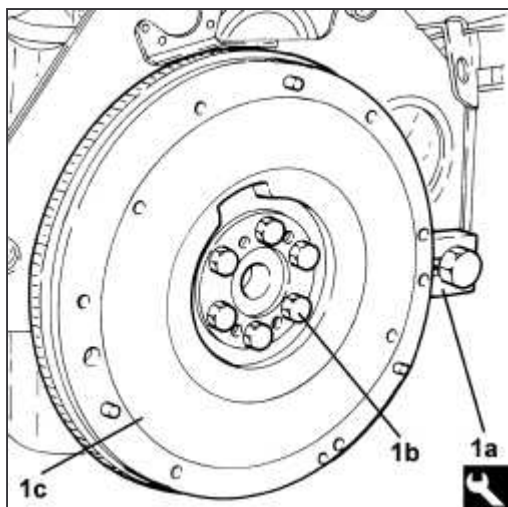


ENGINE - POSITION ON STAND AND REMOVE 1004D40

1. Fit the flywheel retaining tool (1a), unscrew bolts (1b) and remove the engine flywheel (1c)



Tool	Description	Function	Validity
1860846000	Counter-torque	Flywheel lock	

- Remove the flywheel lock.

Tool	Description	Function	Validity
1860846000	Counter-torque	Flywheel lock	

- Remove the centring bush guard.

- Fit the mount on the crankcase.

Tool	Description	Function	Validity
1871000000	Overhaul stand	Engine overhaul	

- Using the tool and a hydraulic lift, place the engine on the overhaul stand.

Tool	Description	Function	Validity
	Overhaul	Engine	

1871000000	stand	overhaul	
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- Support the engine using the tools and a hydraulic lift.
- Undo the bolts fixing the engine block to the overhaul stand support.
- Position the flywheel guard and fit the engine flywheel.
- Fit the flywheel lock.

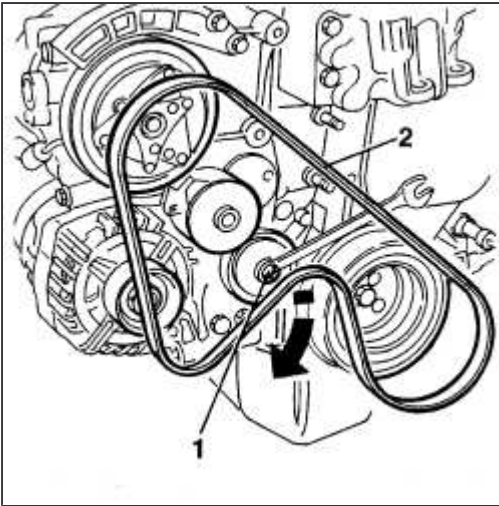
Tool	Description	Function	Validity
1860846000	Counter-torque	Flywheel lock	

- Tighten the new bolts securing the engine flywheel to the recommended torque.

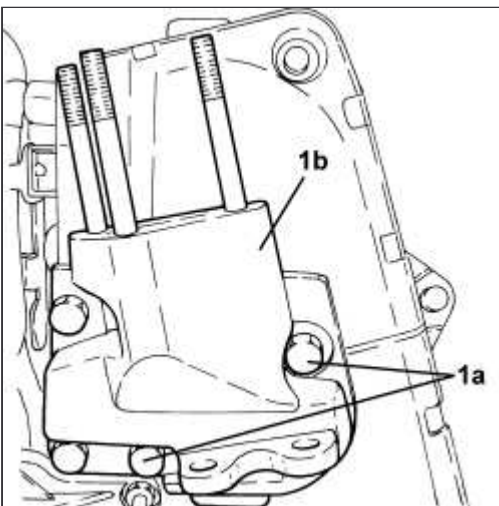
Component	Fastening	dia	Value (daNm)	Validity
Engine flywheel	Bolt (to be replaced)	M8	4.0 ÷ 4.8	1.2 8v 1.4 8v 1.3 Multijet

**ENGINE, REMOVED - REMOVE CYLINDER HEAD
AND OIL SUMP FOR INSPECTION - INCLUDES POSITIONING ON STAND AND
REMOVAL 1004E10**

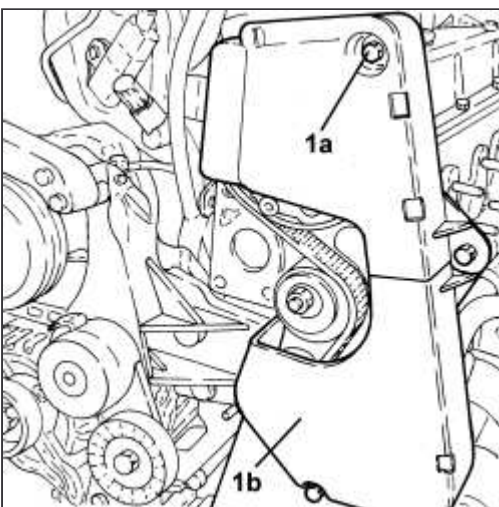
1. Turn the wrench clockwise on the auxiliary drivebelt tensioner.
2. Remove the auxiliary drivebelt.



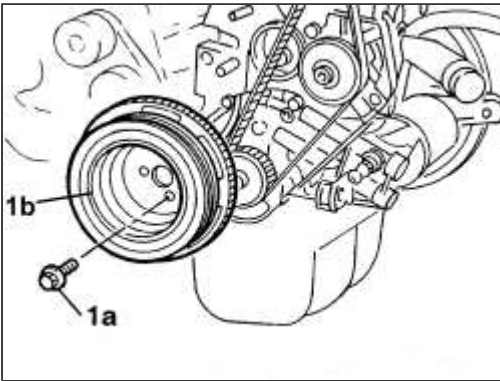
1. Undo the bolts (1a) and timing side power unit rigid mount (1b).



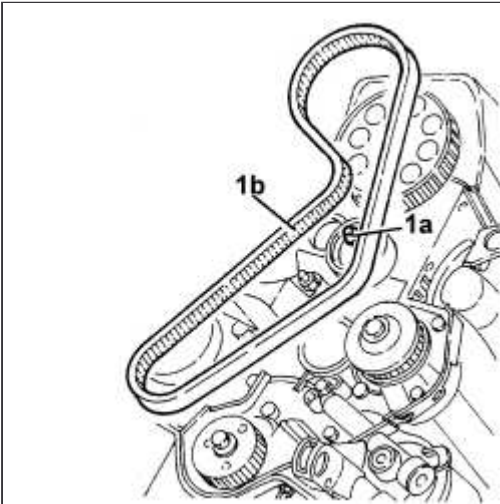
1. Undo the bolts (1a) and remove the protective timing covers.



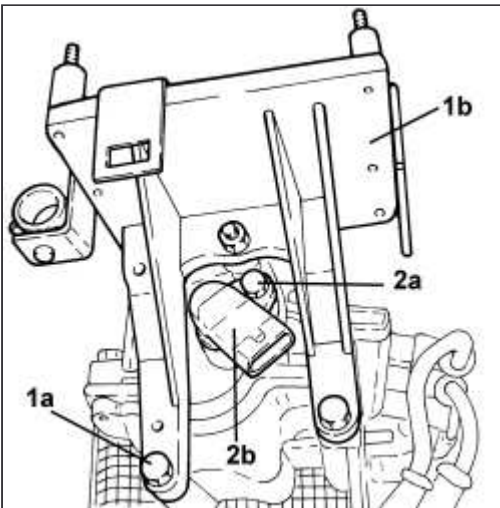
1. Undo the bolts (1a) and remove the engine pulley (1b).



1. Adjust the belt tensioner (1a) and remove the timing belt (1b).



- Disconnect the electrical connection for the water temperature sensor.



	Description	Connector
-	Engine coolant temperature sensor/sender unit	_ See K036 ENGINE COOLANT TEMPERATURE SENSOR/SENDER UNIT

- Disconnect the electrical connection for the timing sensor.

	Description	Connector
-	Timing sensor	_ See K047 TIMING SENSOR

- Disconnect the electrical connection from the ignition coil module.

	Description	Connector
-	Ignition coil	_See A030 IGNITION COIL

- Disconnect the electrical connection for the throttle body.

	Description	Connector
-	Integrated throttle casing actuator	_See N075 THROTTLE BODY ACTUATOR

- Disconnect the electrical connection for the knock sensor.

	Description	Connector
-	Detonation sensor	_See K050 DETONATION SENSOR

- Disconnect the air conditioner compressor activation electrical connection.

	Description	Connector
-	Air conditioning compressor engagement solenoid	_See L021 AIR CONDITIONING COMPRESSOR ENGAGEMENT SOLENOID VALVE

- Disconnect the earth lead from the crankcase.

