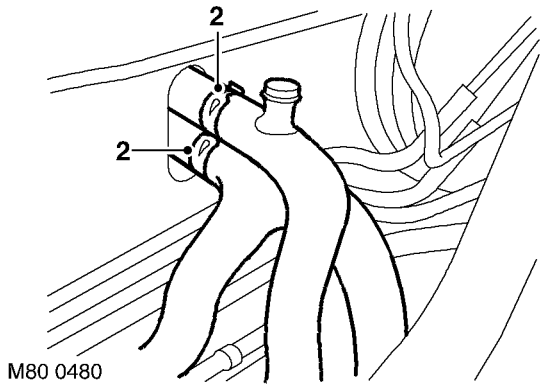
1. Fit filters and retainers to air intake moulding and secure with clips.
2. Fit bonnet sealing rubber to air intake moulding.
3. Fit air intake moulding and secure with studs. Fit front studs first.
4. Fit wiper arms.
   ☞ **WIPERS AND WASHERS, REPAIRS, Arm - wiper - each.**

Heater unit

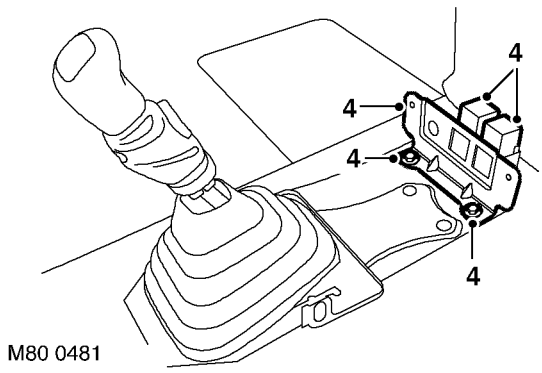
80.20.01

Remove

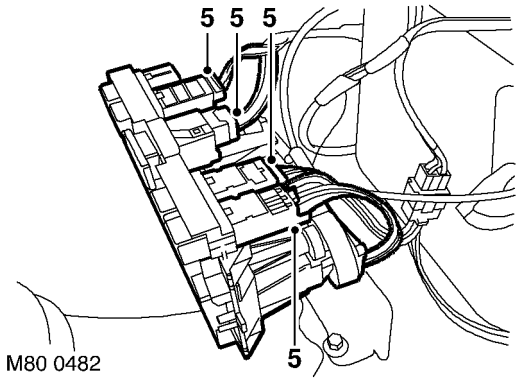
1. Drain cooling system.
   ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
   ☞ **COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.**
   ☞ **COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.**



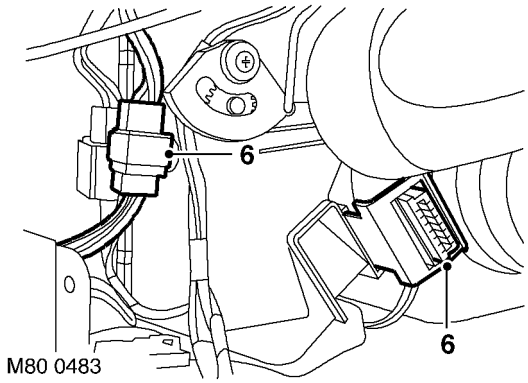
2. Release 2 clips securing heater hoses to heater and disconnect hoses.
3. Remove fascia.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**



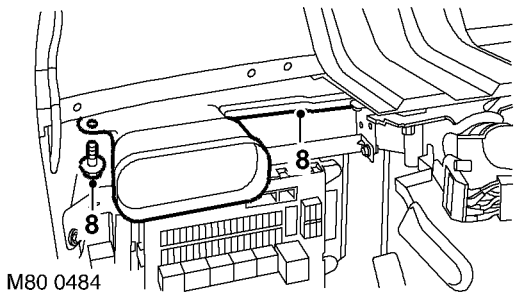
4. Remove 2 bolts from console support bracket, release 2 relays and remove bracket.



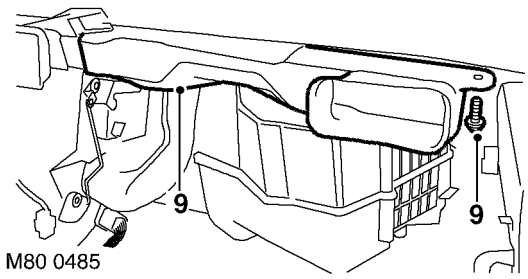
5. Disconnect 4 multiplugs from heater controls.



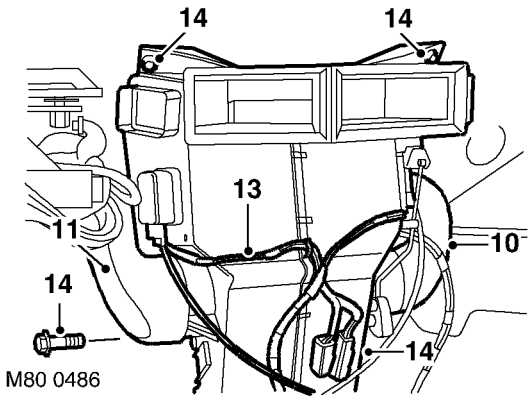
6. Disconnect multiplug from heater and release diagnostic socket.
7. **Models with A/C:** Disconnect multiplug from evaporator.



8. Remove bolt from duct of LH outer face level vent and release duct from heater.

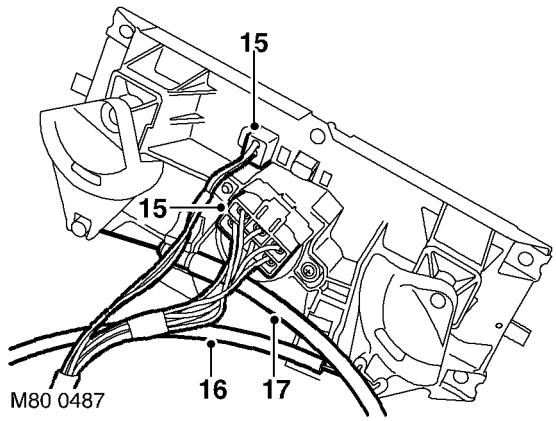


9. Remove bolt from duct of RH outer face level vent and release duct from heater.



10. Release duct of RH demister vent.
11. Release duct of LH demister vent.
12. Release air inlet connector hose.
13. Release harness from 2 clips on heater.
14. Remove 2 nuts and 1 bolt securing heater to body and remove heater.

NOTE: Do not carry out further dismantling if component is removed for access only.



15. Disconnect 2 multiplugs from heater controls.
16. Release air blend control cable from lever and abutment.
17. Release air distribution cable from lever and abutment.
18. Remove heater controls.

Refit

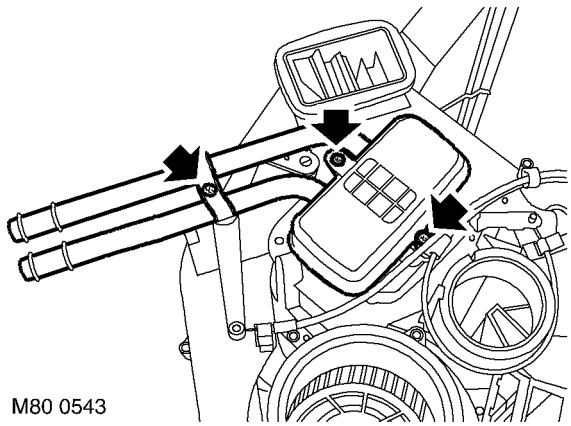
1. Position heater controls to replacement heater.
2. Connect air distribution cable to lever and abutment.
3. Connect air blend cable to lever and abutment.
4. Connect multiplugs to heater controls.
5. Fit heater and secure with nuts and bolt.
6. Position harness and connect to clips on heater.
7. Fit air inlet connector hose.
8. Fit RH demister vent duct to heater.
9. Fit RH outer face level vent duct to heater and secure to body with bolt.
10. Fit LH demister vent duct to heater.
11. Fit LH outer face level vent duct to heater and secure to body with bolt.
12. **Models with A/C:** Connect multiplug to evaporator.
13. Connect multiplug to heater and secure diagnostic socket.
14. Connect multiplugs to heater controls.
15. Fit console support bracket and secure with bolts.
16. Fit relays to console support bracket.
17. Fit fascia.
    ☞ INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.
18. Connect heater hoses and secure with clips.
19. Refill cooling system.
    ☞ COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
    ☞ COOLING SYSTEM - K SERIES 1.8, ADJUSTMENTS, Coolant - drain & refill.
    ☞ COOLING SYSTEM - K SERIES KV6, ADJUSTMENTS, Coolant - drain and refill.

Element - positive temperature co-efficient (PTC) heater - Td4 models

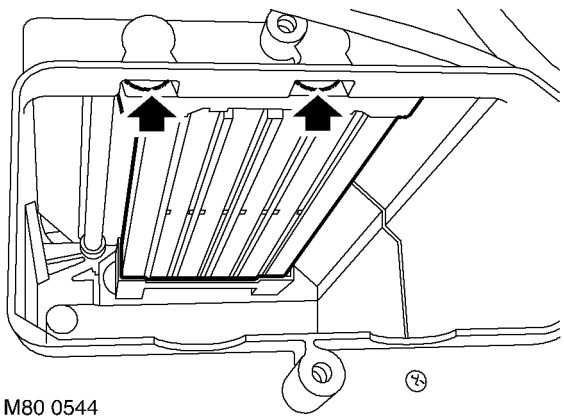
80.20.05

Remove

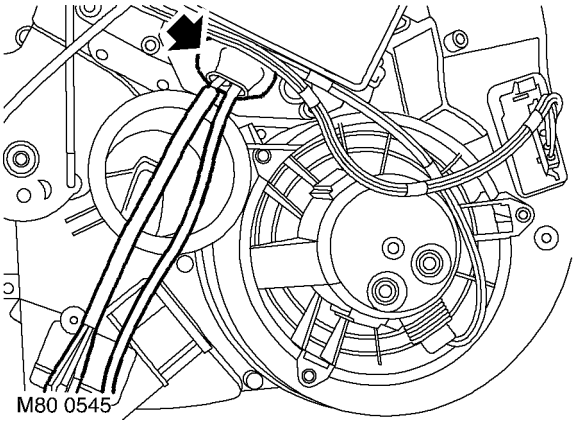
1. Remove heater assembly.
   ☞ HEATING AND VENTILATION, REPAIRS, Heater unit.



2. Remove 2 screws from matrix cover, remove cover.
3. Remove screw securing saddle clamp, remove clamp.
4. Remove heater matrix.



5. Release PTC top and bottom retaining stud bosses from locating holes.



6. Release PTC element harness grommet from passenger side of heater unit.
7. Carefully remove element also guiding harness through assembly

Refit

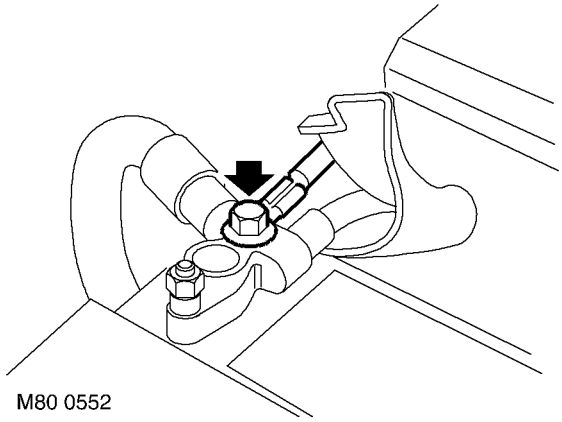
1. Carefully fit PTC element into heater assembly, also guide harness through opposite side.
2. Fit harness grommet.
3. Locate bottom stud bosses into locating holes, then locate top bosses.
4. Fit heater matrix and secure with saddle clamp.
5. Fit matrix cover and secure with screws.
6. Fit heater assembly
   ☞ **HEATING AND VENTILATION, REPAIRS, Heater unit.**

Harness - positive temperature co-efficient (PTC) heater - Td4 models

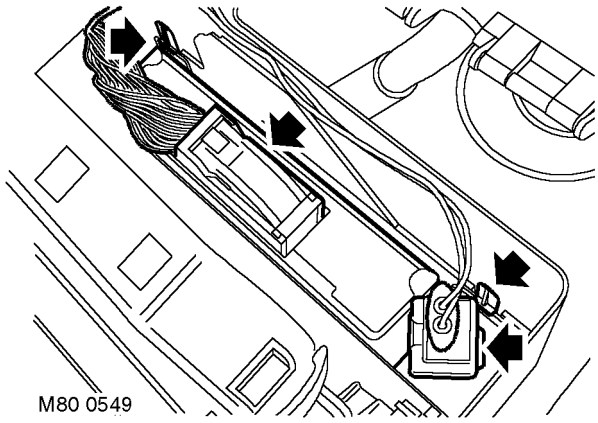
🔧 ***80.20.06***

Remove

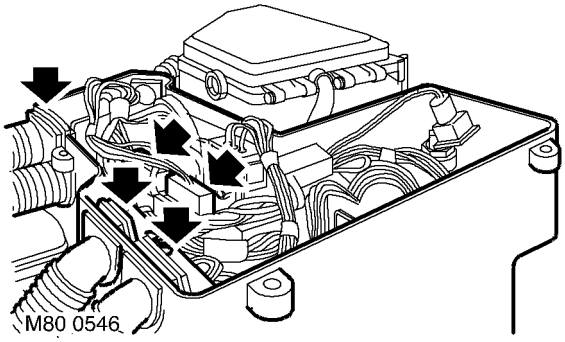
1. Disconnect battery earth lead.



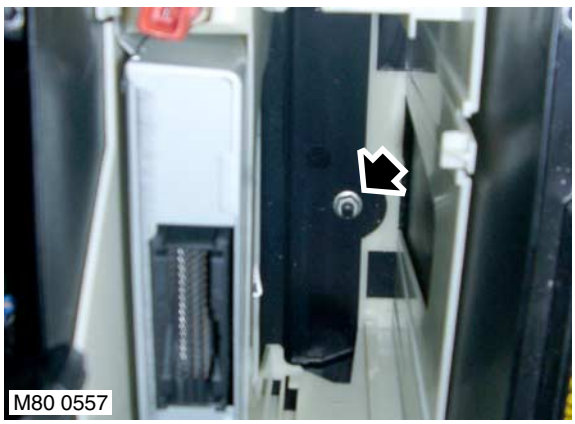
2. Remove bolt securing PTC cable from positive side of battery.
3. Remove ECM from 'E' box.
   ☞ **ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).**



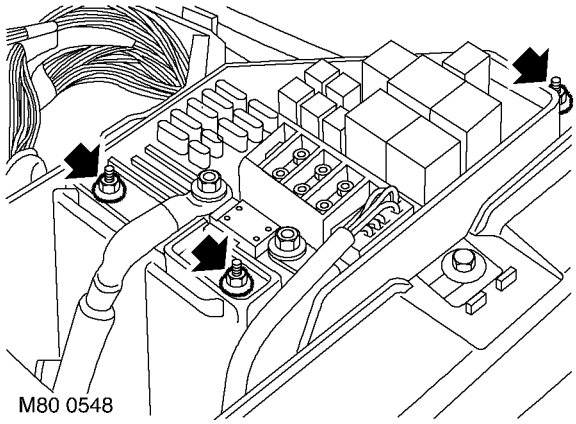
4. Disconnect multiplugs from gearbox ECU and cooling fan sensor



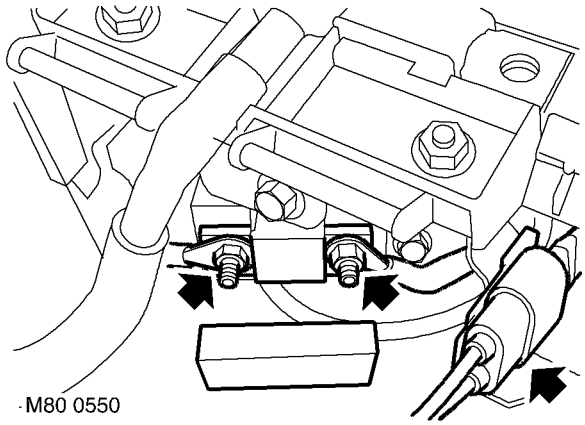
5. Release harness from cable ties and release relays from inner casing.
6. Release and disconnect cooling fan and joint harness multiplugs.
7. Release 3 harnesses and air duct rubber sleeve's from housing.
8. Release clips and remove fuse box cover.



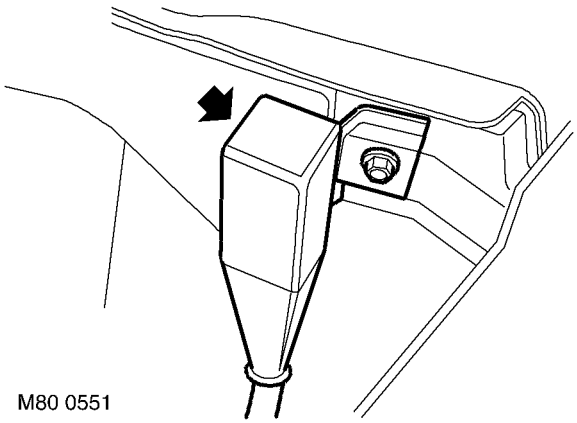
9. Remove nut securing ECM housing.
10. Release housing from retaining brackets and remove.



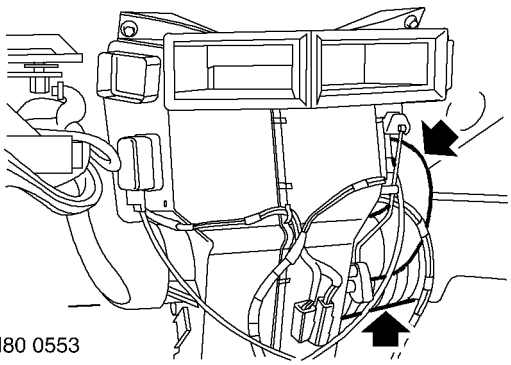
11. Remove 3 nuts securing fuse box, place fuse box aside.
12. Release PTC harness from ECM housing bracket.



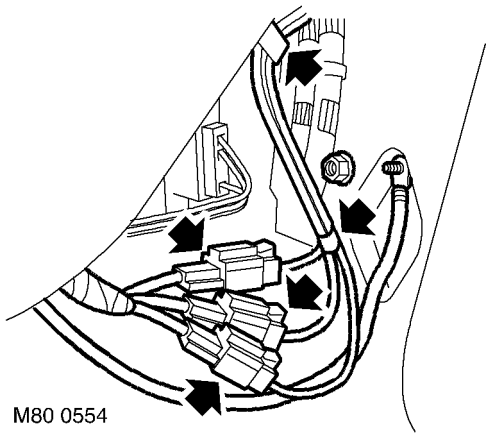
13. Remove cover from PTC positive lead fuse holder.
14. Release multiplug and disconnect PTC harness from engine harness.
15. Remove 2 nuts securing both leads from (80 amp) fuse holder, remove leads.
16. Release clip securing PTC harness to ECM housing bracket.


M80 0551

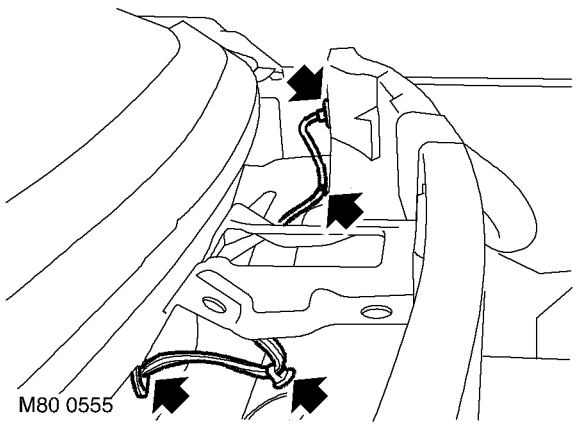
17. Release PTC harness relay from bulkhead retaining bracket.
18. Remove fascia.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**


M80 0553

19. Release and remove RH demister vent duct
20. Release and remove air duct.


M80 0554

21. Disconnect 3 Lucar connections from PTC element.
22. Release cable ties securing PTC harness to main harness.
23. Remove air intake plenum.
☞ **HEATING AND VENTILATION, REPAIRS, Plenum - air intake.**


M80 0555

24. Release 2 clips securing PTC harness from plenum box section.
25. With assistance release 2 grommets from bulkhead and remove PTC harness from vehicle.

Refit

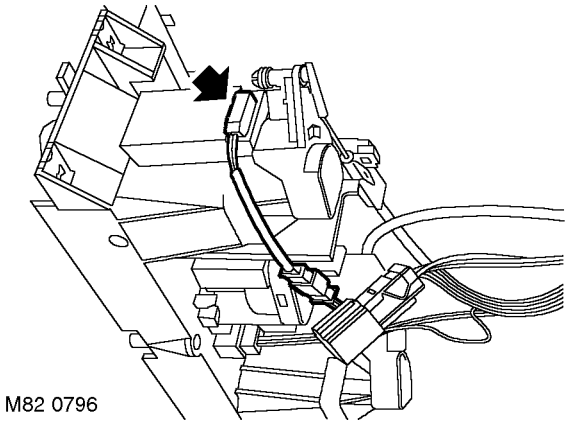
1. With assistance route PTC harness through bulkhead and fit grommets.
2. Fit clips securing PTC harness to plenum box
3. Fit air intake plenum.
   ☞ **HEATING AND VENTILATION, REPAIRS, Plenum - air intake.**
4. Fit cable ties securing PTC harness to main bulkhead harness.
5. Connect Lucar connections to PTC element.
6. Fit air duct.
7. Fit RH demister vent duct.
8. Fit fascia.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
9. Connect and secure PTC harness multiplug to engine harness.
10. Secure PTC harness/relay to bulkhead bracket
11. Fit clip to secure PTC harness to ECM housing bracket.
12. Fit PTC positive leads to (80 amp) fuse holder, fit and tighten nuts to 7 Nm (5.2 lbf.ft).
13. Fit (80 amp) fuse cover.
14. Secure PTC harness/relays to ECM housing bracket.
15. Fit fuse box, ensure harness routing is clear suspension turret. Tighten nuts to 10 Nm (7 lbf.ft).
16. Fit fuse box cover.
17. Fit 'E' box housing into securing brackets.
18. Fit and tighten nut securing housing.
19. Fit harness and air duct rubber sleeve's to housing.
20. Fit harness cable tie and secure relay in housing.
21. Connect and secure joint harness and cooling fan multiplugs.
22. Connect cooling fan sensor and gearbox ECU multiplugs.
23. Fit ECM into 'E' box.
    ☞ **ENGINE MANAGEMENT SYSTEM - EDC, REPAIRS, Engine control module (ECM).**
24. Position PTC positive cable to battery and secure with bolt, tighten to 25 Nm (18 lbf.ft).
25. Connect battery earth lead.

Microswitch - positive temperature co-efficient (PTC) heater - Td4 models

80.20.08

Remove

1. Remove front console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**



2. Disconnect multiplug and release microswitch from heater control pack.

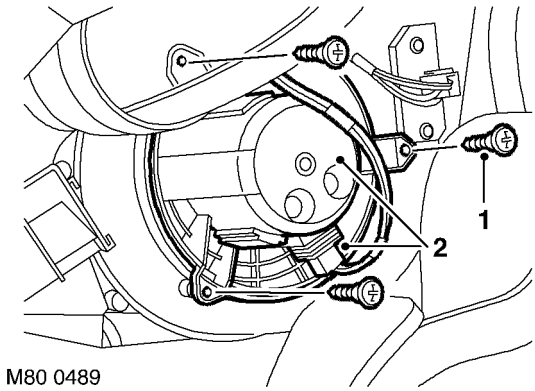
Refit

1. Fit microswitch to heater control pack and connect multiplug.
2. Fit front console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**

Blower assembly

80.20.12

Remove



M80 0489

1. Remove 3 screws securing fan motor assembly to heater casing.
2. Release fan assembly from heater and disconnect multiplug.
3. Remove fan assembly.

Refit

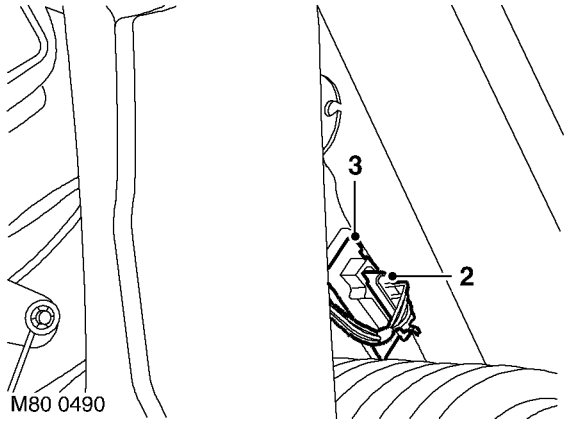
1. Position fan assembly to heater and connect multiplug.
2. Fit fan assembly to heater casing and secure with screws.

Resistor unit - fan motor

80.20.17

Remove

1. **LHD models only:** Disconnect air inlet connector hose from heater and evaporator.



M80 0490

2. Disconnect multiplug from resistor.
3. Release clip and remove resistor from heater.

Refit

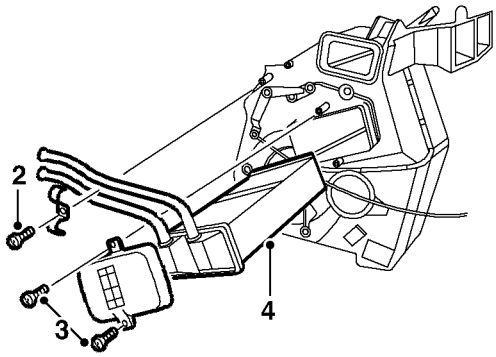
1. Fit resistor to heater.
2. Connect multiplug to resistor.
3. **LHD models only:** Connect air inlet connector hose.

Matrix - heater

80.20.29

Remove

1. Remove heater assembly.
   HEATING AND VENTILATION, REPAIRS, Heater unit.



M80 0491

2. Remove screw securing pipe clamp to heater casing and remove clamp.
3. Remove 2 screws from matrix cover and remove cover.
4. Remove heater matrix.

Refit

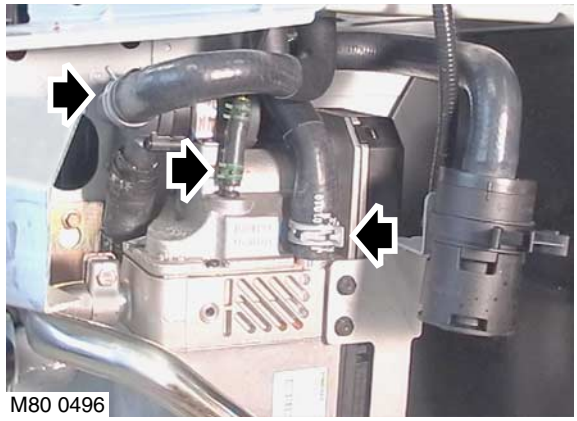
1. Fit heater matrix to heater assembly.
2. Fit matrix cover and secure with screws.
3. Fit pipe clamp and secure with screw.
4. Fit heater assembly.
   HEATING AND VENTILATION, REPAIRS, Heater unit.

Fuel burning heater (FBH)

80.40.01

Remove

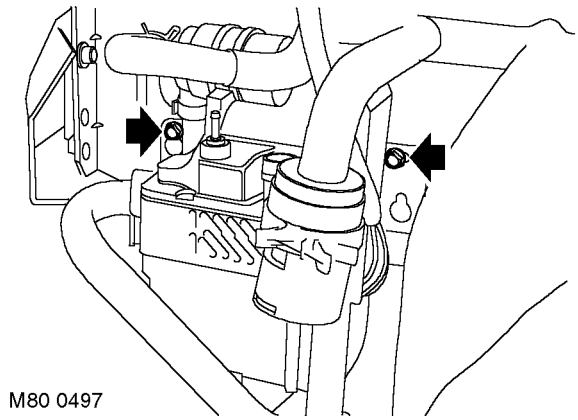
1. Disconnect battery earth lead.
2. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
3. Drain coolant.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
4. Position container to collect coolant spillage.



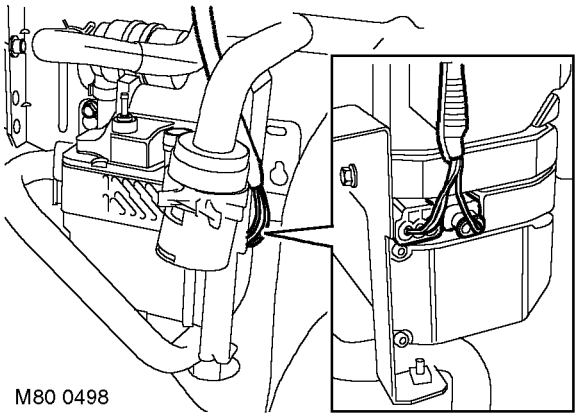
M80 0496

5. Release clips, disconnect coolant feed and return hoses from FBH.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

6. Position an absorbent cloth, release clip and remove fuel feed hose from FBH. Plug connections and move aside.

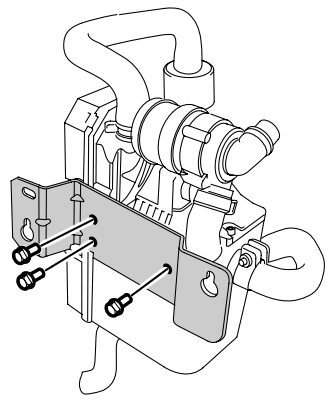

M80 0497

7. Loosen 1 bolt and remove other bolt securing FBH mounting bracket to body.


M80 0498

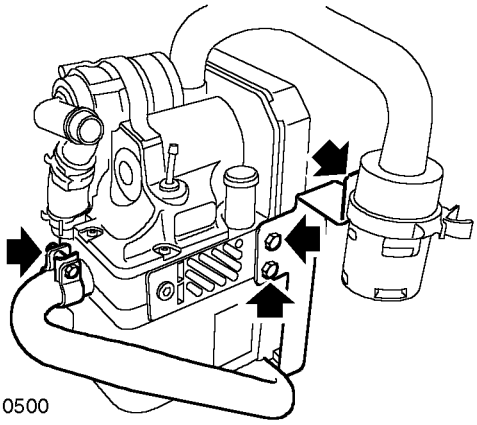
8. Release FBH from mounting, disconnect multiplugs and move assembly aside.

NOTE: Do not carry out further dismantling if component is removed for access only.


M80 0499

9. Remove 3 bolts securing FBH to mounting bracket.

10. Remove bracket.


M80 0500

11. Release clip securing air intake hose to FBH, release clamp from exhaust manifold.

12. Remove 2 bolts securing air intake and exhaust assembly to FBH and move aside.

Refit

1. Fit exhaust pipe, air intake hose and bracket assembly to FBH.

2. Fit and tighten bolts to 10 Nm (7.5 lbf.ft).

3. Tighten exhaust pipe clamp to 5 Nm (3.5 lbf.ft).

4. Align air intake hose with mark on casing and secure with clip.

5. Fit mounting bracket to FBH and tighten bolts to 10 Nm (7.5 lbf.ft).

6. Connect multiplugs to FBH.

7. Fit FBH to body, tighten bolts to 10 Nm (7.5 lbf.ft).

8. Fit coolant hoses to FBH and secure with clips.

9. Fit fuel feed hose to FBH and secure with clip.

10. Refill cooling system.

☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**

11. Fit front bumper.

☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**

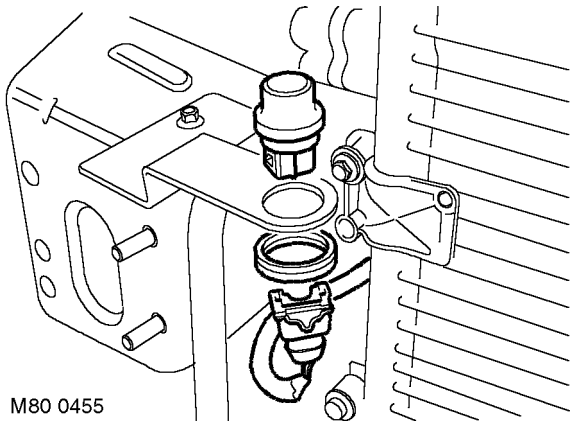
12. Connect battery earth lead.

Sensor - outside temperature (OT)

80.40.31

Remove

1. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.



2. Disconnect multiplug from OT sensor.
3. Remove OT sensor from mounting bracket, collect rubber washer and spacer.

Refit

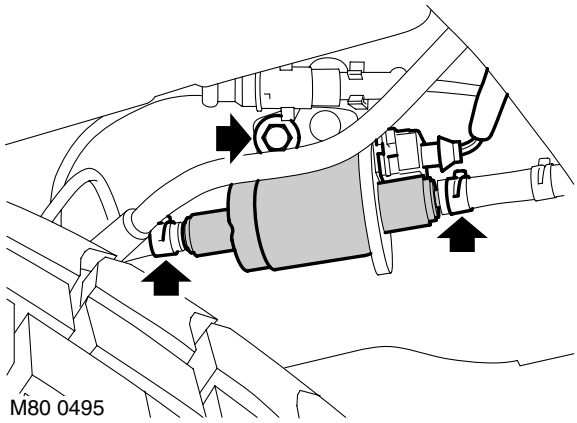
1. Clean OT mounting bracket and sensor.
2. Fit OT sensor to mounting bracket, fit rubber washer and spacer, connect multiplug.
3. Fit front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.

