RENAULT

N.T. 6525A

Vehicle	*Engine*
CLIO IV	**D4F 744 / H4Bt 410**
SANDERO II / LOGAN II	**D4F 744 / H4Bt 410**
DUSTER H79Ph2	**K4M 642 / H4Mk 740**
LODGY J92 / DOKKER FK67	**K7M 828 / H4Mk 740**
MEGANE / MÉGANE SCÉNIC	**K4M 866**
DUSTER H79Ph1	**K4M 616**
SANDERO B90, LOGAN	**K7M 818**
CLIO III/MODUS	**D4F 744**

Sub-section concerned: 17C

Diagnosis – GPL Landi Renzo System OMEGAS PLUS EURO 5 OMEGAS PLUS EURO 6

Edition n° 1 - MAY 2015 **EDITION ANGLAISE**

Contents

17C LPG Injection

DISCLAIMER

For every problem, DTC or consideration not reported in this NT, please refer to the NT of the same vehicles with petrol version

IMPORTANT!

GCU Reprogramming

In case the operation of GCU Re-Calibration or GCU Reprogramming is interrupted by an Error Message (Example ER-ROR 110, ERROR 103, etc) and when PlusMaxRE tool cannot automatically detects the vehicle, the original GCU Hardware Version, SW Ver-sion and Calibration version, **before to replace the GCU Manual Emergency Procedure must be applied**.

IMPORTANT!

1. SCOPE OF THIS DOCUMENT

This document introduces the special fault finding procedure applicable to all:

Vehicle(s): **Sandero II, Logan II (BLK52), Clio IV (B98)** For Engines: **H4Bt 410** Function concerned: **LANDI RENZO LC03** **Regulation: EURO6**	Computer Name: **LC03** Software reference: **RE3600xxG54**
Vehicle(s): **Duster II (H79Ph2), Lodgy (J92), Dokker (FK67)** For Engines: **H4M 740** Function concerned: **LANDI RENZO LC03** **Regulation: EURO6**	Computer Name: **LC03** Software reference: **RE3600xxG54**
Vehicle(s): **Sandero II, Logan II (B52, L52), Clio IV (B98)** For Engines: **D4F*734, D4F*744** Function concerned: **LANDI RENZO LC03**	Computer Name: **LC03** Software reference: **RE3520xxG54** Software reference: **RE3521xxG54**
Vehicle(s): **Duster II (H79Ph2), Lodgy (J92), Dokker (FK67)** For Engines: **K4M*642, K7M*828** Function concerned: **LANDI RENZO LC03**	Computer Name: **LC03** Software reference: **RE3521xxG54**
Vehicle(s): **CLIO III (X85)** For Engines: **D4F 744** Function concerned: **LANDI RENZO LC02**	Computer Name: **LC02 (OMEGAS PLUS)** Software reference: **RE2504xxG34**
Vehicle(s): **SANDERO 1 (B90, FU90), LOGAN 1 (xx90)** For Engines: **K4M*642 , K7M*828** Function concerned: **LANDI RENZO LC02**	Computer Name: **LC02 (OMEGAS PLUS)** Software reference: **RE2504xxG34**
Vehicle(s): **Duster (H79), Scenic (BK95), Megane (BK95)** For Engines: **K4M 616, K4M866, K4M834** Function concerned: **LANDI RENZO LC02**	Computer Name: **LC02 (OMEGAS PLUS)** Software reference: **RE2504xxG34**

2. PREREQUISITES FOR FAULT FINDING

Documentation type

Fault finding procedures (this document):
– Assisted fault finding (integrated into the diagnostic tool), Dialogys.

Wiring Diagrams:
– Visu-Schéma (CD-ROM), paper.

Type of diagnostic tools
– CLIP + multiplex line sensor

Special tooling required
– A multimeter and checking bornier **Elé. 1681** Universal bornier

The present repair method **IS NOT APPLICABLE TO** Software **DR2020xxG24** or **RE2020xxG34**.

3. REMINDERS

Procedure

To run fault finding on the vehicle's computers, switch on the ignition in fault finding mode (forced + after ignition supply voltage).

With vehicles with card reader, proceed as follows:
– vehicle card in reader
– press and hold the Start button (longer than 5 seconds) with start-up conditions not fulfilled,
– connect the diagnostic tool and perform the required operations.

To **cut off the + after ignition supply voltage**, proceed as follows:
– disconnect the diagnostic tool,
– press the Start button twice briefly (less than 3 seconds),
– ensure that the + after ignition power supply has been cut off by checking that the computer indicator lights on the instrument panel have gone out.

Faults

Faults are displayed as present or stored (they appeared in a certain context and have since disappeared, or they are still present but cannot be diagnosed in the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is used after the + after ignition power supply is switched on (without acting on the system components).

For a **present fault**, apply the procedure described in the **Interpretation of faults** section.

For a **stored fault**, note the faults displayed and apply the instructions in the **Notes** section.

If the fault is **confirmed** when the instructions are applied, the fault is present. Deal with the fault.

If the fault is **not confirmed**, check:
– the electrical lines which correspond to the fault,
– the connectors for these lines (for oxidation, bent pins, etc.),
– the resistance of the component detected as faulty,
– the condition of the wires (melted or split insulation, wear).

Conformity check

The aim of the conformity check is to check data that does not produce a fault on the diagnostic tool when the data is inconsistent. Therefore, this stage is used to:
– perform fault finding on faults that do not have a fault display, and which may correspond to a customer complaint.
– check that the system is operating correctly and that there is no risk of a fault recurring after repair.

This section gives the fault finding procedures for statuses and parameters and the conditions for checking them.

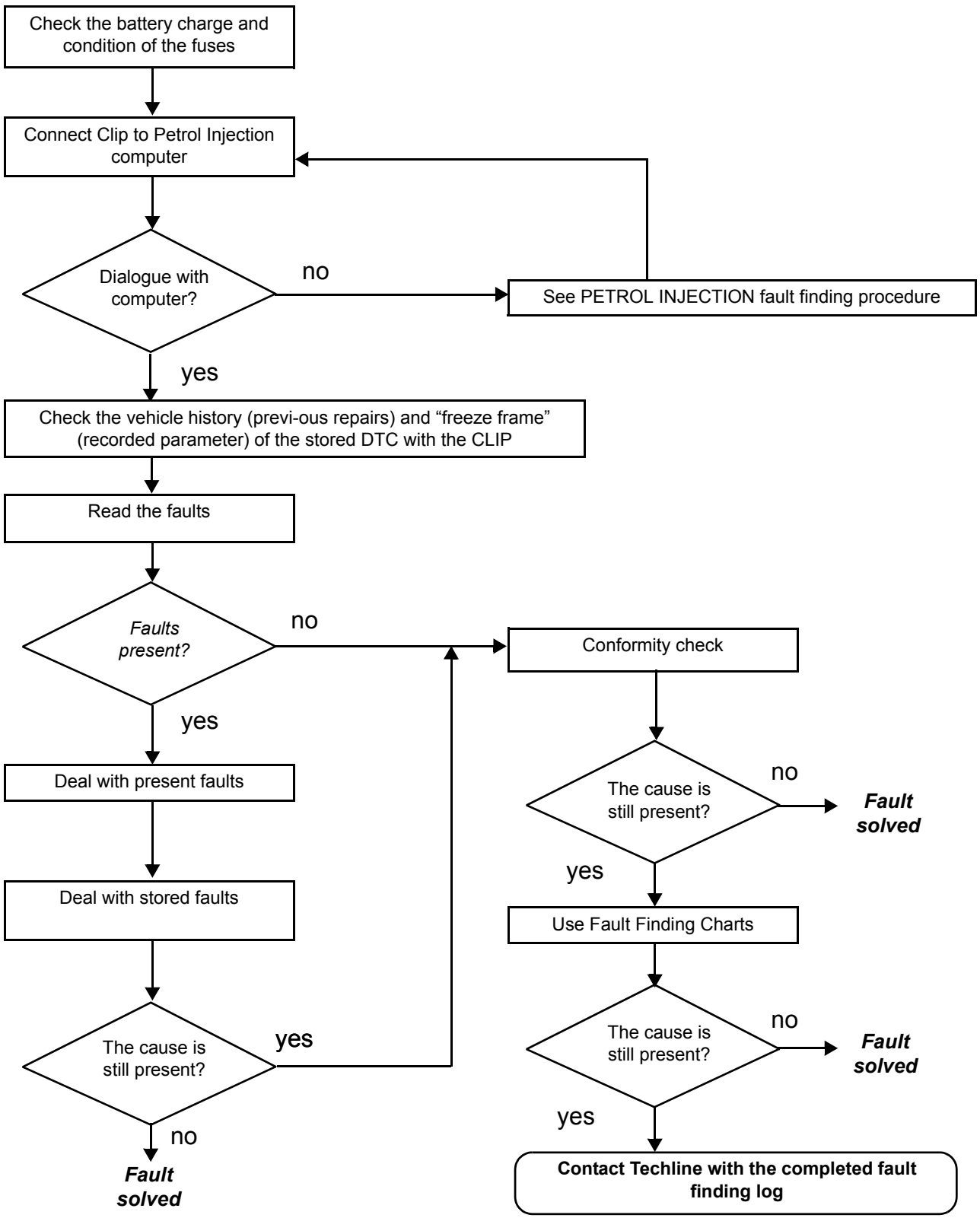
If a status is not behaving normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

Customer complaints - Fault finding chart

If the test with the diagnostic tool is OK but the customer complaint is still present, the fault should be processed by Customer complaints.

A summary of the overall procedure to follow is provided on the following page in the form of a flow chart

4. FAULT FINDING PROCEDURE



4. FAULT FINDING PROCEDURE (continued)

Order of priority:

Electrical faults must be processed before Functional faults (**DTC2293, DTC0184, DTC1608, DTC109A, DTC0618, etc.**) and Customer Complaints.
Note that there must be no electrical failures either present or stored before dealing with Functional or Customer Complaints operational faults.
Other priorities are dealt with in the procedure for the fault in question, in the Notes section.

Wiring check:

Fault finding problems:
Disconnecting the connectors and/or manipulating the wiring may temporarily remove the cause of a fault.
Electrical measurements of the voltage, resistance and insulation are generally correct, especially if the fault is not present when the analysis is made (stored fault).

Visual inspection:
Look for damage under the bonnet and in the passenger compartment.
Carefully check the fuses, insulation and wiring routing.
Look for signs of oxidation.

Tactile inspection:
While manipulating the wiring, use the diagnostic tool to note any change in fault status from stored to present.
Check that the connectors are correctly tightened, apply light pressure to the connectors, twist the wiring harness.
If there is a change in status, try to locate the source of the fault.