	Description	Connector
-	Earth on engine	_See C040 ENGINE EARTH

- Disconnect the electrical connection for the absolute pressure sensor.

	Description	Connector
-	Absolute pressure sensor	_See K048 ABSOLUTE PRESSURE SENSOR

- Disconnect the electrical connection for the air pressure/temperature sensor.

	Description	Connector
-	Air pressure/temperature sensor	_See K044 AIR PRESSURE - TEMPERATURE SENSOR

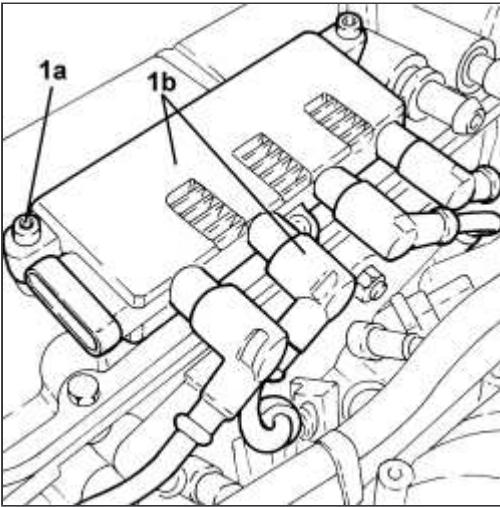
- Disconnect the electrical connection for the variable valve timing electromagnet.

	Description	Connector
-	Variable valve timing actuator	_See N076 PHASE TRANSFORMER ACTUATOR

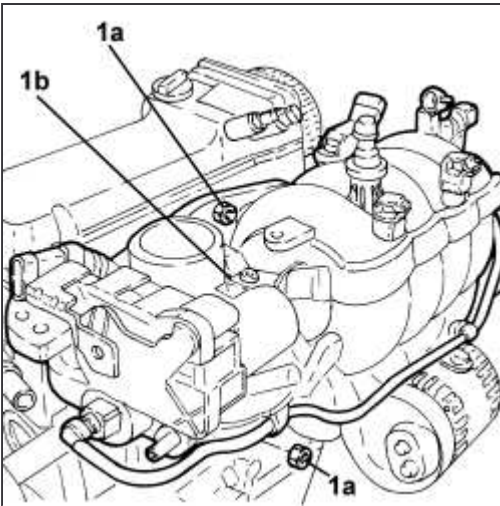
1. Undo bolts (1a) and remove the injection control unit mount (1b).

2. Undo bolts (2a) and remove the timing sensor (2b).

1. Undo the bolts (1a) and remove the ignition coil module (1b).



1. Undo the nuts (1a) and remove the intake chamber (1b).

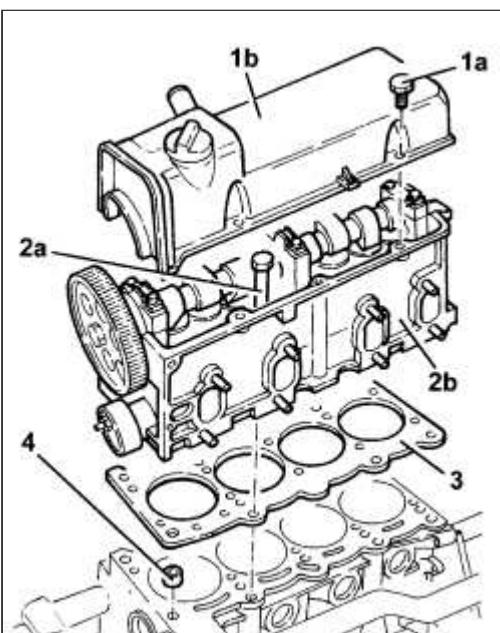


1. Undo the bolts (1a) and remove the cam cover (1b).

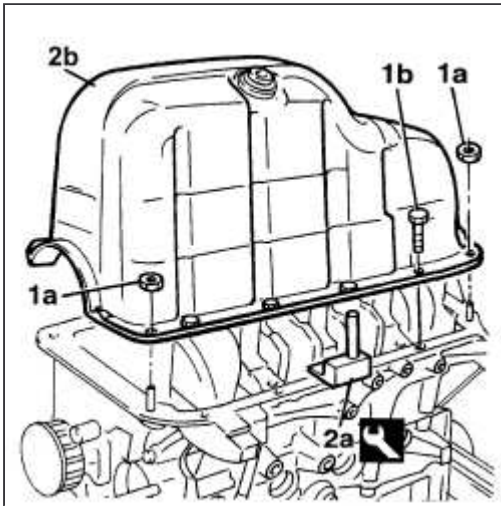
2. Undo the bolts (2a) and remove the cylinder head (2b).

3. Remove the cylinder head gasket from the crankcase.

4. Remove the locating bushes.



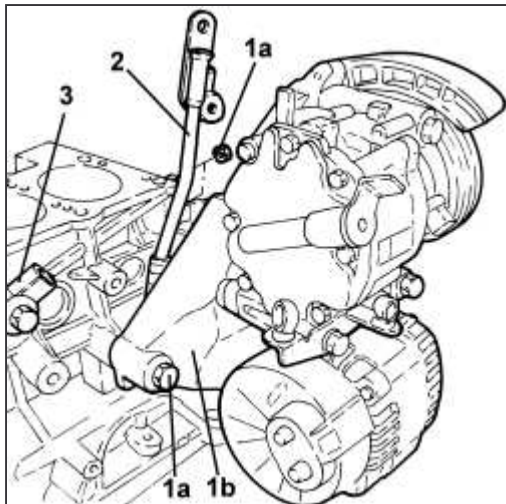
- Turn the engine through 180° on the overhaul stand.



1. Undo the nuts (1a) and bolts (1b) securing the sump to the crankcase.
2. Remove the sealant using tool (2a) and remove the engine oil sump (2b).

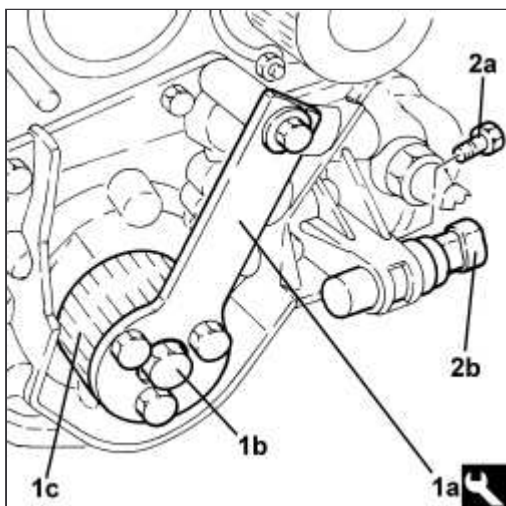
Tool	Description	Function	Validity
1870718000	Blade	Cut sealant	

ENGINE - DISMANTLE AND REASSEMBLE
FOLLOWING OPERATION 1004E10 - WASH AND CHECK DISMANTLED PARTS
- REFIT CYLINDER HEAD AND OIL SUMP - DOES NOT INCLUDE REPAIRS TO
CYLINDER HEAD AND AUXILIARY UNIT 1004E20



Removing ([Refitting](#))

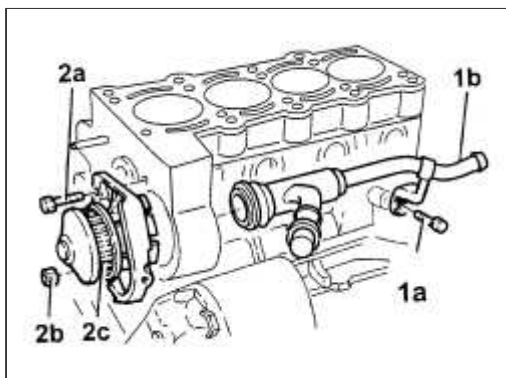
1. Undo the fastenings (1a) and remove the support complete with compressor and alternator (1b).
2. Remove the engine oil dipstick tube.
3. Undo the bolt and remove the detonation sensor.



1. Fit the tool (1a), unscrew the bolt (1b) and remove the crankshaft gear (1c).

Tool	Description	Function	Validity
2000004500	Template	Crankshaft timing	1.2 8v
			1.4 8v
			1.4 16v

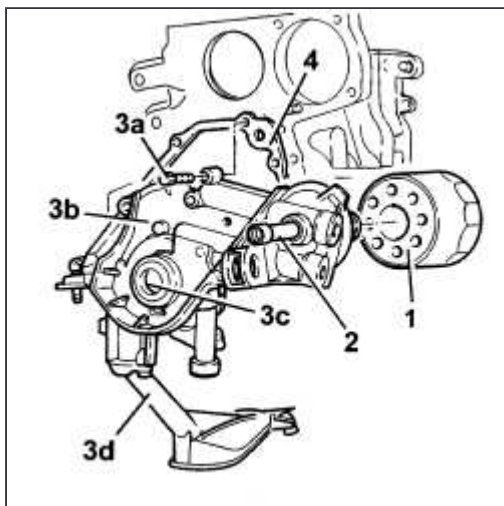
2. Undo the bolt (2a) and remove the rpm sensor (2b).