Fuel pump - fuel burning heater

80.40.40

Remove

1. Disconnect battery earth lead.
2. Remove RH rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.



3. Disconnect multiplug from fuel pump.
4. Release clips and remove fuel pipes from fuel pump.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

5. Release fuel pump from rubber mountings and remove pump.

Refit

1. Clean fuel hose connections.
2. Position fuel pump and secure in rubber mountings.
3. Position fuel pipes to pump and secure with clips.
4. Connect multiplug to fuel pump.
5. Fit rear wheel arch liner.
   EXTERIOR FITTINGS, REPAIRS, Liner - rear wheel arch.
6. Connect battery earth lead.

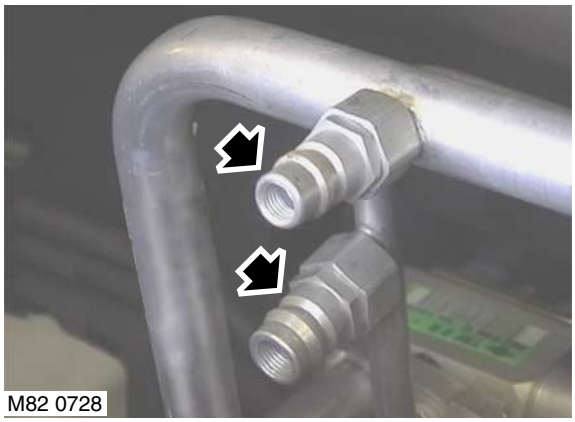
Refrigerant recovery - recycling and recharge

82.30.02

Refrigerant recovery

WARNING: Servicing must only be carried out by personnel familiar with both the vehicle system and the charging and testing equipment. All operations must be carried out in a well ventilated area away from open flame and heat sources.

1. Remove dust caps from high and low pressure connectors.


M82 0728

2. Connect high and low pressure hoses to appropriate connections.
3. Open valves on connectors.
4. Turn valves on refrigerant station to correct positions.
5. Turn process switch to correct position.
6. Turn main switch to 'ON'.
7. Allow station to recover refrigerant from system.

   WARNING: Refrigerant must always be recycled before re-use to ensure that the purity of the refrigerant is high enough for safe use in the air conditioning system. Recycling should always be carried out with equipment which is in compliance with SAE J2210. Other equipment may not recycle refrigerant to the required level of purity. A R134a Refrigerant Recovery Recycling Recharging Station must not be used with any other type of refrigerant. Refrigerant R134a from domestic and commercial sources must not be used in motor vehicle air conditioning systems.

8. Close valves on refrigerant station.
9. Turn main switch to 'OFF'.
10. Close valves on connectors.
11. Disconnect high and low pressure connectors.
12. Fit dust caps to connectors.
13. Open tap at rear of station to drain refrigerant oil.
14. Measure and record quantity of refrigerant oil recovered from system.
15. Close tap at rear of station.

Evacuation

1. Remove dust caps from high and low pressure connectors.
2. Connect high and low pressure hoses to appropriate connections.
3. Open valves on connectors.
4. Turn valves on refrigerant station to correct positions.
5. Turn Process switch to correct position.
6. Turn main switch to 'ON'.
7. Allow station to evacuate system.

Recharging

CAUTION: The system must be evacuated immediately before recharging commences. Delay between evacuation and recharging is not permitted.

1. Close valves on refrigerant station.
2. Close valve on oil charger.
3. Disconnect yellow hose from refrigerant station.
4. Remove lid from oil charger.
5. Pour correct quantity of refrigerant oil into oil charger.

   ☞ **GENERAL INFORMATION, Air conditioning compressor replacement.**
6. Fit lid to oil charger.
7. Connect yellow hose to refrigerant station.
8. Open valve on oil charger.
9. Move pointer on refrigerant gauge to mark position of refrigerant drop.
10. Slowly open correct valve on refrigerant station and allow vacuum to pull refrigerant into system.
11. Close valve on refrigerant station when correct amount of refrigerant has been drawn into air conditioning system.

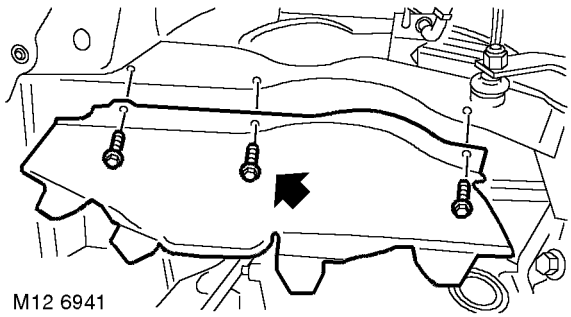
    ☞ **GENERAL INFORMATION, Air conditioning compressor replacement.**
12. Turn main switch to 'OFF'.
13. Close valves on connectors.
14. Disconnect high and low pressure connectors.
15. Fit dust caps to connectors.

Drive belt - compressor - Td4

82.10.01

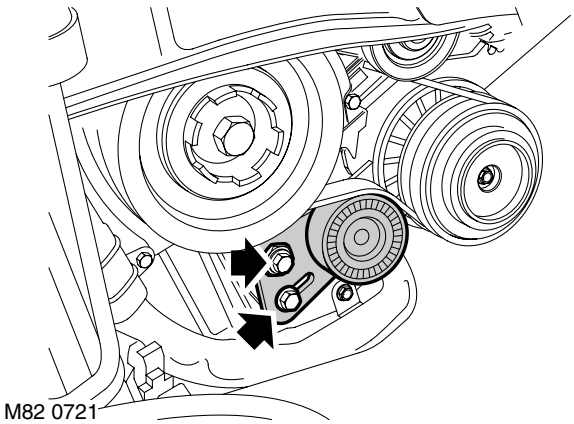
Check

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
3. Turn steering on RH lock.


M12 6941

4. Remove 3 bolts and RH splash shield.
5. Check condition of drive belt. Renew a drive belt that shows signs of wear and splitting.

Adjust


M82 0721

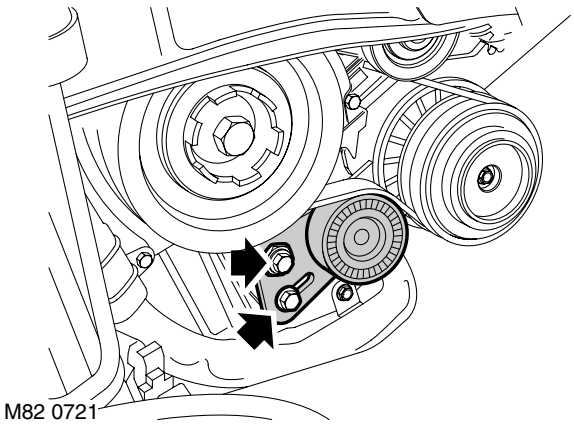
1. Loosen clamp and pivot bolts of compressor drive belt tensioner.
2. Apply an anti-clockwise torque of 38 Nm (28 lbf.ft) for an existing belt and 47 Nm (35 lbf.ft) for a new belt to tensioner plate hexagon.
3. Tighten tensioner clamp bolt to 24 Nm (18 lbf.ft).
4. Tighten tensioner pivot bolt to 24 Nm (18 lbf.ft).
5. Fit splash shield and tighten bolts to 10 Nm (7.5 lbf.ft).
6. Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
7. Connect battery earth lead.

Drive belt - compressor - Td4

82.10.02

Remove

1. Disconnect battery earth lead.
2. Remove ancillary drive belt.
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.


M82 0721

3. Loosen clamp and pivot bolts of compressor drive belt tensioner.
4. Remove compressor drive belt.

Refit

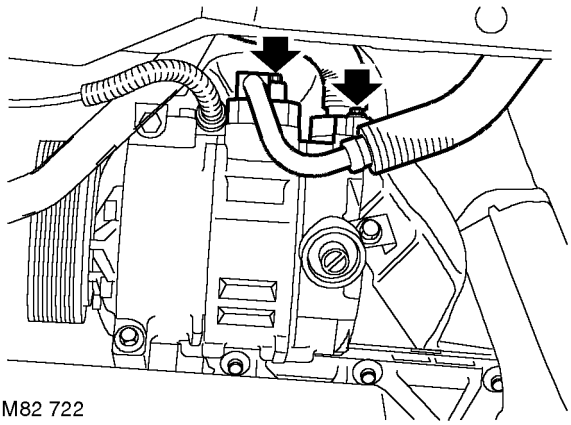
1. Ensure compressor drive belt and compressor, crankshaft and tensioner pulleys are clean.
2. Fit compressor drive belt.
3. Adjust compressor drive belt.
   AIR CONDITIONING, ADJUSTMENTS, Drive belt - compressor - Td4.
4. Fit ancillary drive belt.
   CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.
5. Connect battery earth lead.

Compressor - Td4

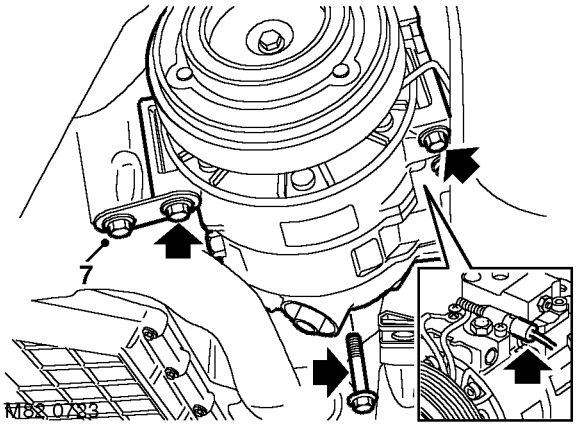
82.10.20

Remove

1. Raise front of vehicle.
   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.
2. Disconnect battery earth lead.
3. Recover refrigerant from A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.
4. Remove compressor drive belt.
   AIR CONDITIONING, REPAIRS, Drive belt - compressor - Td4.
   WARNING: Under no circumstances should refrigerant hoses be disconnected without first discharging the system.


M82 722

5. Remove 2 bolts securing A/C pipes to compressor. Release pipes from compressor.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.
6. Remove and discard 'O' rings from A/C pipes.



7. Loosen bolt securing compressor support bracket to sump, do not remove.
8. Remove 3 bolts and remove compressor from mounting bracket. Move support strap aside, disconnect compressor multiplug and remove compressor.

Refit

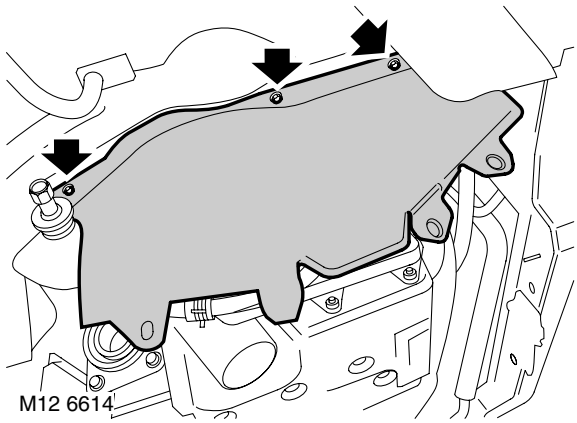
1. If a new compressor is being installed, drain the required amount of refrigerant oil from the new compressor.
   ☞ **GENERAL INFORMATION, Air conditioning compressor replacement.**
2. A new compressor is sealed and pressurised with Nitrogen gas, slowly release the sealing cap, gas pressure should be heard to release as the seal is broken.
3. Ensure mating faces of A/C pipes and compressor are clean.
4. Fit A/C compressor to mounting bracket, align support strap and tighten bolts to 25 Nm (18 lbf.ft).
5. Connect multiplug to compressor.
6. Lubricate new 'O' rings with clean refrigerant oil and fit to evaporator pipes
7. Position A/C pipes to compressor, fit bolts and tighten to 22 Nm (16 lbf.ft).
8. Replace receiver drier.
   ☞ **AIR CONDITIONING, REPAIRS, Receiver drier.**
9. Fit compressor drive belt.
   ☞ **AIR CONDITIONING, REPAIRS, Drive belt - compressor - Td4.**
10. Recharge A/C system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
11. Connect battery earth lead.
12. Remove stands and lower vehicle.

Compressor - KV6

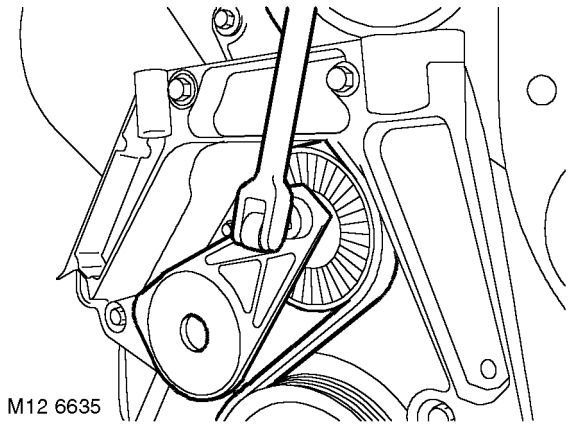
🔧 ***82.10.20***

Remove

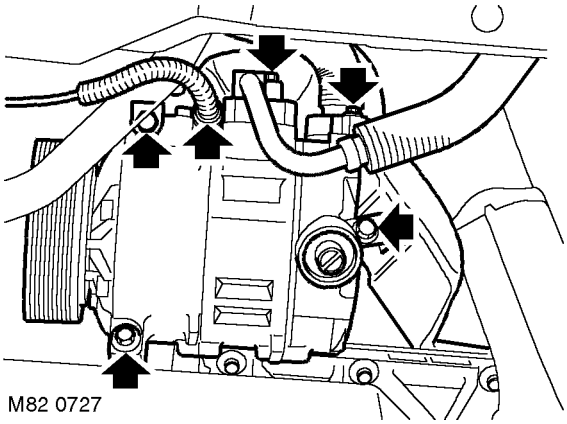
1. Disconnect battery earth lead.
2. Recover refrigerant from A/C system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
3. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
4. Remove RH front road wheel.



5. Remove 3 bolts securing RH splash shield to body and remove shield.



6. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and release drive belt from A/C compressor pulley.



7. Remove 2 bolts securing high and low pressure pipes to compressor. Release pipes from compressor, remove and discard 'O' rings.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

8. Disconnect multiplug from compressor.
9. Note fitted position of heat shield on compressor and remove 3 bolts securing compressor to front mounting plate and cylinder block. Remove compressor and heat shield.

Refit

1. If a new compressor is being installed, drain the required amount of refrigerant oil from the new compressor.

   ☞ **GENERAL INFORMATION, Air conditioning compressor replacement.**
2. A new compressor is sealed and pressurised with Nitrogen gas, slowly release the sealing cap, gas pressure should be heard to release as the seal is broken.
3. Clean compressor and mating face on front mounting plate and cylinder block.
4. Position compressor, fit but do not fully tighten lower bolt.
5. Position heat shield and fit compressor upper securing bolts. Tighten compressor upper and lower securing bolts to 25 Nm (18 lbf.ft).

6. Remove caps from compressor and high pressure pipe.
7. Clean compressor high pressure pipe connection.
8. Lubricate new 'O' ring with refrigerant oil and fit to high pressure pipe.
9. Connect high pressure pipe to compressor, fit and tighten bolt to 25 Nm (18 lbf.ft).
10. Connect multiplug to compressor.
11. Remove caps from compressor and low pressure pipe.
12. Clean compressor low pressure pipe connection.
13. Lubricate new 'O' ring with refrigerant oil and fit to low pressure pipe.
14. Connect low pressure pipe to compressor, fit and tighten bolt to 25 Nm (18 lbf.ft).
15. Clean pulley 'V's and tensioner pulley running surface.
16. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
17. Fit splash shield and secure with bolts.
18. Fit RH road wheel and tighten nuts to 115 Nm 85 lbf.ft).
19. Replace receiver drier.
    ☞ **AIR CONDITIONING, REPAIRS, Receiver drier.**
20. Recharge A/C system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
21. Connect battery earth lead.
22. Fit underbelly panel.
    ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**

Compressor - K1.8

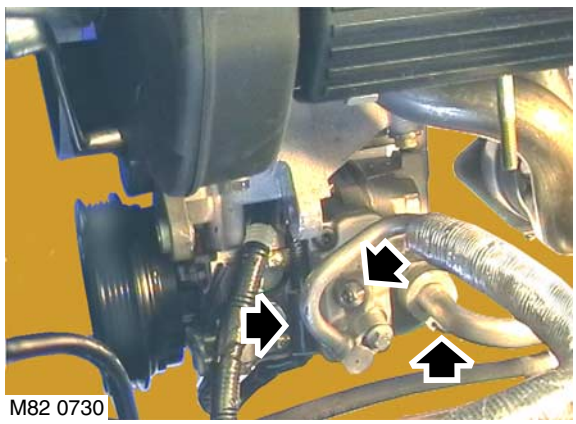
🔧 ***82.10.20***

Remove

1. Disconnect battery earth lead.
2. Raise front of vehicle.

   WARNING: Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

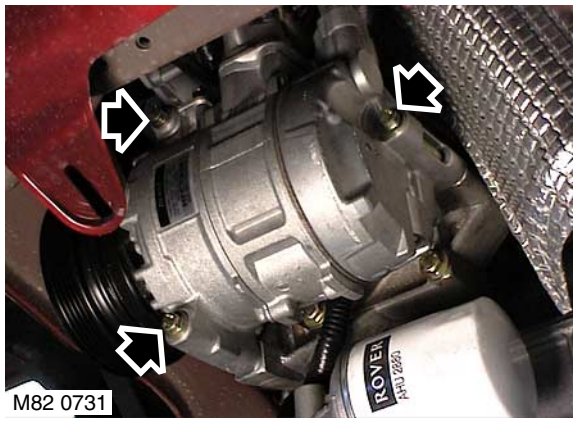
3. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
4. Recover refrigerant from A/C system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
5. Remove alternator.
   ☞ **CHARGING AND STARTING, REPAIRS, Alternator - K1.8.**


M82 0730

6. Disconnect multiplug from compressor.
7. Remove 2 bolts securing A/C pipes to compressor, release A/C pipes from compressor.

   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

8. Remove and discard 'O' rings from A/C pipes.



9. Remove 3 bolts securing compressor to mounting bracket.
10. Release compressor from mounting bracket and remove from under vehicle.
11. Drain oil from old compressor and record the amount drained.

Refit

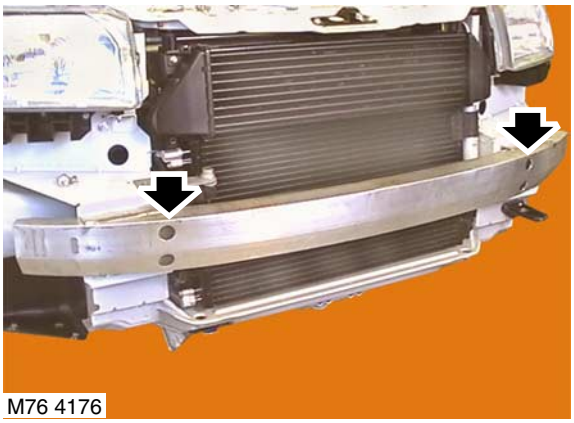
1. If a new compressor is being installed, drain the required amount of refrigerant oil from the new compressor.
   GENERAL INFORMATION, Air conditioning compressor replacement.
2. A new compressor is sealed and pressurised with Nitrogen gas, slowly release the sealing cap, gas pressure should be heard to release as the seal is broken.
3. Ensure mating faces of A/C pipes and compressor are clean.
4. Lubricate new A/C pipe 'O' rings with clean refrigerant oil.
   GENERAL DATA, Air Conditioning.
5. Fit 'O' rings to A/C pipes.
6. Fit A/C compressor to mounting bracket. Fit and tighten bolts to 25 Nm (18 lbf.ft).
7. Position compressor mounting bracket, fit bolts and tighten to 25 Nm (18 lbf.ft).
8. Connect A/C compressor multiplug.
9. Fit alternator.
   CHARGING AND STARTING, REPAIRS, Alternator - K1.8.
10. Replace receiver drier.
    AIR CONDITIONING, REPAIRS, Receiver drier.
11. Recharge A/C system.
    AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.
12. Remove stands and lower vehicle.
13. Connect battery earth lead.
14. Fit underbelly panel.
    EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.

Condenser

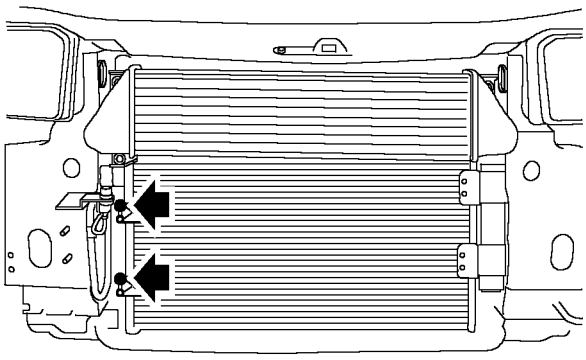
82.15.07

Remove

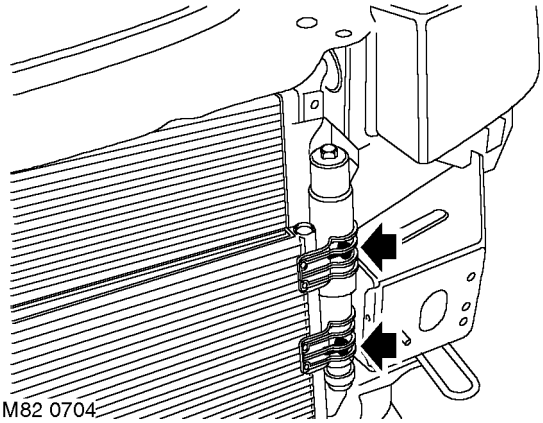
1. Disconnect battery earth lead.
2. Recover refrigerant from A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.
3. **Td4 models:** Remove intercooler.
   FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Intercooler.
4. Remove bumper valance.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.


M76 4176

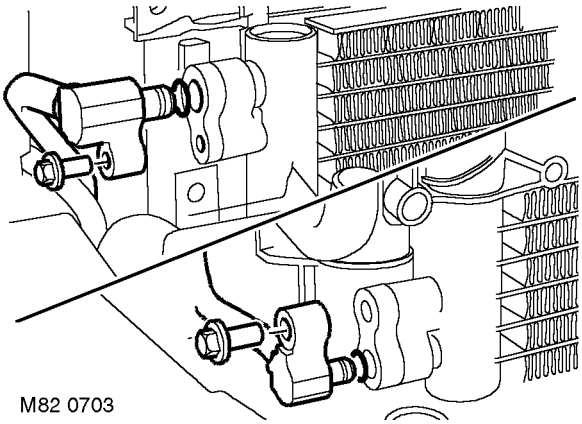
5. Remove 4 nuts and 4 bolts securing armature to body and remove armature.


M82 0705

6. Remove 2 bolts securing condenser to radiator.

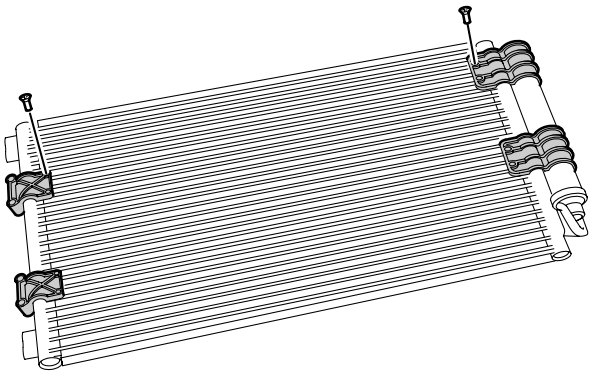

M82 0704

7. Remove 2 bolts securing receiver drier mounting brackets to radiator.


M82 0703

8. Remove 2 bolts securing A/C pipes to condenser and release pipes from condenser.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

9. Remove and discard 'O' rings from A/C pipes.



M82 0706

10. Remove condenser.
11. Remove 8 screws, securing 4 mounting brackets to condenser and move aside.
12. Remove and discard receiver drier, plug connections.

Refit

1. Fit condenser mounting brackets, fully tighten LH screws. Leave RH screws loose until receiver drier is fitted.

   CAUTION: Ensure that bolts of the correct length are used on refit.

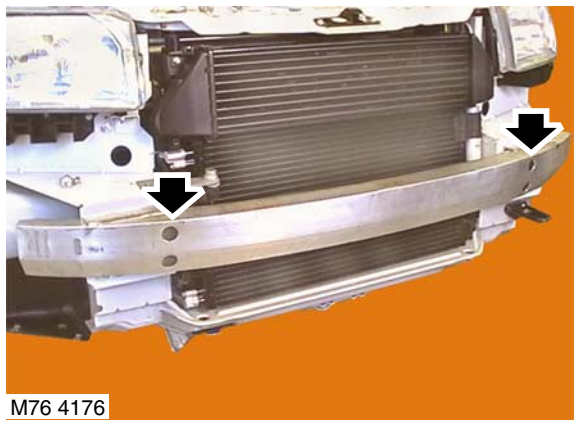
2. Lubricate new 'O' rings with clean refrigerant oil, fit one seal to each condenser pipe.
3. Position A/C pipes to condenser, fit bolts and tighten to 8 Nm (6 lbf.ft).
4. Fit bolts securing condenser to radiator and tighten to 8 Nm (6 lbf.ft).
5. Fit receiver drier assembly to condenser.
   ☞ **AIR CONDITIONING, REPAIRS, Receiver drier.**
6. Position armature, fit and tighten 4 nuts and bolts securing armature to body.
7. Fit bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
8. **Td4 models:** Fit intercooler.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Intercooler.**
9. Recharge A/C system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
10. Connect battery earth lead.

Receiver drier

82.17.03

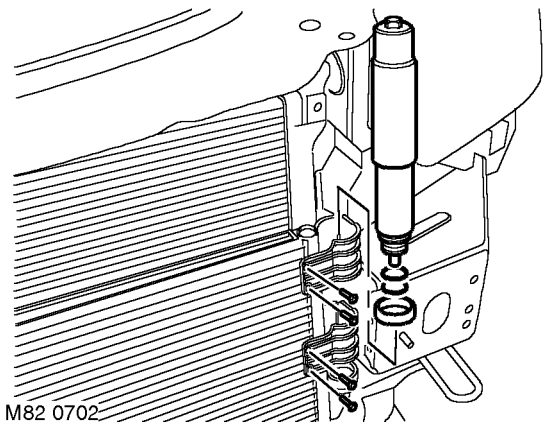
Remove

1. Disconnect battery earth lead.
2. Recover refrigerant from A/C system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
3. Remove bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**



M76 4176

4. Remove 4 nuts and 4 bolts securing armature to body and remove armature.
5. **Td4 models:** Remove intercooler.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Intercooler.**



M82 0702

6. Remove 4 screws from clamps securing receiver drier to condenser.

7. Remove receiver drier from condenser.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

8. Discard dust shield and 'O' ring seals.

Refit

1. Lubricate new 'O' rings, dust shield and condenser thread with refrigerant oil.
2. Fit 'O' rings and dust shield to receiver drier.
   CAUTION: Do not remove receiver/dryer from packaging until immediately before installation.

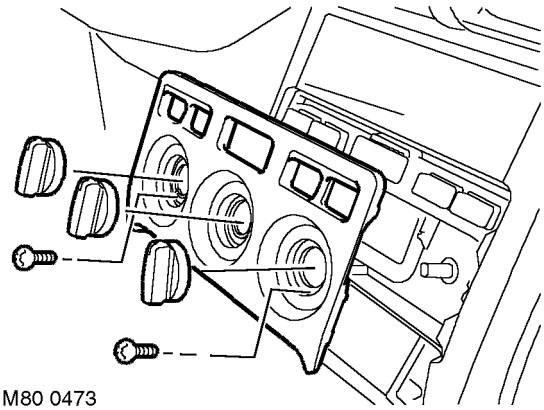
3. Fit receiver drier to condenser and tighten to 12 Nm (9 lbf.ft).
4. Tighten clamps securing receiver drier to condenser.
5. **Td4 models:** Fit intercooler.
   ☞ **FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Intercooler.**
6. Position armature, fit and tighten 4 nuts and bolts securing armature to body.
7. Fit bumper valance.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
8. Recharge A/C system.
   ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**
9. Connect battery earth lead.

Switch - control

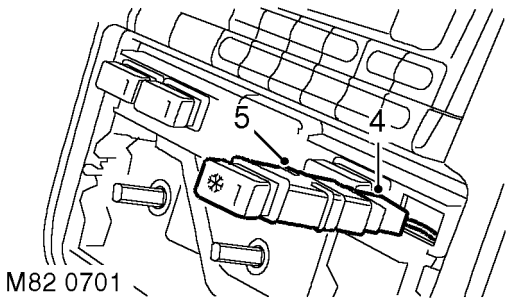
82.20.07

Remove

1. Remove radio.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Radio.**



2. Remove 3 heater control knobs.
3. Remove 2 screws securing heater control finisher to heater controls and remove finisher.



4. Disconnect multiplug from A/C control switch.
5. Remove switch from heater controls.

Refit

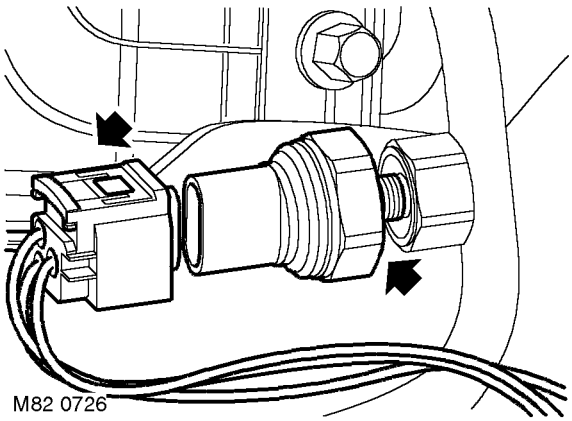
1. Fit A/C control switch and connect multiplug.
2. Fit heater control finisher and secure with screws.
3. Fit heater control knobs.
4. Fit radio.
   ☞ **IN CAR ENTERTAINMENT, REPAIRS, Radio.**

Sensor - refrigerant pressure

82.20.38

Remove

1. Disconnect battery earth lead.
2. Recover refrigerant from A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.
3. **Td4 & KV6 models:** Remove underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.



4. Release multiplug from refrigerant pressure sensor.
   WARNING: Under no circumstances should refrigerant hoses be disconnected without first discharging the system.

5. Remove refrigerant pressure sensor from A/C pipe mounting. Use two spanners to avoid straining A/C pipe mounting.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

6. Discard 'O' ring.

Refit

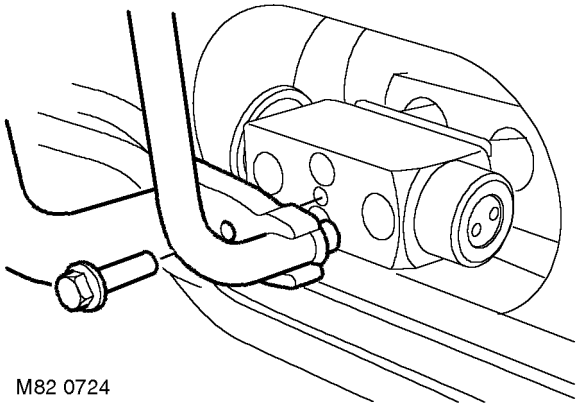
1. Clean refrigerant pressure switch and surrounding area.
2. Fit new 'O' ring to sensor and tighten to 10 Nm (7.5 lbf.ft).
3. Fit multiplug to sensor.
4. **Td4 & KV6 models:** Fit underbelly panel.
   EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.
5. Recharge A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.
6. Connect battery earth lead.

Valve - thermostatic expansion (TXV)

82.25.01

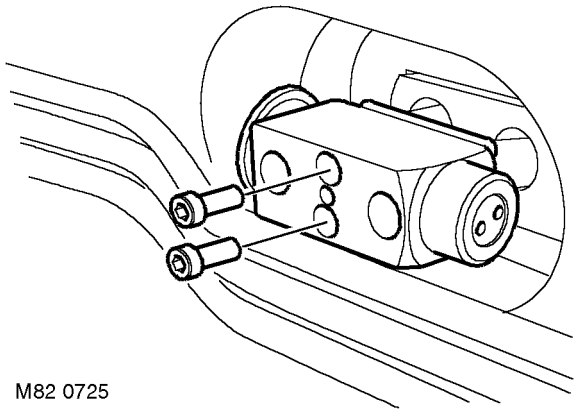
Remove

1. Disconnect battery earth lead.
2. Recover refrigerant from A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.



M82 0724

3. Remove bolt securing A/C pipes to TXV, disconnect pipes and discard 'O' rings. Plug A/C connections.
   WARNING: Under no circumstances should refrigerant hoses be disconnected without first discharging the system.



M82 0725

4. Remove 2 Allen screws securing TXV to bulkhead, withdraw assembly and discard 'O' rings.
   CAUTION: Before disconnecting or removing components, ensure the immediate area around joint faces and connections are clean. Plug open connections to prevent contamination.