Inspection of each component:
Disconnect the connectors and check the appearance of the clips and tabs, as well as their crimping (no crimping on the insulating section).
Make sure that the clips and tabs are properly locked in the sockets.
Make sure no clips or tabs have been dislodged during connection.
Check the clip contact pressure using an appropriate model of tab.

Resistance check:
Check the continuity of entire lines, then section by section.
Look for a short circuit to earth, to **+ 12 V** or with another wire.
If a fault is detected, repair or replace the wiring harness.

5. FAULT FINDING LOG

IMPORTANT!

IMPORTANT
Any fault on a complex system requires thorough fault finding with the appropriate tools. The FAULT FINDING LOG, which should be completed during the fault finding procedure, ensures a record is kept of the procedure carried out. It is an essential document when consulting the manufacturer.

IT IS THEREFORE MANDATORY TO FILL OUT A FAULT FINDING LOG EACH TIME FAULT FINDING IS CARRIED OUT.

You will always be asked for this log:
– when requesting technical assistance from Techline,
– for approval requests when replacing parts with mandatory approval, and to be enclosed when returning monitored parts on request. The log is needed for warranty reimbursement, and enables better analysis of the parts removed.

6. SAFETY INSTRUCTIONS

All work on components requires you to strictly follow safety rules to prevent any physical damage or human injury.
– Make sure the battery is properly charged to avoid damaging the computers with a low charge.
– Use the proper tools.

Safety instructions that must be followed before any operation is performed on the vehicle

– If a major LPG leak occurs, the vehicle must be isolated, away from buildings and any fire risks.
– The emergency services may be required to intervene if the situation cannot be controlled.
– All work on the LPG circuit must be performed by qualified and authorized personnel.
– Do not try to open the tank. Don't ever try to remove the multi-valve located at the end of the tank.
– Do not clean the engine compartment with detergent when the system is pressurized.
– Always refer to the RENAULT Workshop Repair Manual before performing any work.

Safety instructions that must be followed when any operation is performed on the vehicle

– All work must be carried out in a well-ventilated space.
– There must not be any flames, sparks, burning cigarettes or telephones near the area where work is being carried out.
– The operator must not wear acrylic clothes likely to generate static electricity.
– Disconnect the battery and leave the vehicle on the ground.
– If working on the tank, drain it by running the engine in LPG mode.
– Once it has been drained and removed, the tank can be sent to the GIAT Company, with the manual insulation valve in closed position (fully rotated clockwise) and fitted with its mounting.
– If work is to be done in the painting station, remove the tank (with its mounting).
– The tank must not be subjected to temperatures greater than 50°C.

Safety instructions that must be followed when any operation is performed on the vehicle

– After working on a LPG joint, check that it is not leaking after reassembling.
– Apply soapy water or the product distributed by SODICAM, part number 77 11 143 071 (leak detector) to the open joint(s).
– Fill the fuel tank with a few liters of LPG if it has been bled (the ignition must be switched off first).
– Crank the engine, switch in LPG mode and check again that there is no leak.
– If a leak is detected, retighten the relevant joint. If the leak persists, remake the joint.
– Fill the fuel tank (80 % of total volume). Start the engine, switch in LPG mode and check that there is no leak.

After reassembling, check that all the rubber and encased metal LPG pipes are not in contact with any parts that can be accessed by the user and may create a LPG leak.

WARNING
Before performing any work on the vehicle, drain the LPG circuit.
Only personnel who have undergone specific LPG training can work with LPG joints where liquid LPG is circulating and moving through the fuel tank from the filler neck to the expansion valve.
In addition, only personnel who have undergone specific LPG training can perform maintenance and repairs on LPG vehicles.
Workshops can only carry out work on the fuel tank if they have a degassing burner.
If the tank cannot be degassed, do not touch it and contact the:

Comité Français du Butane et du Propane
8, terrasse Bellini
92807 PUTEAUX cedex
E-Mail: contact@cfbp.fr
Tél: +33 (0)1 41 97 02 80
Fax: +33 (0)1 41 97 02 89

Maintenance operations
– No adjustment.
– Removal of internal components is not allowed, except when expressly authorized,.
– If LPG fixation clips and fittings are removed, they must be replaced.
– If LPG joints are removed, they must be replaced.

The tank must be empty before removing:
• the fuel tank,
• a component bolted onto the tank, before bleeding the LPG contained in the LPG circuit.

To remove the following, bleed all LPG contained in the LPG circuit (except the LPG in the tank):
• the filler neck,
• the pipes,
• the filter,
• The pressure reducer
• The LPG injector

ESD protection

Electronic sensors and pushbuttons used for LPG injection systems integrates an electronic circuit. Electrostatic discharge (ESD) may cause serious damage to electronic circuits.
Personnel responsible for storage, transport, and handling must have training in ESD protection.
The material handling and installation system must be accommodated in agreement with allowable ESD limit of ELECTRONIC SENSORS AND PUSHBUTTONS as defined in its specification.

WARNING:
OBSERVE ALL PRECAUTIONS FOR ESD PROTECTION WHEN HANDLING ELECTRONIC COMPONENTS, GAS CONTROL UNIT, SENSORS AND PUSHBUTTONS USED FOR LPG INJECTION SYSTEMS!

AVOID ELECTROSTATIC DISCHARGE!

7. GENERAL APPROACH TO FAULT FINDING

– Use Plus Max RE to identify the system fitted to the vehicle.

If the Software Version is in the form : RE36xxxxG54 the GCU is an LC03 adopted on vehicles compliant with EU6 emission norm.
If the Software Version is in the form: RE35xxxxG54 the GCU is an LC03 adopted on vehicles compliant with EU5+ emission norm.
If the Software Version is in the form: RE25xxxxG34 the GCU is an LC02 adopted on vehicles compliant with EuroV emission norm.

In the chapter "Fault Finding – Fault Interpretation" carefully follow the symbolism:

in order to ensure the correctness of the repair procedure.

1. LPG SYSTEM DESCRIPTION

1.1 Changeover from petrol to gas

The vehicle switch to LPG when:

1) The driver has selected the LPG fuel switch mode in the current trip or in the previous trip the engine stopped in LPG mode.
2) Coolant water temperature must be higher than the tuned threshold; this threshold is a function of a complex algorithm and depends on the coolant temperatures and LPG rail temperature at the crank; usually the threshold is 30°C when external temperature is 20°C.
3) A tuned delay is elapsed from the cranking; the delay a function of a complex algorithm and depends on the coolant temperatures and LPG rail temperature at the crank; usually cranking at a coolant temperature of 20°C the delay is 60s.
4) Gas Temperature must be higher than the tuned threshold. Please note that with low winter temperature (for example -10°C), the delay requested to the LPG temperature to reach the threshold could be long and sometimes more than 5 minutes.
5) RPM value must be greater than the tuned RPM threshold ranging from idle or cut-off condition for vehicles with Stop&Start function and usually between 1300 and 1800 RPM depending on engine power and vehicle gearbox ratio on vehicles without Stop&Start System
6) LPG switching isn't allowed at very high engine loads, for example in full acceleration.
7) No LPG system fault must be present.

1.2 Temporary switcback

The vehicle can temporarily switch to gasoline mode at high load and when the LPG in the tank is not compliant with external temperature requirements. Usually this happens in cold climate.
Refer to User Notes

1.3 General checks

Before proceeding with repairs, verify that there are no additional faults stored in the petrol ECU.

The **operating pressure** of the LPG displayed on the DIAGNOSTIC TOOLS should be between **1.15 & 1.36 bar**, when the vehicle is running in LPG mode, at idle speed (750 rpm) and when the temperature of the coolant is over 70°C,with all auxiliary load (AC, fan,..) **switched off**.
[Usually the LPG pressure should be 0,9 - 0,95 bar over the intake manifold pressure].

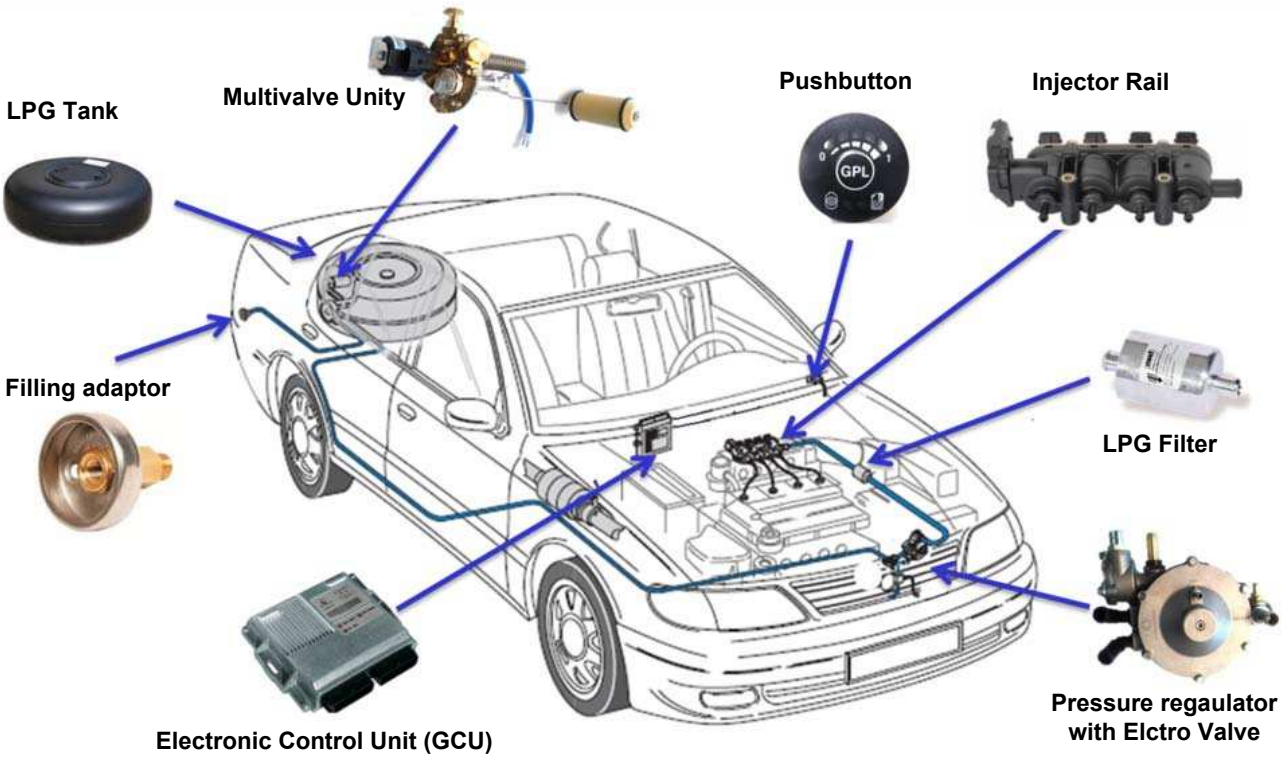
The **system automatically switches** the vehicle **back to petrol** when pressure drops below a safety threshold, depending on the engine load.
This switchback to petrol can occur when the LPG tank is empty; in this case no DTC code is stored in the memory of the diagnostic system.