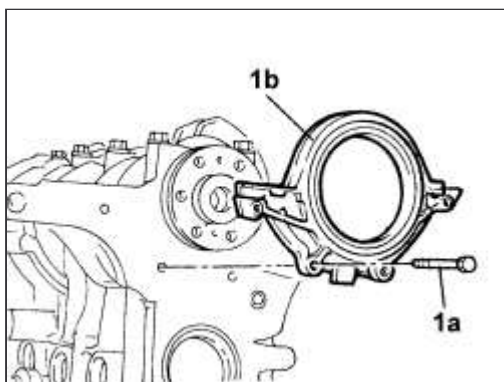
1. Undo the bolts (1a) and remove the rigid water return pipe to the pump (1b).

2. Undo the bolts (2a), nuts (2b) remove the water pump (2c).

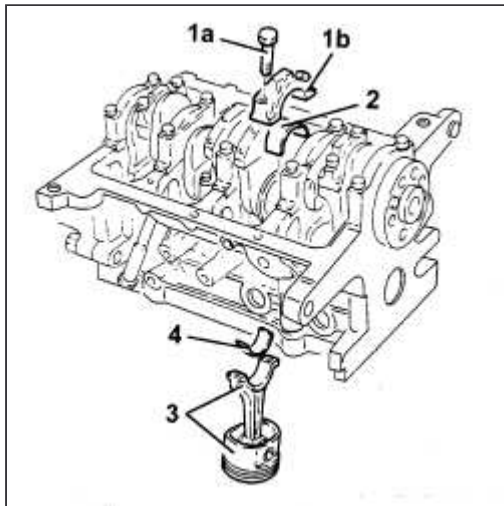
1. Remove the oil filter cartridge.
2. Remove the minimum engine oil pressure switch.



3. Undo the bolts (3a) and remove the engine block front cover (3b) with the built-in oil pump complete with crankshaft front oil seal (3c) and intake chamber (3d).
4. Remove the engine block front cover gasket.

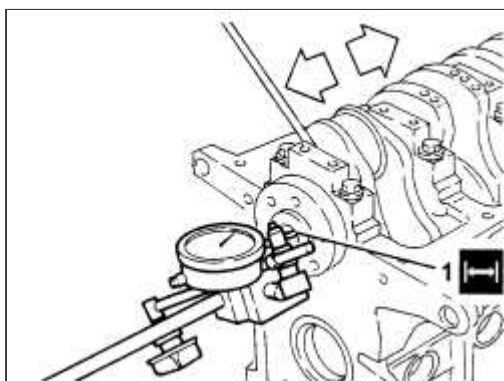


1. Undo the bolts (1a) and remove the crankshaft rear cover (1b).



1. Undo the bolts (1a) and remove the connecting rod cap (1b).
2. Remove the lower crankpin half-bearings.
3. Remove the connecting rod - piston assemblies.
4. Remove the upper connecting rod half-bearings.

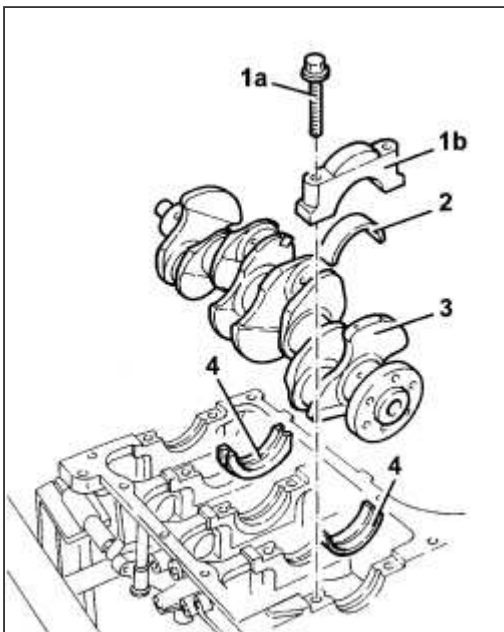
- Carry out the same operations for removing the remaining pistons.



1. Check that the crankshaft endfloat is within specified limits.

Measurement	Value	Validity
Crankshaft endfloat (mm)	0.055 ÷ 0.265	1.2 8v
		1.4 8v

1.3 Multijet

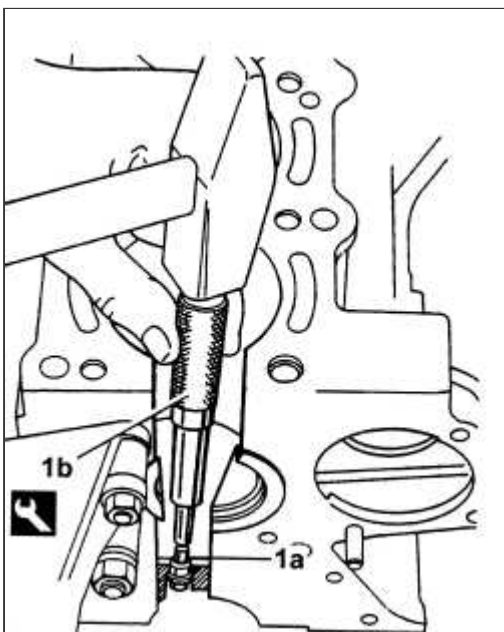


- If the value for the crankshaft endfloat does not correspond with the recommended figures, when refitting, regrind the crankcase seat and use suitable thrust washers (fastened to the central main bearing half) oversized by 0.127 mm.

1. Undo the bolts (1a) and remove the connecting rod caps (1b).
2. Remove the lower main journal half-bearings.
3. Remove the crankshaft.
4. Remove the upper main journal half-bearings.


 The central main bearing half incorporates the crankshaft thrust ring halves.

[Op. 1084B18 ENGINE OIL PUMP, REMOVED - CHECK AT BENCH](#)



- Unscrew the coolant chamber plugs from the crankcase.
- Remove the lubrication duct plug from the crankcase.
- Check the condition of the piston cooling oil sprays.

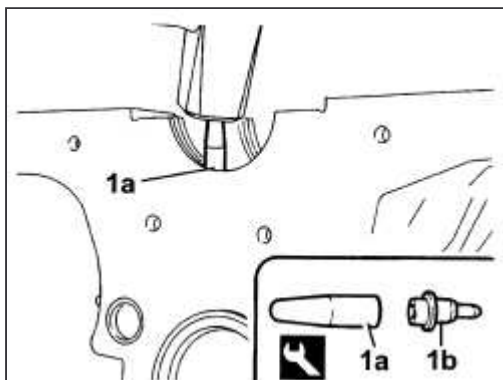
1. If oil sprays (1a) are blocked, remove them using tool (1b).

 Insert the drift guide hole on the nozzle surface to prevent the drift from slipping and damaging the cylinder liner during the removal operation.

Tool	Description	Function	Validity
1860395000	Drift	Engine oil jet removal	1.2 8v
			1.4 8v
			1.4 16v

 Refitting ([Removing](#) )

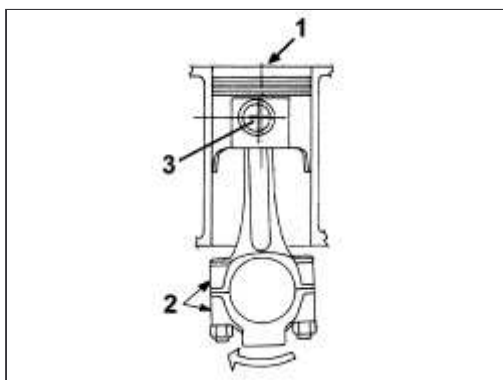
- Wash and check the appearance of all compents removed.
- Tighten the water/oil sealing plugs to the upper crankcase.



1. Use the tool (1a) to fit new oil sprays (1b).

Tool	Description	Function	Validity
1860313000	Fitting tool	Engine oil jet fitting	1.2 8v
			1.4 8v
			1.4 16v

- Check that the planarity of the cylinder head support surface corresponds to the recommended figure; if this is not the case, regrind the cylinder head support surface.



Measurement	Value	Validity
Cylinder head support surface flatness (mm)	< 0.1	1.2 8v
		1.4 8v
		1.4 16v
		1.9 Multijet

- Measure the diameter of the cylinder bores and check that they correspond to the recommended figures.