Refit

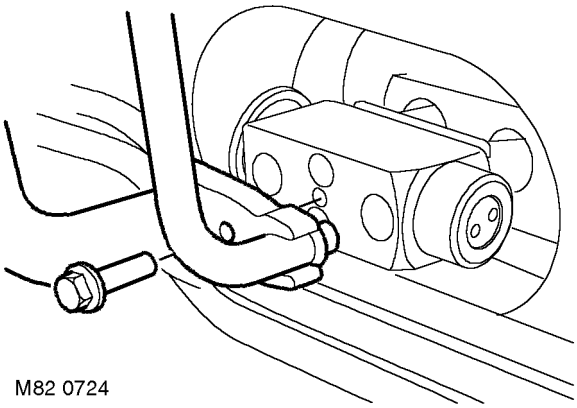
1. Clean mating faces and seal recesses on evaporator, TXV and block and pipe assembly.
2. Lubricate new 'O' rings with clean refrigerant oil and fit to TXV pipes.
3. Fit block and pipe assembly to TXV and tighten bolts to 5 Nm (3.5 lbf.ft).
4. Recharge A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.
5. Connect battery earth lead.

Evaporator

82.25.20

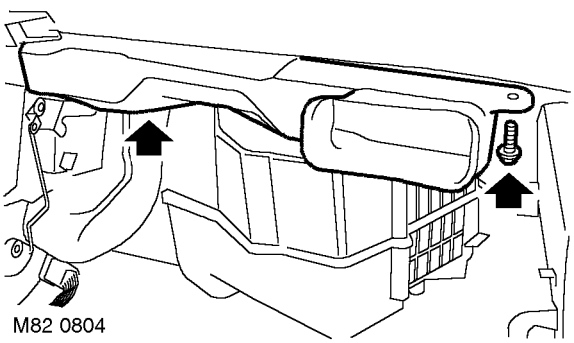
Remove

1. Depressurise A/C system.
   AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.

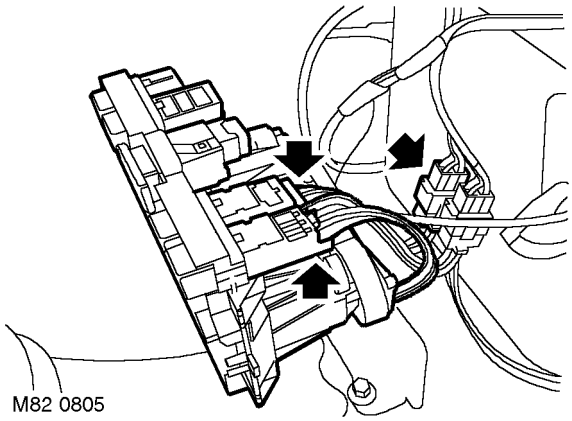

M82 0724

2. Remove bolt securing pipes to TXV valve.
3. Release both pipes from TXV valve.
4. Remove and discard 2 'O' rings from pipes.
   CAUTION: Immediately cap all A/C pipes to prevent ingress of dirt and moisture into the system.

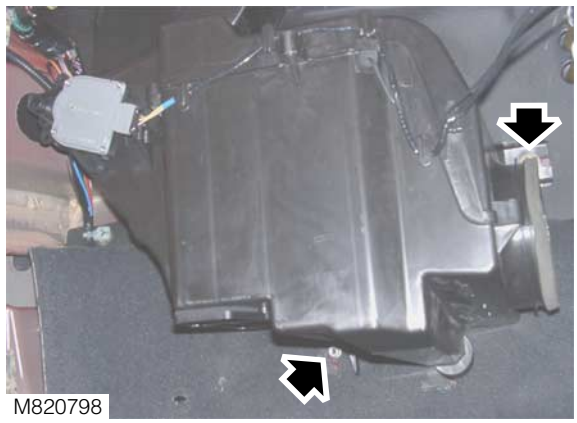
5. Remove fascia.
   INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.


M82 0804

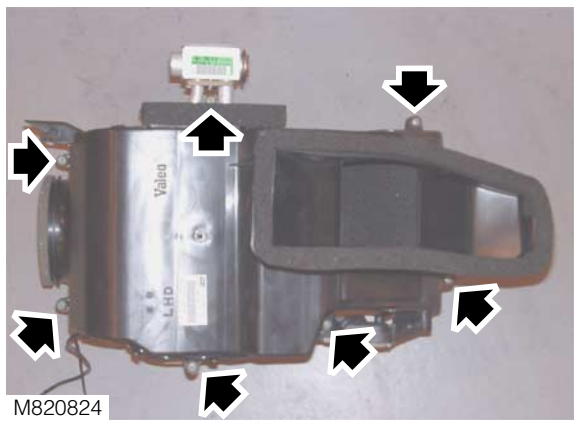
6. Remove bolt from face level ducting and remove ducting.


M82 0805

7. Disconnect 3 multiplugs from A/C switches and heater harness.

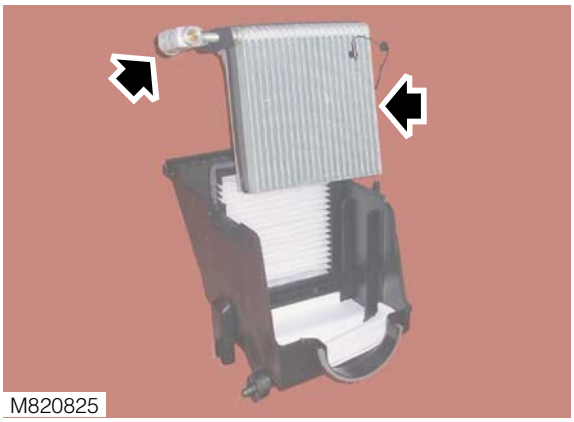

M820798

8. Remove 2 nuts securing evaporator to body.
9. Release evaporator from drain hose and air intake, remove evaporator assembly.
10. Release harness from evaporator securing clips.



M820824

11. Remove 7 screws from evaporator casing and remove top half of casing.


M820825

12. Remove evaporator from casing.
13. Remove 2 Allen key bolts securing TXV valve, remove valve and discard 2 'O' rings.

Refit

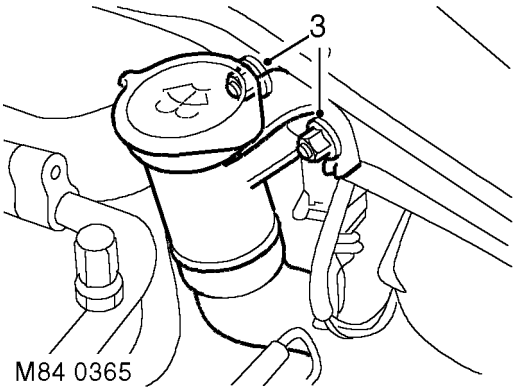
1. Lubricate new 'O' rings with clean refrigerant oil and fit to evaporator pipes
2. Fit evaporator pipes to TXV valve and fit bracket, fit and tighten bolt to 10 Nm (7 lbf.ft).
3. Carefully fit evaporator to casing.
4. Fit top half of evaporator casing.
5. Fit 7 screws to casing.
6. Fit harness in securing clips.
7. Locate evaporator assembly to drain hose and air intake, position evaporator to body.
8. Fit and tighten nuts securing evaporator to body.
9. Connect multiplugs to heater harness and A/C switches.
10. Position face level vent ducting, fit and tighten bolt.
11. Fit fascia.
    ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.**
12. Clean evaporator pipes.
13. Lubricate new 'O' rings with refrigerant oil.
14. Fit 'O' rings to evaporator pipes.
15. Clean evaporator pipes.
16. Fit pipes to TXV valve and fit bracket, tighten bolt to 10 Nm (7 lbf.ft).
17. Charge A/C system.
    ☞ **AIR CONDITIONING, REFRIGERANT RECOVERY, RECYCLING AND RECHARGING, Refrigerant recovery - recycling and recharge.**

Reservoir - washer

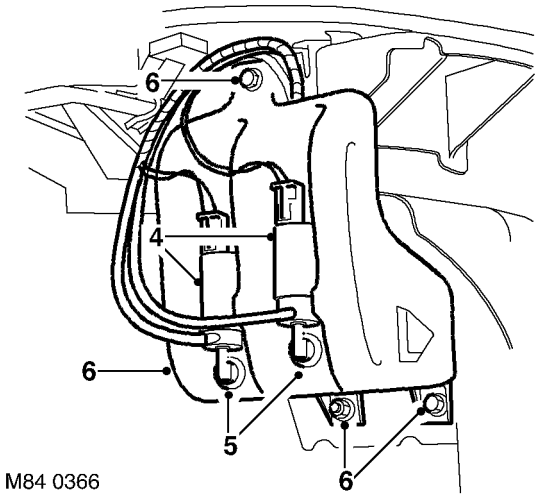
84.10.01

Remove

1. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
2. Position container to collect fluid loss.



3. Remove 2 nuts securing reservoir filler neck and remove filler neck.



4. Release both washer pumps from reservoir.
5. Remove and discard pump sealing grommets.
6. Remove 3 bolts securing washer reservoir and remove.

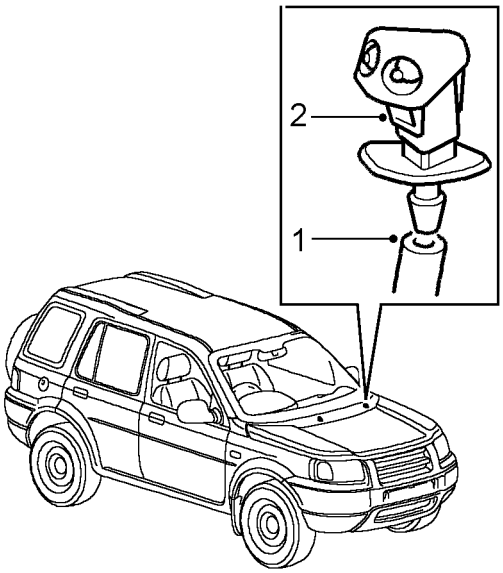
Refit

1. Fit reservoir and secure with bolts.
2. Fit new pump sealing grommets to reservoir.
3. Fit pumps to reservoir.
4. Fit filler neck and secure with nuts.
5. Fit front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.

Jet - washer - each

84.10.08

Remove



M84 0367

1. Disconnect tube from washer jet.
2. Depress plastic lugs and remove washer jet from bonnet.

Refit

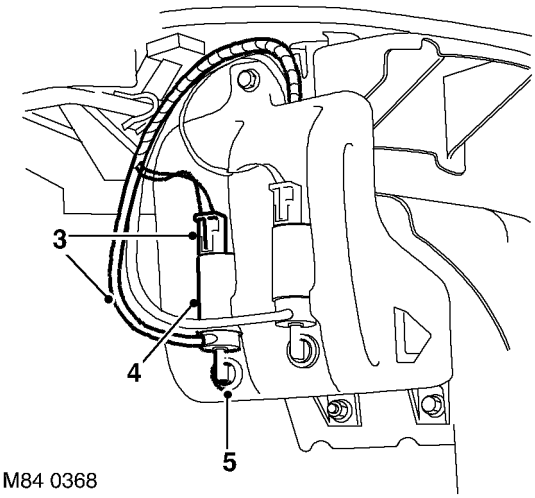
1. Fit washer jet to bonnet and connect tube.
2. Adjust jet so the inside spray is to centre of the screen, and the outer spray is to the top of the screen.

Pump - washer

84.10.21

Remove

1. Remove front bumper.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**
2. Position container to catch windscreen washer fluid.



M84 0368

3. Disconnect multiplug and hose from windscreen washer pump.
4. Release pump from reservoir.
5. Remove and discard pump sealing grommet.

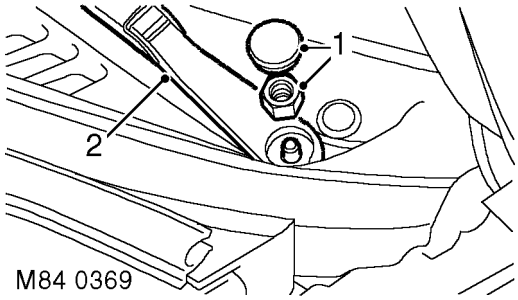
Refit

1. Fit new pump sealing grommet to reservoir.
2. Fit pump to reservoir.
3. Connect hose and multiplug to pump.
4. Fit front bumper.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.**

Arm - wiper - each

84.15.02

Remove



1. Remove nut cover on wiper arm and remove nut.
2. Remove wiper arm from spindle.
   NOTE: Do not carry out further dismantling if component is removed for access only.
3. Remove wiper blade.
   ☞ **WIPERS AND WASHERS, REPAIRS, Blade - wiper - each.**

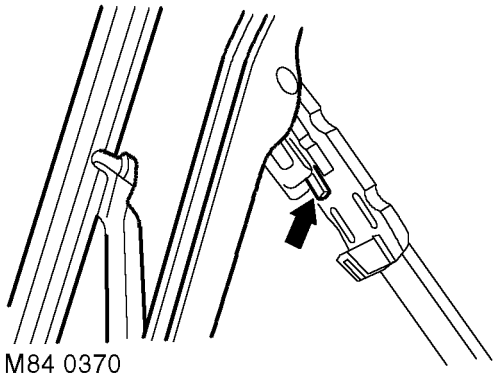
Refit

1. Fit wiper blade.
   ☞ **WIPERS AND WASHERS, REPAIRS, Blade - wiper - each.**
2. Fit wiper arm to spindle, with tip of wiper blade aligned to screen marks.
3. Fit nut and tighten to 18 Nm (13 lbf.ft).

Blade - wiper - each

84.15.06

Remove



1. Lift wiper arm from screen.
2. Press retaining lever.
3. Slide blade down arm and withdraw.

Refit

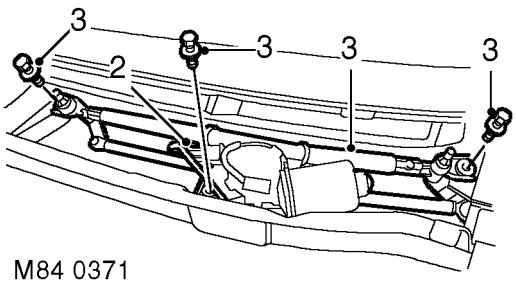
1. Position new blade to wiper arm.
2. Push blade into engagement with arm, and check blade is retained.
3. Lower arm onto screen.

Motor & linkage - wiper

84.15.11

Remove

1. Remove air intake moulding.
   HEATING AND VENTILATION, REPAIRS, Plenum - air intake.



M84 0371

2. Disconnect multiplug from windscreen wiper motor.
3. Remove 3 bolts securing wiper motor and linkage to body and remove wiper motor and linkage.

Refit

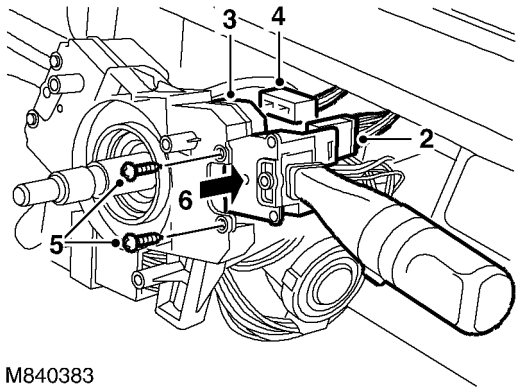
1. Fit motor and linkage to body, fit bolts and tighten to 5 Nm (3.5 lbf.ft).
2. Connect multiplug to windscreen wiper motor.
3. Fit air intake moulding.
   HEATING AND VENTILATION, REPAIRS, Plenum - air intake.

Switch - wiper/washer

84.15.34

Remove

1. Remove rotary coupler.
   RESTRAINT SYSTEMS, REPAIRS, Rotary coupler - (SRS) air bag system.



M840383

2. Disconnect multiplug from washer and wiper switch.
3. Release multiplug connector from switch base on steering column.
4. Disconnect multiplug from connector.
5. Remove 2 screws from wiper switch.
6. Depress retaining tag and remove switch.

Refit

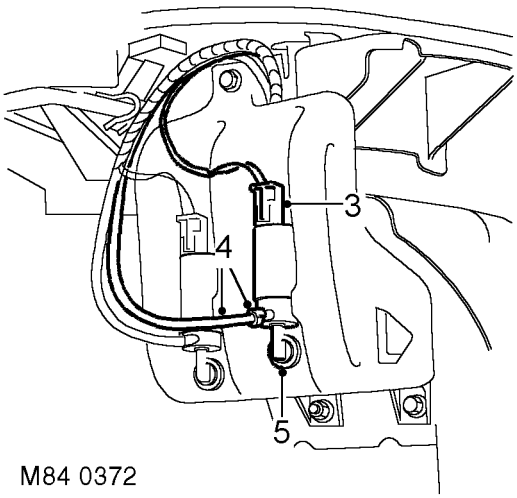
1. Fit washer and wiper switch assembly and secure with screws.
2. Connect multiplugs to switch.
3. Secure multiplug to steering column.
4. Fit rotary coupler.
   RESTRAINT SYSTEMS, REPAIRS, Rotary coupler - (SRS) air bag system.

Pump - washer

84.30.21

Remove

1. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
2. Position container to catch windscreen washer fluid.



M84 0372

3. Disconnect multiplug from washer pump.
4. Release hose from pump.
5. Remove washer pump from reservoir and remove and discard pump seal.

Refit

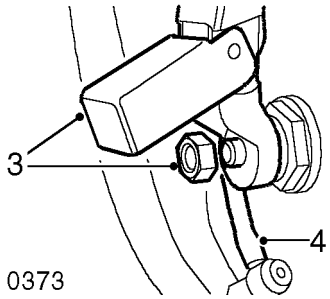
1. Fit new pump sealing grommet to reservoir.
2. Fit pump to reservoir.
3. Connect hose and multiplug to pump.
4. Fit front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.

Arm - wiper

84.35.01

Remove

1. Remove wiper blade.
   WIPERS AND WASHERS, REPAIRS, Blade - wiper.
2. Remove spare wheel mounting bracket.
   EXTERIOR FITTINGS, REPAIRS, Bracket - spare wheel mounting.



M84 0373

3. Raise nut cover on wiper arm and remove nut.
4. Release washer jet tube and remove wiper arm.

   NOTE: Do not carry out further dismantling if component is removed for access only.

5. Release washer jet and washer jet tube from wiper arm.

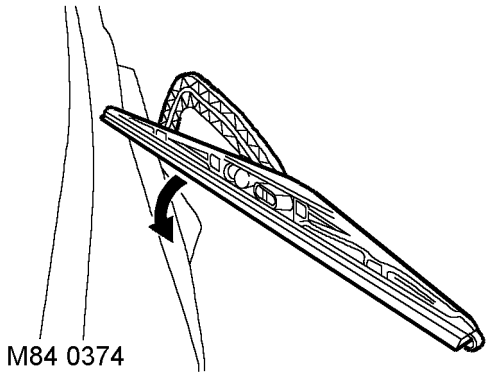
Refit

1. Position and secure washer tube and jet to wiper arm.
2. Position wiper arm to tail door and connect washer tube.
3. Set wiper arm with tip contacting joint line between waist seal and rear door. Fit and tighten wiper arm nut to 13 Nm (10 lbf.ft).
4. Fit wiper blade.
   WIPERS AND WASHERS, REPAIRS, Blade - wiper.
5. Fit spare wheel mounting bracket.
   EXTERIOR FITTINGS, REPAIRS, Bracket - spare wheel mounting.

Blade - wiper

84.35.02

Remove



1. Lift wiper arm from tail door glass.
2. Remove wiper blade from arm.

Refit

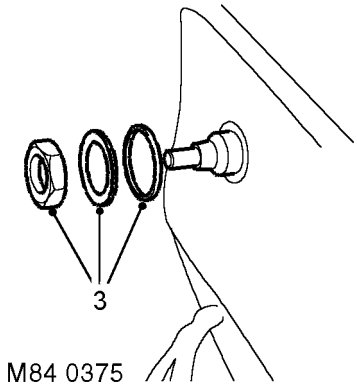
1. Position new blade to wiper arm.
2. Secure blade in retainer.
3. Position blade to glass.

Motor - wiper

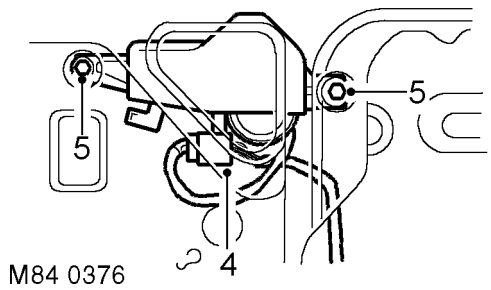
84.35.12

Remove

1. Remove rear wiper arm.
   ☞ **WIPERS AND WASHERS, REPAIRS, Arm - wiper.**
2. Remove tail door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**

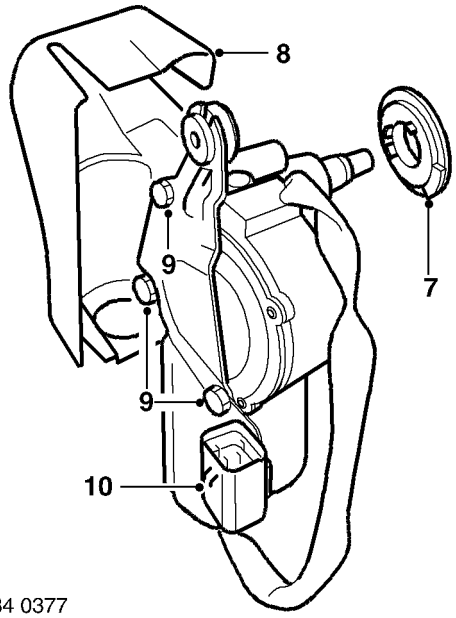


3. Remove spindle nut and flat washer and discard rubber seal.



4. Disconnect multiplug from rear wiper motor.
5. Remove 2 bolts securing wiper motor to tail door.
6. Remove wiper motor.

   NOTE: Do not carry out further dismantling if component is removed for access only.



M84 0377

7. Remove and discard spindle sealing washer.
8. Remove motor water shield.
9. Remove 3 bolts securing mounting plate to wiper motor.
10. Release multiplug and remove mounting plate.

Refit

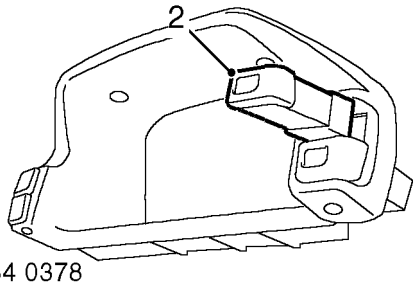
1. Position mounting plate, tighten bolts and secure multiplug.
2. Fit motor water shield and new sealing washer to spindle.
3. Fit wiper motor and tighten bolts to 5 Nm (3.5 lbf.ft).
4. Connect multiplug to rear wiper motor.
5. Fit NEW rubber seal to wiper motor spindle.
6. Fit flat washer and tighten spindle nut to 5 Nm (3.5 lbf.ft).
7. Fit tail door plastic sheet.
   ☞ **DOORS, REPAIRS, Plastic sheet - tail door.**
8. Fit wiper arm.
   ☞ **WIPERS AND WASHERS, REPAIRS, Arm - wiper.**

Switch - combined wiper/washer

84.35.34

Remove

1. Remove instrument cowl.
   ☞ **INSTRUMENTS, REPAIRS, Cowl - instrument.**



M84 0378

2. Remove rear wiper switch from instrument cowl.

Refit

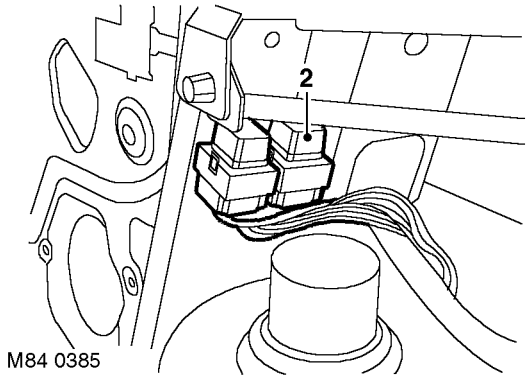
1. Fit switch to instrument cowl.
2. Fit instrument cowl.
   ☞ **INSTRUMENTS, REPAIRS, Cowl - instrument.**

Relay - tailgate wipe - 5 door

84.35.38

Remove

1. Remove RH rear quarter lower trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.



2. Remove rear wiper motor relay.

Refit

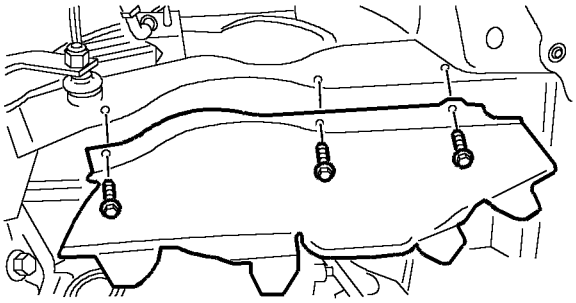
1. Fit rear wiper motor relay.
2. Fit RH rear quarter lower casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.

Ancillary drive belt - K1.8

86.10.05

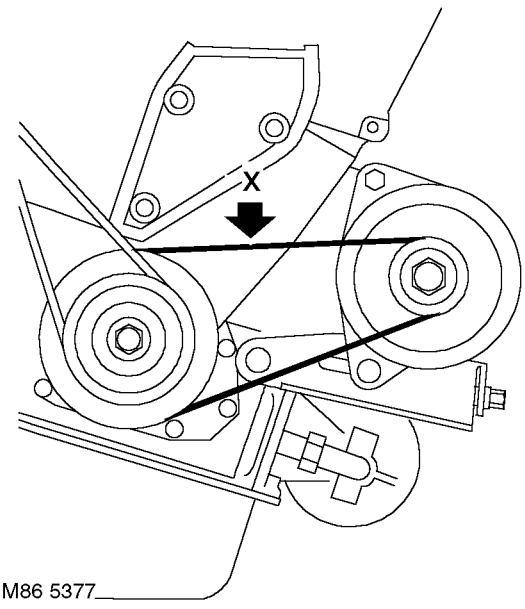
Check

1. Disconnect battery earth lead.
2. Turn steering on RH lock.



M12 6977

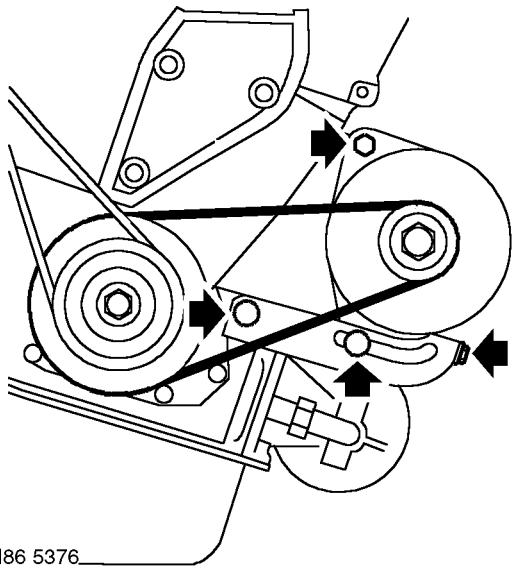
3. Remove 3 bolts and remove splash shield.
4. Rotate crankshaft a sufficient number of turns to check condition of drive belt. Renew a drive belt that shows signs of wear, splitting or oil contamination.



M86 5377

5. Apply a force of 10 kg to drive belt at position 'X' and measure deflection between crankshaft pulley and alternator pulley. Deflection must be 6 - 8 mm.

Adjust



M86 5376

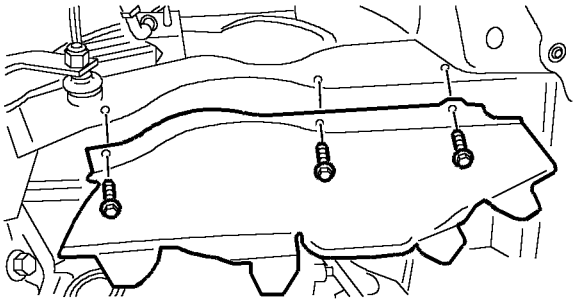
1. Loosen alternator pivot nut and bolt.
2. Loosen bolt securing alternator adjustment bracket to engine.
3. Loosen bolt securing alternator to adjustment bracket.
4. Increase drive belt tension by rotating alternator adjustment bolt clockwise.
5. Tighten alternator pivot and adjustment bracket bolts to 25 Nm (18 lbf.ft).
6. Recheck drive belt tension.
7. Fit splash shield and secure with bolts.
8. Straighten steering.
9. Connect battery earth lead.

Ancillary drive belt - K1.8 with A/C

86.10.05

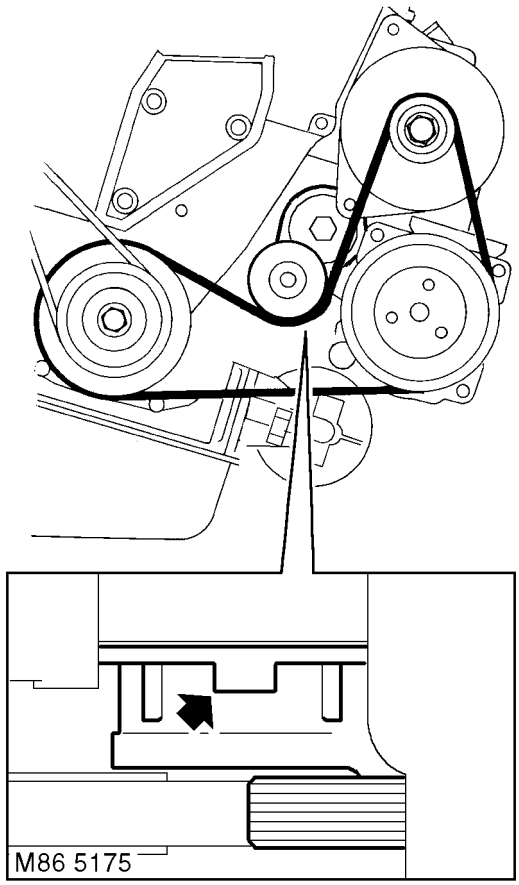
Check

1. Disconnect battery earth lead.
2. Turn steering on RH lock.



M12 6977

3. Remove 3 bolts and remove splash shield.
4. Rotate crankshaft a sufficient number of turns to check condition of drive belt. Renew a drive belt that shows signs of wear, splitting or oil contamination.



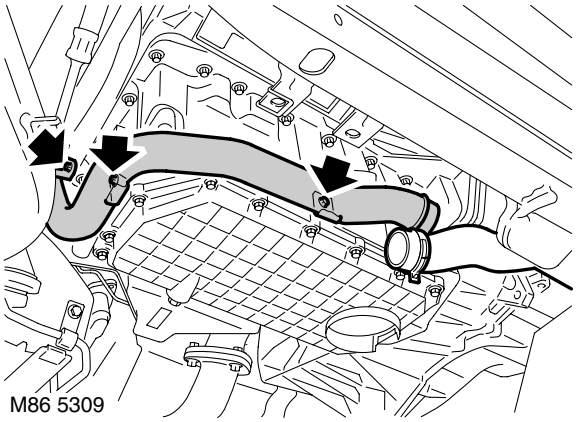
5. Check belt length, belt must be renewed before indicator reaches RH end of slot.
6. Fit splash shield and secure with bolts.
7. Straighten steering.
8. Connect battery earth lead.

Alternator - Td4

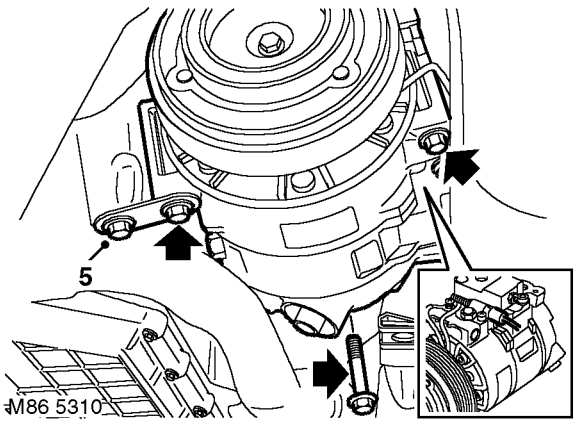
86.10.02

Remove

1. Disconnect battery earth lead.
2. Drain cooling system.
   COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.
3. **Models with A/C:** Remove compressor drive belt.
   AIR CONDITIONING, REPAIRS, Drive belt - compressor - Td4.

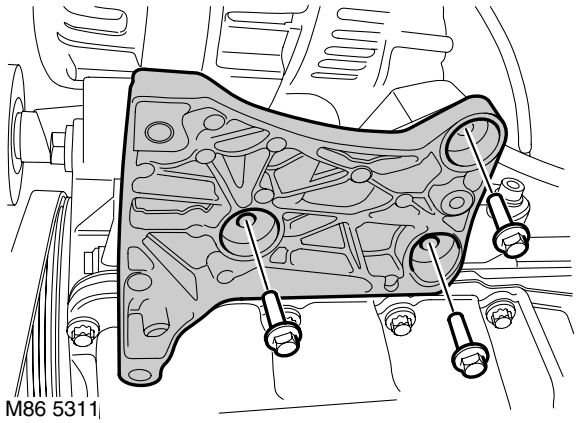

M86 5309

4. Remove 3 bolts securing coolant rail to sump and cylinder block.
   CAUTION: Care must be taken to ensure that oil or fluid does not enter or contaminate the alternator.