The **"supply voltage of LPG injectors"** influences the correct operation of the LPG system. The voltage range for a correct operation is between **9 & 16 Volts**.

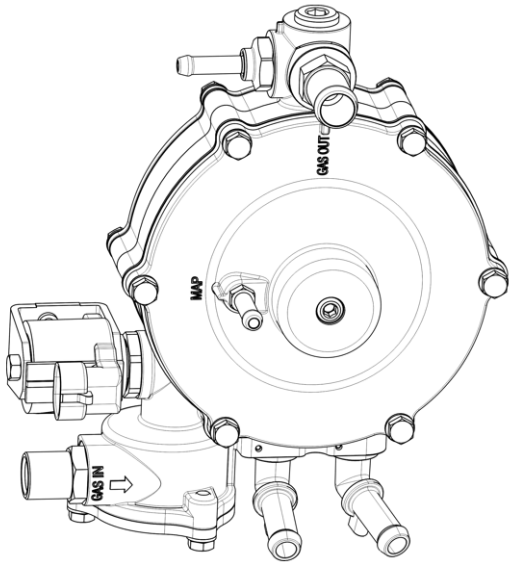
1.4 Road Test

If a road test is required make a comparison between Petrol Mode and LPG mode driving.
Perform the same tests and check for a different driving behaviour of the vehicle.

GAS SYSTEM COMPONENT OVERVIEW



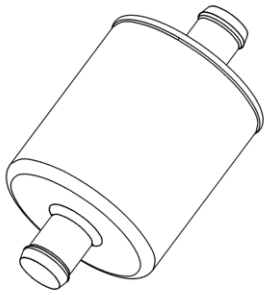
COMPONENT DESCRIPTION



LI 10 PRESSURE REGULATOR

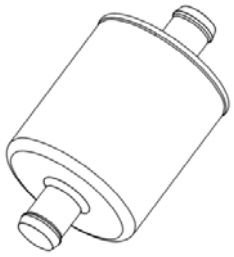
Aluminium body
ON-OFF solenoid safety valve
Filter incorporated in solenoid

Supply pressure:	**2.5 to 30 bar**
Calibration pressure:	**0,95 bar**
Temperature range:	**-20° to 120°C**
Solenoid power supply:	**6 to 16 Volts**
Maximum flow rate:	**30 Kg/h**
Weight:	**1450 g.**
Homologation:	**ECE/ONU R67/01**



COALESCENCE EURO 5 LPG FILTER

Type of gas:	**LPG or Methane**
Pipe diameter IN:	**14 mm**
Pipe diameter OUT:	**14 mm**
Body diameter:	**58 mm**
Maximum pressure:	**2.2 bar (absolute)**
Filtering grade:	**10 micron**
Weight:	**75 g**
Homologation:	**ECE R110 - ECE R67/01**

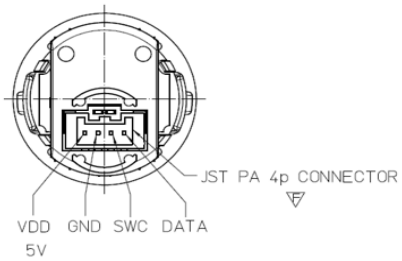


COALESCENCE EURO 6 LPG FILTER

Type of gas:	**LPG or Methane**
Pipe diameter IN:	**14 mm**
Pipe diameter OUT:	**14 mm**
Body diameter:	**50 mm**
Maximum pressure:	**2.2 bar (absolute)**
Filtering grade:	**10 micron**
Weight:	**75 g**
Homologation:	**ECE R110 - ECE R67/01**

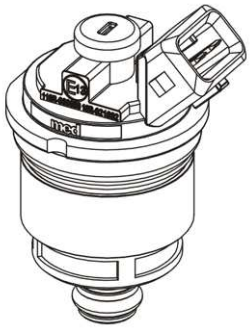
SWITCH

The switch shows the level of LPG and offers the driver a choice of fuels (gas/petrol).
The switch have an internal "buzzer" that work when the system switch back to petrol in case of any fault on LPG system or when the LPG tank is empty.



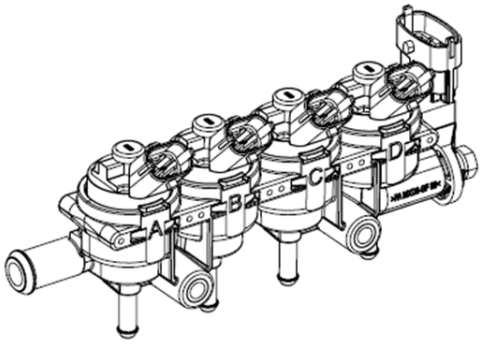
Pin assignment:

1) **+5V Power supply**
2) **Ground**
3) **Contact**
4) **Serial Data**



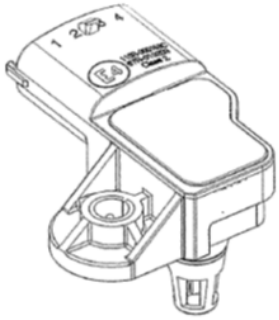
GAS INJECTOR used on EU5 application

Current management:	**6/1.5A "Peak and hold"**
Supply voltage:	**6 to 16 Volts**
Temperature range:	**- 40 °C to +120 °C**
Nominal pressure:	**0.8 to 3 bar**
Opening time @12V:	**2.0 ms**
Dimensions:	**Ø 32 x h 73 mm**
Weight:	**120 g**
Homologation:	**ECE R 110 - ECE R 67/01**



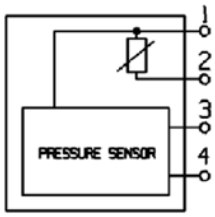
GAS RAIL used on EU6 application (SingleInjectors cannot be singularly replaced)

Version:	**3 and 4 cylinder**
Current management:	**8/1.6A "Peak and hold"**
Supply voltage:	**6 to 16 Volts**
Temperature range:	**- 40 °C to +120 °C**
Nominal pressure:	**0.8 to 3 bar**
Opening time @12V:	**2.0 ms**
Dimensions:	**Ø 32 x h 73 mm**
Weight:	**120 g**
Homologation:	**ECE R 110 - ECE R 67/01**



LPG PRESSURE AND TEMPERATURE SENSOR

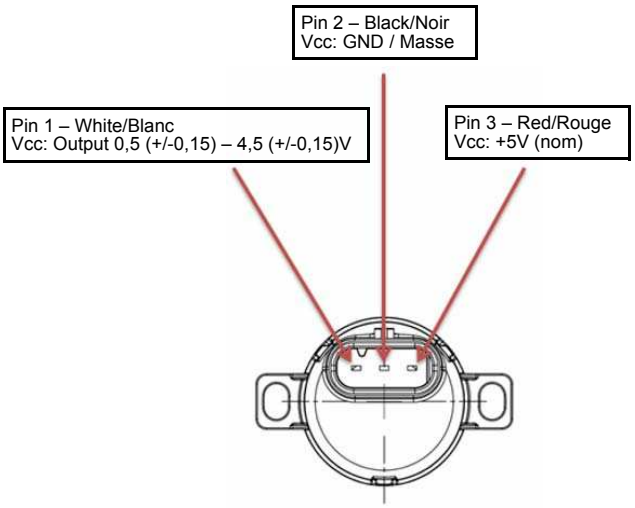
Supply voltage:	**4.5 to 5.5 Volts**
Temperature range:	**- 40 °C to +120 °C**
Nominal pressure:	**50 to 350 kPa**
Nominal pressure (only for H4Bt):	**50 to 550 KPa**



Connector-Track assignment

Track 1	**Ground**
Track 2	**NTC resistor**
Track 3	**+5 V**
Track 4	**Output signal**

HALL EFFECT TANK LEVEL SENSOR (3 TERMINALS)



Level Sensor / Capteur Niveau X98, H79PH2, X92, X67 (463518000)
Clio IV, Duster 2, Lodgy, Dokker.

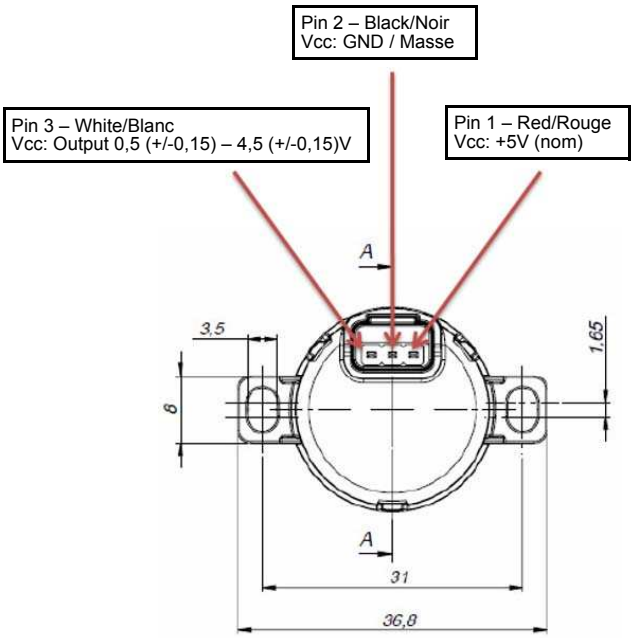
(External tank)

LC03

1) The level sensor must be supplied with 5,00 V nominal

2) Supply Voltage must be in the range 4,5 – 5,5 V. Below 4,5 V the measure isn't accurate; over 5,5 V the sensor could be damaged.

3) The Hall Effect Sensor Output Voltage is Ratiometric over the Power Supply



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2) Supply Voltage must be in the range 4,5 – 5,5 V. Below 4,5 V the measure isn't accurate; over 5,5 V the sensor could be damaged.