Measurement	Value	Validity
Cylinder liner diameter - Grade A (mm)	72.000 ÷ 72.010	1.4 8v
		1.4 16v
Measurement	Value	Validity
Cylinder liner diameter - Grade B (mm)	72.010 ÷ 72.020	1.4 8v
		1.4 16v

Measurement	Value	Validity
Cylinder liner diameter - Grade C (mm)	72.020 ÷ 72.030	1.4 8v 1.4 16v

- Check that the ovality of the cylinder liners is within the recommended limits.

Measurement	Value	Validity
Cylinder liner ovality (mm)	+/- 0.05	1.2 8v 1.4 8v 1.4 16v

- Check that the taper of the cylinder liners/bores is within the recommended limits.

Measurement	Value	Validity
Cylinder liner taper (mm)	+/- 0.005	1.2 8v 1.4 8v 1.4 16v

- If the cylinder bore, taper or ovality measurements are not within the recommended limits, ream the cylinder bores following the recommended oversizes.



In the case of reaming, all the bores must have the same oversize.

Measurement	Value	Validity
		1.2 8v

Cylinder liner diameter oversize (mm)	0.1	1.4 8v
		1.4 16v
		1.3 Multijet
		1.9 Multijet

- Check that the diameter of the main journals corresponds to the recommended figures.

Measurement	Value	Validity
Main journal diameter - Category A (mm)	47.997 ÷ 48.003	1.4 8v 1.4 16v
Measurement	Value	Validity
Main journal diameter - Category B (mm)	47.988 ÷ 47.994	1.4 8v 1.4 16v
Measurement	Value	Validity
Main journal diameter - Category C (mm)	47.982 ÷ 47.988	1.4 8v 1.4 16v

- If the diameter of the main journals is not correct, they should be reground to the recommended undersize.



Because the crankshaft has undergone nitriding, this treatment should be repeated and the size re-checked if it is ground.

Measurement	Value	Validity
		1.2 8v

Main journal diameter undersize (mm)	0.127	1.4 8v
		1.4 16v
		1.3 Multijet

- Check that the diameter of the crankpins corresponds to the recommended figures.

Measurement	Value	Validity
Crankpin diameter (mm)	41.990 ÷ 42.008	1.2 8v
		1.4 8v
		1.4 16v

- If the diameter of the crankpins is not correct, they should be reground to the recommended undersize.

 Because the crankshaft has undergone nitriding, this treatment should be repeated and the size re-checked if it is ground.

Measurement	Value	Validity
Crankpin diameter undersize (mm)	0.127	1.2 8v
		1.4 8v
		1.4 16v
		1.3 Multijet
		1.9 Multijet

- Fit the crankshaft into its seat on the crankcase.

- Fit the calibrated wire (plastigage) for measuring the main journal backlash.

- Refit the connecting rod caps complete with half-bearings and secure them by tightening the bolts to the recommended torque.

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Component	Fastening	dia	Value (daNm)	Validity
Bearing caps	Bolt	M10	$1.9 \div 2.1 + 90^\circ \pm 3^\circ$	1.2 8v 1.4 8v

- Check that the diameter of the main journals corresponds to the recommended figures.

Measurement	Value	Validity
Main journal seat diameter - Category 1 (mm)	$51.705 \div 51.709$	1.2 8v 1.4 8v
Measurement	Value	Validity
Main journal seat diameter - Category 2 (mm)	$51.709 \div 51.713$	1.2 8v 1.4 8v
Measurement	Value	Validity
Main journal seat diameter - Category 3 (mm)	$51.713 \div 51.717$	1.2 8v 1.4 8v

- The size of the main journal half-bearings is given.

Measurement	Value	Validity
Main journal half-bearings - Category 1 (Red)	$1.836 \div 1.840$	1.2 8v 1.4 8v

(mm)		1.4 16v
Measurement	Value	Validity
Main journal half-bearings - Category 2 (Blue) (mm)	1.843 ÷ 1.847	1.2 8v 1.4 8v 1.4 16v
Measurement	Value	Validity
Main journal half-bearings - Category 3 (Yellow) (mm)	1.848 ÷ 1.852	1.2 8v 1.4 8v 1.4 16v
Measurement	Value	Validity
Main journal half-bearing thickness oversize (mm)	0.254 ÷ 0.508	1.4 8v

- Remove the main bearing caps and check the main journal backlash. Use an appropriate gauge to measure the width of the plastigage.



Check one main journal at a time, without rotating the crankshaft.

Measurement	Value	Validity
Clearance between main bearings - crankshaft main journals (mm)	0.025 ÷ 0.040	1.2 8v 1.4 8v 1.4 16v

- After checking all the main journals, refit the main bearing caps with half-bearings and secure by tightening the bolts to

the specified torque.

Component	Fastening	dia	Value (daNm)	Validity
Bearing caps	Bolt	M10	1.9 ÷ 2.1 + 90° +/- 3°	1.2 8v 1.4 8v

Op. 1028H54 PISTON WITH CONNECTING ROD - DISMANTLING AT THE BENCH

- Clean any carbon residues carefully from the pistons.

- Check that the outer diameter of the pistons corresponds to the recommended figures; if not, replace the piston complete with piston rings and gudgeon pin.

Measurement	Value	Validity
Piston outer diameter -Grade A (mm)	71.960 ÷ 71.970	1.4 8v 1.4 16v
Measurement	Value	Validity
Piston outer diameter - Grade B (mm)	71.970 ÷ 71.980	1.4 8v 1.4 16v
Measurement	Value	Validity
Piston outer diameter - Grade C (mm)	71.980 ÷ 71.990	1.4 8v 1.4 16v



Measure perpendicular to the gudgeon pin axis, 9 mm from the lower edge of the skirt.

- Position the piston in the cylinder liner and use a feeler

gauge to measure the specified clearance.

- Check that the pin seat bore diameter is within specified values, otherwise replace the pin with an oversized pin.

Measurement	Value	Validity
Gudgeon pin housing diameter in pistons (mm)	17.982 ÷ 17.986	1.2 8v 1.4 8v
Measurement	Value	Validity
Piston gudgeon pin diameter oversize (mm)		1.2 8v 1.4 8v

- Check that the outer diameter of the gudgeon pins is within the recommended limits; if not, replace the worn gudgeon pins.

Measurement	Value	Validity
Piston pin outer diameter (mm)	17.970 ÷ 17.974	1.2 8v 1.4 8v 1.4 16v

- Check that the piston ring seats are within the recommended values.

Measurement	Value	Validity
Piston ring seat in piston - 1st groove (mm)	1.020 ÷ 1.040	1.4 8v 1.4 16v

Measurement	Value	Validity
Piston ring seat in piston - 2nd groove (mm)	1.210 ÷ 1.230	1.4 8v 1.4 16v
Measurement	Value	Validity
Piston ring seat in piston - 3rd groove (mm)	2.010 ÷ 2.030	1.4 8v 1.4 16v

- Check that the thickness of the piston rings is within the recommended limits.

Measurement	Value	Validity
Cylinder compression 1st piston ring thickness (mm)	0.970 ÷ 0.990	1.4 8v 1.4 16v
Measurement	Value	Validity
Cylinder compression 2nd piston ring thickness (mm)	1.170 ÷ 1.190	1.4 8v 1.4 16v
Measurement	Value	Validity
Cylinder compression 3rd piston ring thickness (mm)	1.975 ÷ 1.990	1.4 8v 1.4 16v
Measurement	Value	Validity

Seal oversize (mm)	0.1	1.2 8v 1.4 8v 1.4 16v
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- Fit the sealing rings in the cylinder liner and check the gap between the seal ends is within specified limits. Otherwise replace the sealing rings.

Measurement	Value	Validity
Cylinder compression 1st piston ring gap (mm)	0.20 ÷ 0.40	1.4 8v
Measurement	Value	Validity
Cylinder compression 2nd piston ring gap (mm)	0.50 ÷ 0.70	1.4 8v
Measurement	Value	Validity
Cylinder compression 3rd piston ring gap (mm)	0.20 ÷ 0.40	1.4 8v

- Check that the mating clearance between the piston rings and the grooves on the piston is within specified limits.

Measurement	Value	Validity
Cylinder		1.4 8v

compression 1st piston ring endfloat (mm)	0.030 ÷ 0.070	1.4 16v
Measurement	Value	Validity
Cylinder compression 2nd piston ring endfloat (mm)	0.020 ÷ 0.060	1.4 8v 1.4 16v
Measurement	Value	Validity
Cylinder compression 3rd piston ring endfloat (mm)	0.020 ÷ 0.055	1.4 8v 1.4 16v

[Op. 1028H54 PISTON WITH CONNECTING ROD - DISMANTLING AT THE BENCH](#)

[Op. 1084B18 ENGINE OIL PUMP, REMOVED - CHECK AT BENCH](#)

- Fit the connecting rod-piston assemblies and align in accordance with the following references.