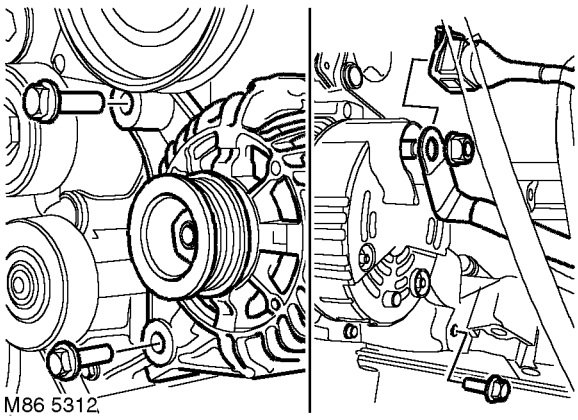


M86 5310

5. **Models with A/C:** Loosen bolt securing compressor support bracket to sump, do not remove.
6. **Models with A/C:** Remove 3 bolts securing compressor to mounting bracket, release support bracket and tie compressor aside.


M86 5311

7. **Models with A/C:** Remove 3 bolts and bracket, securing compressor mounting to casting on cylinder block.


M86 5312

8. Disconnect alternator multiplug.
9. Remove nut securing battery cable to alternator and remove cable.
10. Remove 3 bolts and remove alternator.

Refit

1. Clean alternator mounting points.
2. Fit alternator to mounting bracket.Tighten M10 bolt to 45 Nm (33 lbf.ft) and M8 bolts to 25 Nm (18 lbf.ft).
   CAUTION: Ensure upper bolt is fitted prior to assembly.
3. Connect alternator multiplug.
4. Fit battery cable to alternator terminal and tighten to 10 Nm (7.5 lbf.ft).

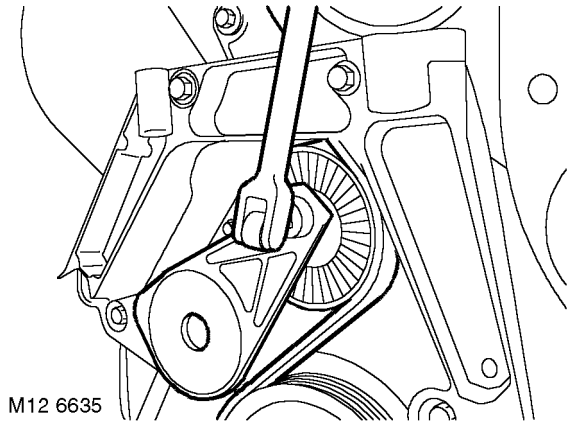
5. **Models with A/C:** Clean A/C compressor and housing mating faces, dowels and dowel holes.
6. **Models with A/C:** Fit bolts and compressor mounting to casting, tighten to 25 Nm (18 lbf.ft).
7. **Models with A/C:** Position A/C compressor, fit bolts and tighten to 25 Nm (18 lbf.ft).
8. **Models with A/C:** Align compressor support bracket to sump and tighten bolt to 10 Nm (7.5 lbf.ft).
9. Fit lower coolant rail to sump and tighten bolts to 10 Nm (7.5 lbf.ft).
10. Fit compressor drive belt.
    ☞ **AIR CONDITIONING, REPAIRS, Drive belt - compressor - Td4.**
11. Refill cooling system.
    ☞ **COOLING SYSTEM - Td4, ADJUSTMENTS, Coolant - drain and refill.**
12. Connect battery earth lead.

Alternator - KV6

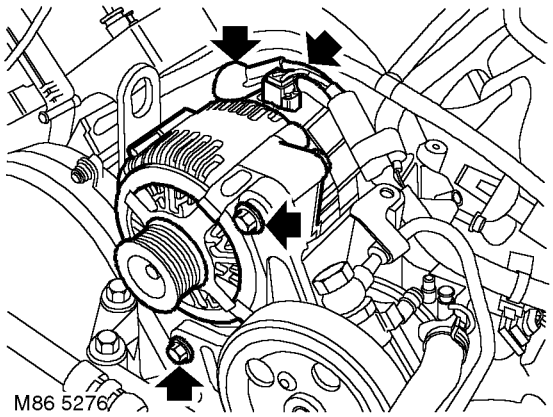
86.10.02

Remove

1. Disconnect battery earth lead.
2. Remove top arm.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.**



3. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and release drive belt from alternator pulley.



4. Release alternator battery lead terminal cover, loosen terminal nut and disconnect lead from terminal
5. Disconnect alternator multiplug.
6. Remove lower bolt and upper nut and bolt securing alternator to front mounting plate.
7. Remove alternator.

Refit

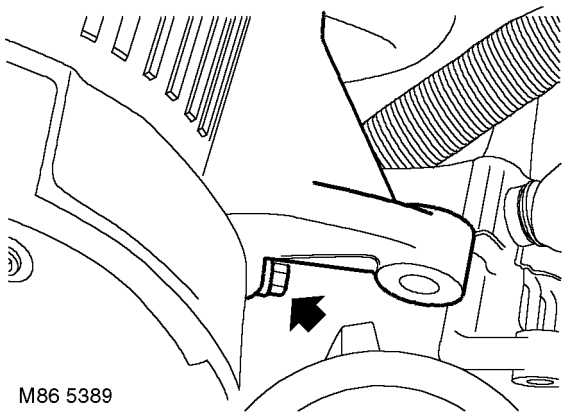
1. Position alternator to front mounting plate.
2. Fit bolt and nut and bolt securing alternator to front mounting plate and tighten to 45 Nm (33 lbf.ft).
3. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and fit drive belt to pulleys.
4. Connect alternator multiplug.
5. Position battery cable to alternator, tighten nut to 10 Nm (7.5 lbf.ft) and position terminal cover.
6. Fit top arm.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.**
7. Connect battery earth lead.

Alternator - K1.8

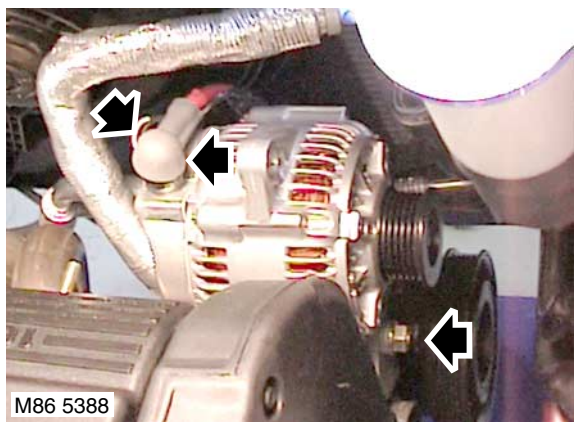
86.10.02

Remove

1. Disconnect battery earth lead.
2. Remove exhaust manifold heat shield.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Heat shield - exhaust manifold - with A/C.**



3. Remove bolt securing alternator mounting bracket. Rotate bracket clear of alternator and remove bracket.



4. Release cover from battery lead on alternator.
5. Loosen nut securing battery lead to alternator and release lead.
6. Disconnect multiplug from alternator.
7. Remove nut and bolt from alternator lower mounting bracket.
8. Remove alternator from mounting bracket.

Refit

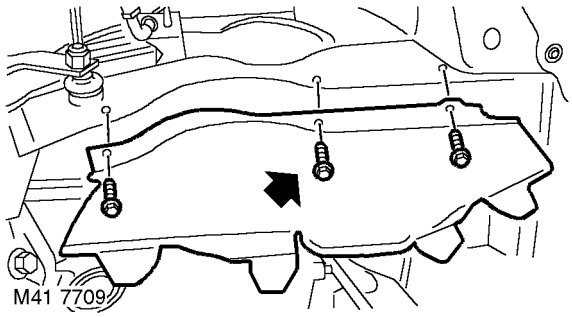
1. Position alternator to mounting bracket.
2. Fit lower nut and bolt securing alternator but do not tighten at this stage.
3. Connect multiplug and position battery cable to alternator and tighten nut.
4. Position battery lead cover.
5. Fit alternator mounting bracket, tighten bolts to 25 Nm (18 lbf.ft).
6. Fit exhaust manifold heat shield.
   ☞ **MANIFOLDS & EXHAUST SYSTEMS - K SERIES 1.8, REPAIRS, Heat shield - exhaust manifold - with A/C.**
7. Connect battery earth lead.

Ancillary drive belt - Td4

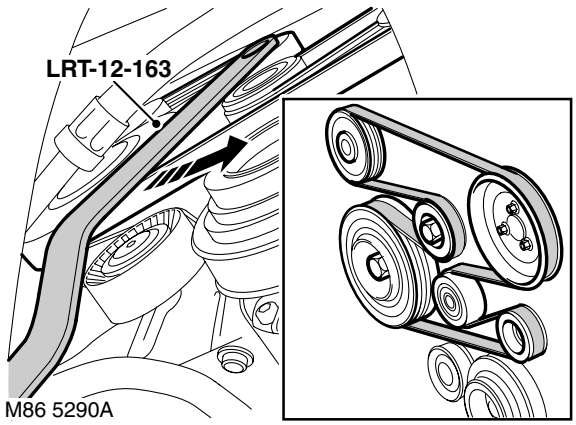
⊸ ***86.10.03***

Remove

1. Disconnect battery earth lead.
2. Remove engine acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
3. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
4. Turn steering on RH lock.



5. Remove 3 bolts and RH splash shield.



6. Position **LRT-12-163** to ancillary drive belt tensioner, turn tensioner anti-clockwise and release ancillary drive belt from pulleys.
7. Remove ancillary drive belt.

Refit

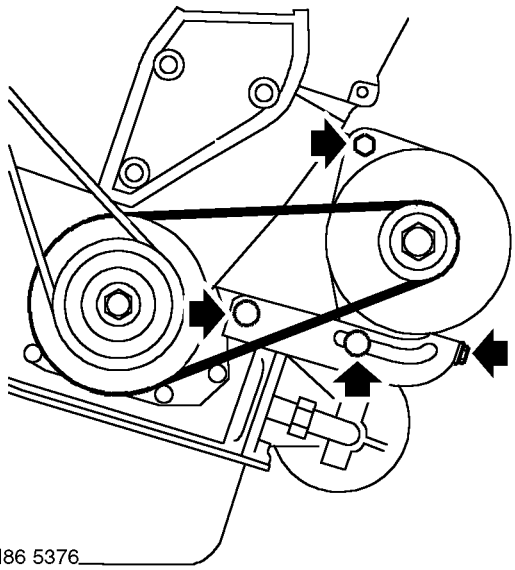
1. Ensure pulleys are clean and damage free.
   CAUTION: Examine drive belt for signs of wear. A drive belt with cracked ribs is acceptable. A drive belt that has loose or missing parts of ribs must be changed.
2. Use **LRT-12-163** to hold belt tensioner off and with assistance, fit ancillary belt. Ensure belt is correctly located in pulley grooves.
3. Fit splash shield and tighten bolts to 10 Nm (7 lbf.ft).
4. Fit underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
5. Fit acoustic cover.
   ☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
6. Connect battery earth lead.

Ancillary drive belt - K1.8 without A/C

86.10.03

Remove

1. Disconnect battery earth lead.
2. Remove PAS pump drive belt.
   ☞ **STEERING, REPAIRS, Drive belt - K1.8.**



3. Loosen alternator pivot nut and bolt.
4. Loosen bolt securing alternator adjustment bracket to engine.
5. Loosen bolt securing alternator to adjustment bracket.
6. Rotate alternator drive belt adjustment bolt anti-clockwise to release tension from belt and remove belt.

Refit

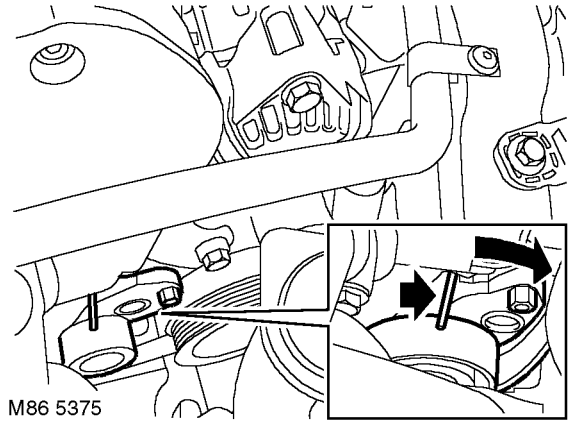
1. Ensure pulleys are clean and damage free.
   CAUTION: Examine drive belt for signs of wear. A drive belt with cracked ribs is acceptable. A drive belt that has loose or missing parts of ribs must be changed.
2. Fit drive belt. Ensure belt is located correctly in pulley grooves.
3. Adjust belt tension.
   ☞ **CHARGING AND STARTING, ADJUSTMENTS, Ancillary drive belt - K1.8.**
4. Fit PAS pump drive belt.
   ☞ **STEERING, REPAIRS, Drive belt - K1.8.**
5. Connect battery earth lead.

Ancillary drive belt - K1.8 with A/C

86.10.03

Remove

1. Disconnect battery earth lead.
2. Remove PAS pump drive belt.
   STEERING, REPAIRS, Drive belt - K1.8.



3. Fit a 13 mm spanner to hexagon on belt tensioner and rotate fully clockwise to release tension on drive belt.
4. To hold tensioner in this position, use a suitable pin, not exceeding 3 mm diameter, fitted into hole in tensioner backplate.
5. Remove drive belt.

Refit

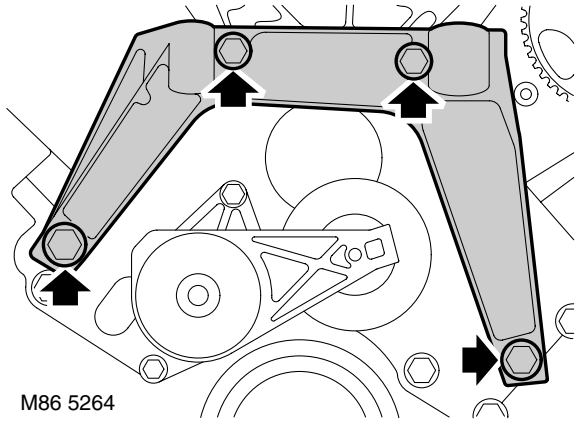
1. Clean drive belt pulley grooves and ensure grooves are not damaged.
   CAUTION: Examine drive belt for signs of wear. A drive belt with cracked ribs is acceptable. A drive belt that has loose or missing parts of ribs must be changed.
2. Fit drive belt. Ensure belt is located correctly in pulley grooves.
3. Release tension, remove retaining pin and lower tensioner pulley onto drive belt.
4. Fit PAS pump drive belt.
   STEERING, REPAIRS, Drive belt - K1.8.
5. Connect battery earth lead.

Ancillary drive belt - KV6

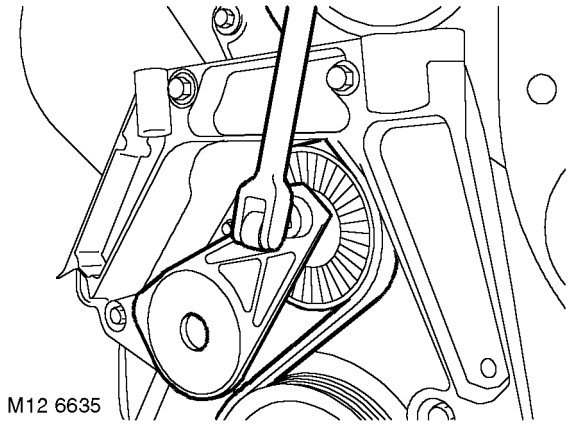
86.10.03

Remove

1. Disconnect battery earth lead.
2. Remove top arm.
   ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.



3. Remove 4 bolts securing engine mounting bracket to engine front plate and remove bracket.



4. Using a 3/8” square drive socket bar, raise ancillary drive belt tensioner and release drive belt from alternator pulley.
5. Release and remove ancillary drive belt from remaining pulleys.

Refit

1. Clean pulley 'V's and tensioner pulley running surface.
   NOTE: Examine drive belt for signs of wear. A drive belt with cracked ribs is acceptable. A drive belt that has loose or missing parts of ribs must be changed.
2. Fit new drive belt to crankshaft pulley.
3. Raise belt tensioner and connect drive belt to steering pump, alternator and compressor pulleys. Ensure drive belt is correctly located in pulley grooves.
4. Position engine mounting front bracket to engine front plate and tighten bolts to 45 Nm (33 lbf.ft).
5. Fit top arm.
   ☞ **ENGINE - K SERIES KV6, REPAIRS, Arm assembly - engine mounting RH.**
6. Connect battery earth lead.

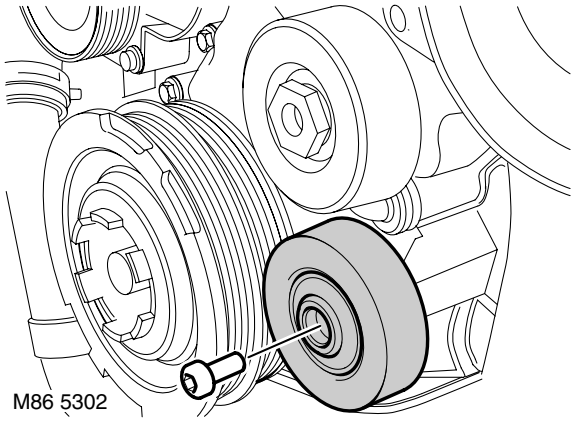
Tensioner - ancillary drive belt - Td4

86.10.06

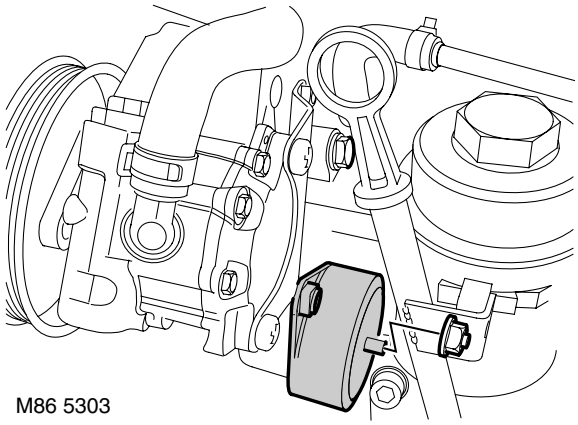
Remove

1. Disconnect battery earth lead.
2. Remove underbelly panel.
   ☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
3. Remove hydramount.
   ☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
4. Remove ancillary drive belt.
   ☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**

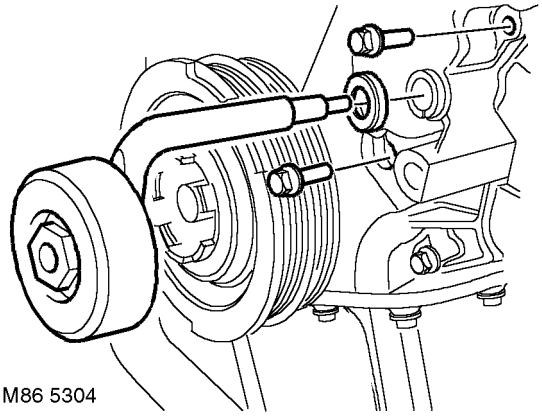
5. Remove bolt securing dipstick tube to oil filter.
6. Move dipstick tube aside for access.
7. Remove alternator.
   ☞ **CHARGING AND STARTING, REPAIRS, Alternator - Td4.**
8. Manoeuvre engine to suitable working height.


M86 5302

9. Remove Allen bolt securing ancillary belt idler and remove idler from vehicle.


M86 5303

10. Remove nut, securing ancillary drive belt tensioner arm to rear of spring housing.
11. Rotate belt tensioner arm through 180° to clear chassis side member and remove from timing cover.


M86 5304

12. Remove and discard tensioner arm seal.
13. Remove 2 bolts from timing cover, securing ancillary drive belt tensioner.
14. Remove tensioner.

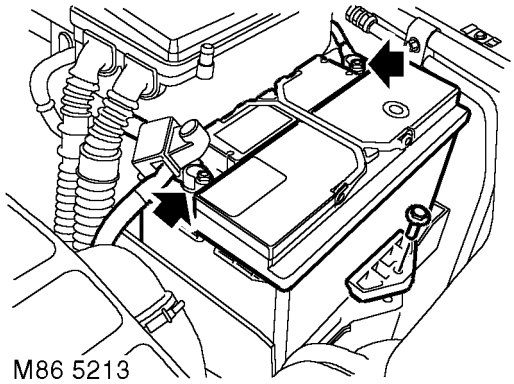
Refit

1. Clean tensioner block and mounting.
2. Position tensioner block, temporarily fit tensioner arm to align spring block with timing cover. Fit bolts and tighten to 25 Nm (18 lbf.ft). Remove tensioner arm.
3. Clean seal mounting for tensioner arm on timing cover, fit new seal.
4. Fit ancillary drive belt tensioner arm to timing cover, turn through 180° to align with tensioner spring housing, push fully home. Fit and tighten nut to 10 Nm (7.5 lbf.ft).
5. Fit alternator.
☞ **CHARGING AND STARTING, REPAIRS, Alternator - Td4.**
6. Fit idler pulley to mounting and tighten Allen bolt to 25 Nm (18 lbf.ft).
7. Position dipstick tube to oil filter, fit bolt and tighten to 10 Nm (7.5 lbf.ft).
8. Fit ancillary drive belt.
☞ **CHARGING AND STARTING, REPAIRS, Ancillary drive belt - Td4.**
9. Fit hydramount.
☞ **ENGINE - Td4, REPAIRS, Hydramount - engine - RH.**
10. Fit underbelly panel.
☞ **EXTERIOR FITTINGS, REPAIRS, Panel - underbelly.**
11. Connect battery earth lead.

Battery

86.15.01

Remove


M86 5213

1. Disconnect both battery terminals, earth lead first.
2. Remove bolt and battery clamp.
3. Remove battery.

Refit

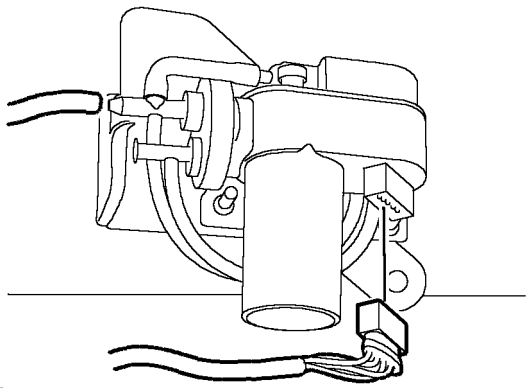
1. Clean battery tray.
2. Fit battery and clamp, tighten bolt to 12 Nm (9 lbf.ft).
3. Apply petroleum jelly to both terminals, fit and tighten terminal bolts negative lead last.

Carrier - battery

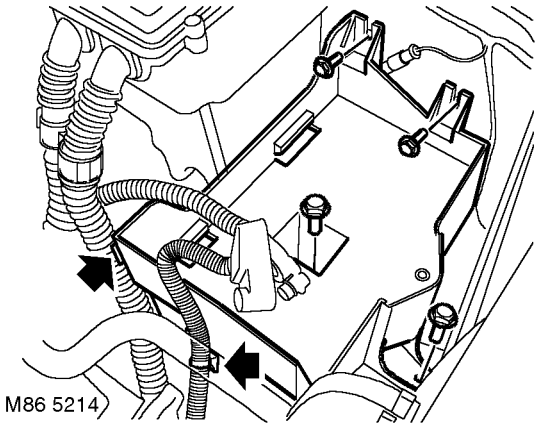
86.15.11

Remove

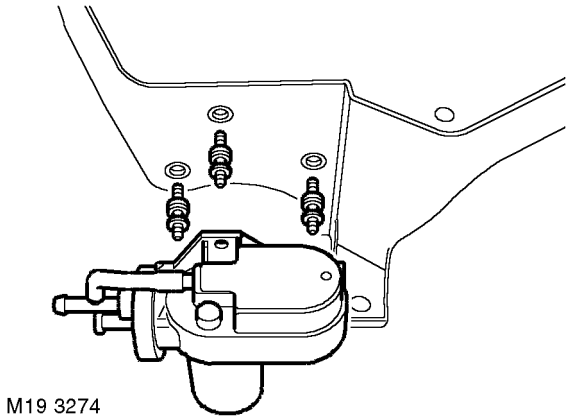
1. Remove battery.
   CHARGING AND STARTING, REPAIRS, Battery.


M86 5382

2. **Models with cruise control:** Disconnect multiplug and hose from cruise control vacuum pump.


M86 5214

3. Release harness clips from battery carrier.
4. Remove 4 bolts and remove battery carrier.


M19 3274

5. **Models with cruise control:** Remove cruise control vacuum pump and mountings from battery carrier.

Refit

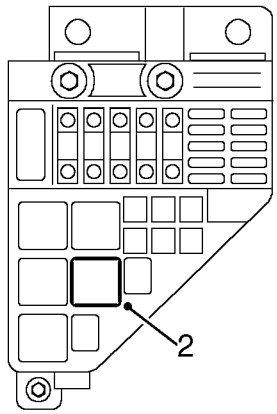
1. **Models with cruise control:** Fit mountings and cruise control vacuum pump to battery carrier.
2. Fit battery carrier and tighten bolts to 10 Nm (7.5 lbf.ft).
3. Secure harness clips to battery carrier.
4. **Models with cruise control:** Connect multiplug and hose to cruise control vacuum pump.
5. Fit battery.
   ☞ **CHARGING AND STARTING, REPAIRS, Battery.**

Relay - main

⊸ ***86.55.08***

Remove

1. Open engine compartment fuse box.



M86 5293

2. Identify and remove main relay.

Refit

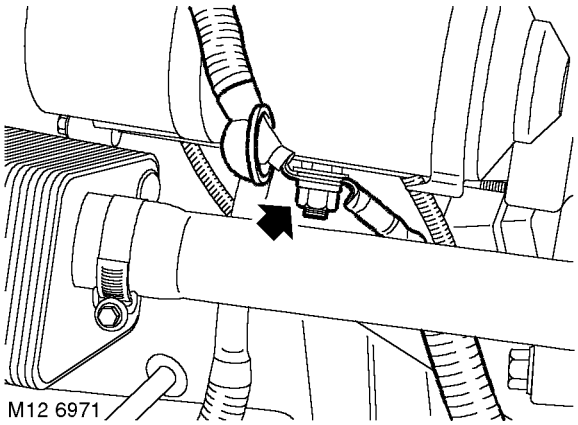
1. Fit main relay.
2. Close engine compartment fuse box.

Starter motor - Td4

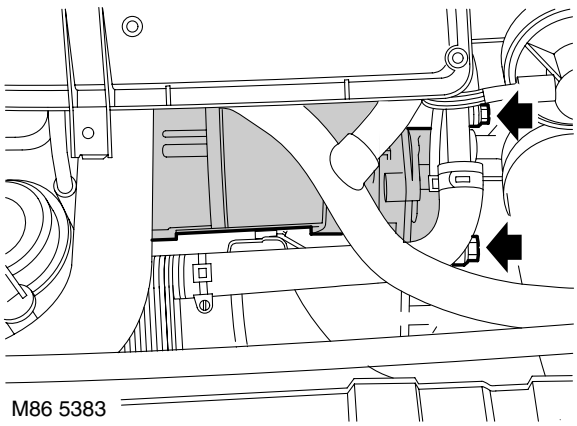
86.60.01

Remove

1. Disconnect battery earth lead.
2. **Models with automatic transmission:** Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
3. Remove engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.



4. Release terminal cover, remove nut and disconnect 2 cables from starter motor solenoid.



5. Remove 2 bolts and remove starter motor.

Refit

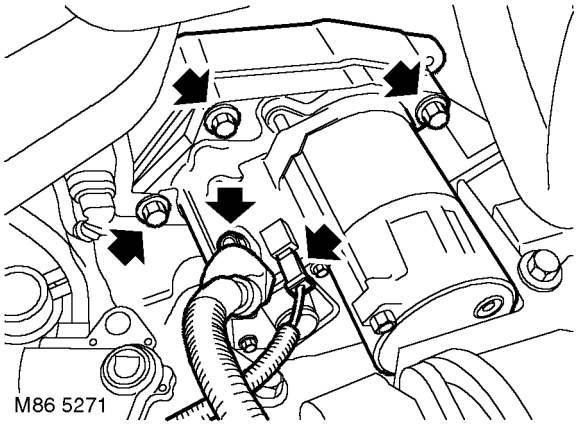
1. Clean starter motor and mating face. Clean dowel and dowel hole.
2. Fit starter motor and tighten bolts to 45 Nm (33 lbf.ft)
3. Fit cables to starter motor solenoid and tighten nut to 13 Nm (9.5 lbf.ft). Secure terminal cover.
4. Connect Lucar to starter motor solenoid.
5. Fit engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
6. **Models with automatic transmission:** Fit battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.
7. Connect battery earth lead.

Starter motor - KV6

86.60.01

Remove

1. Remove battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.



2. Release starter motor solenoid terminal cover, remove nut securing battery lead to solenoid and disconnect battery lead.
3. Disconnect Lucar connector from starter solenoid.
4. Remove 3 bolts securing starter motor to gearbox noting that the LH bolt also secures the mounting bracket for the CKP sensor multiplug.
5. Manoeuvre and remove starter motor.

Refit

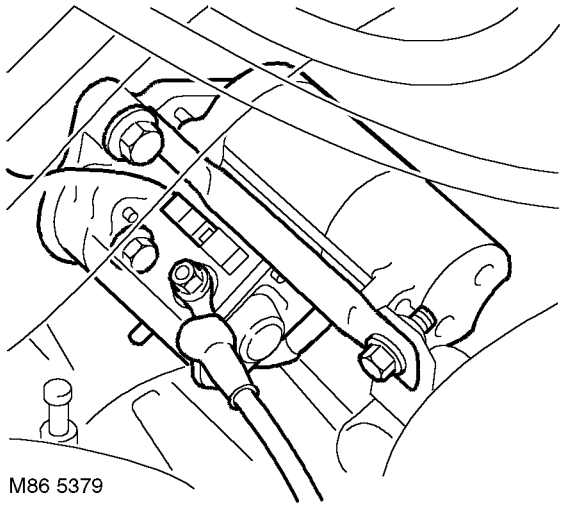
1. Clean starter motor and mating face on gearbox.
2. Position starter motor to gearbox, align CKP sensor multiplug bracket, fit and tighten bolts to 45 Nm (33 lbf.ft).
3. Connect battery lead to solenoid terminal, fit nut and tighten to 13 Nm (9.5 lbf.ft). Secure terminal cover.
4. Connect Lucar connector to starter solenoid.
5. Fit battery carrier.
   CHARGING AND STARTING, REPAIRS, Carrier - battery.

Starter motor - K1.8

86.60.01

Remove

1. Disconnect battery earth lead.
2. Remove air cleaner assembly.
   FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.



3. Disconnect Lucar connector from starter motor.
4. Remove nut and disconnect battery lead from starter solenoid.
5. Remove lower nut and bolt securing starter motor.
6. Remove bolt securing steady bar to engine LH mounting.
7. Remove upper nut and bolt securing starter motor.
8. Remove engine steady bar.
9. Remove starter motor.

Refit

1. Clean starter motor and mating face.
2. Ensure gearbox closing plate is in position.
3. Fit starter motor and fit lower bolt but do not tighten bolt at this stage.
4. Fit engine steady bar, fit bolt securing steady bar to engine mounting but do not tighten at this stage.
5. Fit starter motor upper bolt.

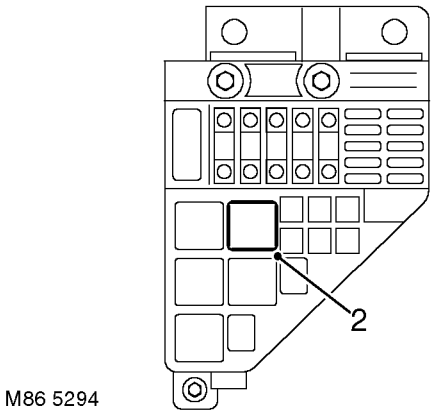
6. Tighten starter motor upper and lower nuts and bolts to 80 Nm (59 lbf.ft).
7. Tighten bolt securing engine steady bar to LH engine mounting to 25 Nm (18 lbf.ft).
8. Connect battery cable to starter solenoid, fit nut and tighten to 8 Nm (6 lbf.ft).
9. Connect Lucar to solenoid.
10. Fit air cleaner assembly.
    ☞ **FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Air cleaner - K1.8.**
11. Connect battery earth lead.

Relay - starter

86.60.10

Remove

1. Open engine compartment fuse box.



M86 5294

2. Identify and remove starter relay.

Refit

1. Fit starter relay.
2. Close engine compartment fuse box.

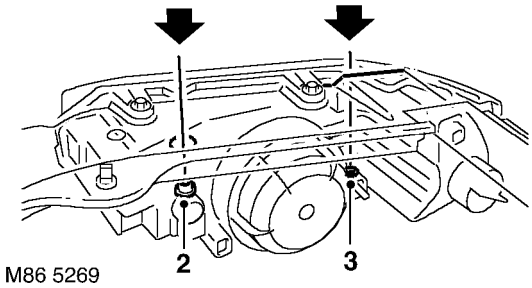
Headlamps - pair - align beam

86.40.17

Check

1. Align suitable beam setting equipment to headlamp.
2. Switch on headlamps. Headlamp setting
   - **Non NAS models:** 1.2% below horizontal and parallel.
   - **NAS models:** 0.4% below horizontal and parallel.