3) The Hall Effect Sensor Output Voltage is Ratiometric over the Power Supply

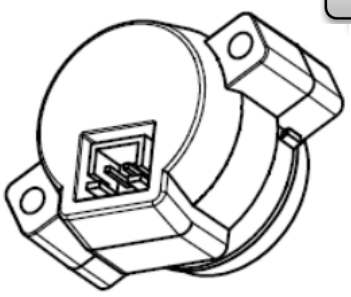
Level Sensor / Capteur Niveau X52 (616506000)
Sandero II

(Internal tank)

LC03

LC02

RESISTIVE TANK LEVEL SENSOR (2 TERMINALS)

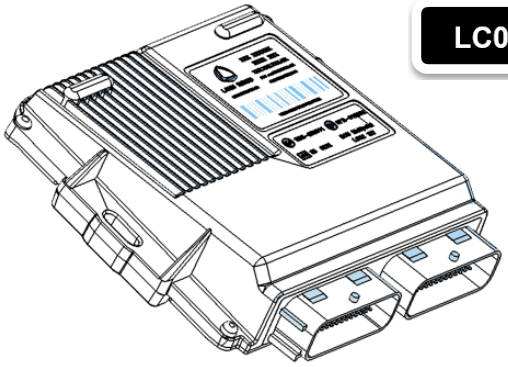


Temperature range:	**- 10 °C to +85 °C**
Nominal resistance:	**from 100 to 21800 ohm**

Connector-Track assignment

Track 1	**Tank Level Voltage**
Track 2	**Ground**

GCU PINOUT

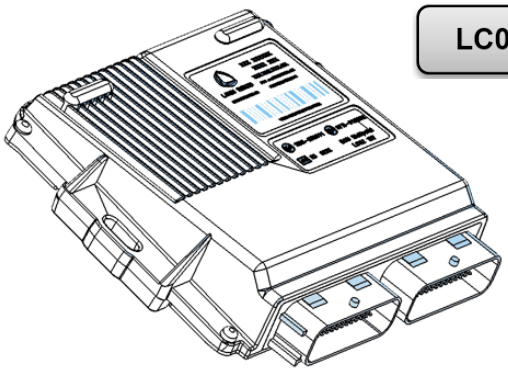


LC03

LC03 GAS CONTROL UNIT

Automotive 16 bit 40 Mhz microprocessor Manages up to 6 injectors and 2 additional relay Internal self-diagnosis for sensors and actuators Temperature range – 40° to 105°C CAN communication

LANDIRENZO GCU PIN-OUT 56 WAYS			
PIN	FUNCTION DESCRIPTION	PIN	FUNCTION DESCRIPTION
1	N.C.	29	N.C.
2	Gasoline Pump Shutdown Relay Control when present on the specific vehicle)	30	N.C.
3	N.C.	31	N.C.
4	N.C.	32	N.C.
5	N.C.	33	N.C.
6	N.C.	34	N.C.
7	POWER GROUND	35	N.C.
8	N.C.	36	TNKLV_IN - LEVEL SENSOR IN
9	N.C.	37	+15_PINJ
10	Gasoline Pump Shutdown Relay Coil Feedback (when present on the specific vehicle)	38	N.C.
11	Gasoline Pump Shutdown Relay Status (when present on the specific vehicle)	39	N.C.
12	PC_TX	40	PC_RX
13	N.C.	41	N.C.
14	CAN H	42	CAN L
15	+30_POWER SUPPLY FROM BATTERY	43	+30_POWER SUPPLY FROM BATTERY
16	+15 INJECTOR SUPPLY (Safety Relay)	44	+15 INJECTOR SUPPLY (Safety Relay)
17	GV1_OUT - TANK SHUT OFF VALVE	45	GASP_IN - LPG PRESSURE
18	GV2_OUT - VAPORIZER SHUT OFF VALVE	46	GAST_IN - LPG TEMPERATURE
19	VCC_S +5V LPG PRESSURE SENSOR	47	VCC_S +5V TANK LEVEL SENSOR
20	HMI_GAS_L - SERIAL LINE SWITCH	48	LOGIC GROUND
21	VCC_HMI_GL - 5 VOLT SUPPLY SWITCH	49	F_SW_IN - LPG PUSHBUTTON SWITCH
22	POWER GROUND	50	+15_KEY-ON / +APC
23	INJECTOR 4 EMULATOR INJ SIDE	51	INJECTOR 4 EMULATOR GCU SIDE
24	INJECTOR 3 EMULATOR INJ SIDE	52	INJECTOR 3 EMULATOR GCU SIDE
25	INJECTOR 2 EMULATOR INJ SIDE	53	INJECTOR 2 EMULATOR GCU SIDE
26	INJECTOR 1 EMULATOR INJ SIDE	54	INJECTOR 1 EMULATOR GCU SIDE
27	GAS INJECTOR 1	55	GAS INJECTOR 3
28	GAS INJECTOR 2	56	GAS INJECTOR 4



LC02

LC02 GAS CONTROL UNIT

Automotive 16 bit 40 Mhz microprocessor Manages up to 6 injectors and 2 additional relay Internal self-diagnosis for sensors and actuators Temperature range – 40° to 105 °C CAN communication

LANDIRENZO GCU PIN-OUT 56 WAYS			
PIN	FUNCTION DESCRIPTION	PIN	FUNCTION DESCRIPTION
1	INJECTOR 1 EMULATOR GCU SIDE	29	INJECTOR 1 EMULATOR INJ SIDE
2	INJECTOR 2 EMULATOR GCU SIDE	30	INJECTOR 2 EMULATOR INJ SIDE
3	INJECTOR 3 EMULATOR GCU SIDE	31	INJECTOR 3 EMULATOR INJ SIDE
4	INJECTOR 4 EMULATOR GCU SIDE	32	INJECTOR 4 EMULATOR INJ SIDE
5	+15_KEY-ON / +APC	33	N.C.
6	GAST_IN - LPG TEMPERATURE	34	N.C.
7	N.C.	35	N.C.
8	GASP_IN - LPG PRESSURE	36	N.C.
9	VCC_S +5V LPG PRESSURE SENSOR	37	PRESSURE SENSOR LOGIC GROUND
10	PC_RXD	38	PC_TXD
11	SERIAL SUPPLY	39	SERIAL LOGIC GROUND
12	N.C.	40	N.C.
13	N.C.	41	N.C.
14	CAN H	42	N.C.
15	+30_POWER SUPPLY FROM BATTERY	43	+30_POWER SUPPLY FROM BATTERY
16	N.C.	44	N.C.
17	N.C.	45	N.C.
18	TNKLV_IN - LEVEL SENSOR IN	46	N.C.
19		47	HMI_GAS_L - SERIAL LINE SWITCH
20	CAN L	48	F_SW_IN - LPG PUSHBUTTON SWITCH
21	LEVEL SENSOR LOGIC GROUND	49	VCC_HMI_GL - 5 VOLT SUPPLY SWITCH
22	LOGIC GROUND	50	SWITCH LOGIC GROUND
23	GV2_OUT - TANK SHUT OFF VALVE	51	GROUND TANK SHUT OFF VALVE
24	GV1_OUT - VAPORIZER SHUT OFF VALVE	52	GROUND VAPORIZER SHUT OFF VALVE
25	POWER GROUND	53	POWER GROUND
26	+15 INJECTOR SUPPLY (Safety Relay)	54	+15 INJECTOR SUPPLY (Safety Relay)
27	GAS INJECTOR 1	55	GAS INJECTOR 3
28	GAS INJECTOR 2	56	GAS INJECTOR 4

SUMMARY OF FAULT THAT CAN BE READ WITH THE DIAGNOSTIC TOOL

RENAULT CLIP Faults (Managed on all LC02 and LC03 with 2C39 -RDC720 SW)			LR Diagnosis Enum	LPG System Failure Info CAN GCU
DTC ($)	Failure Type ($)	Description	LABEL	LABEL
ELECTRICAL Failures				
2666	15	TANK SOLENOID VALVE CIRCUIT	DIAG__TANKSOV_OC	ElecDiagLPGTankValve_OC
	15		DIAG__TANKSOV_SCPLUS	ElecDiagLPGTankValve_OC
	11		DIAG__TANKSOV_SCGND	Short circuit to Ground
	38		DIAG__TANKSOVMAXCYC	TankShutOffValveCyclesDiagnosis
2294	15	REGULATOR SOLENOID VALVE CIRCUIT	DIAG__REGSOV_OC	ElecDiagPressureValve_OC
	15		DIAG__REGSOV_SCPLUS	ElecDiagPressureValve_OC
	11		DIAG__REGSOV_SCGND	ElecDiagPressureValve_CC
1572	38	REGULATOR SOLENOID VALVE CYCLES	DIAG__REGSOVMAXCYC	VaporizerShutOffValveCyclesDiagnosis
18A	12	LPG PRESSURE SENSOR CIRCUIT	DIAG__PGAS_ELECT_SCPLUS	ElecDiagGazPressure_CC_plus
	11		DIAG__PGAS_ELECT_SCGND_OC	ElecDiagGazPressure_CC
	13		DIAG__PGAS_ELECT_SCGND_OC	ElecDiagGazPressure_OC
185	11	GAS TEMPERATURE SENSOR CIRCUIT	DIAG__TGAS_ELECT_SCGND	ElecDiagGazPressure_CC_plus
	15		DIAG__TGAS_ELECT_SCPLUS_OC	ElecGazTemperature_OC
2265	11	GAS TANK GAUGE VOLTAGE SIGNAL	DIAG__TANKLEVEL_SCGND	ElecTankLevelSensor_CC
	15		DIAG__TANKLEVEL_SCPLUS_OC	ElecTankLevelSensor_OC
10A0	12	CYLINDER 1 GAS INJECTOR CIRCUIT	DIAG__GINJ1_SCPLUS	ElecGazInj_1_CC_plus
	14		DIAG__GINJ1_SCGND	ElecGazInj_1_OC_or_CC
	14		DIAG__GINJ1_OC	ElecGazInj_1_OC_or_CC
10A1	12	CYLINDER 2 GAS INJECTOR CIRCUIT	DIAG__GINJ2_SCPLUS	ElecGazInj_2_CC_plus
	14		DIAG__GINJ2_SCGND	ElecGazInj_2_OC_or_CC
	14		DIAG__GINJ2_OC	ElecGazInj_2_OC_or_CC
10A2	12	CYLINDER 3 GAS INJECTOR CIRCUIT	DIAG__GINJ3_SCPLUS	ElecGazInj_3_CC_plus
	14		DIAG__GINJ3_SCGND	ElecGazInj_3_OC_or_CC
	14		DIAG__GINJ3_OC	ElecGazInj_3_OC_or_CC
10A3	12	CYLINDER 4 GAS INJECTOR CIRCUIT	DIAG__GINJ4_SCPLUS	ElecGazInj_4_CC_plus
	14		DIAG__GINJ4_SCGND	ElecGazInj_4_OC_or_CC
	14		DIAG__GINJ4_OC	ElecGazInj_4_OC_or_CC
1316	11	GASOLINE PUMP SHUTDOWN RELAY	DIAG__GSLPMPRLY_SCGND_OC DIAG__GSLPMPRLY_PLAUS DIAG__GSLPMPRLY_DAMAGE	ElecGslPmpRelayDrv_OC_or_CC
	12		DIAG__GSLPMPRLY_SCPLUS	ElecGslPmpRelayDrv_CC_plus