1. Piston class and arrow indicating timing side.
2. Area where the number of the matching cylinder liner is stamped.

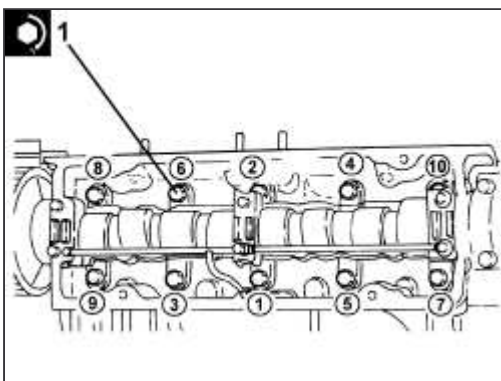
3. Piston pin offset

- Fit the connecting rod-piston assemblies with half-bearings using the tool to compress the piston rings and then fit the piston into the liner.


- Rotate the engine through 180° on the overhaul stand.


- Apply the calibrated wire (plastigate) for measuring the crankpin clearance.

- Refit the connecting rod caps complete with half-bearings and secure them by tightening the bolts to the recommended torque.



The connecting rod caps are fracture type. If replaced, they are supplied pre-fractured by the manufacturer.

 Check that the parts are free of burrs, blisters, scratches or any other surface defect. Before installation, parts must be thoroughly washed, cleaned and dried. Fit the connecting rod caps so that the number stamped on each cap faces towards the same side as the number stamped on the big end.

 Each connecting rod must be paired with its cap, respecting the numerical references stamped on the parts. Connecting rods and connecting rod caps are not interchangeable.

Component	Fastening	dia	Value (daNm)	Validity
Connecting rod big end bearing caps	Bolt	M8	$1.9 \div 2.1$ $+ 40^\circ \pm 2^\circ$	1.2 8v
				1.4 8v
				1.4 16v
				1.3 Multijet

- Check that the diameter of the crankpins corresponds to the recommended figures.

Measurement	Value	Validity
Crankpin seat diameter (mm)	$45.128 \div 45.138$	1.2 8v
		1.4 8v

- The size of the connecting rod half-bearings is given.

Measurement	Value	Validity
Connecting rod half-bearing	$1.544 \div 1.548$	1.2 8v
		1.4 8v

thickness (mm)		1.4 16v
Measurement	Value	Validity
Connecting rod half-bearing thickness oversize (mm)	0.254 ÷ 0.508	1.2 8v
		1.4 8v

- Remove the connecting rod caps and check the crankpin backlash. Use an appropriate gauge to measure the width of the plastigage.

Measurement	Value	Validity
Clearance between connecting rod bearings - crankpins (mm)	0.021 ÷ 0.060	1.2 8v
		1.4 8v



Check one crankpin at a time, without rotating the crankshaft.

- If the value measured is not within the recommended figures, replace the connecting rod bearings.

- Refit the connecting rod caps complete with half-bearings and secure them by tightening the bolts to the recommended torque.

Component	Fastening	dia	Value (daNm)	Validity
Connecting rod big end bearing caps	Bolt	M8	1.9 ÷ 2.1 + 40° +/- 2°	1.2 8v
				1.4 8v
				1.4 16v
				1.3 Multijet

- Position a new oil pump gasket.
- Fit the front crankcase cover with built-in oil pump complete with intake chamber and secure by tightening bolts to the specified torque.
- Fit the engine oil filter.
- Fit the minimum engine oil pressure switch.
- Fit the oil seal to the crankshaft front cover using the tool.

Tool	Description	Function	Validity
1860903000	Fitting tool	Fitting crankshaft front oil seal	1.2 8v 1.4 8v

- Fit the crankcase rear cover and secure by tightening the bolts to the specified torque.

Component	Fastening	dia	Value (daNm)	Validity
Crankshaft to crankcase rear cover	Bolt	M6	0.8 ÷ 1.0	1.2 8v
				1.4 8v
				1.4 16v

- Fit a new rear camshaft oil seal using the tools.

Tool	Description	Function	Validity
1860879000	Grip	Fitting crankshaft rear oil seal	1.2 8v 1.4 8v
Tool	Description	Function	Validity

1860881000	Fitting tool	Fitting crankshaft rear oil seal	1.2 8v 1.4 8v
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- Fit the water pump and secure with the bolts and nut.

- Fit the rigid coolant return pipe to the pump and secure to the crankcase with the bolt.

- Fit the crankshaft gear.

- Position the tool and tighten the crankshaft gear bolt to the specified torque.

Tool	Description	Function	Validity	
2000004500	Template	Crankshaft timing	1.2 8v 1.4 8v 1.4 16v	
Component	Fastening	dia	Value (daNm)	Validity
Crankshaft gear	Bolt	M11	1.9 ÷ 2.1 + 90° +/- 3°	1.2 8v 1.4 8v

- Remove the tool fitted previously.

- Rotate the engine on the overhaul stand.


- Clean the crankcase and oil sump contact surfaces, removing the silicon sealant residues.

- Apply the silicone sealant continuously without any breaks over the entire perimeter of the crankcase sump.



Join the end to the beginning seamlessly.

- Fit the crankcase sump and secure it by tightening the bolts and the nuts to the specified torque.

 When positioning the crankcase sump, avoid significant sideways movements that could remove the sealant.

Component	Fastening	dia	Value (daNm)	Validity
Engine oil sump - crankcase side	Bolt	M8	2.2 ÷ 2.7	1.2 8v
				1.4 8v
Component	Fastening	dia	Value (daNm)	Validity
Engine oil sump - rear cover side and oil pump side	Nut	M6	0.8 ÷ 1.0	1.2 8v
				1.4 8v

- Clean the contact surfaces between the cylinder head and engine block.

- Fit the locating bushes for the cylinder block/crankcase.

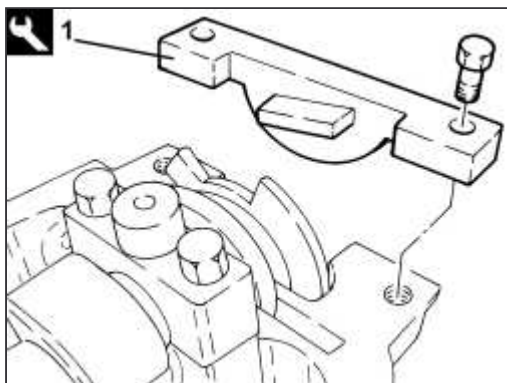
- Position the cylinder head gasket on the cylinder block/crankcase.

1. Fit the cylinder head and tighten the fixing bolts to the recommended torque.

Component	Fastening	dia	Value (daNm)	Validity
Cylinder head	Bolt	M9	2.9 ÷ 3.1 + 90° + 90° +/- 3°	1.2 8v
				1.4 8v

 Follow the order illustrated below for the tightening of the cylinder head bolts.

- Fit the intake chamber and tighten the nuts to the specified torque.

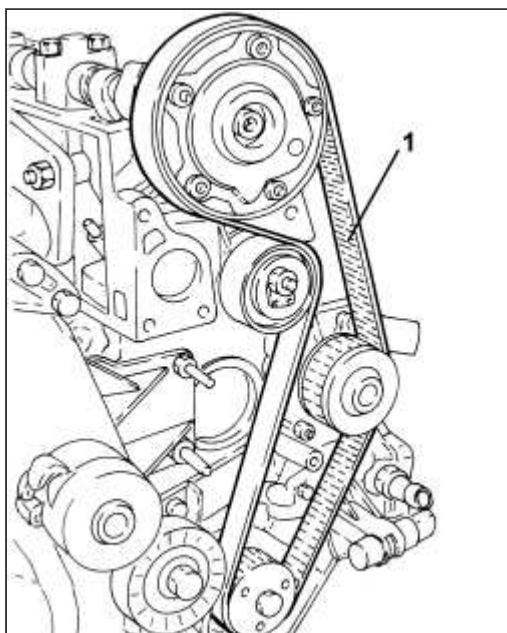


Component	Fastening	dia	Value (daNm)	Validity
Intake manifold	Nut	M8	2.3 ÷ 2.8	1.2 8v
				1.4 8v
				1.9 Multijet

1. Fit the template to the camshaft rear shank.

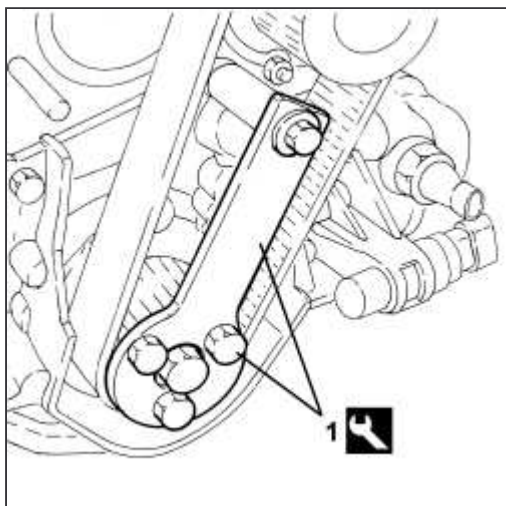
Tool	Description	Function	Validity
2000004400	Template	Camshaft timing	1.2 8v
			1.4 8v