Adjust



M86 5269

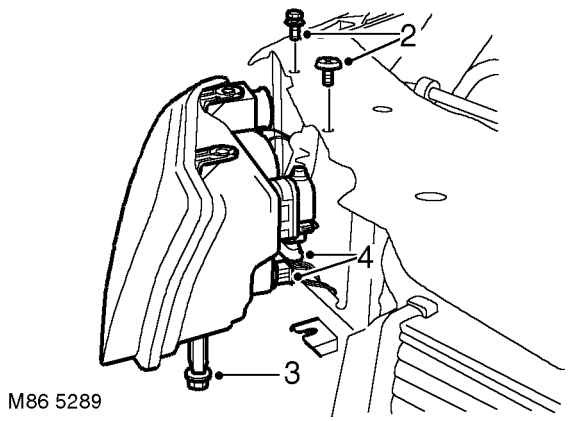
1. Adjust headlamp using a 6 mm Allen key.
2. Turn Allen screw for vertical alignment.
3. **Non NAS models:** Turn Allen screw for horizontal alignment.
4. Align beam setting equipment to 2nd headlamp.
5. Adjust 2nd headlamp as detailed above.
6. Switch off headlamps and remove beam setting equipment.

Headlamp assembly

86.40.49

Remove

1. Remove front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.



2. Remove bolt and screw securing headlamp to body.
3. Loosen nut securing headlamp to body.
4. Disconnect 2 multiplugs from headlamp and remove headlamp.

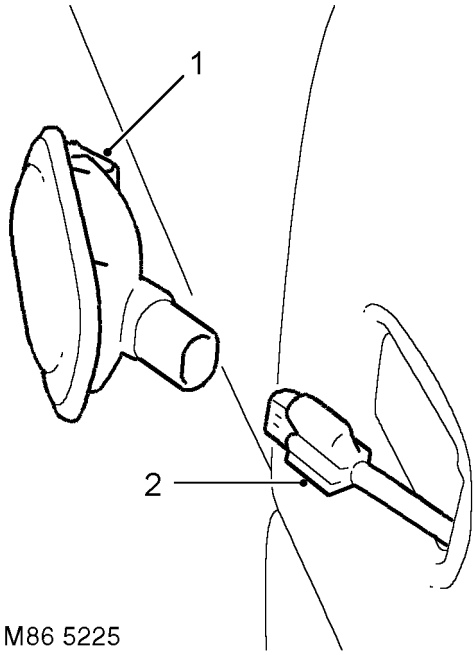
Refit

1. Position headlamp and connect multiplugs.
2. Fit and tighten bolt, screw and nut securing headlamp.
3. Fit front bumper.
   EXTERIOR FITTINGS, REPAIRS, Bumper - assembly - front.
4. Check headlamp adjustment.
   LIGHTING, ADJUSTMENTS, Headlamps - pair - align beam.

Lamp assembly - flasher side repeater - front

86.40.53

Remove



1. Push lamp towards rear of vehicle to release spring clip, and release lamp from wing.
2. Disconnect multiplug.

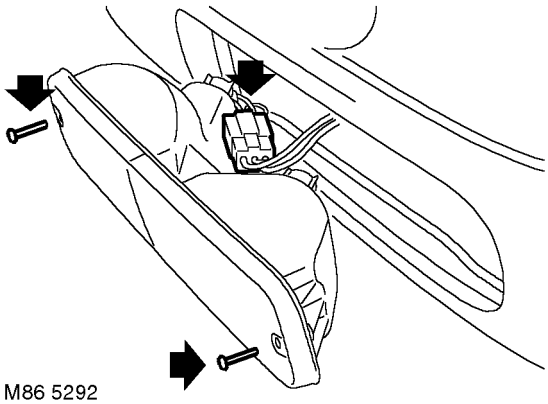
Refit

1. Connect multiplug to lamp and secure lamp to wing.

Lamp assembly - tail

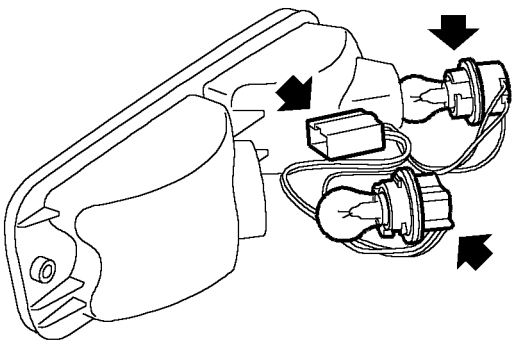
86.40.70

Remove



M86 5292

1. Remove 2 Torx screws securing tail lamp to bumper.
2. Release lamp, disconnect multiplug and remove lamp.
   NOTE: Do not carry out further dismantling if component is removed for access only.



M86 5295

3. Remove multiplug and bulb holders from tail lamp.

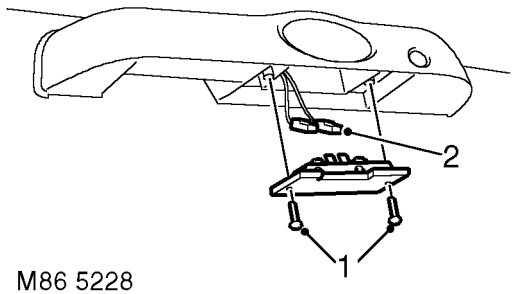
Refit

1. Fit multiplug and bulb holders to replacement tail lamp.
2. Position tail lamp, connect multiplug and secure to bumper with Torx screws.

Lamp assembly - number plate

86.40.86

Remove



M86 5228

1. Remove 2 screws securing lamp to tail door handle.
2. Disconnect 2 Lucars from number plate lamp.

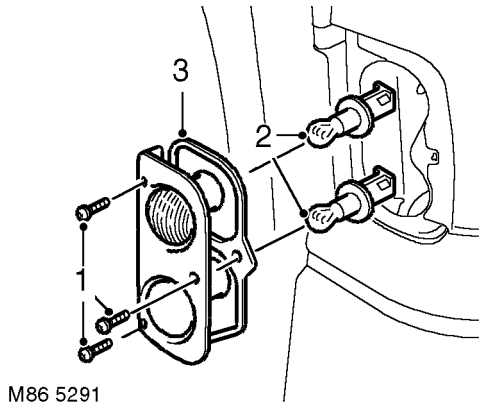
Refit

1. Position number plate lamp and connect Lucars.
2. Fit number plate lamp and secure with screws.

Lamp assembly - rear

86.41.15

Remove



1. Remove 3 Torx screws securing lamp to body.
2. Release lamp, disconnect 2 bulb holders and remove lamp.
3. Remove lamp sealing rubber.

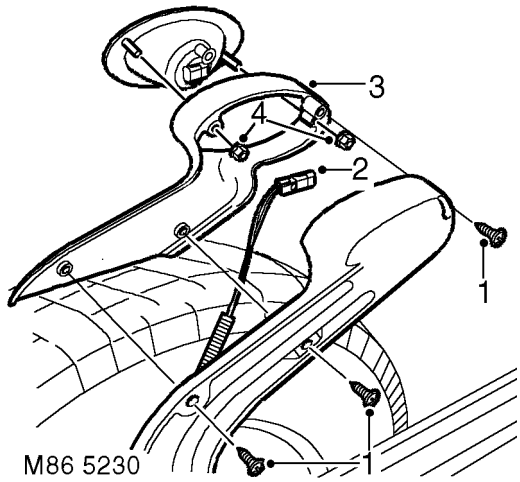
Refit

1. Fit sealing rubber and bulb holders to lamp.
2. Position lamp, fit and tighten Torx screws.

Lamp assembly - centre high mounted stop (CHMSL)

86.41.32

Remove



1. Remove 3 screws securing CHMSL bracket to spare wheel carrier.
2. Release lamp bracket and disconnect multiplug.
3. Remove lamp and bracket.
4. Remove 2 nuts and remove lamp from bracket.

Refit

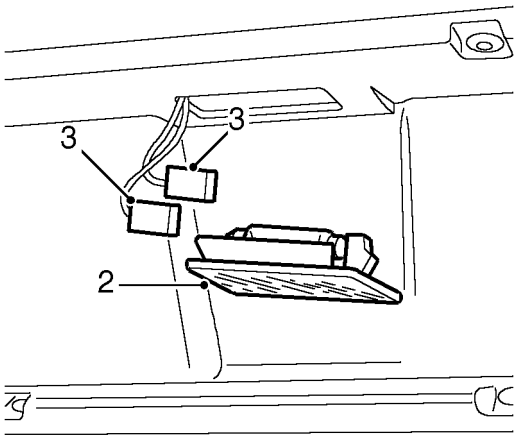
1. Position lamp to bracket and tighten nuts.
2. Position lamp bracket and connect multiplug to lamp.
3. Position lamp bracket to spare wheel carrier and secure with screws.

Lamp assembly - glove compartment

86.45.08

Remove

1. Open glove box.



M86 5231

2. Release illumination lamp from glove box.
3. Disconnect 2 Lucars and remove glove box lamp.

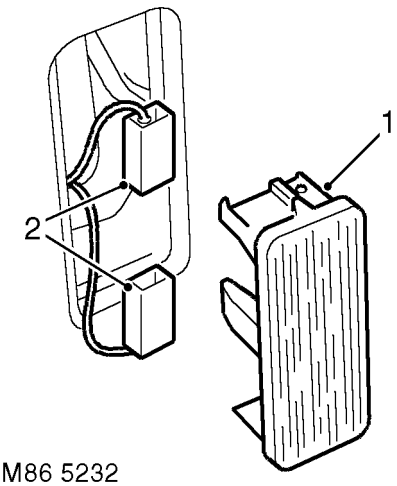
Refit

1. Position lamp and connect Lucars.
2. Fit lamp and close glove box.

Lamp assembly - load space

86.45.16

Remove



M86 5232

1. Release load space lamp from trim casing.
2. Disconnect 2 Lucars and remove load space lamp.

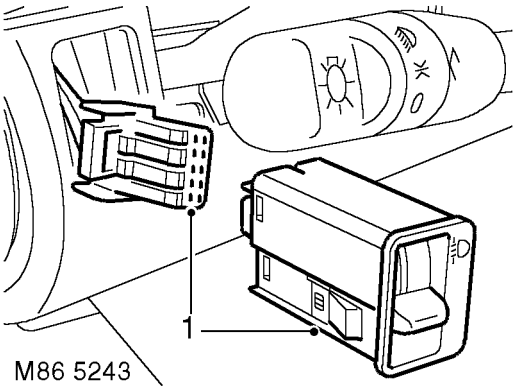
Refit

1. Position lamp and connect Lucars.
2. Fit load space lamp to trim casing.

Switch - headlamp levelling

86.65.16

Remove



1. Release headlamp levelling switch from fascia and disconnect multiplug.

Refit

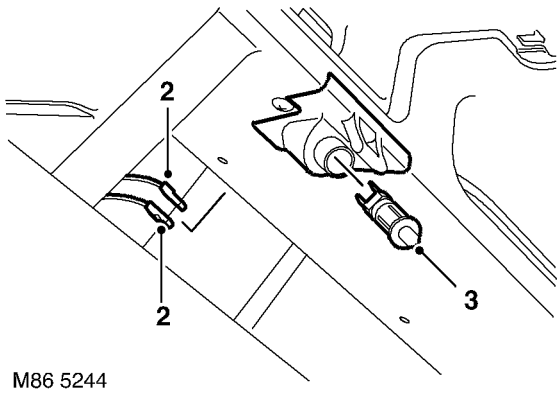
1. Position switch, connect multiplug and secure switch to fascia.

Switch - glove compartment

86.65.24

Remove

1. Remove glove box.
   INTERIOR TRIM COMPONENTS, REPAIRS, Glove box.



2. Disconnect 2 Lucars from glove box lamp switch.
3. Release clips and remove switch from glove box latch.

Refit

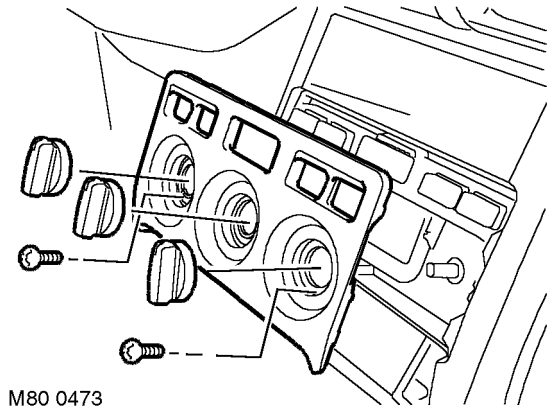
1. Fit switch to glove box latch and connect Lucars.
2. Fit glove box.
   INTERIOR TRIM COMPONENTS, REPAIRS, Glove box.

Switch - hazard warning

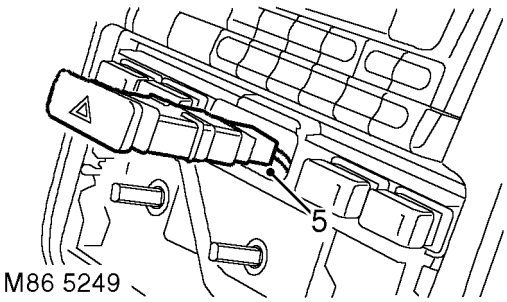
86.65.50

Remove

1. Remove radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.



2. Remove selector knobs from heater controls.
3. Remove 2 screws securing heater control finisher to heater controls and remove finisher.



4. Release hazard warning switch from heater controls.
5. Disconnect multiplug and remove hazard warning switch.

Refit

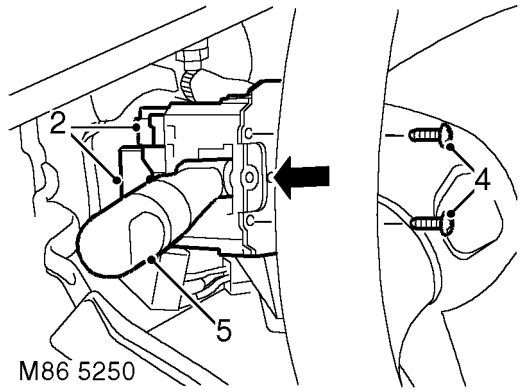
1. Position hazard warning switch and connect multiplug.
2. Fit hazard warning switch to heater controls.
3. Fit heater contol finisher to heater controls and secure with screws.
4. Fit heater control knobs.
5. Fit radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.

Switch - combined direction indicator/ headlight/horn

86.65.55

Remove

1. Remove steering column nacelle.
   STEERING, REPAIRS, Nacelle - column.



2. Disconnect 2 multiplugs from indicator and light switch.
3. Rotate steering wheel to access switch screws.
4. Remove 2 screws securing switch.
5. Depress retaining tag and remove switch.

Refit

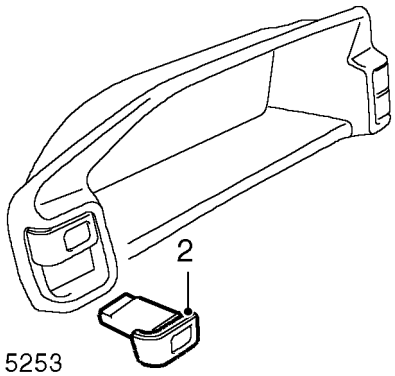
1. Fit indicator and light switch and secure with screws.
2. Connect multiplugs to switch.
3. Fit steering column nacelle.
   STEERING, REPAIRS, Nacelle - column.

Switch - rear fog lamp

86.65.65

Remove

1. Remove instrument cowl.
   INSTRUMENTS, REPAIRS, Cowl - instrument.



M86 5253

2. Remove rear fog lamp switch from instrument cowl.

Refit

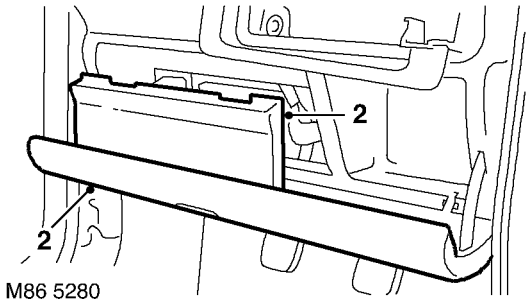
1. Fit switch to instrument cowl.
2. Fit instrument cowl.
   INSTRUMENTS, REPAIRS, Cowl - instrument.

Central Control Unit (CCU)

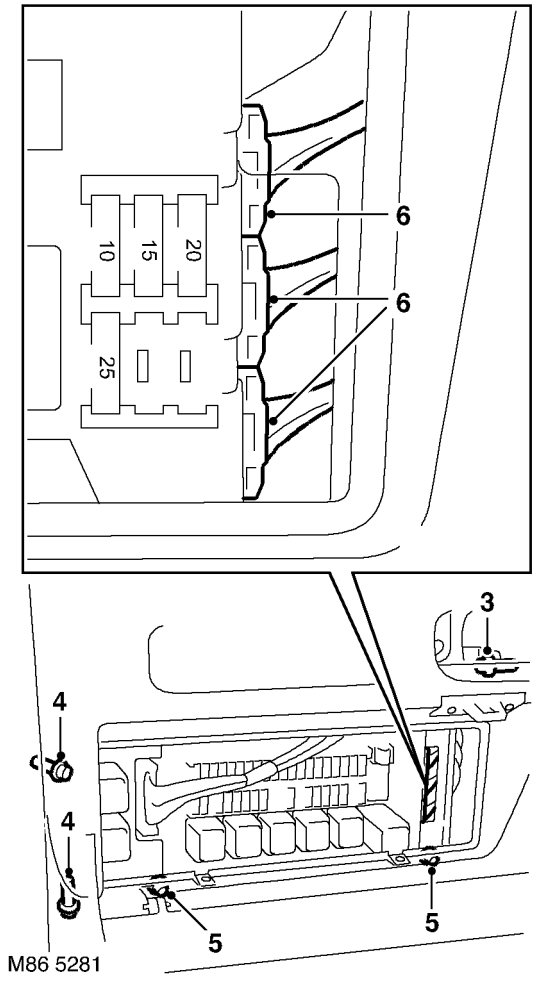
86.55.75

Remove

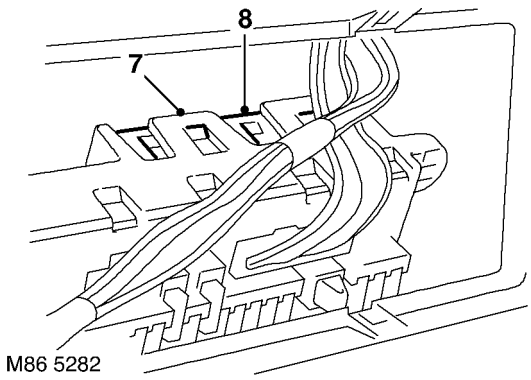
1. Disconnect battery earth lead.



2. Open drivers glove box lid and remove fuse box cover.



3. Remove bolt securing fuse box mounting plate to steering column bracket.
4. Remove 2 bolts securing mounting plate to body.
5. Remove 2 bolts securing fuse box to mounting plate.
6. Disconnect 3 multiplugs from CCU in rear of fuse box.



7. Manoeuvre fuse box to gain access to CCU.
8. Release retaining clips and remove CCU.

Refit

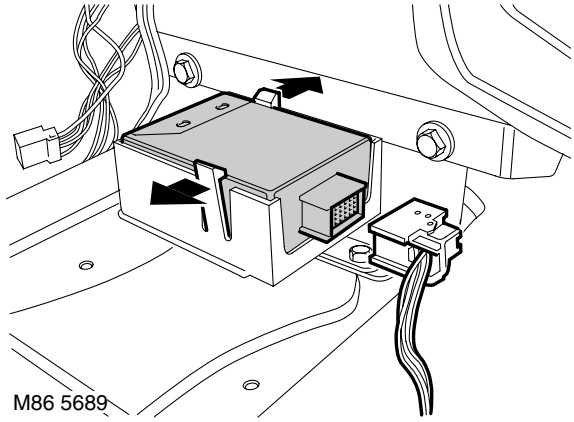
1. Position CCU and secure in clips.
2. Align fuse box to mounting plate.
3. Connect multiplugs to CCU.
4. Fit bolts securing fuse box to mounting bracket and tighten to 8 Nm (6 lbf.ft).
5. Position mounting plate and tighten bolts to 8 Nm (6 lbf.ft).
6. Fit fuse box cover.
7. Close glove box.
8. Connect battery earth lead.

Control Unit - Power fold mirrors

86.54.30

Remove

1. Remove the front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.



2. Release the two clips securing the power fold mirror control unit.
3. Release the control unit from its mounting and disconnect the multiplug.
4. Remove the control unit.

Refit

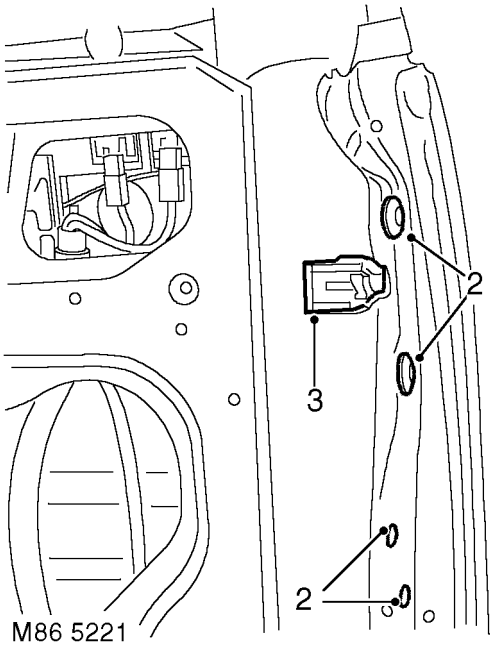
1. Locate the control unit in its mounting and ensure the clips are fully engaged.
2. Connect the multiplug to the control unit.
3. Fit the front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.

Solenoid/motor - taildoor

86.26.02

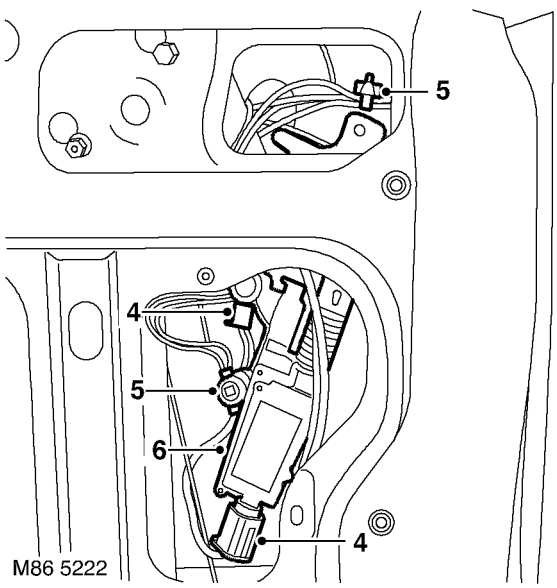
Remove

1. Remove tail door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - tail door.



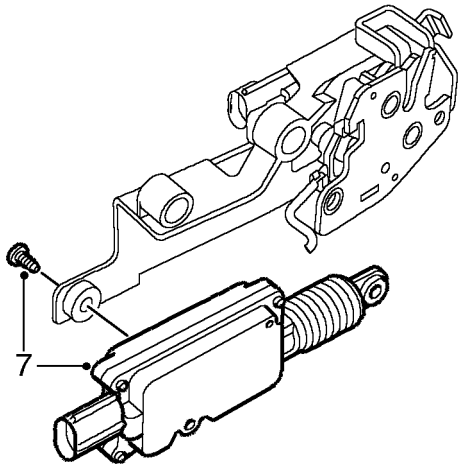
M86 5221

2. Remove 4 screws securing door latch.
3. Release door latch to access harness clips and multiplugs.



M86 5222

4. Disconnect 2 multiplugs from door latch.
5. Release 2 door harness clips from latch.
6. Remove door latch.



M86 5223

7. Remove screw from solenoid motor and remove motor from latch.

Refit

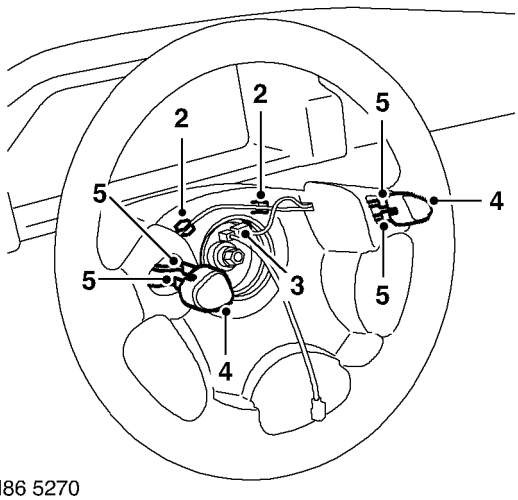
1. Position solenoid motor to latch, fit and tighten screw.
2. Position door latch, connect multiplugs and harness clips.
3. Locate door latch in position, fit and tighten screws.
4. Fit tail door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - tail door.

Switch/push - horn

86.30.01

Remove

1. Remove airbag module from steering wheel.
   RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.



M86 5270

2. Release horn switch multiplugs and leads from steering wheel base.
3. Disconnect multiplug from rotary coupler.
4. Using a broad round edged tool, carefully prise horn switch from steering wheel.
5. Noting fitted position disconnect 2 Lucars and remove horn switch.

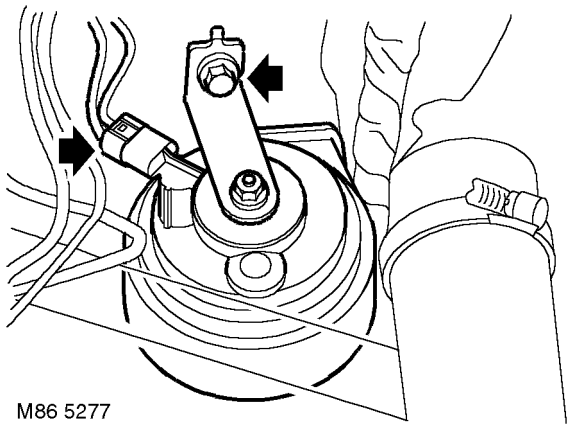
Refit

1. Position horn switch and connect Lucars.
2. Carefully fit horn switch to steering wheel.
3. Connect multiplug to rotary coupler.
4. Secure leads and multiplug to base of steering wheel.
5. Fit airbag to steering wheel.
   RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.

Horn

86.30.10

Remove


M86 5277

1. Remove bolt securing horn to body.
2. Disconnect multiplug from horn and remove horn.
   NOTE: Do not carry out further dismantling if component is removed for access only.
3. Remove nut securing bracket to horn and remove bracket.

Refit

1. Fit bracket to horn and secure with nut.
2. Connect multiplug to horn.
3. Fit horn to body and secure with bolt.

Immobilisation - electronic control unit (ECU) -

86.77.07

Remove

1. Disconnect battery earth lead.
2. Remove fascia.
   INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.


M86 5633

3. Remove 2 plastic nuts securing immobilisation ECU and disconnect multiplug.

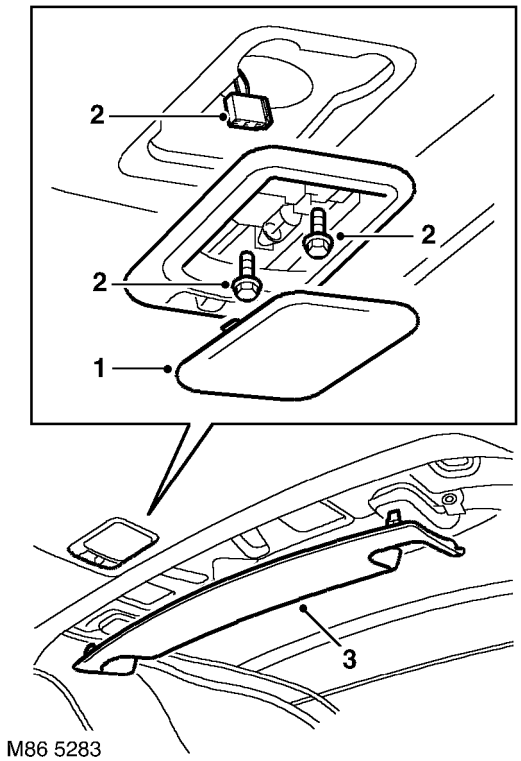
Refit

1. Connect ECU multiplug.
2. Position ECU, fit and tighten 2 plastic nuts.
3. Fit fascia.
   INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.
4. Connect battery earth lead.
5. Initiate using TestBook.

Sensor - volumetric - alarm system - 3 door

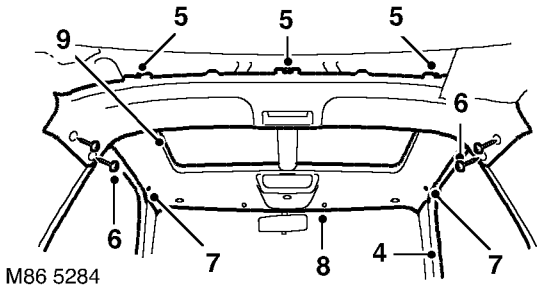
86.77.29

Remove



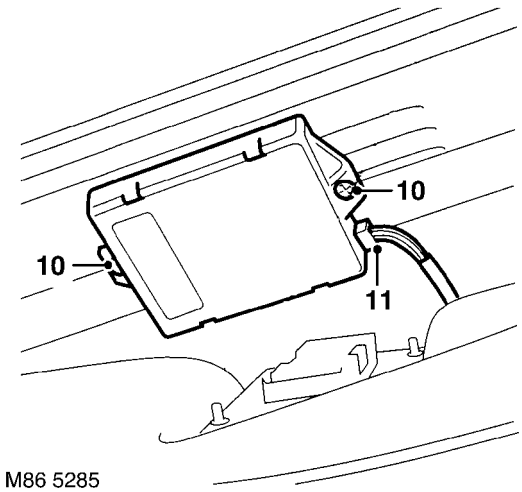
M86 5283

1. Remove roof lamp lens.
2. Remove 2 screws, release roof lamp and disconnect multiplug.
3. Release headlining rear finisher from roof panel and remove finisher.



M86 5284

4. Release door aperture seals to release headlining.
5. Release 3 studs securing rear edge of headlining to roof panel.
6. Remove 4 screws securing headlining to 'B' posts.
7. Release 2 studs securing sides of headlining to body.
8. Lower front edge of headlining.
9. Release sun roof seal.



M86 5285

10. Remove 2 screws from volumetric sensor.
11. Disconnect multiplug from volumetric sensor and remove.

Refit

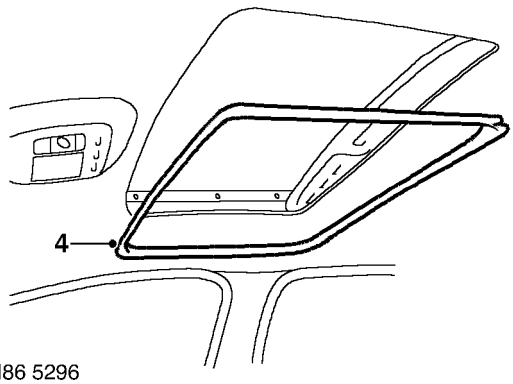
1. Position volumetric sensor and connect multiplug.
2. Fit sensor and secure with screws.
3. Fit headlining to 'B' posts and secure with screws.
4. Secure headlining behind rear vent rubbers.
5. Fit headlining rear finisher.
6. Fit door aperture seals.
7. Fit headlining to sun roof seal.
8. Position roof lamp and connect multiplug.
9. Fit roof lamp and secure with screws.
10. Fit lens to roof lamp.

Sensor - volumetric - alarm system - 5 door

86.77.29

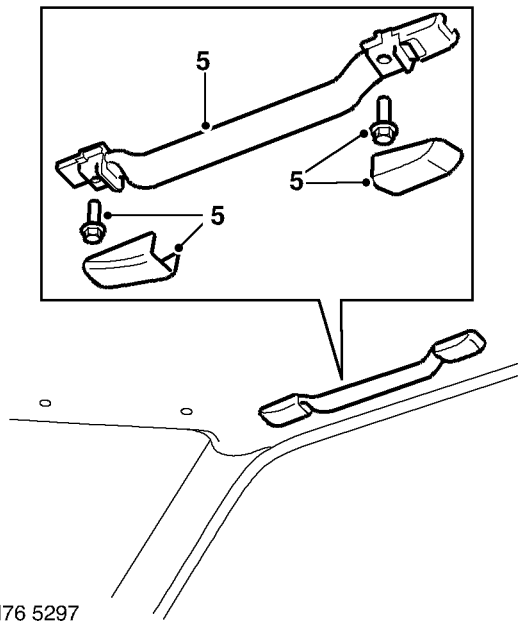
Remove

1. Remove LH rear quarter upper trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.
2. Remove LH 'A' post finisher.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.
3. Release front and rear LH door seals.