FUNCTIONAL Failures				
DTC ($)	Failure Type ($)	Description	Reference	LABEL
2293	21	PRESSURE IN THE LPG RAIL	DIAG__PGAS_FUNCT_HIGH	FctDiagGazPressure_TooHigh
	22			FctDiagGazPresLPGTank_coherency
	64		DIAG__PGAS_PLAUS	On Euro6 applications this DTC will be generated only when TANK LVL over a tunable value (usually 20%) and no re-pressurization happens after 1st switchback.
0184	21	GAS TEMPERATURE IN THE RAIL	DIAG__TGAS_FUNCT_LOW	FctGazTemperature_TooLow
	22		DIAG__TGAS_FUNCT_HIGH	FctGazTemperature_TooHigh
1318	21	GAS PRESSURE LEAKAGE	DIAG__LOWPRESS_LEAKAGE	FctGazLeakageLoPress LPG System isn't able to pressurize the circuit (Pgas<1150mBar)
			DIAG__LOPRESS_SMALLLEAKAGE	LPG System detect a pressure decay during testing phase
1608	4B	INJECTOR CONTROL COMPUTER	DIAG__NTC1TEMP_HIGH	ElecInjectorDrivers_Overtemp
109A	64	AUTOMATIC COMPUTER FEED RELAY	FctSafetyRelay_coherency	FctSafetyRelay_coherency
109A	64	AUTOMATIC COMPUTER FEED RELAY	DIAG__SR_VOLTAGE_LOW DIAG__SR_SCPLUS DIAG__SR_SCGND	Internal Safety Relay Short Circuit
1570	13	LPG SWITCH STATUS	DIAG__BUTTON_SCGND_OC	ElecDiagSwitchPosition_OC
1612	16	SENSOR SUPPLY VOLTAGE	DIAG__5V_LOW	LGPPowerSupplyTooLowDiagnosis
	17		DIAG__5V_HIGH	LGPPowerSupplyTooHighDiagnosis
1610	16	BATTERY VOLTAGE	DIAG__VBAT_LOW	ElecBatteryVoltage_U_Min
	17		DIAG__VBAT_HIGH	ElecBatteryVoltage_U_Sup
0618	46	LPG SYSTEM	DIAG__EEPROM	ElecE2PROM_DIAG

DTC Related to LPG System but managed by ECU				
			CAN Messages Faults	LPG System Failure Description
DTC ($)	Failure Type ($)	Description	Reference	LABEL
0300	F8	Random/Multiple Cylinder Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
0301	F8	Cylinder 1 Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
0302	F8	Cylinder 2 Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
0303	F8	Cylinder 3 Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
0304	F8	Cylinder 4 Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
0313	F8	Misfire Detected with Low Fuel	Internal Gasoline ECU diagnostics	Not managed by LPG System
0314	F8	Single Cylinder Misfire (Cylinder not Specified)	Internal Gasoline ECU diagnostics	Not managed by LPG System
1314	F8	Single Cylinder LPG Misfire (Cylinder not Specified)	Internal Gasoline ECU diagnostics	Not managed by LPG System
1300	F8	Random/Multiple Cylinder LPG Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
1301	F8	Cylinder 1 LPG Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
1302	F8	Cylinder 2 LPG Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
1303	F8	Cylinder 3 LPG Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
1304	F8	Cylinder 4 LPG Misfire Detected	Internal Gasoline ECU diagnostics	Not managed by LPG System
C108	87	Lost communication with alternative fuel control module	Internal Gasoline ECU diagnostics	Not managed by LPG System
1170	09	LPG Fuel Trim Function	Internal Gasoline ECU diagnostics	Not managed by LPG System

DTC2666 PRESENT OR STORED	**TANK SOLENOID VALVE CIRCUIT** 15: Open circuit 15: Short circuit to +12 V 11: Short circuit to ground. 38: Too much open close cycles

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects a short circuit to +12V, a short circuit to ground, a wiring interruption or solenoid coil resistance out of range, in the circuit controlling the tank electrovalve solenoid.

FAILURE TYPE 15 and 11	***NOTES***	**Priority of treatment if more than one fault is present:** If the fault **DTC2294** is present at the same time, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on GCU Track 16 and 44.

Check if the tank electrovalve plug has been properly connected. Repair if necessary.

Check the tank electrovalve connections. Repair if necessary.

Check the computer connections. Repair if necessary

Remove the GCU 56 way connector.

Ensure the continuity of the connection between:

LC03	**GCU connector Track 17 → Track 2 of the EV plug**
LC03	**Track 1 of the EV plug → Ground**

LC02	**GCU connector Track 23 → Track 1 of the EV plug**
LC02	**Track 2 of the EV plug → Ground**

Measure the resistance of the coil of the tank Electrovalve

Replace the coil if the resistance is not in the range 11,0 and 13,5 ohm at ambient temperature (20°C).

If the fault persist after these check, replace the coil.

FAILURE TYPE 38	***NOTES***	

The Tank Solenoi Multivalve reached the number of Opening/Closing Cycle limit.
Replace the Tank Solenoid Multivalve

DTC2294 PRESENT OR STORED	**PRESSURE CONTROL CIRCUIT VALVE** 15: Open circuit 15: Short circuit to +12 V 11: Short circuit to ground.

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele.1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects a short circuit to +12V, a short circuit to ground, a wiring interruption or solenoid coil resistance out of range, in the circuit controlling the tank electrovalve solenoid.

DTC2294 PRESSURE CONTROL CIRCUIT VALVE

FAILURE TYPE 15 and 11	***NOTES***	**Priority of treatment if more than one fault is present:** If the fault **DTC2666** is present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on GCU Track 16 and 44.

Check if the pressure regulator electrovalve plug has been properly connected. Repair if necessary.

Check the pressure regulator electrovalve connections. Repair if necessary.

Check the computer connections. Repair if necessary

Remove the GCU 56 way connector.

LC03	**GCU connector Track 18 → Track 1 of the EV plug**
LC03	**Track 2 of the EV plug → Ground**

LC02	**GCU connector Track 23 → Track 1 of the EV plug**
LC02	**Track 2 of the EV plug → Ground**

If required, replace the faulty harness.

Measure the resistance of the coil of the electrovalve.

Replace the coil if the resistance is not in the range **11,0 and 13,5 ohm at ambient temperature (20 °C)**.

If the fault persist after these check, replace the coil.

DTC1572 PRESENT OR STORED	**PRESSURE CONTROL CIRCUIT VALVE** 38: Too much open close cycles

DTC1572 PRESSURE CONTROL VALVE CIRCUIT

FAILURE TYPE	*NOTES*	
38		

The Solenoid Valve assembled on the Reducer/Vaporizer inlet reached the number of Opening/Closing Cycle limit.
Replace the Reducer/Vaporizer Solenoid Valve

DTC018A PRESENT OR STORED	**LPG PRESSURE SENSOR CIRCUIT** 11: Short-circuit to ground 12: Short-circuit to +5V 13: Open Circuit

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer
	WARNING: It is imperative that no ohmmeter check is carried out on the pressure sensor (risk of destroying it).

This electrical fault could occur when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or LPG Pressure Sensor in open circuit or short circuit) in the circuit acquiring the LPG Pressure Signal.

DTC018A LPG PRESSURE SENSOR CIRCUIT

FAILURE TYPE 11, 12 and 13	***NOTES***	**Priority of treatment if more than one fault is present:** If the fault **DTC018A** is present at the same time, perform the current check first.

Check the LPG pressure connections. Repair if necessary

Check the GCU connections. Repair if necessary.

Remove the GCU 56 way connector.

LC03	**GCU connector Track 19 → Track 3 of the sensor plug**
LC03	**GCU connector Track 45 → Track 4 of the sensor plug**
LC03	**Track 1 of the sensor plug → Ground**

LC02	**GCU connector Track 9 → Track 3 of the sensor plug**
LC02	**GCU connector Track 8 → Track 4 of the sensor plug**
LC02	**Track 1 of the sensor plug → Ground**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

Ensure the insulation against Ground of the connection between:

LC03	**GCU connector Track 19 → Track 3 of the sensor plug**
LC02	**GCU connector Track 9 → Track 3 of the sensor plug**

Repair if necessary. If required, replace the faulty harness.

Reconnect the GCU 56 way connector and check for the presence of a 5V +/-10% supply voltage on Track 3 of the sensor when in Key-On and push button LEDs are turned on.

If the fault persist after these check, carry out a road test followed by a test using the diagnostic tool and proceed to fault finding of “Unexpected switch back to petrol” Chart 1.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC2293 PRESENT OR STORED	**LPG PRESSURE** 21: Low LPG pressure 22: High LPG pressure 64: Incoherence

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer
	WARNING: It is imperative that no ohmmeter check is carried out on the pressure sensor (risk of destroying it).

This functional fault could occur when the GCU Diagnostic System detects pressure parameters out of range (LPG pressure too low or too high to guarantee a regular operation of the engine, or pressure delay due to a leakage in the rubber hoses) in the circuit controlling the LPG pressure supply to the LPG rail. The 64 recurrence could be symptomatic of a clogged hose or a leakage in a rubber hose connection or damaged hose.

DTC2293 LPG PRESSURE

FAILURE TYPE 21 and 22	***NOTES***	**Priority of treatment if more than one fault is present:** Deal with the faults **DF633/DTC1170, DF635/DTC1301, DF636/DTC1302, DF637/DTC1303, DF638/DTC1304** and **DF639/DTC1300** if are present at the same time. Deal with the electrical fault **DTC018A** if is present at the same time.

Ensure that there are no leaks on the inlet manifold.

Repair if necessary.

If no fault is found, then there must be a problem with the LPG fuel system and proceed to fault finding of "Unexpected switch back to petrol" Chart 1 checking:

- Fuel check
- Fuel pressure sensor check
- Multivalve electrovalve check
- Fuel supply hoses check
- Fuel pressure regulator check

Replace the defective component.

For both

LC03 **LC02**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC2293 LPG PRESSURE

FAILURE TYPE 64	*NOTES*	**Priority of treatment if more than one fault is present:** Deal with the electrical fault **DTC018A** if is present at the same time.

Ensure that there are no leaks on the inlet manifold.
Repair if necessary.

If no fault is found, then there must be a problem with the LPG fuel system and proceed to fault finding of:

Fault finding Assisted by PlusMaxRE
Chart LPG 2

FUEL SUPPLY CONFORMITY CHECK: LEAKAGE TEST
[DTC 2293-64]

FUEL SUPPLY CONFORMITY CHECK: TOO LOW PRESSURE
[DTC 2293-64]

"IMPOSSIBLE SWITCHING IN LPG MODE" Chart 3 and/or "IMPOSSIBLE TO SWITCH IN LPG MODE AND LPG SWITCH IS BUZZING" Chart 8.

For both

LC03

LC02

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC1318 PRESENT OR STORED	NOT CORRECT LPG PRESSURIZATION 21: Low LPG pressure

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer
	WARNING: It is imperative that no ohmmeter check is carried out on the pressure sensor (risk of destroying it).