1. Fit the timing belt.



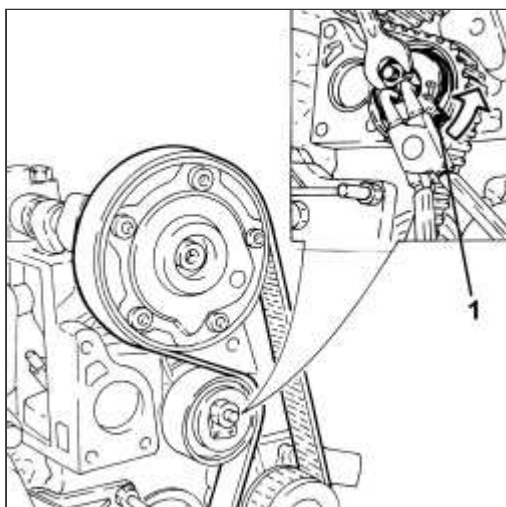
1. Fit the crankshaft timing template to the drive pulley.

Tool	Description	Function	Validity
			1.2 8v

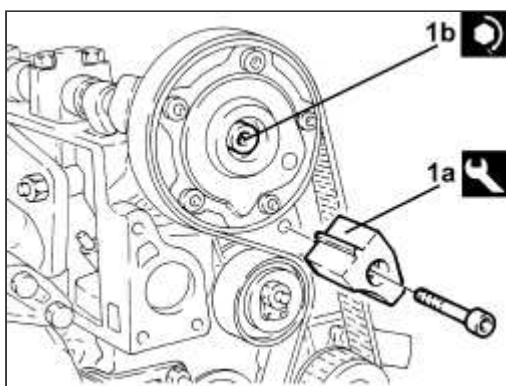


2000004500	Template	Crankshaft timing	1.4 8v 1.4 16v
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1. Proceed as shown in the figure to adjust the automatic tensioner reference fork until it is in contact.



1. Fit the reaction tool (1a) and tighten the variable valve timing bolt (1b) to the specified torque.



Tool	Description	Function	Validity	
2000004200	Counter-torque	Timing driven pulley lock	1.4 8v	
Component	Fastening	dia	Value (daNm)	Validity
Phase transformer	Bolt	M12	1.9 ÷ 2.1 + 55° +/- 2°	1.4 8v

- Fit the variable valve timing bolt plug and secure to the

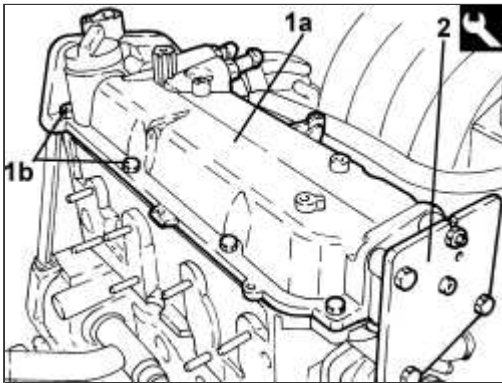
specified torque.

Component	Fastening	dia	Value (daNm)	Validity
Phase transformer sealing plug	Plug	M27	2.4 ÷ 3.0	1.4 8v

- Remove both templates and the reaction tool fitted previously and turn the engine through a couple of revolutions to settle the timing belt.

- Loosen the belt tensioner nut and adjust the front fork until it is aligned with the rear fork.

- Tighten the belt tensioner nut to the recommended torque.



Component	Fastening	dia	Value (daNm)	Validity
Timing moving tensioner	Nut	M8	2.5 ÷ 3.1	1.2 8v 1.4 8v

- Fit the templates removed previously to check the engine timing adjustment.

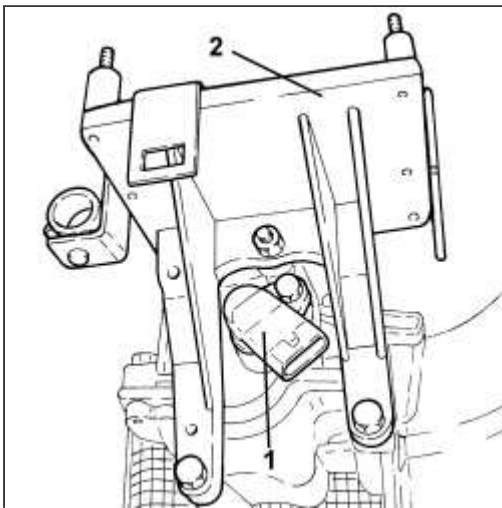
1. Position cam cover (1a) on the cylinder head and tighten bolts (1b).

2. Fit the tappet cover locating tool.

Tool	Description	Function	Validity
2000004300	Template	Tappet cover centering	1.4 8v

- Tighten the previously screwed in cam cover bolts to the specified torque.

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Component	Fastening	dia	Value (daNm)	Validity
Tappet cover	Bolt	M6	0.8 ÷ 1.0	1.2 8v
				1.4 8v
				1.3 Multijet
				1.9 Multijet

- Remove the tappet cover locating tool fitted previously.

1. Fit the timing sensor.

2. Fit the injection control unit mount.

- Fit the rpm sensor and tighten the bolt.

- Fit the knock sensor and tighten the bolt to the specified torque.

Component	Fastening	dia	Value (daNm)	Validity
Detonation sensor	Bolt (to be replaced)	M8	2.2 ÷ 2.7	1.2 8v
				1.4 8v
				1.4 16v

- Fit the engine oil dipstick tube.

- Fit the mount with compressor and alternator and secure the fastenings.

Component	Fastening	dia	Value (daNm)	Validity
Compressor				

support	Bolt	M10x1.25	4.5 ÷ 5.5	1.2 8v
Component	Fastening	dia	Value (daNm)	Validity
Compressor support	Nut	M8x1.25	2.3 ÷ 2.7	1.2 8v
Component	Fastening	dia	Value (daNm)	Validity
Compressor support	Nut	M10x1.25	4.5 ÷ 5.5	1.2 8v

- Fit the timing belt protective covers and secure them using the bolts.

- Fit the crankshaft pulley and tighten the bolts to the recommended torque.

Component	Fastening	dia	Value (daNm)	Validity
Services pulley on crankshaft	Bolt	M8	2.3 ÷ 2.8	

- Fit the auxiliary drivebelt by adjusting the automatic belt tensioner.

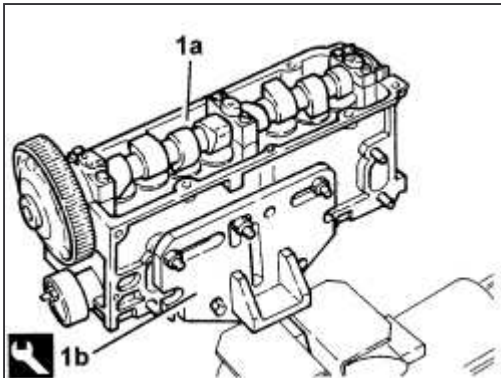
- Fit the timing side rigid power unit mount and tighten the bolts to the specified torque.

Component	Fastening	dia	Value (daNm)	Validity
Timing side power unit rigid	Bolt	M10	5.4 ÷ 6.6	1.2 8v 1.4 8v

support				1.4 16v
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- Connect the electrical connection for the coolant temperature sensor.
- Connect the electrical connection for the timing sensor.
- Connect the electrical connection of the ignition coil module.
- Connect the electrical connection for the throttle casing.
- Connect the electrical connection for the knock sensor.
- Connect the air conditioning compressor electrical connection.
- Connect the earth lead to the crankcase.
- Connect the electrical connection for the absolute pressure sensor.
- Connect the electrical connection for the air pressure/temperature sensor.
- Connect the electrical connection for the variable valve timing electromagnet.
- Remove the engine from the overhaul stand.