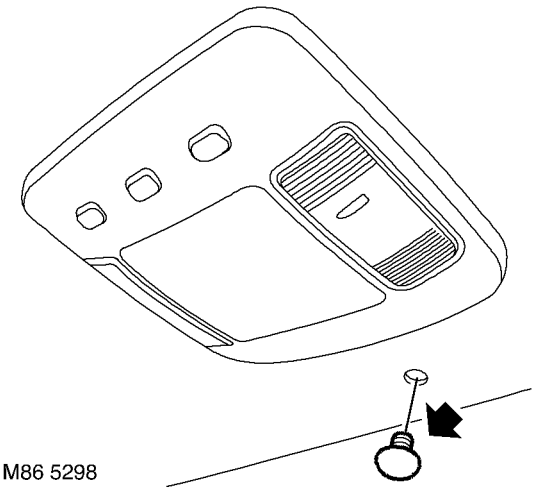
M86 5296

4. Release and remove sun roof finisher.



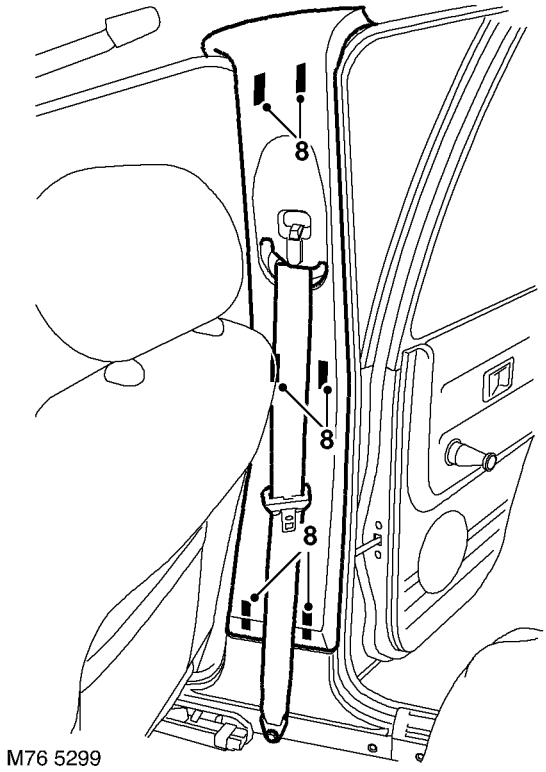
M76 5297

5. Remove screw covers and screws from both LH grab handles and remove grab handles.
6. Remove LH sun visor.
   INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.



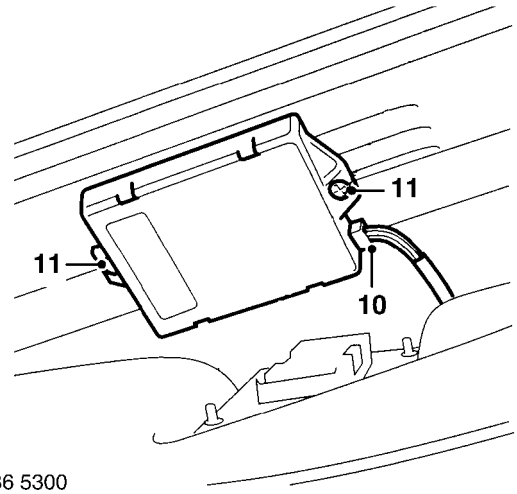
M86 5298

7. Remove trim stud from centre of headlining.



M76 5299

8. Release LH 'B/C' post upper finisher.
9. Carefully lower headlining to gain access to volumetric sensor.



M86 5300

10. Disconnect multiplug from volumetric sensor.
11. Remove 2 screws and remove sensor.

Refit

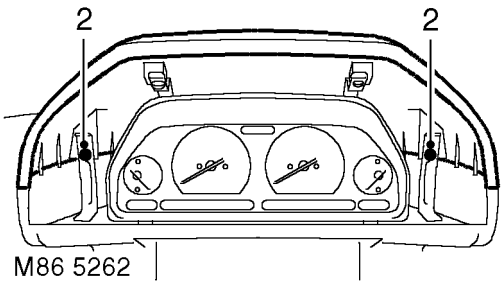
1. Fit volumetric sensor and secure with screws.
2. Connect multiplug to sensor.
3. Position 'B/C' post upper finisher and secure with clips.
4. Fit sun visor.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.**
5. Fit retaining stud to headlining.
6. Fit grab handles, tighten screws and fit screw covers.
7. Fit 'A' post finisher.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.**
8. Position and secure sun roof finisher.
9. Fit rear quarter upper trim casing.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 5 door.**
10. Secure front and rear door seals.

Receiver - alarm system

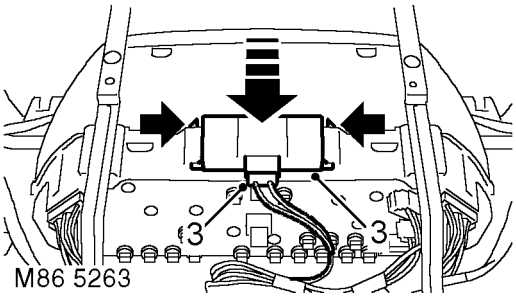
86.77.31

Remove

1. Remove instrument cowl.
   INSTRUMENTS, REPAIRS, Cowl - instrument.



2. Remove 4 screws and remove instrument panel upper cover.



3. Disconnect multiplug and remove alarm receiver from instrument pack.

Refit

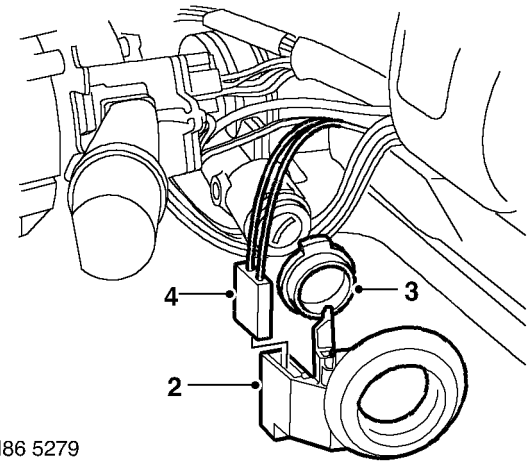
1. Fit alarm receiver and connect multiplug.
2. Fit instrument panel upper cover and secure with screws.
3. Fit instrument cowl.
   INSTRUMENTS, REPAIRS, Cowl - instrument.

Coil - passive immobilisation - alarm system

86.77.35

Remove

1. Remove steering column nacelle.
   STEERING, REPAIRS, Nacelle - column.



2. Release passive coil from steering lock.
3. Collect illumination ring.
4. Disconnect multiplug and remove passive coil.

Refit

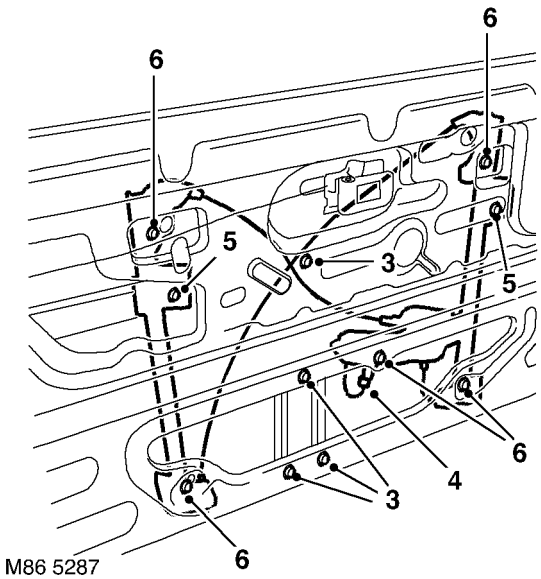
1. Fit illumination ring.
2. Fit passive coil and connect multiplug.
3. Fit steering column nacelle.
   STEERING, REPAIRS, Nacelle - column.

Motor & control unit - front door - 3 door

86.25.01

Remove

1. Remove upper plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - upper - 3 door.
2. Remove lower plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - lower.



3. Remove 4 Torx screws securing door stiffener, release bowden cable from clip and remove door stiffener.
4. Disconnect multiplug from door glass motor.
5. Loosen 2 screws clamping control unit to glass and release glass from clamps.
6. Remove 5 screws securing control unit to door.
7. Manoeuvre motor and control unit out from door aperture.

Refit

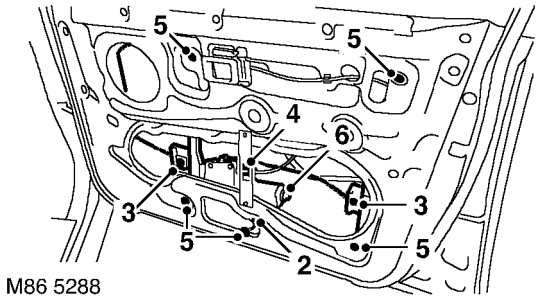
1. Position motor and control unit in door aperture and locate to glass.
   CAUTION: It is very important when fitting the control unit that the cable with the anti-rattle sleeve is next to the trim casing and the motor cable next to the glass.
2. Secure control unit to door with screws.
3. Tighten clamps securing control unit to glass, to 9 Nm (7 lbf.ft).
4. Connect multiplug to door glass motor.
5. Position door stiffener, fit and tighten Torx screws to 9 Nm (7 lbf.ft).
6. Secure cable in door stiffener clip.
7. Fit lower plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - lower.
8. Fit upper plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - lower.

Motor & control unit - front door - 5 door

86.25.01

Remove

1. Remove front door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - 5 door.



2. Disconnect multiplug from door glass motor.
3. Loosen 2 screws clamping control unit to glass.
4. Release cable from door clip.
5. Remove 5 screws securing control unit to door.
6. Release cable from door clip and manoeuvre motor and control unit out from door aperture.

Refit

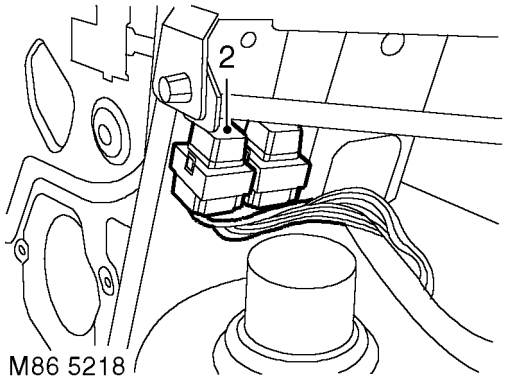
1. Position motor and control unit in door aperture and locate to glass.
   CAUTION: It is very important when fitting the control unit that the cable with the anti-rattle sleeve is next to the trim casing and the motor cable next to the glass.
2. Fit and tighten screws securing control unit to door.
3. Secure cable in door clip.
4. Tighten clamps securing control unit to glass, to 9 Nm (7 lbf.ft).
5. Connect multiplug to door glass motor.
6. Fit front door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - 5 door.

Relay - control - tail door glass

86.25.45

Remove

1. Remove RH rear quarter lower trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.



2. Remove tail door glass control relay.

Refit

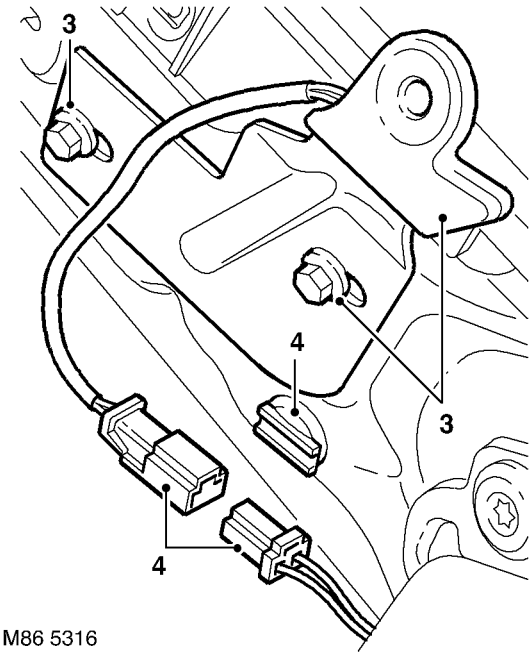
1. Fit tail door glass control relay.
2. Fit RH rear quarter lower casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 3 door.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.

Microswitch - hardtop sensing - 3 door

86.25.46

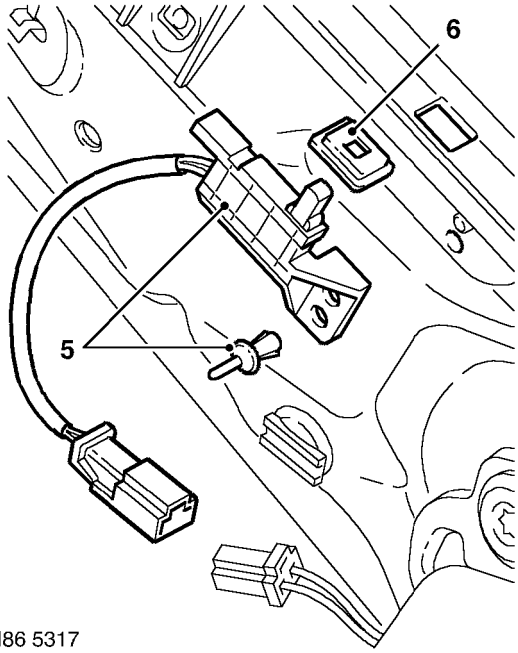
Remove

1. Remove hard-back or soft-back.
   HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.
2. Remove RH rear quarter upper trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 3 door.



M86 5316

3. Remove 2 bolts securing soft-back support bracket.
4. Disconnect micro-switch multiplug and release from retainer.



M86 5317

5. Remove peg securing micro-switch, and remove micro-switch.
6. Collect micro-switch seal.

Refit

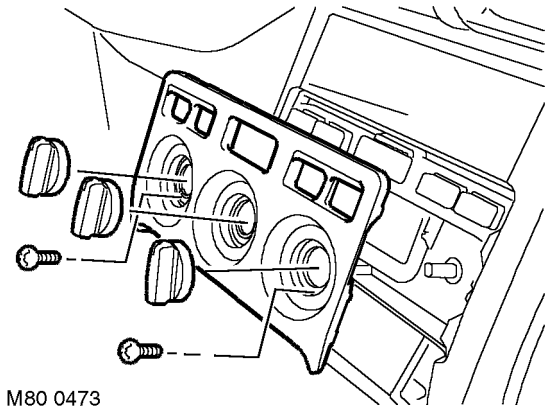
1. Locate micro-switch seal, position micro-switch and secure with peg.
2. Connect multiplug and secure to retainer.
3. Position soft-back support bracket, fit bolts and tighten to 25 Nm (18 lbf.ft).
4. Fit RH rear quarter upper trim casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - upper - 3 door.
5. Fit hard-back or soft-back.
   HOOD, REPAIRS, Frame & hood cover - assembly - remove for access & refit.

Switch - backlight heater

86.65.36

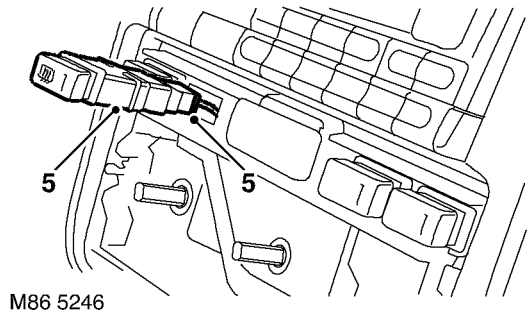
Remove

1. Remove radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.



M80 0473

2. Remove selector knobs from heater controls.
3. Remove 2 screws securing heater control finisher to heater controls and remove finisher.
4. Release heated rear screen switch from heater controls.



M86 5246

5. Disconnect multiplug from heated rear screen switch and remove switch.

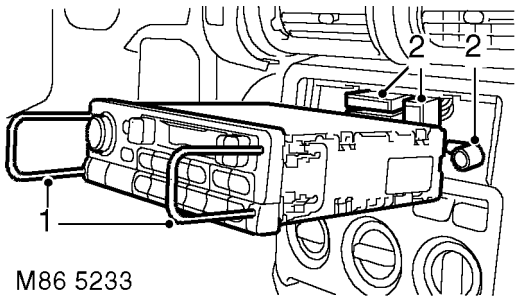
Refit

1. Position heated rear screen switch and connect multiplug.
2. Fit switch to heater control panel.
3. Fit heater contol finisher to heater controls and secure with screws.
4. Fit heater control knobs.
5. Fit radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.

Radio

86.50.03

Remove



M86 5233

1. Using tool **SMD 4091** release radio from centre console.
2. Disconnect multiplugs and aerial from radio and remove radio.

Refit

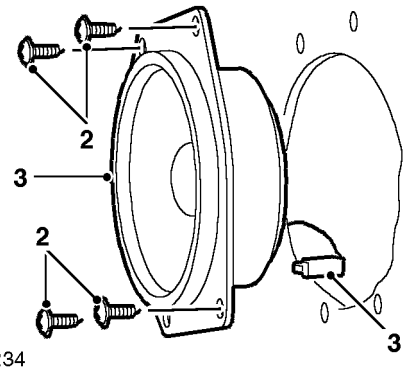
1. Position radio cassette player to fascia aperture and connect multiplugs and aerial.
2. Fit radio to centre console.

Speaker - rear - 3 door

86.50.12

Remove

1. Remove body rear side casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.



M86 5234

2. Remove 4 screws securing speaker to body.
3. Disconnect multiplug from speaker and remove speaker.

Refit

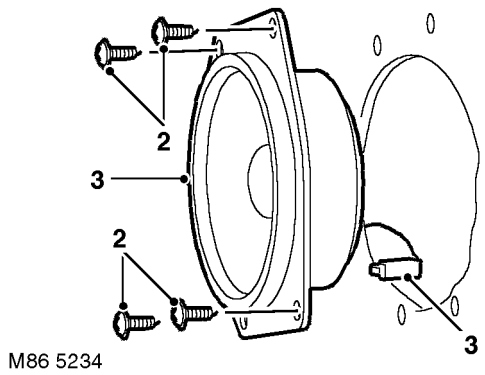
1. Position speaker to door and connect multiplug.
2. Fit speaker to body and secure with screws.
3. Fit body rear side casing.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - body side - rear - LH.

Speaker - rear - 5 door

86.50.12

Remove

1. Remove rear door trim casing.
   DOORS, REPAIRS, Trim casing - rear door.



M86 5234

2. Remove 4 screws securing speaker to door.
3. Disconnect multiplug from speaker and remove speaker.

Refit

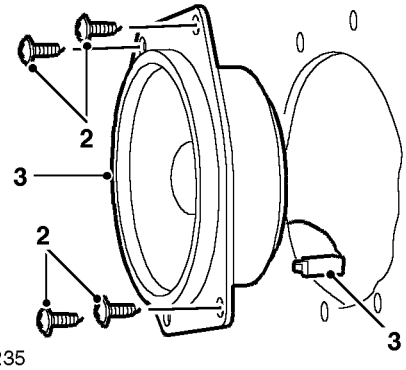
1. Position speaker to door and connect multiplug.
2. Fit screws securing speaker to door.
3. Fit rear door trim casing.
   DOORS, REPAIRS, Trim casing - rear door.

Speaker - front

86.50.15

Remove

1. Remove front door trim casing.
   DOORS, REPAIRS, Trim casing - front door - 3 door.
   DOORS, REPAIRS, Trim casing - front door - 5 door.



M86 5235

2. Remove 4 screws securing speaker to front door.
3. Disconnect multiplug from speaker and remove speaker.

Refit

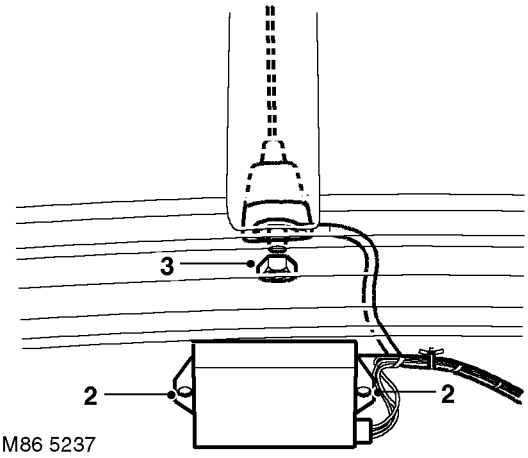
1. Position speaker to door and connect multiplug.
2. Fit speaker to door and secure with screws.
3. Fit front door trim casing.
   DOORS, REPAIRS, Trim casing - front door - 3 door.
   DOORS, REPAIRS, Trim casing - front door - 5 door.

Aerial - manual - 3 door

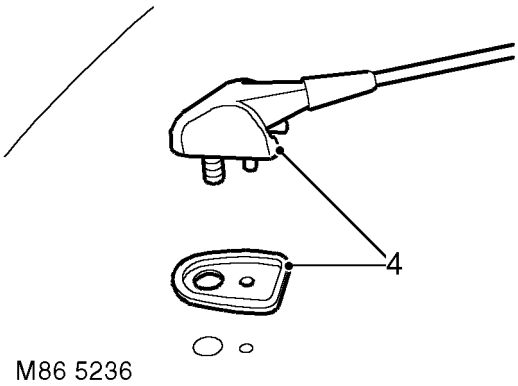
86.50.18

Remove

1. Remove headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.



2. Remove 2 screws and release volumetric sensor mounting bracket.
3. Remove nut securing coaxial cable to aerial base.



4. Remove aerial base from roof panel and remove rubber seal.

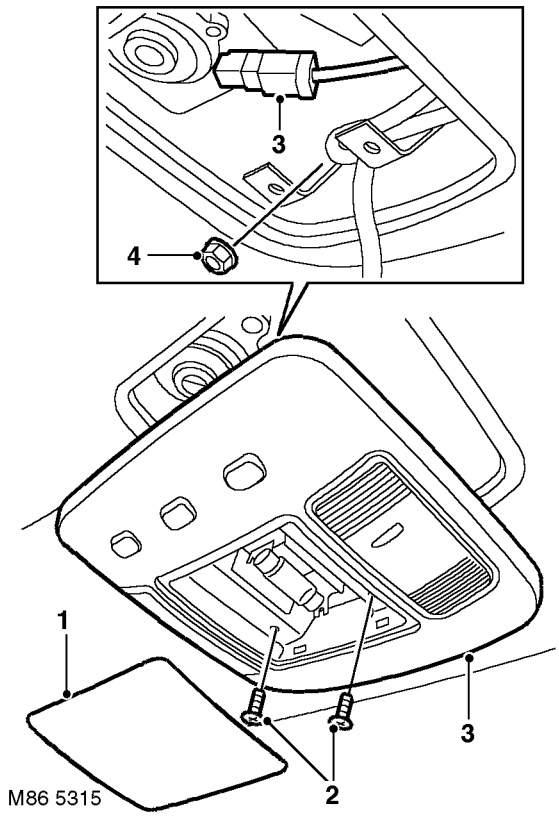
Refit

1. Position rubber seal and fit aerial base to roof panel.
2. Connect coaxial cable and secure with nut.
3. Position volumetric sensor bracket and secure with screws.
4. Fit headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 3 door.

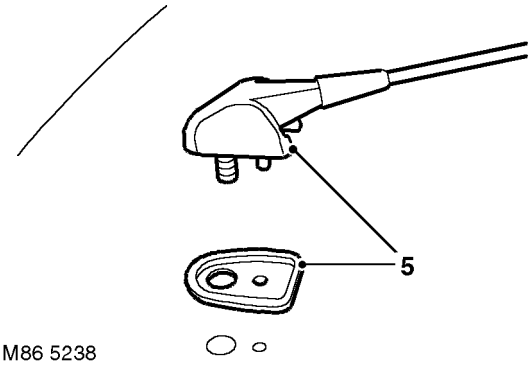
Aerial - manual - 5 door

86.50.18

Remove



1. Remove lens from front interior lamp.
2. Remove 2 bolts securing front interior lamp to body.
3. Release interior lamp from headlining, disconnect multiplug and remove lamp.
4. Remove nut securing coaxial cable to aerial base.



M86 5238

5. Remove aerial base from roof panel and remove rubber seal.

Refit

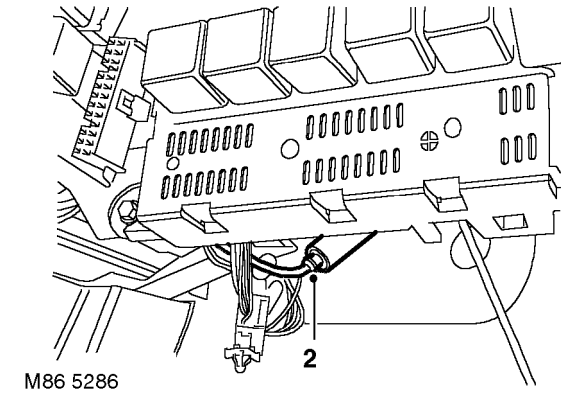
1. Position rubber seal and fit aerial base to roof panel.
2. Connect coaxial cable and secure with nut.
3. Position front interior lamp and connect multiplug.
4. Fit front interior lamp to headlining and secure with bolts.
5. Fit lens to rear interior lamp.

Coaxial lead - front aerial - 3 door

86.50.24

Remove

1. Remove aerial.
   IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 3 door.
   NOTE: Original coaxial lead cannot be removed as it is part of the body harness.



M86 5286

2. Disconnect coaxial lead from link lead behind fuse box.

Refit

1. Position new coaxial lead to roof panel.
2. Align coaxial lead behind fascia and connect to link lead.
3. Secure coaxial lead to harness with cable ties.
4. Fit aerial.
   IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 3 door.

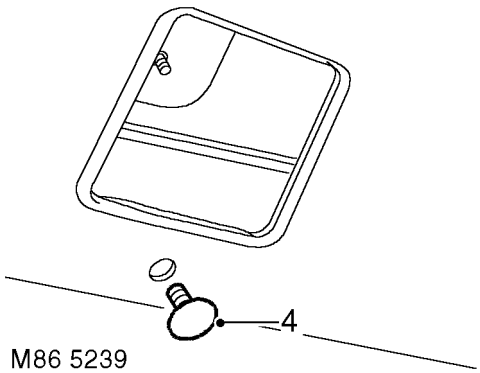
Coaxial lead - front aerial - 5 door

86.50.24

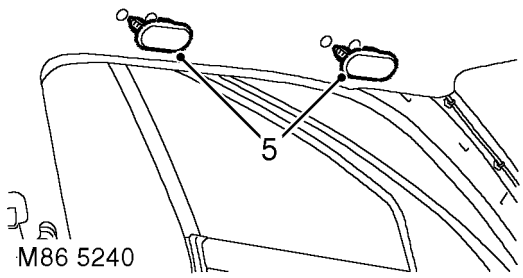
Remove

1. Remove aerial.
   IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 5 door.
2. Remove 'A' post upper trim finisher.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.
3. Remove sun visor.
   INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.

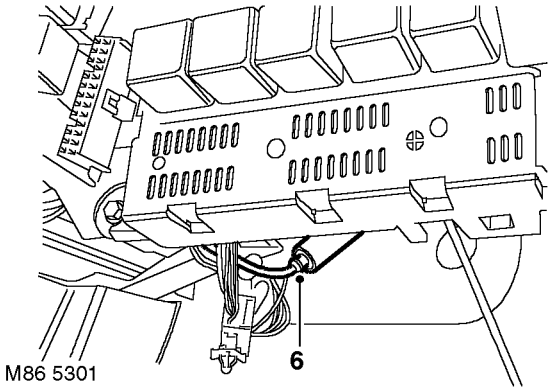
   NOTE: Original coaxial lead cannot be removed as it is part of the body harness.



4. Remove stud securing front edge of headlining.



5. Remove grab handle blanking plugs.



6. Disconnect coaxial lead from link lead behind fuse box.

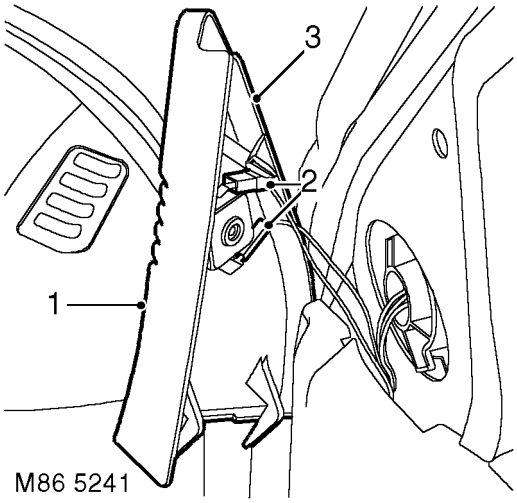
Refit

1. Position new coaxial lead to roof panel.
2. Align coaxial lead behind fascia and connect to link lead.
3. Secure coaxial lead to harness with cable ties.
4. Fit stud and grab handle blanking plugs to headlining.
5. Fit 'A' post upper trim finisher.
   INTERIOR TRIM COMPONENTS, REPAIRS, Trim finisher - 'A' post - upper - renew.
6. Fit sun visor.
   INTERIOR TRIM COMPONENTS, REPAIRS, Sun visor.
7. Fit aerial.
   IN CAR ENTERTAINMENT, REPAIRS, Aerial - manual - 5 door.

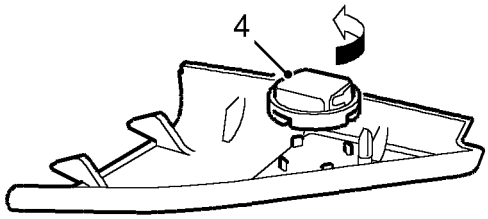
Speaker - tweeter - front

86.50.34

Remove



1. Release cheater panel from front door.
2. Disconnect Lucars from tweeter speaker.
3. Remove cheater panel.



4. Remove tweeter.

Refit

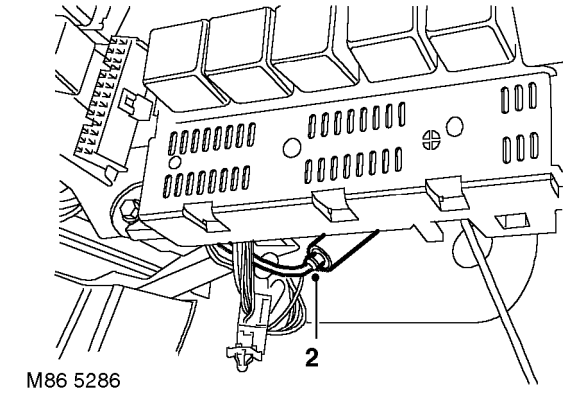
1. Fit tweeter to cheater panel.
2. Position cheater panel and connect Lucars.
3. Fit cheater panel to door.

Coaxial lead - extension

86.50.65

Remove

1. Remove radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.



2. Disconnect coaxial link lead from aerial lead.
3. Release coaxial link lead from harness.
4. Remove coaxial link lead.

Refit

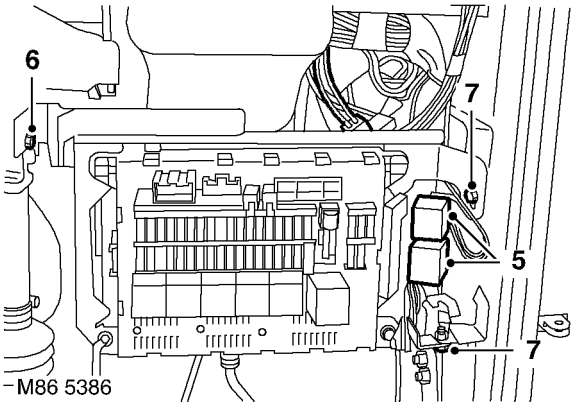
1. Fit coaxial link lead and secure to harness.
   WARNING: Ensure link lead does not foul control pedals or steering column.
2. Connect link lead to aerial lead.
3. Fit radio.
   IN CAR ENTERTAINMENT, REPAIRS, Radio.

Fuse box - passenger compartment

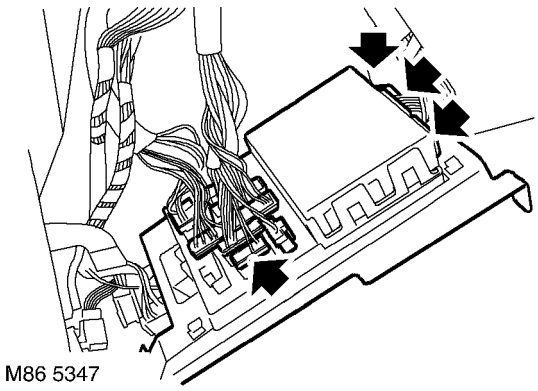
86.70.01

Remove

1. Disconnect battery earth lead.
2. Open glove box.
3. Remove hinge pins and lid.
4. Remove fuse box cover.



5. Remove relays from fuse box mounting plate.
6. Remove bolt securing fuse box mounting plate to steering column bracket.
7. Remove 2 bolts securing mounting plate to body.
8. Remove 2 bolts securing fuse box to mounting plate.



9. Disconnect 3 multiplugs from CCU in rear of fuse box.
10. Release fusebox and disconnect 8 multiplugs.
11. Remove fusebox.
12. Remove fuses and relays from fuse box.

Refit

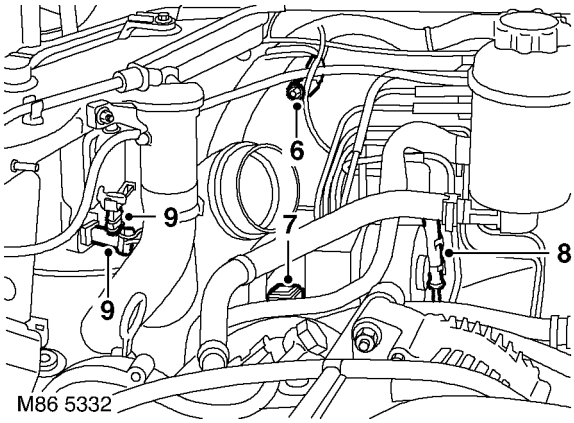
1. Identify and fit fuses.
2. Fit relays.
3. Fit fuse box.
4. Connect multiplugs to fusebox.
5. Connect multiplugs to CCU.
6. Fit bolts fuse box to mounting plate and tighten to 8 Nm (6 lbf.ft).
7. Fit bolts securing fuse box mounting plate to body and tighten to 8 Nm (6 lbf.ft).
8. Fit relays to mounting plate.
9. Fit fuse box cover.
10. Fit glove box lid and hinge pins.
11. Close lid.
12. Connect battery earth lead.