This functional fault could occur when the GCU Diagnostic System detects pressure parameters out of range (LPG pressure too low or too high to guarantee a regular operation of the engine, or pressure decay due to a leakage in the rubber hoses) in the circuit controlling the LPG pressure supply to the LPG rail and could be symptomatic of a clogged hose or a leakage in a rubber hose connection or damaged hose.

FAILURE TYPE 21	*NOTES*	**Priority of treatment if more than one fault is present:** Deal with the electrical fault **DTC018A** if is present at the same time.

Ensure that there are no leaks on the inlet manifold.
Repair if necessary.

If no fault is found, then there must be a problem with the LPG fuel system and proceed to fault finding of:

Fault finding Assisted by PlusMaxRE
Chart LPG 2

FUEL SUPPLY CONFORMITY CHECK: LEAKAGE TEST
[DTC 2293-64] or [DTC 1318-64]

FUEL SUPPLY CONFORMITY CHECK: TOO LOW PRESSURE
[DTC 2293-64] or [DTC 1318-64]

"IMPOSSIBLE SWITCHING IN LPG MODE" Chart 3 and/or "IMPOSSIBLE TO SWITCH IN LPG MODE AND LPG SWITCH IS BUZZING" Chart 8.

For both

LC03

LC02

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC0185 PRESENT OR STORED	**LPG TEMPERATURE SENSOR CIRCUIT** 11: Open circuit 15: Short circuit to ground

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or LPG Temperature Sensor in open circuit or short circuit) in the circuit acquiring the LPG Temperature Signal.

DTC0185 LPG TEMPERATURE SENSOR CIRCUIT

FAILURE TYPE 11 and 15	***NOTES***	**Priority of treatment if more than one fault is present:** If the fault **DTC0184** is present at the same time, perform the current check first.

Check the LPG pressure connections. Repair if necessary

Check the GCU connections. Repair if necessary.

Remove the GCU 56 way connector.

LC03	**GCU connector Track 46 → Track 2 of the sensor plug**
LC03	**Track 1 of the sensor plug → Ground**

LC02	**GCU connector Track 6 → Track 2 of the sensor plug**
LC02	**Track 1 of the sensor plug → Ground**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

Ensure the insulation against +12V of the connection between:

LC03	**GCU connector Track 46 → Track 3 of the sensor plug**
LC02	**GCU connector Track 6 → Track 3 of the sensor plug**

Repair if necessary. If required, replace the faulty harness.

If the fault persist after these check, carry out a road test AND proceed to fault finding of “Unexpected switch back to petrol” Chart 1.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC0184 PRESENT OR STORED	**LPG TEMPERATURE** 21: Low LPG temperature 22: High LPG temperature

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer
	WARNING: It is imperative that no ohmmeter check is carried out on the pressure sensor (risk of destroying it).

This functional fault could occur when the GCU Diagnostic System detects temperature parameters out of range (LPG temperature too low or too high to guarantee a regular combustion and operation of the engine) in the circuit controlling the LPG pressure supply to the LPG rail.

DTC0184 LPG TEMPERATURE

FAILURE TYPE 21 and 22	***NOTES***	**Priority of treatment if more than one fault is present:** Deal with the electrical fault **DTC0185** if is present at the same time.

Proceed to fault finding of “wrong gas temperature” fault finding Chart 2

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC2265 PRESENT OR STORED	**LPG TANK LEVEL SENSOR CIRCUIT** 11: Open circuit 15: Open circuit or short-circuit to +5V

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 5 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer
	WARNING: It is imperative that no ohmmeter check is carried out on the tank level sensor (risk of destroying it).

This electrical fault could occur when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or LPG Level Sensor in open circuit or short circuit) in the circuit acquiring the LPG Tank Level Signal.

DTC2265 GAS TANK GAUGE VOLTAGE SIGNAL

FAILURE TYPE 11 and 15	***NOTES***	**Priority of treatment if more than one fault is present:** If faults **DTC2666** and **DTC2294** are present at the same time, perform a rear wiring harness check first.

Check the LPG Tank Level Signal. Repair if necessary

Check the GCU connections. Repair if necessary.

Remove the GCU 56 way connector.

LC03	**GCU connector Track 47 → Track 1 of the sensor plug**
LC03	**GCU connector Track 36 → Track 3 of the sensor plug**
LC03	**Track 2 of the sensor plug → Ground**

LC02	**GCU connector Track 18 → Track (1) of the sensor plug**
LC02	**GCU connector Track 21 → Track (2) of the sensor plug**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

On LC03 Systems only, ensure the continuity of the connection between:

LC03	**Track 2 of the sensor plug → Ground**

Ensure the insulation against +12V of the connection between:

LC03	**GCU connector Track 47 → Track 2 of the sensor plug**
LC02	**GCU connector Track 21 → Track (2) of the sensor plug**

GCU connector Track 47 → Track 1 of the EV plug

Repair if necessary. If required, replace the faulty harness.

If the harness is conform replace just the level sensor, not the complete MultiValve.

Reconnect the GCU 56 way connector and check for the presence of a 5 +/-10% volt supply on Track 1 of the sensor when in Key-On and push button LEDs are turned on.

If there is no supply, replace the injection computer (reprogram and configure the computer: see introduction).

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC1608 PRESENT OR STORED	INJECTION CONTROL COMPUTER **4B**: GCU's Over temperature

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 8 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects as an over temperature of LPG Injector drivers due to a short circuit to +12V in the wiring harness, an intermittent wiring interruption or solenoid coil resistance out of range.

DTC1608 INJECTION CONTROL COMPUTER

FAILURE TYPE 4B	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.
Check if the LPG Injectors plugs has been properly connected. Repair if necessary.
Check the connection and condition of the injector connector. Change the connector if necessary.
Check the ground connection to the chassis. Repair if necessary.
With the engine running in LPG mode, **check for the presence of +12 volts on the correct Track (1 or 2) of the injector. (Check the correct track assignment on wiring diagram of the function for the vehicle concerned)**.
Connect the bornier in place of the computer and check the resistance value of the injector by measuring between **tracks 1 and 2 of the LPG injector**: Track 16 and 27 for an injector 1; Track 16 and 28 for an injector 2; Track 44 and 55 for an injector 3; Track 44 and 56 for an injector 4; Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).
If the fault persists after these checks, **contact Techline**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC10A0 PRESENT OR STORED	CYLINDER 1 LPG INJECTOR CIRCUIT **12**: Short circuit to +12 volts **14**: Open circuit **14**: Short circuit to ground

NOTES	**Conditions for applying the diagnostic to stored faults:** The fault is declared present while: – the LPG system in pre-heating mode or while or the engine is running in LPG mode and – the LPG Injector 1 is activated for 50 time and for 50 times the GCU Diagnostic System detect the fault.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

These electrical faults could occur individually or in multiple messages, when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or solenoid coil resistance out of range) in the circuit controlling the four LPG injectors.

DTC10A0 CYLINDER 1 LPG INJECTOR CIRCUIT

FAILURE TYPE 12 and 14	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.
Check if the LPG Injectors plugs has been properly connected. Repair if necessary. Check the connection and condition of the injector connector. Change the connector if necessary. Check the ground connection to the chassis. Repair if necessary.
With the engine running in gasoline mode and the LPG Pushbutton in waiting mode, **check for the presence of +12 volts on the correct Track (1 or 2) of the injector. (Check the correct track assignment on wiring diagram of the function for the vehicle concerned)**.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection:**

LC03	**+15 INJECTOR SUPPLY GCU track 16**	→	**LPG Injector 1 Track 1**
LC02	**+15 INJECTOR SUPPLY GCU track 26**	→	**LPG Injector 1 Track 1**

Repair if necessary.

If there is no supply voltage, check the insulation, continuity and absence of interference resistance of the connection:

LC03 LC02	**GAS INJECTOR 1 GCU track 27**	→	**LPG Injector 1 Track 2**

Repair if necessary.

Check the **resistance value** of the injector by measuring between **tracks 1 and 2 of the LPG injector**.

Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).

Check the **resistance value** of the injector by measuring between **tracks 1 and 2 of the LPG injector**.

Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).

Reverse the connection between 2 LPG injectors.

If the fault persist after these check, replace GCU.

Restore the correct connection on the LPG injectors.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

DTC10A1 PRESENT OR STORED	**CYLINDER 2 LPG INJECTOR CIRCUIT** **12**: Short circuit to +12 volts **14**: Open circuit **14**: Short circuit to ground

NOTES	**Conditions for applying the diagnostic to stored faults:** The fault is declared present while: – the LPG system in pre-heating mode or while or the engine is running in LPG mode and – the LPG Injector 1 is activated for 50 time and for 50 times the GCU Diagnostic System detect the fault.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

These electrical faults could occur individually or in multiple messages, when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or solenoid coil resistance out of range) in the circuit controlling the four LPG injectors.

DTC10A1 CYLINDER 2 LPG INJECTOR CIRCUIT

FAILURE TYPE 12 and 14	***NOTES***	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.
Check if the LPG Injectors plugs has been properly connected. Repair if necessary. Check the connection and condition of the injector connector. Change the connector if necessary. Check the ground connection to the chassis. Repair if necessary.
With the engine running in gasoline mode and the LPG Pushbutton in waiting mode, **check for the presence of +12 volts on the correct Track (1 or 2) of the injector. (Check the correct track assignement on wiring diagram of the function for the vehicle concerned)**.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection**:

LC03	**+15 INJECTOR SUPPLY GCU track 16**	→	**LPG Injector 2 Track 1**
LC02	**+15 INJECTOR SUPPLY GCU track 26**	→	**LPG Injector 2 Track 1**

Repair if necessary.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection**:

LC03 LC02	**GAS INJECTOR 1 GCU track 28**	→	**LPG Injector 2 Track 2**

Repair if necessary.

Check the **resistance value** of the injector by measuring between **tracks 1 and 2 of the LPG injector**.

Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).

Reverse the connection between 2 LPG injectors.

If the fault persist after these check, replace GCU.

Restore the correct connection on the LPG injectors.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

DTC10A2 PRESENT OR STORED	CYLINDER 3 LPG INJECTOR CIRCUIT **12**: Short circuit to +12 volts **14**: Open circuit **14**: Short circuit to ground

NOTES	**Conditions for applying the diagnostic to stored faults:** The fault is declared present while: – the LPG system in pre-heating mode or while or the engine is running in LPG mode and – the LPG Injector 1 is activated for 50 time and for 50 times the GCU Diagnostic System detect the fault.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

These electrical faults could occur individually or in multiple messages, when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or solenoid coil resistance out of range) in the circuit controlling the four LPG injectors.