SINGLE CYLINDER HEAD, REMOVED - OVERHAUL 1016E10

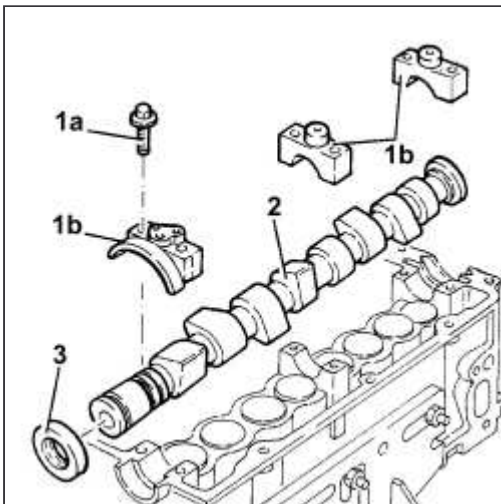


Removing ([Refitting](#))

1. Position the cylinder head (1a) in a vice using the tool (1b).

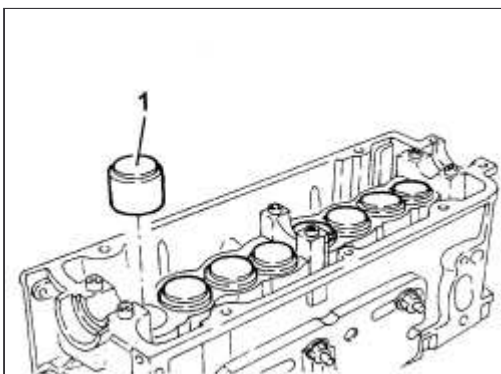
Tool	Description	Function	Validity
1860470000	Support	Cylinder head support	1.2 8v 1.4 8v 1.3 Multijet 1.9 Multijet

- Unscrew the bolt and remove the toothed driven pulley.
 - Undo the nut and remove the mobile timing belt tensioner.
1. Undo the bolts (1a) and remove the camshaft caps (1b).

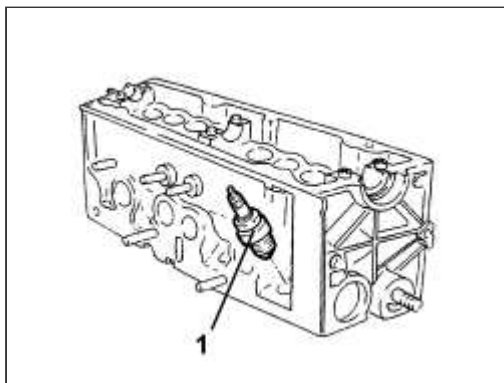


2. Remove the camshaft.
3. Remove the camshaft front oil seal.

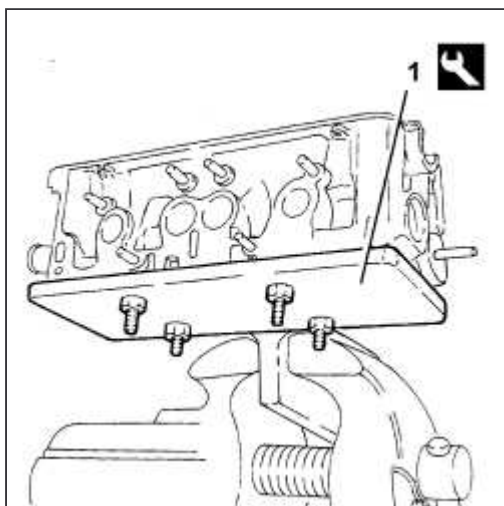
1. Remove the tappet sleeves with shims.



1. Remove the spark plugs.

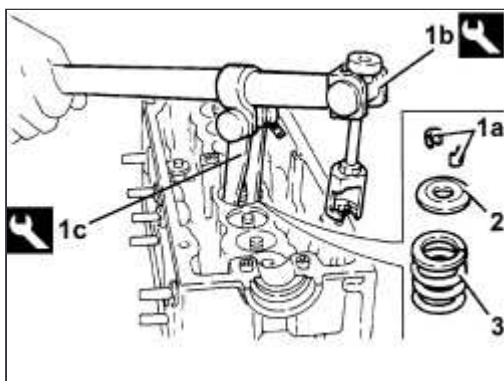


1. Fit the valve retaining tool beneath the cylinder head.



Tool	Description	Function	Validity
1860749000	Stand	Valve support	1.2 8v 1.4 8v 1.3 Multijet

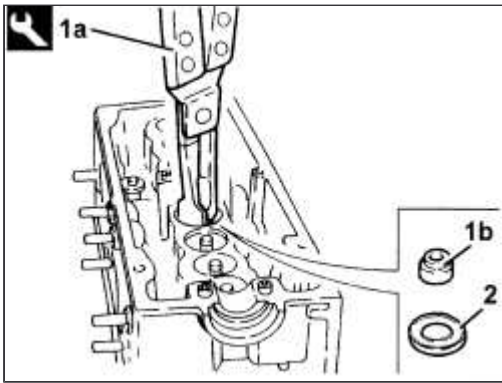
1. Fit the cotters (1a) using the tools (1b) and (1c).



Tool	Description	Function	Validity
1860644001	Lever	Removing/ refitting valves	1.2 8v 1.4 8v 1.3 Multijet
Tool	Description	Function	Validity
1870890000	Chamber	Valve cotter removal	1.2 8v 1.4 8v

2. Fit the upper valve shims.

3. Remove the valve springs.



1. Use tool (1a) to remove oil seals (1b).
2. Fit the lower valve shims.

- Replace the valve guides

[Op. 1016E14 VALVE GUIDES IN SINGLE CYLINDER HEAD - REPLACE DURING OP. 1016E10](#)

 Refitting ([Removing](#) )

- Clean any residues of the old gasket from the lower cylinder head plane.

[Op. 1016E38 SINGLE CYLINDER HEAD OR \(ONE\) L OR R, REMOVED - GRINDING](#)

- Check that the diameter of the valve stems corresponds to the recommended figures; if not, replace the worn valves.

Measurement	Value	Validity
Inlet valve stem diameter (mm)	4.982 ÷ 5.000	1.2 8v
		1.4 8v
Measurement	Value	Validity
Exhaust valve stem diameter (mm)	4.974 ÷ 4.992	1.2 8v
		1.4 8v

- Check that the diameter of the valve head corresponds to the recommended figures; if not, replace the valves.

Measurement	Value	Validity

Inlet valve head diameter (mm)	33.10 ÷ 33.30	1.2 8v 1.4 8v
Measurement	Value	Validity
Exhaust valve head diameter (mm)	27.80 ÷ 28.10	1.2 8v 1.4 8v

- Check that the length of the valve springs released is within the recommended values.

Measurement	Value	Validity
Valve spring free length (mm)	42.29	1.2 8v 1.4 8v

- Check that the measurements for the valve springs are within the recommended values.

Measurement	Value	Validity
Length of valve springs under a load of 15.5 daN (mm)	35.10	1.2 8v 1.4 8v
Measurement	Value	Validity
Length of valve springs under a load of 39 daN (mm)	26.30	1.2 8v 1.4 8v

- Clean the valve seats thoroughly.

- Check that the diameter of the camshaft journals

corresponds to the recommended figures; if not, replace the camshaft.

Measurement	Value	Validity
Camshaft bearing diameter - First bearing (mm)	24.000 ÷ 24.015	1.2 8v
		1.4 8v
Measurement	Value	Validity
Camshaft bearing diameter - Second bearing (mm)	23.500 ÷ 23.515	1.2 8v
		1.4 8v
Measurement	Value	Validity
Camshaft bearing diameter - Third bearing (mm)	30.992 ÷ 31.008	1.2 8v
		1.4 8v

- Check that the nominal camshaft cam lift corresponds to the recommended figures; if not, replace the worn camshaft.

Measurement	Value	Validity
Nominal camshaft cam lift (mm)	9.5	1.2 8v
		1.4 8v

- Check that the diameter of the cylinder head camshaft tappet sleeve housings corresponds to the recommended figures; if not, replace the cylinder head.

Measurement	Value	Validity

Tappet rod outer diameter (mm)		1.2 8v
	34.975 ÷ 34.995	1.4 8v

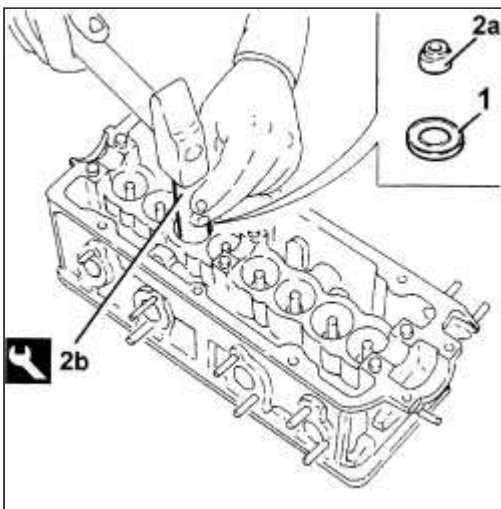
- Check that the diameter of the cylinder head camshaft tappet sleeve housings corresponds to the recommended figures; if not, replace the cylinder head.