Harness - main

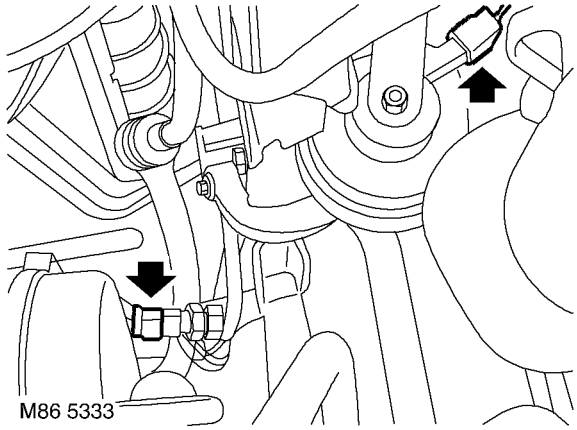
86.70.07

Remove

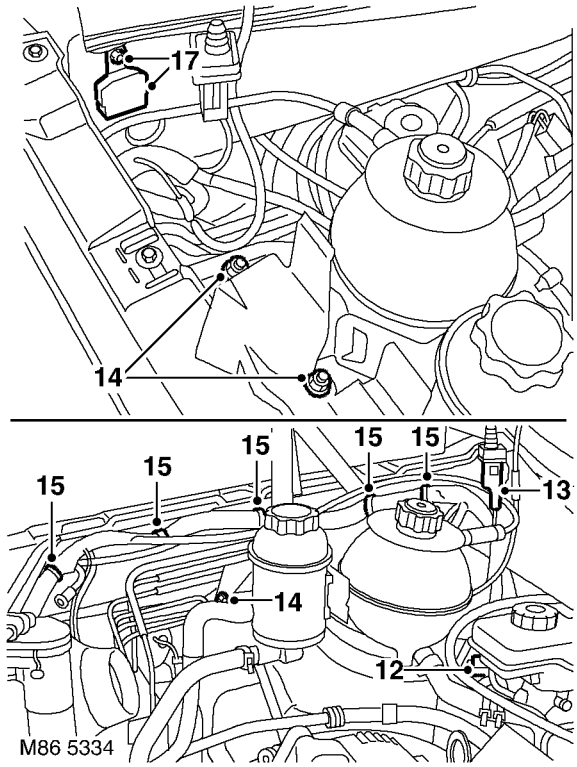
1. Make the SRS system safe.
   GENERAL INFORMATION, Supplementary restraint system precautions.
2. Remove carpet.
3. Remove engine acoustic cover.
   ENGINE - Td4, REPAIRS, Cover - engine acoustic.
4. Remove windscreen washer reservoir.
   WIPERS AND WASHERS, REPAIRS, Reservoir - washer.
5. Pull reservoir harness and washer tubes into engine bay.



6. Remove nut and release earth header from RH inner wing.
7. Disconnect multiplug from ABS modulator.
8. Disconnect multiplug from RH ABS speed sensor and release harness from clips.
9. Disconnect 2 multiplugs from RH headlamp and headlamp levelling motor.

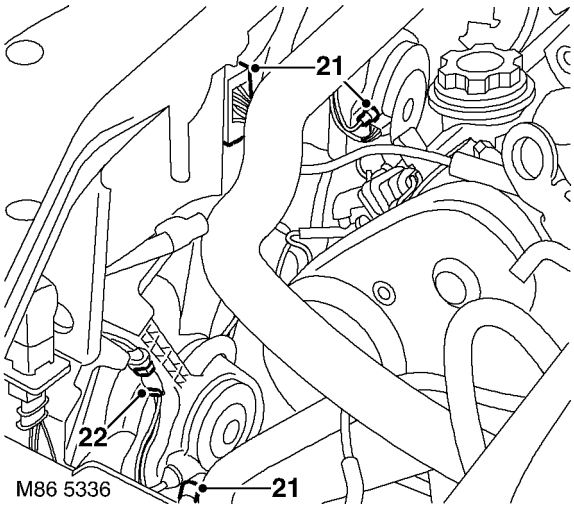


10. Disconnect multiplugs from horn, refrigerant pressure sensor and compressor.
11. Remove jack from holder in engine bay.

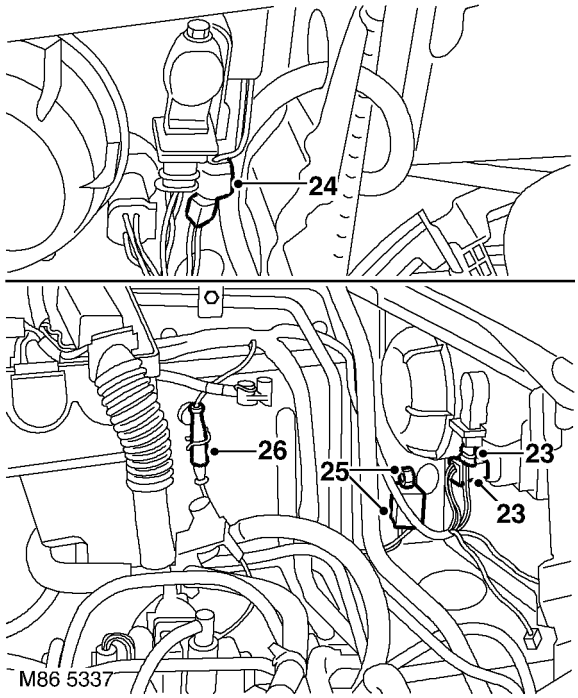


12. Disconnect multiplug from brake fluid low level indicator switch.
13. Disconnect multiplug from bonnet switch.
14. Remove bolt and 2 nuts securing PAS and coolant reservoir support bracket and position aside.
15. Release 5 harness retaining clips.
16. Release front screen wash tube from harness and position aside.
17. Remove nut securing earth header to bulk head and remove earth header.

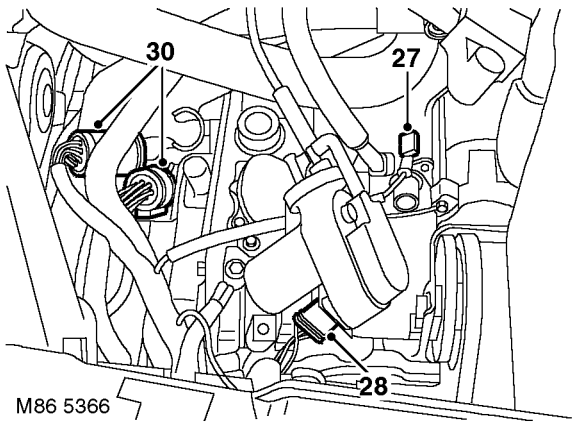
18. With assistance feed harness through bulk head into vehicle.
19. Remove battery carrier.
☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
20. Remove 3 cable ties and release bonnet release cable from harness.



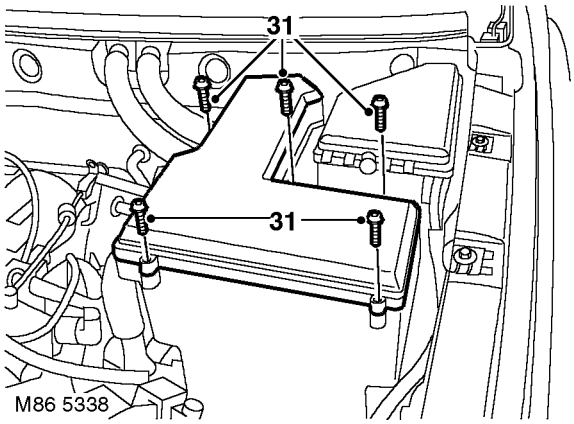
21. Disconnect multiplug from cooling fan pack and 2 multiplugs from cooling fans.
22. Release 4 clips securing harness to cooling fans and release harness from cooling fans.



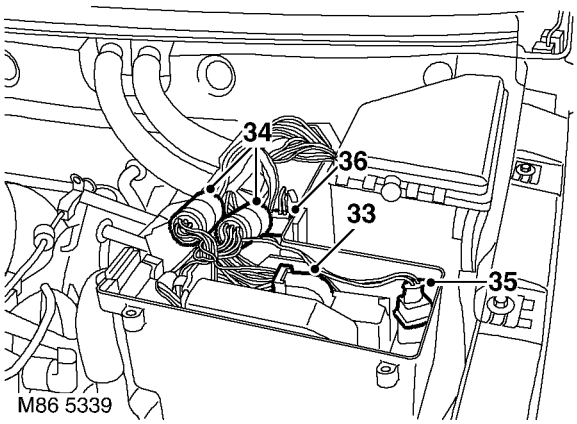
23. Disconnect 2 multiplugs from LH headlamp and headlamp levelling motor.
24. Disconnect multiplug from harness.
25. Remove nut securing LH earth header and release header.
26. Disconnect multiplug from front LH ABS speed sensor.



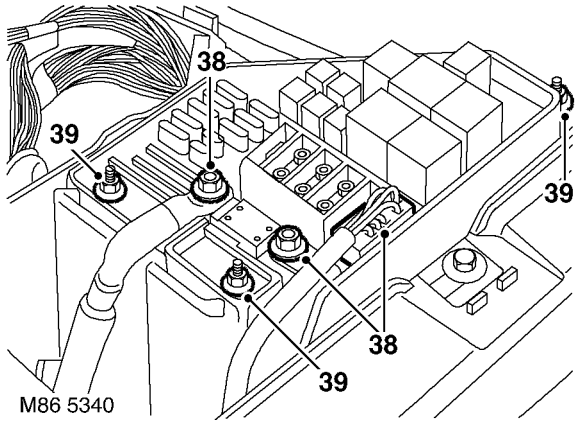
27. Disconnect Lucar connector from starter motor.
28. **Models with cruise control:**Disconnect multiplug from cruise control vacuum pump.
29. Release 5 harness retaining clips.
30. Disconnect 2 engine harness to main harness multiplugs.



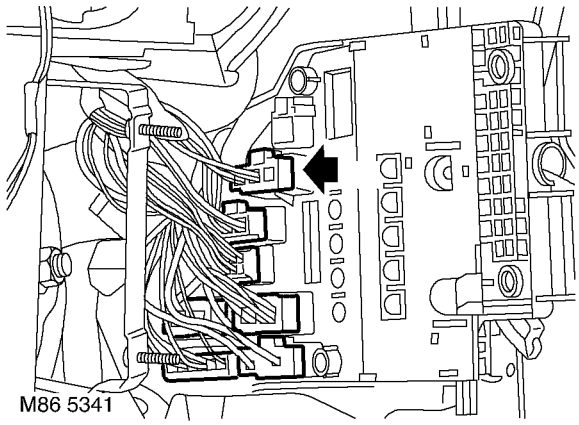
31. Release 5 Allen screws securing 'E' box cover to 'E' box.
32. Remove 'E' box cover



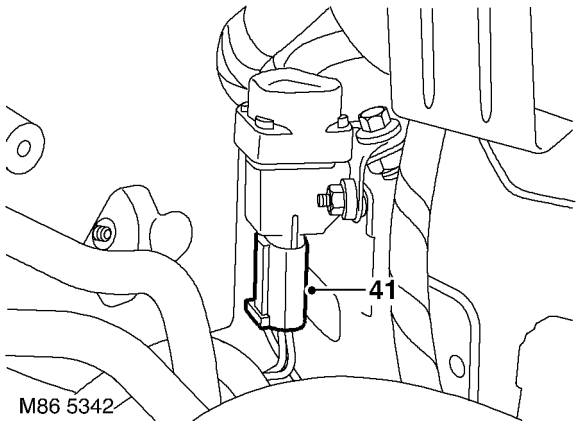
33. **Automatic gearbox only:** Disconnect multiplug from automatic gearbox ECU.
34. Disconnect 2 engine harness to main harness multiplugs.
35. Disconnect 'E' box temperature sensor multiplug.
36. Disconnect 'E' box cooling fan multiplug.
37. Remove fuse box cover.



38. Remove 2 bolts securing battery connections to fuse box and disconnect multiplug from fuse box.
39. Remove 3 nuts securing fuse box to brackets.

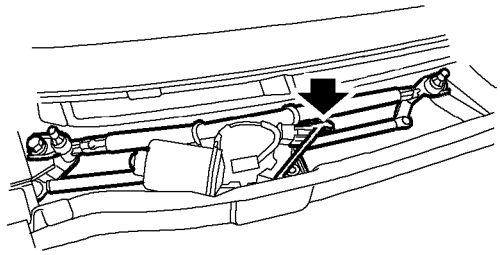


40. Disconnect 6 multiplugs from the underside of fusebox.



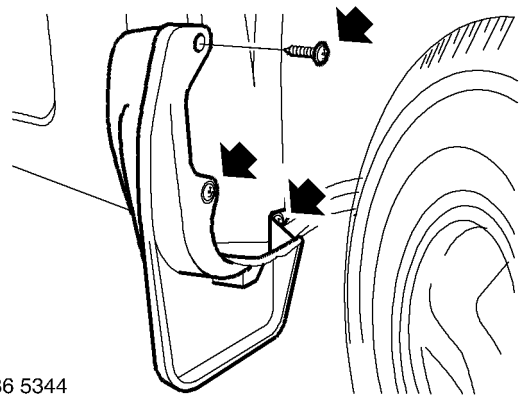
41. Disconnect multiplug from inertia switch.
42. Release 2 fixings securing harness to LH side of engine bay.

43. Remove air intake plenum.
☞ **HEATING AND VENTILATION, REPAIRS, Plenum - air intake.**



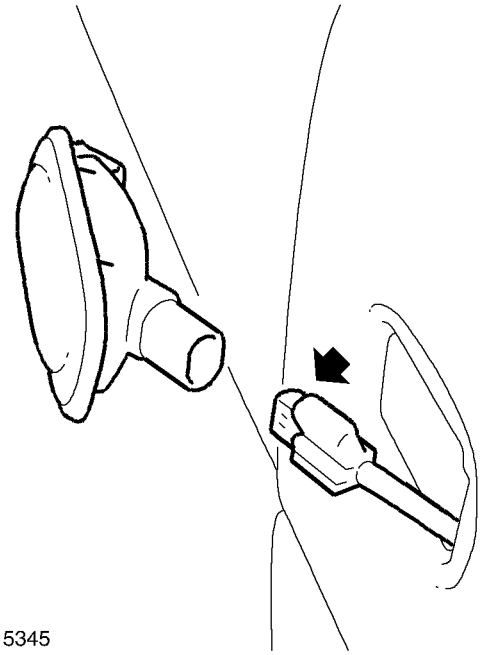
M86 5343

44. Disconnect multiplug from wiper motor and pull into engine bay.
45. With assistance pull main harness into vehicle interior.



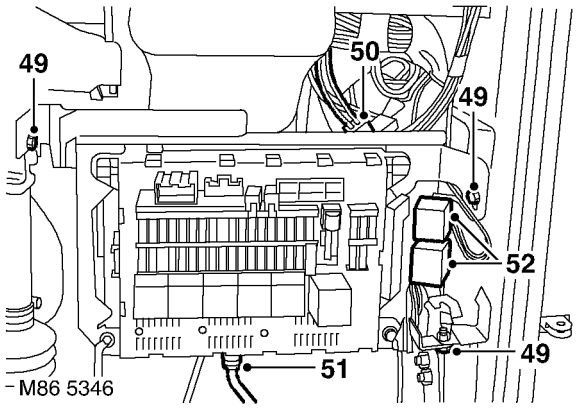
M86 5344

46. Remove 6 screws securing front mud flaps and remove mud flaps.
47. Release rear edges of front wheel arch liners.



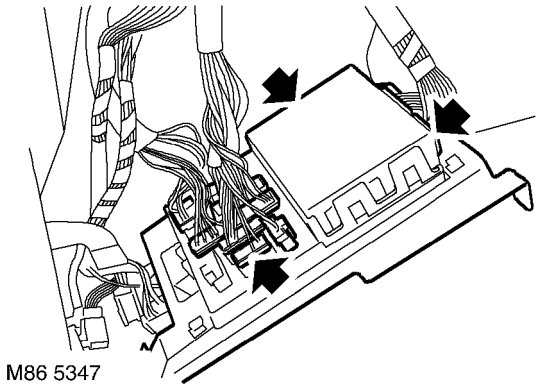
M86 5345

48. Release side repeater lamps, disconnect multiplugs and remove lamps.

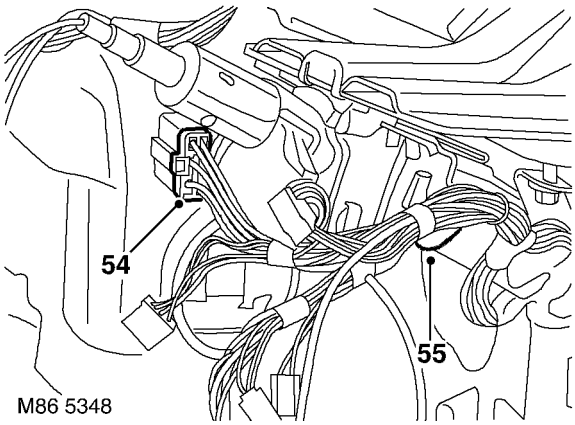


M86 5346

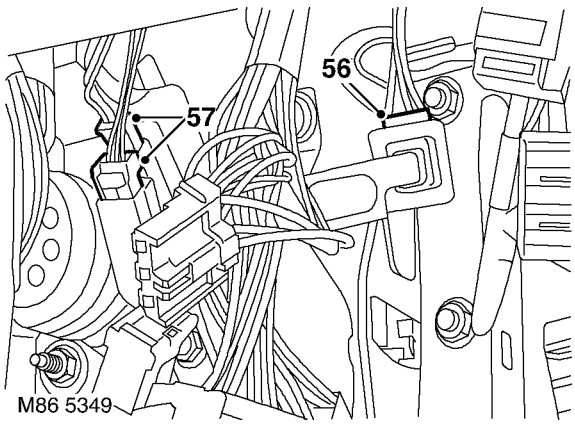
49. Remove 3 bolts from passenger compartment fuse box and pull fuse box forward.
50. Release and disconnect multiplug from RH 'A' post.
51. Disconnect coaxial cable.
52. Release relays from fuse box bracket.



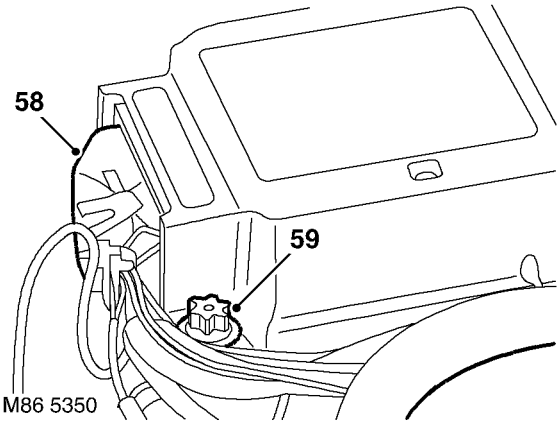
53. Release fuse box, disconnect 11 multiplugs and remove fuse box.



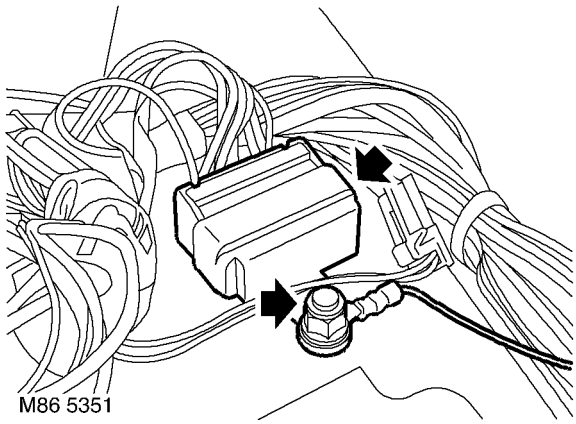
54. Disconnect multiplug from steering column switch.
55. Release harness clip from steering column.



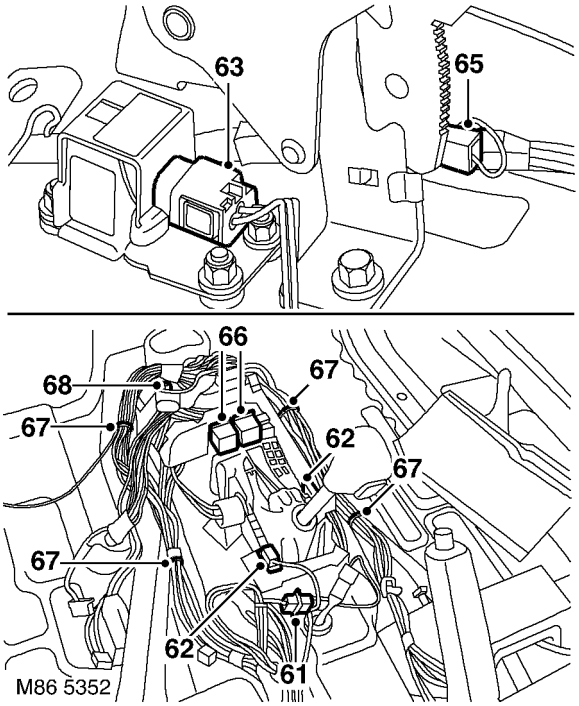
56. Disconnect multiplug from throttle position sensor.
57. Disconnect multiplugs from brake light switch and brake pedal position switch.



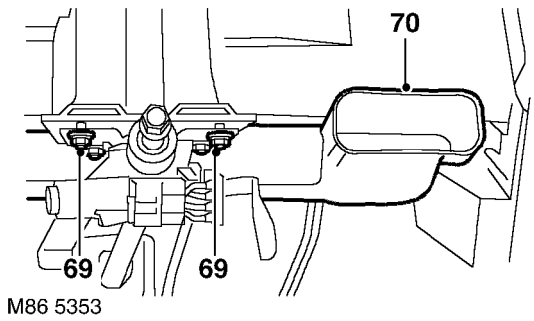
58. Disconnect multiplug from airbag ECU.
59. Remove airbag ECU securing bolt and release earth lead.



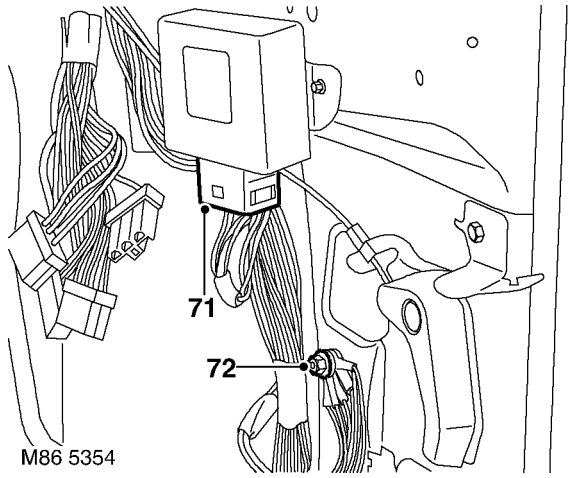
60. Remove nut from earth header and release header from floor tunnel.



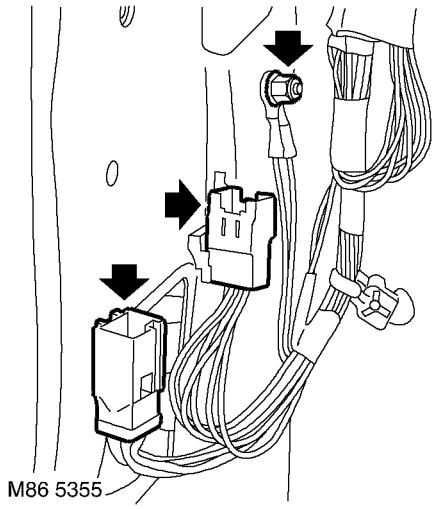
61. Disconnect heated oxygen sensor multiplug.
62. **Automatic gearbox only:** Disconnect multiplugs from gear selector.
63. Disconnect multiplug from accelerometer.
64. **Manual gearbox only:** Disconnect multiplug from gear lever hill descent switch.
65. Disconnect Lucar from handbrake switch.
66. Release 2 relays from bracket and remove bracket.
67. Release 4 clips securing harness to air ducting.
68. Remove nut from rear heater ducting and remove ducting.



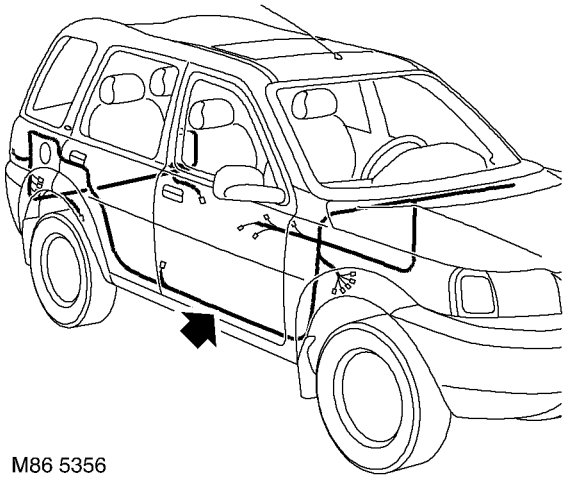
69. Remove 4 nuts securing steering column to bracket and lower column.
70. Remove face level vent ducting to access main harness clips.



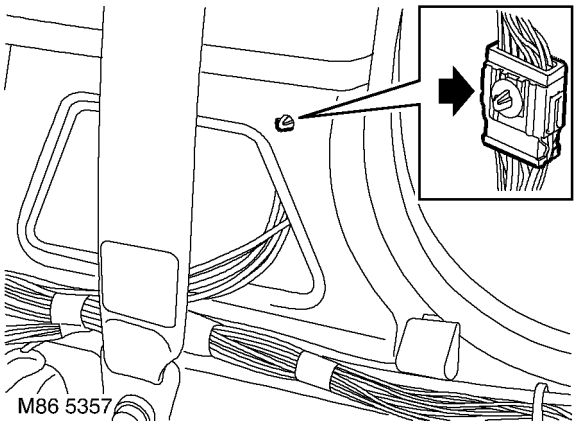
71. Disconnect multiplug from window lift ECU.
72. Remove nut securing earth header to RH 'A' post and release header.



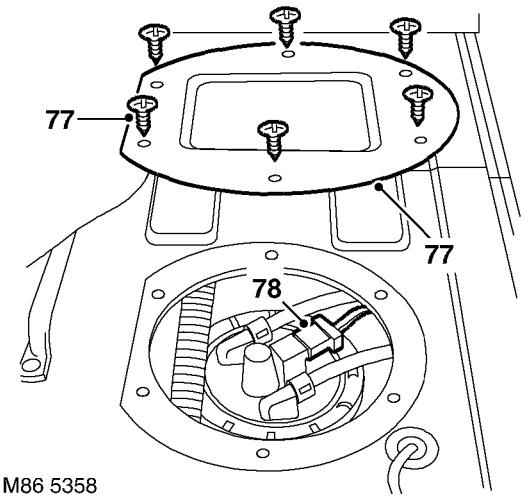
73. Release multiplugs and earth header from LH lower 'A' post.


M86 5356

74. Release all harness clips from interior of vehicle.

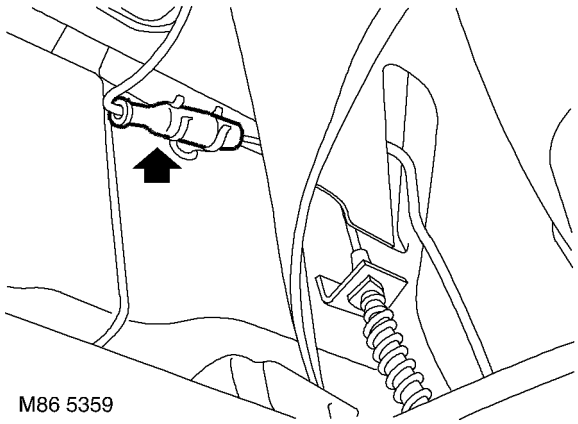

M86 5357

75. Release and disconnect multiplugs from base of 'B/C' posts.
76. Remove luggage compartment carpet.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**

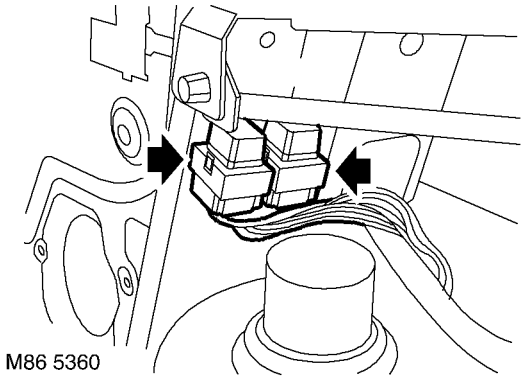


M86 5358

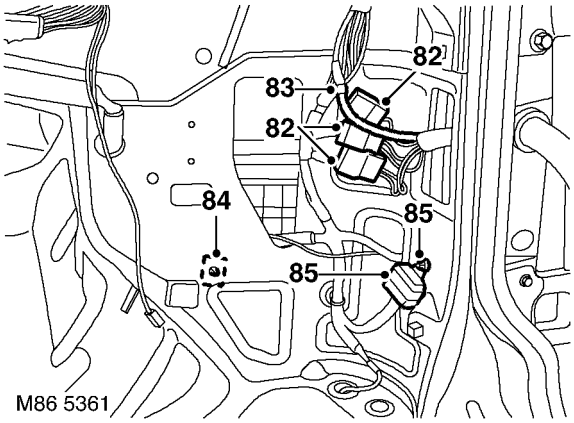
77. Remove 6 screws from fuel pump access cover and remove cover.
78. Disconnect multiplug from fuel pump.


M86 5359

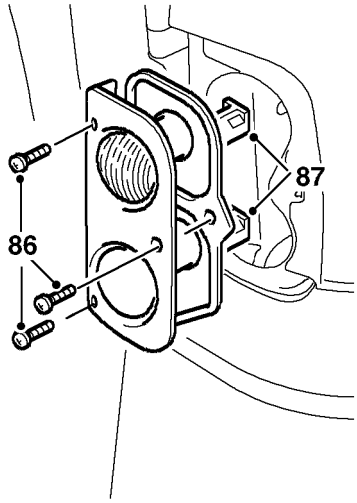
79. Release both rear ABS speed sensor harnesses and disconnect multiplugs.
80. Pull harness into vehicle interior.



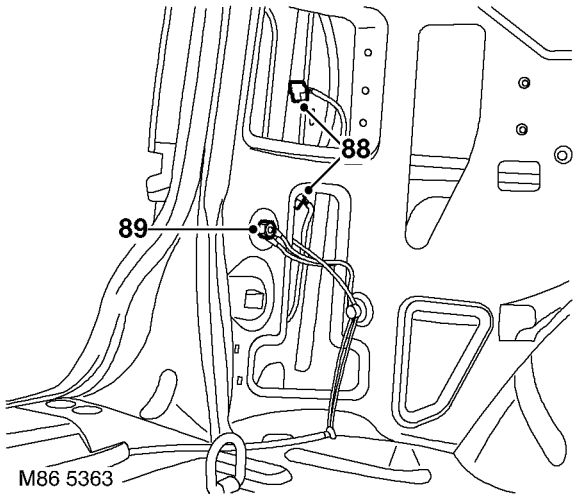
81. Release and disconnect rear window lift and wash/wipe relays.



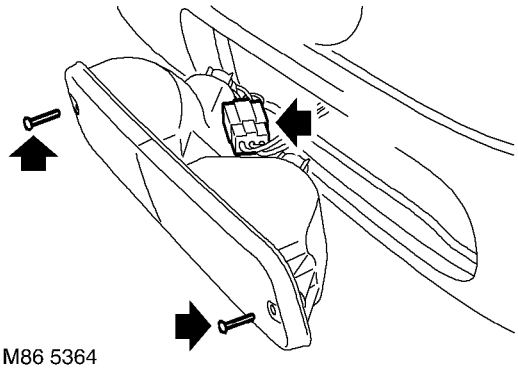
82. Disconnect 3 multiplugs from tail door harness.
83. Disconnect rear screen washer tube.
84. Disconnect multiplug from towing electrics.
85. Remove nut from RH rear earth header and release header.



86. Remove 3 Torx screws securing RH tail lamp to body.
87. Disconnect multiplugs and remove tail lamp.



88. Disconnect multiplugs from LH tail lamp.
89. Remove nut from LH rear earth header and release header.


M86 5364

90. Remove 4 screws from rear bumper lamps, release lamps and disconnect multiplugs.
91. Release harness clips and pull harness into luggage compartment.
92. Release main harness retaining clips and pull harness into vehicle interior.
93. Remove main harness.