DTC10A2 CYLINDER 3 LPG INJECTOR CIRCUIT

FAILURE TYPE 12 and 14	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.
Check if the LPG Injectors plugs has been properly connected. Repair if necessary. Check the connection and condition of the injector connector. Change the connector if necessary. Check the ground connection to the chassis. Repair if necessary.
With the engine running in gasoline mode and the LPG Pushbutton in waiting mode, **check for the presence of +12 volts on the correct Track (1 or 2) of the injector. (Check the correct track assignement on wiring diagram of the function for the vehicle concerned)**.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection**:

LC03	**+15 INJECTOR SUPPLY GCU track 44**	→	**LPG Injector 3 Track 1**
LC02	**+15 INJECTOR SUPPLY GCU track 54**	→	**LPG Injector 3 Track 1**

Repair if necessary.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection**:

LC03 LC02	**GAS INJECTOR 1 GCU track 55**	→	**LPG Injector 3 Track 2**

Repair if necessary.

Check the **resistance value** of the injector by measuring between **tracks 1 and 2 of the LPG injector**.

Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).

Reverse the connection between 2 LPG injectors.

If the fault persist after these check, replace GCU.

Restore the correct connection on the LPG injectors.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

DTC10A3 PRESENT OR STORED	CYLINDER 4 LPG INJECTOR CIRCUIT **12**: Short circuit to +12 volts **14**: Open circuit **14**: Short circuit to ground

NOTES	**Conditions for applying the diagnostic to stored faults:** The fault is declared present while: – the LPG system in pre-heating mode or while or the engine is running in LPG mode and – the LPG Injector 1 is activated for 50 time and for 50 times the GCU Diagnostic System detect the fault.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

These electrical faults could occur individually or in multiple messages, when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or solenoid coil resistance out of range) in the circuit controlling the four LPG injectors.

DTC10A3 CYLINDER 4 LPG INJECTOR CIRCUIT

FAILURE TYPE 12 and 14	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.
Check if the LPG Injectors plugs has been properly connected. Repair if necessary. Check the connection and condition of the injector connector. Change the connector if necessary. Check the ground connection to the chassis. Repair if necessary.
With the engine running in gasoline mode and the LPG Pushbutton in waiting mode, **check for the presence of +12 volts on the correct Track (1 or 2) of the injector. (Check the correct track assignment on wiring diagram of the function for the vehicle concerned)**.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection**:

LC03	**+15 INJECTOR SUPPLY GCU track 44**	→	**LPG Injector 4 Track 1**
LC02	**+15 INJECTOR SUPPLY GCU track 54**	→	**LPG Injector 4 Track 1**

Repair if necessary.

If there is no supply voltage, **check the insulation, continuity and absence of interference resistance of the connection**:

LC03 LC02	**GAS INJECTOR 1 GCU track 56**	→	**LPG Injector 4 Track 2**

Repair if necessary.

Check the resistance value of the injector by measuring between **tracks 1 and 2 of the LPG injector**.

Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).

Reverse the connection between 2 LPG injectors.

If the fault persist after these check, replace GCU.

Restore the correct connection on the LPG injectors.

AFTER REPAIR	Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a customer road test to confirm repair using engine speed and load ranges frequently encountered during the vehicle's life, followed by a test using diagnosis tool. Deal with any other possible faults.

DTC1570 PRESENT OR STORED	LPG SWITCH STATUS 13: Open circuit

NOTES	**Conditions for applying the diagnostic to stored faults:** The fault reappears in the memory after the engine has been running for 5 minutes in LPG mode.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects an open circuit of the contact of the pushbutton.

DTC1570 LPG SWITCH STATUS

FAILURE TYPE 13	*NOTES*	None

Check the pushbutton electrical connections. Repair if necessary.
Check the GCU connections. Repair if necessary.

Remove the GCU 56 way connector.
Ensure the continuity of the connection between:

LC03	**GCU connector Track 49 → Track 3 of the pushbutton**
LC03	**Track 2 of the pushbutton plug → Ground**

LC02	**GCU connector Track 48 → Track 3 of the pushbutton**
LC02	**Track 2 of the pushbutton plug → Ground**

Repair if necessary. If required, replace the faulty harness.

If the fault persist after these checks, change the **Pushbutton**.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC1610 PRESENT OR STORED	**BATTERY VOLTAGE** **16**: Too Low voltage **17**: Too High voltage

NOTES	**Conditions for applying the fault finding procedure to the fault stored** The fault is declared present during Power On, after the engine has been running in LPG Mode.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects a power supply voltage below 9V or over 16V for at least 3 seconds.

DTC1610 BATTERY VOLTAGE

FAILURE TYPE *16 and 17*	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the cable connecting the battery to the GCU, the battery Ground cable to the chassis and the chassis grounding cable to the engine and transmission assembly are in good condition.
Repair if necessary.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

Make sure that the battery is in a good state of charge and, if necessary, check the charging circuit.

Connect the bornier in place of the computer and check the insulation, continuity and absence of interference resistance of the connections:

LC03	+30_POWER SUPPLY FROM BATTERY GCU track 15	→	BATTERY FUSE
LC03	+30_POWER SUPPLY FROM BATTERY GCU track 43	→	BATTERY FUSE
LC03	POWER GROUND GCU track 22	→	CHASSIS GROUND
LC03	POWER GROUND GCU track 7	→	CHASSIS GROUND
LC03	LOGIC GROUND GCU track 48	→	CHASSIS GROUND

Repair if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance** of the connections:

LC02	+30_POWER SUPPLY FROM BATTERY GCU track 15	→	BATTERY FUSE
LC02	+30_POWER SUPPLY FROM BATTERY GCU track 43	→	BATTERY FUSE
LC02	POWER GROUND GCU track 25	→	CHASSIS GROUND
LC02	POWER GROUND GCU track 53	→	CHASSIS GROUND
LC02	LOGIC GROUND GCU track 22	→	CHASSIS GROUND

Repair if necessary.

If the fault persists after these checks, **reflash the GCU with the last released SW and Calibration**.

If the fault persists after these checks, **contact Techline**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC1612 PRESENT OR STORED	SENSOR SUPPLY VOLTAGE **16**: Too Low voltage **17**: Too High voltage

NOTES	**Conditions for applying the fault finding procedure to the fault stored** The fault is declared present during Power On, after the engine has been running in LPG Mode.
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This electrical fault could occur when the GCU Diagnostic System detects a sensor supply voltage below 4,5 V or over 5,5 V for at least 500 milliseconds.

DTC1612 BATTERY VOLTAGE

FAILURE TYPE 16 and 17	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the cable connecting the battery to the GCU, the battery Ground cable to the chassis and the chassis grounding cable to the engine and transmission assembly are in good condition.
Repair if necessary.

Check the voltage output on Track 19 of the GCU.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC109A PRESENT OR STORED	GCU SAFETY RELAY **64**: GCU Safety relay incoherence

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 3 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This functional fault could occur when the GCU Diagnostic System detects a failure in internal Solid State Safety Relay voltage feedback from safety relay detects an closed status when it should be open or viceversa.

DTC109A GCU SAFETY RELAY

FAILURE TYPE 64	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC2666, DTC2294,** are present, check for a wiring harness short circuit to battery on: GCU Track 16 and 17 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the cable connecting the battery to the GCU, the battery Ground cable to the chassis and the chassis grounding cable to the engine and transmission assembly are in good condition.
Repair if necessary.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.

With the engine running in gasoline mode and the LPG Pushbutton not selected, **check for the absence of +12 volts on the correct Track (17 or 18 for LC03 GCU and 23 or 24 for LC02 GCU) of the TANK and VAPORIZER SHUT OFF VALVE output**.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

If there +12V is present when the GCU is running in gasoline mode:

1) Remove the GCU 56 way connector.
2) and **check the insulation of the connection between**:

LC03	**+ GCU connector Track 17**	→	**+30_POWER SUPPLY FROM BATTERY GCU track 15**
LC03	**+ GCU connector Track 18**	→	**+30_POWER SUPPLY FROM BATTERY GCU track 15**
LC02	**GCU connector Track 23**	→	**+30_POWER SUPPLY FROM BATTERY GCU track 15**
LC02	**GCU connector Track 24**	→	**+30_POWER SUPPLY FROM BATTERY GCU track 15**

Make sure that the cable connecting the GCU and the TANK SHUT OFF VALVE or GCU and VAPORIZER SHUT OFF VALVE are in good condition.

Repair if necessary.

If the fault persists after these checks, **contact Techline**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC0618 PRESENT OR STORED	LPG SYSTEM **46**: GCU's Last trip data corrupted

NOTES	**Conditions for applying the diagnostic to stored faults:** If the fault reappears in the memory after the engine has been running for 8 minutes in LPG mode
	Special notes: Use the correct bornier Ele. 1681 for all operations on the engine management computer

This functional fault could occur when the GCU Diagnostic System detects a failure in recording last trip data information; typically this occurs when the battery clamp or LPG GCU Power Supply Ground is disconnected during a "Power-latch" of the GCU.

DTC0618 LPG SYSTEM

FAILURE TYPE 46	*NOTES*	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DTC10A0, DTC10A1, DTC10A2, DTC10A3,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Make sure that the cable connecting the battery to the GCU, the battery Ground cable to the chassis and the chassis grounding cable to the engine and transmission assembly are in good condition.
Repair if necessary.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.

GCU not correctly flashed

Apply "Fault Finding – Conformity check assisted with Plus Max RE" LPG 1 - NO DIALOGUE BETWEEN GCU AND TOOL.
Apply "MANUAL EMERGENCY PROCEDURE FOR GCU RE-CALIBRATION OR GCU REPROGRAMMING"

If the fault persists after these checks, **contact Techline.**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance** of the connections:

LC03	+30_POWER SUPPLY FROM BATTERY GCU track 15	→	BATTERY FUSE
LC03	+30_POWER SUPPLY FROM BATTERY GCU track 43	→	BATTERY FUSE
LC03	POWER GROUND GCU track 22	→	CHASSIS GROUND
LC03	POWER GROUND GCU track 7	→	CHASSIS GROUND
LC03	LOGIC GROUND GCU track 48	→	CHASSIS GROUND

Repair if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance** of the connections:

LC02	+30_POWER SUPPLY FROM BATTERY GCU track 15	→	BATTERY FUSE
LC02	+30_POWER SUPPLY FROM BATTERY GCU track 43	→	BATTERY FUSE
LC02	POWER GROUND GCU track 25	→	CHASSIS GROUND
LC02	POWER GROUND GCU track 53	→	CHASSIS GROUND
LC02	LOGIC GROUND GCU track 22	→	CHASSIS GROUND

Repair if necessary.

If the fault persists after these checks, **reflash the GCU with the last released SW and Calibration**.

If the fault persists after these checks, **contact Techline**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

DTC1316 PRESENT OR STORED	**GASOLINE PUMP RELAY** **00**: Open circuit **11**: Short circuit to ground **12**: Short circuit to +12 volts.