Measurement	Value	Validity
Tappet sleeve seat diameter (mm)		1.2 8v
	35.015 ÷ 35.030	1.4 8v

- Fit the thermostat complete with a new gasket and secure it using the bolts.

- Fit the moving timing belt tensioner and secure it with the nut without tightening.

- Fit the valve retaining tool after positioning the valves in their seats.



Tool	Description	Function	Validity
1860749000	Stand	Valve support	1.2 8v
			1.4 8v
			1.3 Multijet

1. Fit the lower valve shims.

2. Fit the valve guide oil seals (2a) using the tool (2b).

- Fit the valve springs, the upper valve plates and the half-cones using the same tool as for the removal.

- Remove the valve retaining tool fitted previously.

- Fit the camshaft tappet sleeves with shims.

- Fit the camshaft on the cylinder head.

- Fit the camshaft caps and secure them tightening the bolts to the recommended torque.



Component	Fastening	dia	Value (daNm)	Validity
Camshaft caps	Bolt	M8	1.8 ÷ 2.2	1.2 8V 1.4 8v

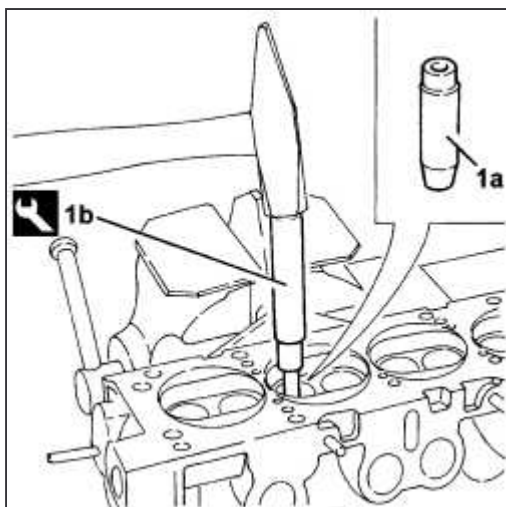
- Fit the oil seal with the tool.

Tool	Description	Function	Validity
1860882000	Fitting tool	Fitting camshaft front oil seal	1.2 8v 1.4 8v

- Fit the toothed driven pulley by tightening the bolt provisionally.

VALVE GUIDES IN SINGLE CYLINDER HEAD - REPLACE DURING OP. 1016E10 - 1016E14

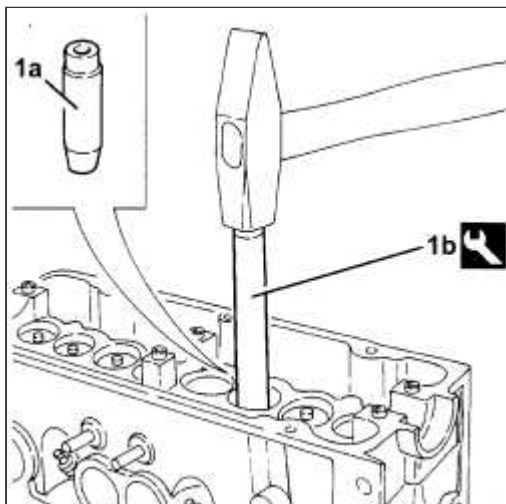
 Removing ([Refitting](#) )



1. Remove the valve guides (1a) using the tool (1b).

Tool	Description	Function	Validity
1871008500	Extractor/ fitting tool	Extracting/fitting valve guides	1.2 8v 1.4 8v

 Refitting ([Removing](#) )



- Measure the valve guide bore and check that it is within the recommended values.

Measurement	Value	Validity
Valve guide diameter (mm)	9.959 ÷ 9.981	1.2 8v 1.4 8v 1.4 16v

- If necessary, ream the valve seat.

- Check the measurement of the new valve guide.

- Make a note of the measurement of the valve seat after reaming.

- The valve guides are supplied by the parts dept with the following diameter.

Measurement	Value	Validity

Valve guide outer diameter (mm)	10.010 ÷ 10.030	1.2 8v
		1.4 8v
		1.4 16v
		1.3 Multijet

- The interference between the valve guides and the seats in the cylinder head is as follows.

Measurement	Value	Validity
Interference between valve guides and valve guide seats (mm)	0.029 ÷ 0.071	1.2 8v
		1.4 8v
		1.4 16v

- Before fitting the new valve guides the cylinder head must be heated to a temperature of around 100° -120 °C.

1. Fit the new valve guides (1a) using the tool (1b).

Tool	Description	Function	Validity
1871008500	Extractor/fitting tool	Extracting/fitting valve guides	1.2 8v 1.4 8v

- If the valve guides are slightly distorted whilst fitting, ream the inner surface using a suitable size reamer.

- Measure the valve guide inner diameter after refacing and the clearance with the valve; check that it is within the recommended values.

Measurement	Value	Validity
Valve guide inner diameter (mm)	5.022 ÷ 5.040	1.2 8v

		1.4 8v
Measurement	Value	Validity
Inlet valve/valve guide clearance (mm)	0.022 ÷ 0.058	1.2 8v 1.4 8v 1.4 16v
Measurement	Value	Validity
Exhaust valve/valve guide clearance (mm)	0.030 ÷ 0.066	1.2 8v 1.4 8v 1.4 16v

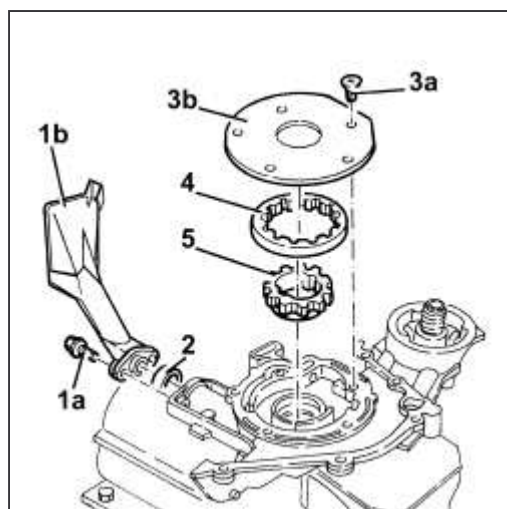
SINGLE CYLINDER HEAD OR (ONE) L OR R,
REMOVED - GRINDING 1016E38

- Check cylinder head flatness and if necessary flatten the lower cylinder head surface. It is permitted to remove 0.1 mm of material from the minimum cylinder head height.

Measurement	Value	Validity
Minimum permitted cylinder head height (mm)	126.5 +/- 0.1	1.2 8v 1.4 8v

ENGINE OIL PUMP, REMOVED -

1084B18



Removing ([Refitting](#))

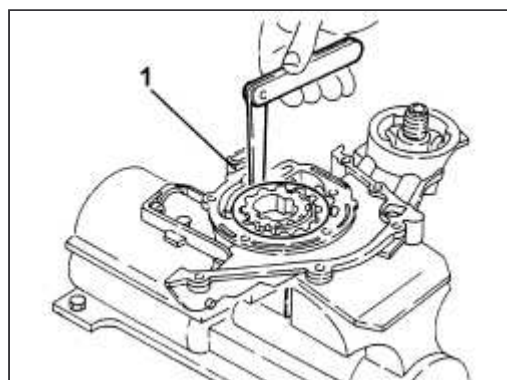
1. Undo the bolts (1a) and remove the intake (1b).
2. Remove the seal.
3. Undo the bolts (3a) and remove the oil pump cover (3b).

Use a percussion screwdriver to undo these bolts.

4. Remove the driven gear.
5. Remove the drive gear.

- Remove the crankshaft front oil seal

Refitting ([Removing](#))



1. Check that the radial clearance between the driven gear and the pump casing is within the recommended limits.

Measurement	Value	Validity
Radial clearance between driven gear and pump casing (mm)	0.080 ÷ 0.186	1.2 8v 1.4 8v 1.9 Multijet

- Check that the height of the oil pressure relief valve spring is within the recommended values.

Measurement	Value	Validity
Height of engine oil pressure relief valve spring (valve opening) with test load of 8 - 8.8 daN (mm)	55.0	1.2 8v 1.4 8v

Measurement	Value	Validity
Height of engine oil pressure relief valve spring (valve completely open) with test load of 13.2 daN (mm)	47.575	1.2 8v 1.4 8v
Measurement	Value	Validity
Length of engine oil pressure relief valve spring (mm)	77.396	1.2 8v 1.4 8v

- Fit the drive gear.
- Fit the driven gear.
- Fit the oil pump cover



Manually rotate the gears to check that they turn without sticking.

- Fit the engine oil intake complete with O-Ring and secure it using the bolts.



The crankshaft front oil should be fitted with the engine oil pump fitted on the crankcase.