Refit

1. Lay main harness in vehicle.
2. Locate rear section and secure in retaining clips.
3. Feed harness to rear bumper lamps, secure in clips and grommets.
4. Connect multiplugs to rear bumper lamps, fit rear lamps and secure with screws.
5. Fit LH rear earth header and secure with nut.
6. Connect multiplugs to LH tail lamp.
7. Position RH tail lamp and connect multiplugs.
8. Fit RH tail lamp and secure with Torx screws.
9. Fit RH rear earth header and secure with nut.
10. Connect multiplug to towing electrics.
11. Connect rear screen washer tube.
12. Connect tail door harness multiplugs.
13. Connect and fit rear window lift and wash/wipe relays.
14. Position harness into luggage compartment.
15. Connect both rear ABS speed sensor multiplugs and secure harness grommets.
16. Connect multiplug to fuel pump.
17. Fit fuel pump access cover and secure with screws.
18. Fit luggage compartment carpet.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Carpet - luggage compartment.**
19. Connect multiplugs at the base of 'B/C' Posts.
20. Fit all harness clips to interior of vehicle.
21. Fit multiplugs and earth header to LH lower 'A' post.
22. Fit earth header to RH lower 'A' post.
23. Connect multiplug to window lift ECU.
24. Fit face level vent ducting.
25. Fit steering column to bracket and secure with nuts.
26. Fit rear heater ducting and secure with nut.
27. Secure harness to rear heater ducting with clips.
28. Position mounting bracket and secure relays.
29. Connect Lucar to handbrake switch.
30. **Manual gearbox only:** Connect multiplug to gear lever hill descent switch.
31. Connect multiplug to accelerometer.
32. **Automatic gearbox only:** Connect multiplugs to gear selector.
33. Connect heated oxygen sensor multiplug.
34. Fit earth header to floor tunnel and secure with nut.
35. Fit earth lead to airbag ECU and secure with bolt.
36. Connect multiplug to airbag ECU.
37. Connect multiplugs to brake light switch and brake pedal position switch.
38. Connect multiplug to throttle position sensor.
39. Fit harness clip to steering column.
40. Connect multiplug to steering column switch.
41. Position fuse box to body and connect multiplugs.
42. Fit relays to fuse box bracket.
43. Connect coaxial cable.
44. Fit and connect multiplug to RH 'A' post.
45. Fit passenger compartment fuse box and secure with bolts.
46. Position side repeater lamps, connect multiplugs and fit to wings.
47. Secure rear edge of front wheel arch liners.
48. Fit front mud flaps and secure with screws.
49. With assistance feed harness through bulk head into engine bay.
50. Position harness to wiper motor and connect multiplug.
51. Fit air intake plenum.
☞ **HEATING AND VENTILATION, REPAIRS, Plenum - air intake.**
52. Secure harness to LH side of engine bay and secure fixings.
53. Connect multiplug to inertia switch.
54. Connect multiplugs to underside of fuse box.
55. Fit nuts securing fuse box to brackets.
56. Fit battery connections and multiplug to fuse box.
57. Fit fuse box cover.
58. Connect 'E' box cooling fan multiplug.
59. Connect 'E' box temperature sensor multiplug.
60. Connect engine harness multiplugs to main harness.
61. **Automatic gearbox only:** Connect multiplug to gearbox ECU.
62. Fit 'E' box cover and secure with Allen screws.

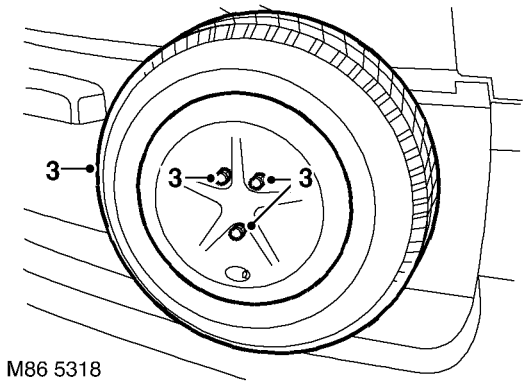
63. Connect engine harness multiplugs to main harness.
64. Fit harness retaining clips.
65. **Models with cruise control:** Connect multiplug to vacuum pump.
66. Connect Lucar connector to starter motor.
67. Connect multiplug to LH ABS speed sensor.
68. Fit LH earth header and secure with nut.
69. Connect multiplug to harness.
70. Connect multiplugs to LH headlamp and headlamp levelling motor.
71. Secure harness to cooling fan clips.
72. Connect multiplugs to cooling fan pack and cooling fans.
73. Position bonnet release cable to harness and secure with cable ties.
74. Fit battery carrier.
☞ **CHARGING AND STARTING, REPAIRS, Carrier - battery.**
75. With assistance feed harness through bulk head into engine bay.
76. Fit earth header to bulk head and secure with nut.
77. Fit front screen washer tube to harness.
78. Fit harness retaining clips.
79. Fit PAS and coolant reservoir support bracket and secure with bolt and nuts.
80. Connect multiplug to bonnet switch.
81. Connect multiplug to brake fluid low level indicator switch.
82. Fit jack to holder in engine bay.
83. Connect multiplugs to horn, refrigerant pressure sensor and compressor.
84. Connect multiplugs to RH headlamp and headlamp levelling motor.
85. Connect multiplug to RH ABS speed sensor and secure to clips.
86. Connect multiplug to ABS modulator.
87. Fit earth header to RH inner wing and secure with nut.
88. Position harness to windscreen washer reservoir.
89. Fit windscreen washer reservoir.
☞ **WIPERS AND WASHERS, REPAIRS, Reservoir - washer.**
90. Fit engine acoustic cover.
☞ **ENGINE - Td4, REPAIRS, Cover - engine acoustic.**
91. Fit carpet.

Harness - tailgate

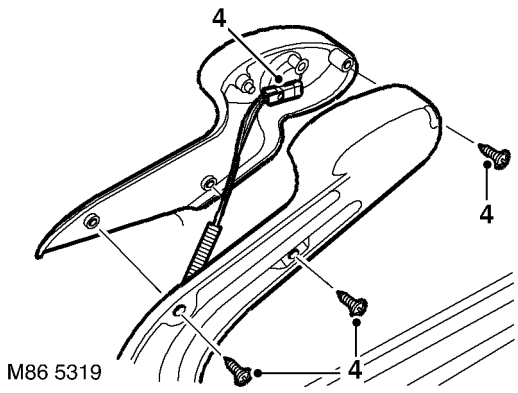
86.70.19

Remove

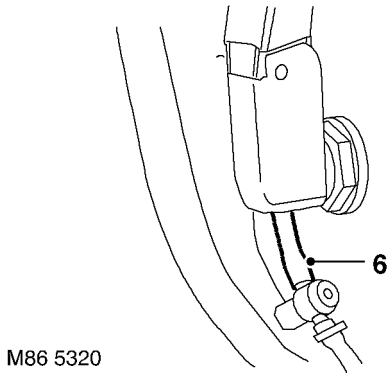
1. Remove RH rear quarter lower trim casing.
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**
2. Remove tail door plastic sheet.
☞ **DOORS, REPAIRS, Plastic sheet - tail door.**



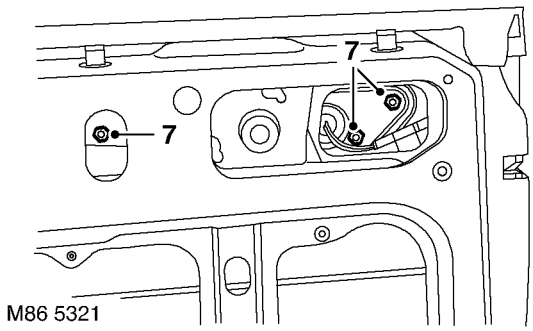
3. Remove 3 nuts and remove spare wheel.



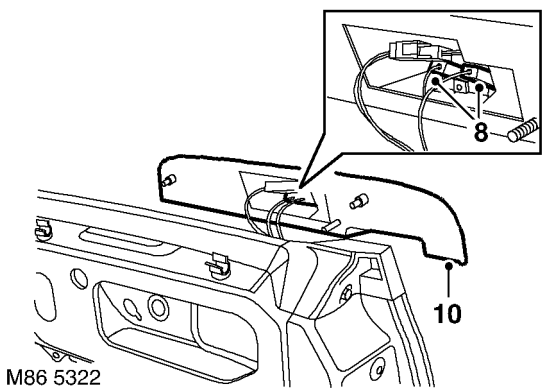
4. Remove 3 screws securing CHMSL, disconnect multiplug and remove CHMSL.
5. Release 2 harness clips.



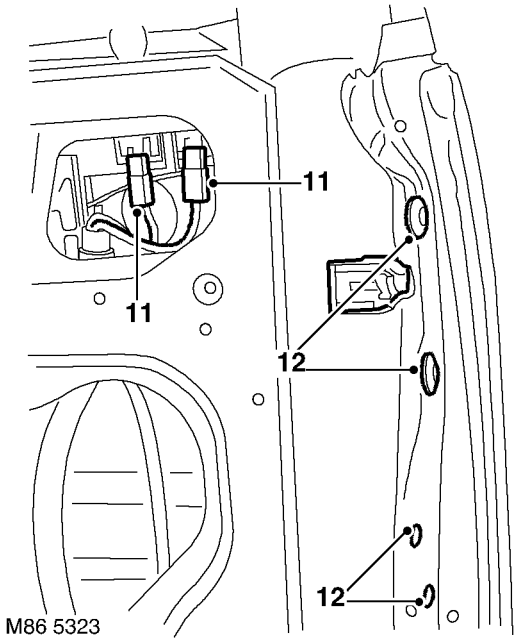
6. Disconnect rear washer tube from behind the spare wheel carrier.



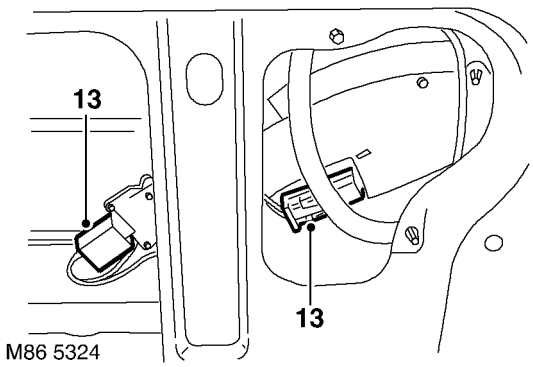
7. Remove 3 nuts from number plate lamp housing and release housing.



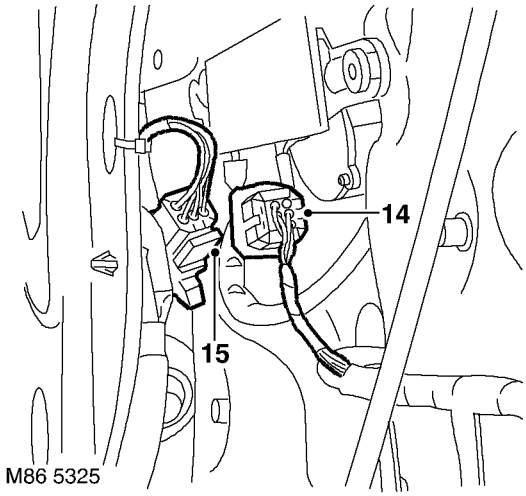
8. Disconnect 2 Lucars and multiplug from housing.
9. Collect 2 spacers and housing seal.
10. Remove housing.



11. Disconnect 2 Lucars from rear screen element.
12. Remove 4 screws from door latch, release door latch to access multiplugs and harness clips.

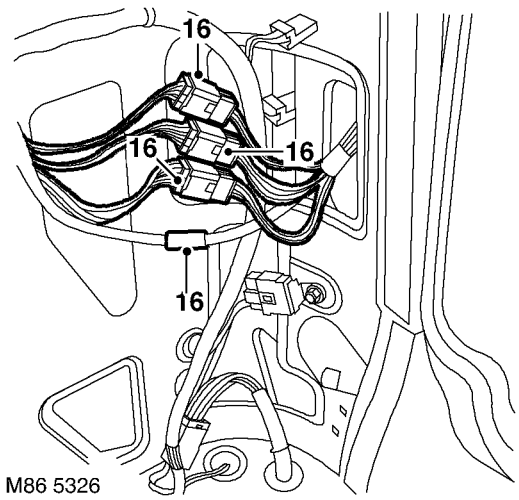


13. Disconnect 2 multiplugs from door lock.



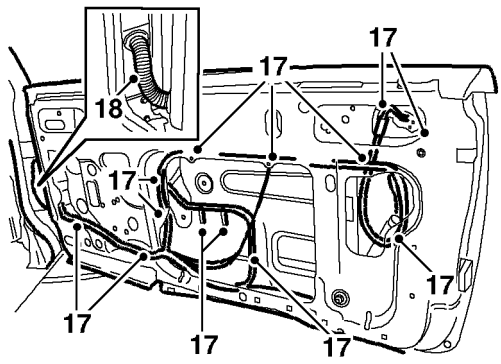
M86 5325

14. Disconnect multiplug from rear wiper motor.
15. Disconnect multiplug from rear window motor.



M86 5326

16. Release and disconnect 3 multiplugs and washer tube from main harness at 'E' post.



M86 5368

17. Release tail door harness from 13 retaining clips.
18. Release harness sheath from tail door and 'E' post.
19. Remove harness from vehicle.

Refit

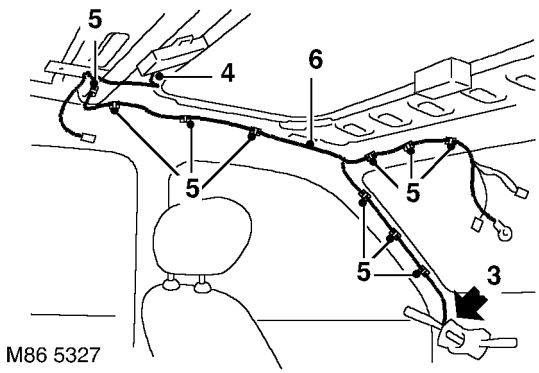
1. Position harness to vehicle and secure in retaining clips.
2. Secure harness sheath to tail door and 'E' post.
3. Connect multiplugs and washer tube to main harness, secure multiplugs to body.
4. Connect multiplugs to window motor, wiper motor and door lock.
5. Position door latch, fit and tighten screws.
6. Connect Lucars to heated rear screen.
7. Position number plate lamp housing, locate seal and fit spacers.
8. Connect multiplug and Lucars to housing.
9. Fit housing and secure with nuts.
10. Connect washer tube behind spare wheel carrier.
11. Secure harness clips to spare wheel carrier, connect multiplug to CHMSL, fit CHMSL and secure with screws.
12. Fit spare wheel and secure with nuts.
13. Fit tail door plastic sheet.
☞ **DOORS, REPAIRS, Plastic sheet - tail door.**
14. Fit rear lower trim casing .
☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Trim casing - rear quarter - lower - 5 door.**

Harness - interior lights - 5 door

86.70.44

Remove

1. Remove fascia.
   INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.
2. Remove headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.



M86 5327

3. Disconnect aerial connection and interior light harness from main harness.
4. Disconnect multiplug from volumetric sensor.
5. Release 10 harness clips.
6. Remove harness.

Refit

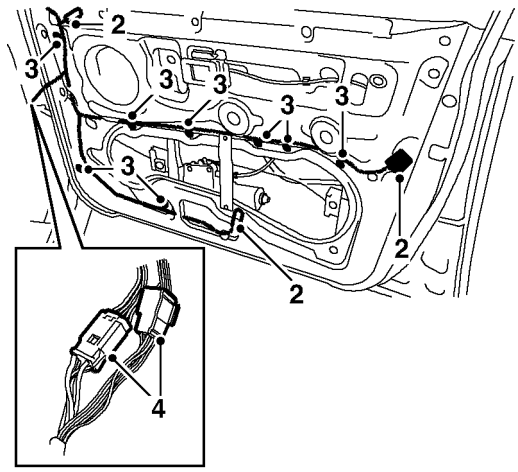
1. Position harness and secure harness clips.
2. Connect multiplug to volumetric sensor.
3. Connect multiplug and aerial connection to main harness.
4. Fit headlining.
   INTERIOR TRIM COMPONENTS, REPAIRS, Headlining - 5 door.
5. Fit fascia.
   INTERIOR TRIM COMPONENTS, REPAIRS, Fascia.

Harness - front door - 5 door

86.70.65

Remove

1. Remove front door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - 5 door.



M86 5328

2. Disconnect multiplugs from door lock, door mirror and window motor.
3. Release 8 clips securing door harness to door.
4. Release 2 multiplugs from location at base of 'A' post and disconnect multiplugs.
5. Release sheath from front edge of door, and pull harness from door.
6. Release sheath from 'A' post and pull harness from 'A' post.
7. Remove door harness.

Refit

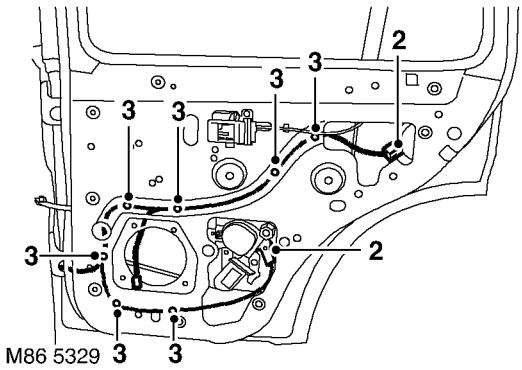
1. Position harness to 'A' post and feed harness partly into 'A' post.
2. Feed sheath onto harness and locate sheath to 'A' post.
3. Feed harness through front edge of door and secure sheath to door.
4. Connect and secure multiplugs at base of 'A' post.
5. Position harness to door and secure with clips.
6. Connect multiplugs to door mirror, door lock and window motor.
7. Fit front door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - front door - 5 door.

Harness - rear door

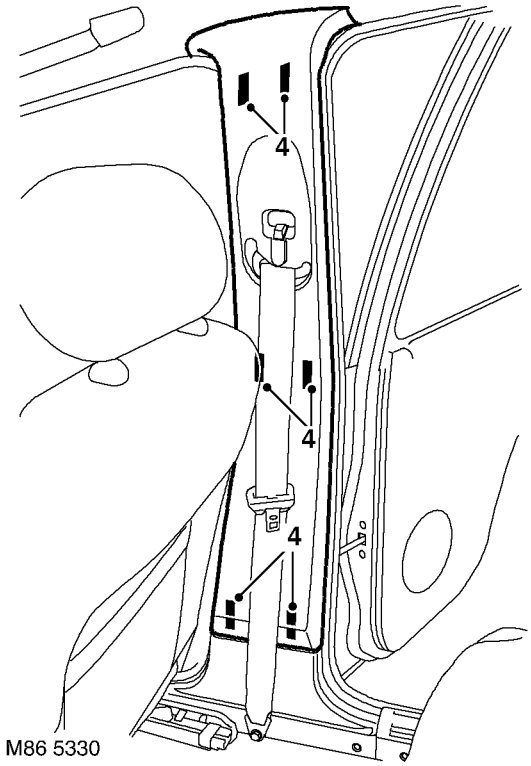
86.70.66

Remove

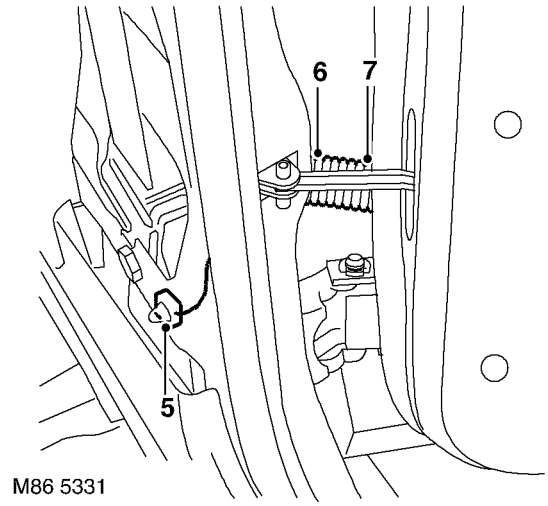
1. Remove rear door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - rear door.



2. Disconnect multiplugs from door latch and window lift motor.
3. Release 7 clips securing door harness to door.



4. Release 'B/C' post upper finisher from 6 clips and position aside.



5. Release multiplug from location at base of 'B/C' post and disconnect multiplug.
6. Release harness sheath from 'B/C' post and pull door harness through 'B/C' post.
7. Release sheath from front edge of door and pull harness into door.
8. Remove door harness.

Refit

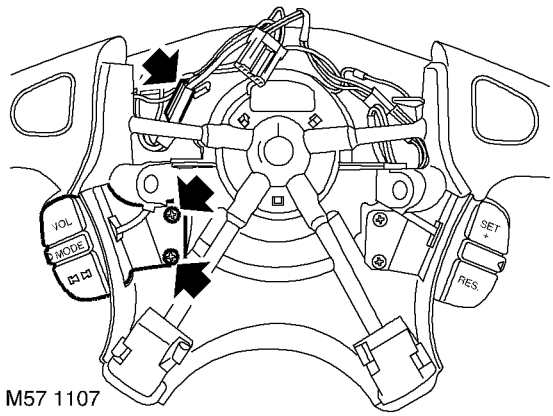
1. Position harness to door and secure with clips.
2. Connect multiplugs to door latch and window lift motor.
3. Feed harness through front edge of door and secure sheath to door.
4. Feed harness into 'B/C' post and secure sheath to 'B/C' post.
5. Connect and secure multiplug at base of 'B/C' post.
6. Position 'B/C' post upper finisher and secure with clips.
7. Fit rear door plastic sheet.
   DOORS, REPAIRS, Plastic sheet - rear door.

Switch - remote control - audio system

86.50.13

Remove

1. Remove drivers airbag.
   RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.



2. Release remote control switch leads and disconnect multiplug.
3. Remove 2 screws securing remote control switch and remove switch.

Refit

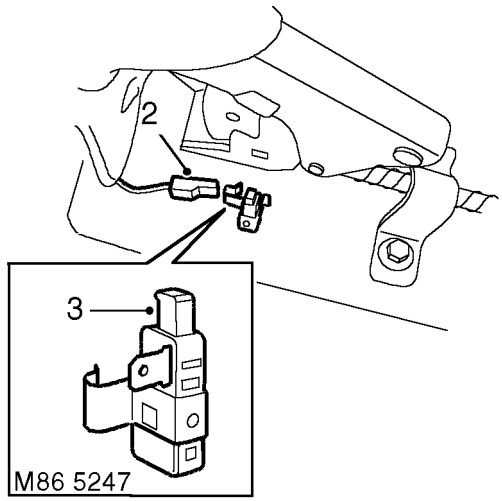
1. Fit remote control switch and secure with screws.
2. Connect switch multiplug and fit leads in clip.
3. Fit drivers airbag.
   RESTRAINT SYSTEMS, REPAIRS, Air bag - steering wheel.

Switch - handbrake warning

86.65.45

Remove

1. Remove rear console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.



2. Disconnect Lucar from handbrake warning switch.
3. Release switch from handbrake.

Refit

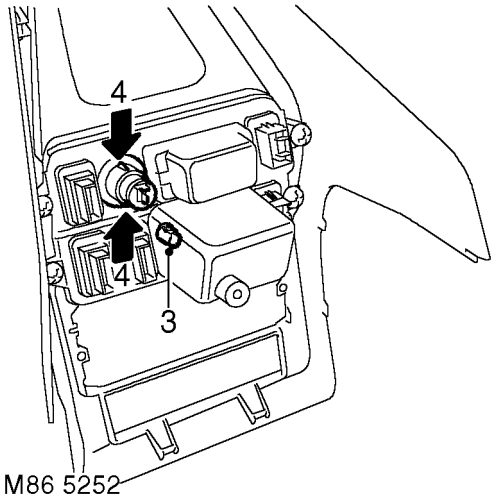
1. Fit switch to handbrake and connect Lucar.
2. Fit rear console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - rear.

Cigar lighter - front

86.65.60

Remove

1. Remove front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.
2. Remove cigar lighter element.



3. Remove bulb holder from lighter.
4. Release cigar lighter body from console and remove.

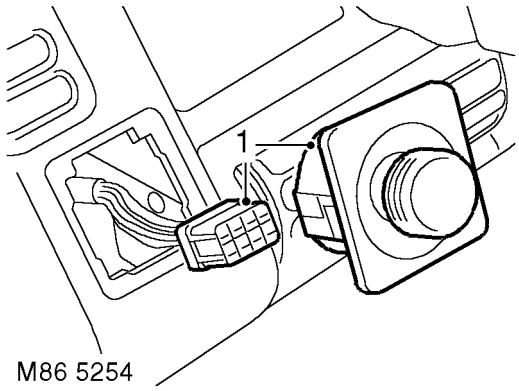
Refit

1. Fit and secure cigar lighter body to console.
2. Fit bulb holder to lighter.
3. Fit lighter element.
4. Fit front console.
   INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.

Switch - control - exterior mirror

86.65.75

Remove



1. Release mirror switch from fascia and disconnect multiplug.

Refit

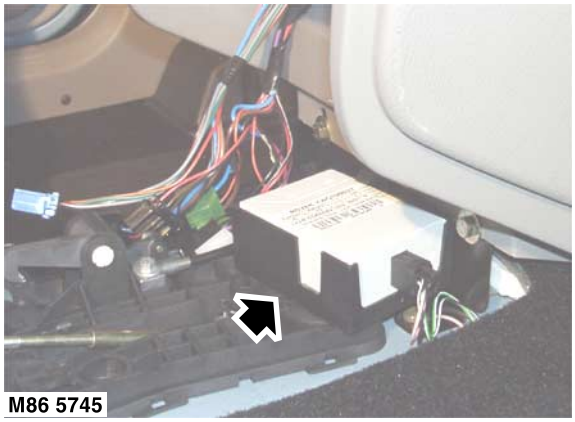
1. Position switch, connect multiplug and secure switch to fascia.

Interface unit - remote control

86.53.15

Remove

1. Remove front console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**


M86 5745

2. Release interface ECU from bracket, disconnect multiplug and remove ECU.

Refit

1. Secure interface ECU in bracket and connect multiplug.
2. Fit front console.
   ☞ **INTERIOR TRIM COMPONENTS, REPAIRS, Console - front.**

Display unit - navigation system

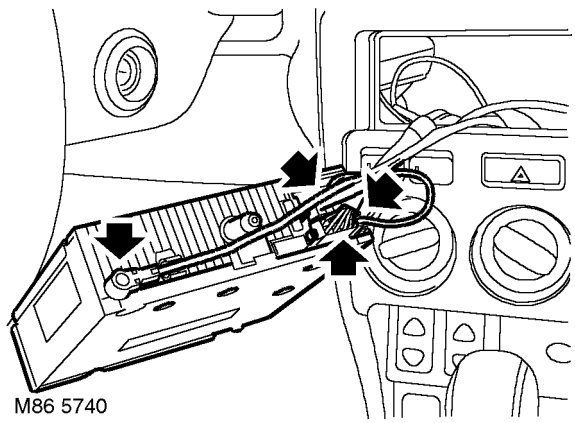
86.53.20

Remove


M86 5741

1. Fit tool **LRT-86-009** into slots, ensuring correct handed tool is in correct slot.
   The tools are stamped with 'TOP L' and 'TOP R', ensure the stampings are facing upwards when removing the unit.

2. Pull unit from fascia.


M86 5740

3. Disconnect 3 multiplugs and 2 coax cables, remove unit.
4. Push retaining clips inwards and remove keys.

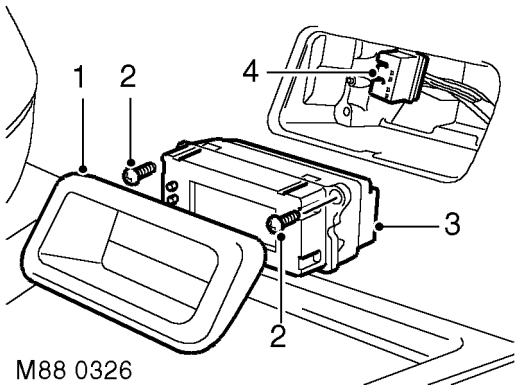
Refit

1. Position unit to fascia, connect multiplugs and coax cables.
2. Slide unit in fascia until retaining clips engage.
3. Enter security code, check system is operational.

Clock

88.15.07

Remove



M88 0326

1. Remove clock finisher from fascia.
2. Remove 2 screws securing clock to fascia.
3. Release clock to gain access to multiplug.
4. Disconnect multiplug and remove clock.

Refit

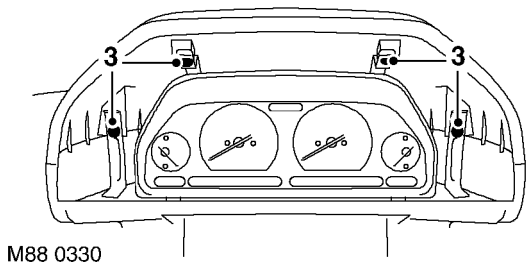
1. Position clock to fascia and connect multiplug.
2. Fit and tighten screws securing clock to fascia.
3. Fit clock finisher to fascia.

Instrument panel

88.20.01

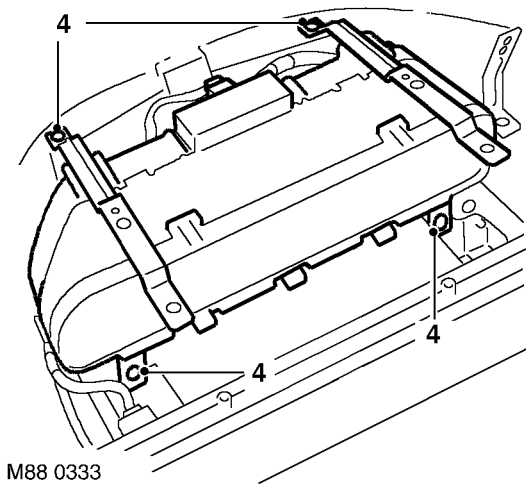
Remove

1. Make the SRS system safe.
   GENERAL INFORMATION, Supplementary restraint system precautions.
2. Remove instrument cowl.
   INSTRUMENTS, REPAIRS, Cowl - instrument.



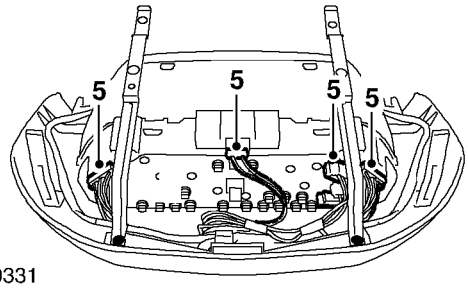
M88 0330

3. Remove 4 screws and remove instrument panel upper cover.



M88 0333

4. Remove 4 screws securing instrument panel to fascia.



M88 0331

5. Disconnect 4 multiplugs and remove instrument panel.

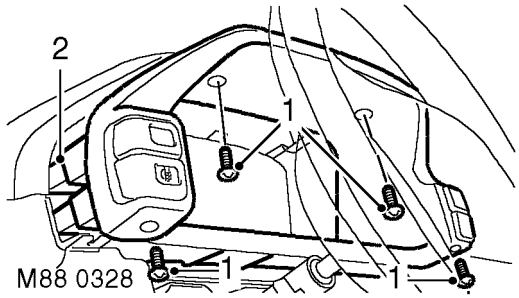
Refit

1. Position instrument panel and connect multiplugs.
2. Fit instrument panel to fascia and secure with screws.
3. Fit instrument panel upper cover and secure with screws.
4. Fit instrument cowl.
   ☞ **INSTRUMENTS, REPAIRS, Cowl - instrument.**
5. Connect battery leads, earth lead last.

Cowl - instrument

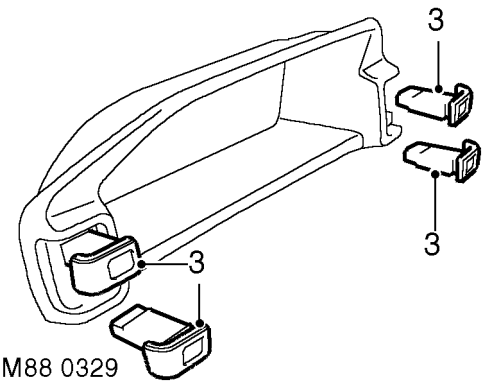
88.20.02

Remove



M88 0328

1. Remove 4 screws and release instrument cowl.
2. Disconnect multiplugs from switches in instrument cowl and remove cowl.



M88 0329

3. Remove switches and switch blanks from cowl.

Refit

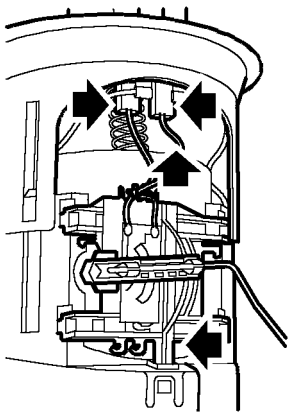
1. Fit switches and switch blanks to cowl.
2. Position cowl and connect multiplugs to switches.
3. Fit cowl and tighten screws.

Sender unit - fuel tank gauge

88.25.32

Remove

1. Disconnect battery earth lead.
2. Remove fuel pump assembly.
   ☞ FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.
   ☞ FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Pump - integral - fuel tank - rear.
   WARNING: Fuel vapour is highly flammable and in confined spaces is also explosive and toxic. Always have a fire extinguisher containing foam, CO_2, gas or powder close at hand when handling or draining fuel.



M19 3246

3. Disconnect 2 Lucars from top of pump unit assembly.
4. Release sprag clip securing sender to pump unit assembly.
5. Remove sender unit.

Refit

1. Position sender to location slots and engage sprag clip.
   CAUTION: Ensure that each of the 4 location lugs on the sender are engaged with corresponding slots in the tank unit.
2. Connect Lucars to top of pump unit assembly.
3. Fit fuel pump assembly.
   ☞ FUEL DELIVERY SYSTEM - PETROL, REPAIRS, Pump - fuel.
   ☞ FUEL DELIVERY SYSTEM - DIESEL, REPAIRS, Pump - integral - fuel tank - rear.
4. Connect battery earth lead.