NOTES	**Priority for dealing with a number of faults:** First, deal with the DF046 / DTC1610 battery voltage fault if it is present or stored.
	Conditions for applying the fault finding procedure to the fault stored: The fault is declared present 3 seconds after the switching in LPG mode.
	Special note: This fault could be present or stored on LC03 System only. **LC03**

These electrical faults could occur individually or in multiple messages, when the GCU Diagnostic System detects any electrical fault (short circuit, wiring interruption or solenoid coil resistance out of range) in the circuit controlling the gasoline pump relay.

DF1316 GASOLINE PUMP RELAY

FAILURE TYPE 11 and 12	***NOTES***	**Priority of treatment if more than one fault is present:** If one or more of the following faults **DF1366, DF1367, DF1368, DF1369,** are present, check the **"+15 INJECTOR SUPPLY (Safety Relay)"** Voltage on: GCU Track 16 and 44 on LC03 Systems GCU Track 26 and 54 on LC02 Systems and deal with those faults before all else.

Check the **condition of the clips** on the injection relay (on the engine fuse/relay plate).

Replace the clips if necessary.

With the engine running in gasoline mode and the LPG Pushbutton in waiting mode, **check for the presence of +12 volts on the Track CDE+ of the injector. (Check the correct track assignment on wiring diagram of the function for the vehicle concerned).**

If there is no power supply **check the insulation, continuity and absence of interference resistance of the connection**:

LC03	**+15 INJECTOR SUPPLY GCU track 16**	→	**FUEL PUMP CUT-OFF RELAY Track CDE+**

Repair if necessary.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

Connect the bornier in place of the computer and **check the insulation, continuity and absence of interference resistance of the connection**:

LC03	**Gasoline Pump Shutdown Relay Control** **GCU track 02**	→	**FUEL PUMP CUT-OFF RELAY** **Track CDE-**
LC03	**Gasoline Pump Shutdown Relay Status** **GCU track 11**	→	**FUEL PUMP CUT-OFF RELAY** **Track CDE-**

Repair if necessary.

Check the resistance value of the relay by measuring between tracks CDE+ and CDE- of the relay.
Replace the relay if the resistance is not approximately: 65 ohms Ω ± 5 Ω at 25 ºC.

If the fault persists after these checks, **contact Techline**

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

1. REMINDERS

Landi Renzo diagnostic tool Plus Max Renault Version (in the following PluxMaxRe) is a diagnostic tool developed to run second level diagnostic on LPG system.

Always use the official diagnostic tool (Renault Clip) supplied by the manufacturer of the vehicle as primary diagnostic and repairing tool.

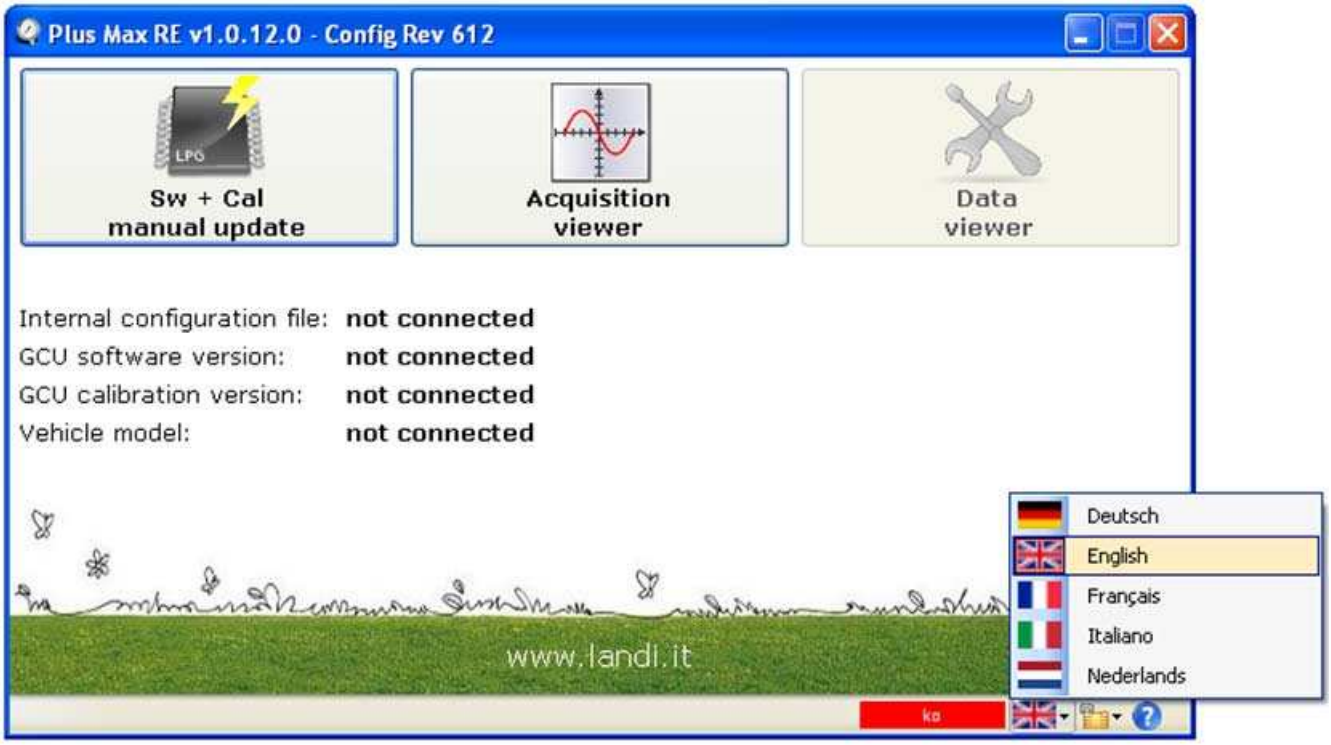
LR PlusMaxRE tools could be used in order to perform a second level diagnostic after the authorization of Renault's After Sales supervisors only.

2. PLUS MAX RE FUNCTIONS

See all the information relating the LPG System
OPERATIONS FOR REPLACING OR REPROGRAMMING THE GCU
Physical measurements
GCU test
Multimeter

PluxMaxRE can be installed on ANY PC running windows XP/VISTA/Windows 7 (32 bit only)

PlusMaxRE supports English French and Italian language.



How to select language

3. EXTRAS

3.1 Info

If the primary installation, follow the instructions, which is attached. If you already have an earlier version, it is recommended to uninstall and then follow the installation instructions.
It only works with original USB adapter.

3.2 Info

LR has created several versions of Diagnostic tools system named PlusMax. Just the version named Plus Max Renault Version (PluxMaxRe) must be connected to the LPG computer via Diag connector. It operates as a diagnostic interface, checking out a series of parameters as well as figuring out problems that you may then solve.

Previous version of PlusMax or other tools, as reflashing tools, or other unauthorized Tools could cause permanent damage to GCU calibration.

3.3 Info

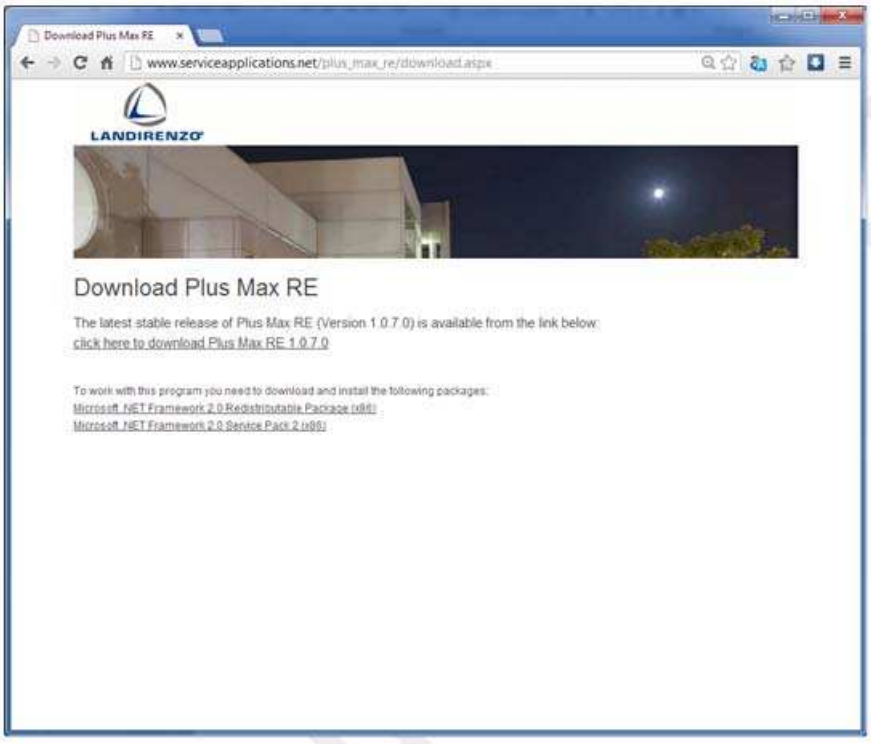
Always keep to the instructions supplied by the vehicle manufacturer. The equipment should be used by trained personnel only.

4. PLUS MAX RE INSTALLATION GUIDE

Before installing please uninstall previous version of PlusMaxRE if you have;

Download the latest Plus Max RE diagnostic tool from Landi Renzo Aftersales Center

http://www.serviceapplications.net/plus_max_re/download.aspx



Double click the downloaded installation file (setup_1.0.x.x.exe)
Follow instructions step by step

SW Installation completed

Desktop Icon

IMPORTANT:
The Diagnostic Functions of the PlusMaxRE tools are not enabled (blocked by code); just the check and SW updating function is allowed

5. OPERATIONS FOR REPLACING OR REPROGRAMMING THE GCU

5.1 Procedure to be applied before replacement

This procedure must be applied before replacing or reprogramming the Gas Control Unit (LPG Computer)

IMPORTANT:
– Connect a battery charger and switch on the vehicle + after ignition supply voltage.
– Switch off all the electrical consumers (lights, interior lighting, air conditioning, radio, etc.).

– Connect the diagnostic tool power supply (mains or cigarette lighter supply).
– Connect the LR USB interface to the diagnostic tool:

Part Number
7711392500

Description
KIT INTERFACCIA USB PER CENTRALINE USB TYPE (LR USB interface)

– Connect the LR USB interface connecting cable to the diagnosis plug on the LPG ECU.
– Switch on vehicle + after ignition (+APC) power supply and wait until the coolant temperature is **less than 60 ºC** and the air temperature **is less than 50 ºC** and LPG injector driver temperature is **less than 40 ºC**. Consult parameter GP103 Coolant temperature and GP104 Air temperature and GP030 LPG injector driver temperature.

IMPORTANT:
It is necessary to respect these temperature values in order to carry out the computer programming or reprogramming operations.

– Apply the programming or reprogramming operations described in **Technical Note Appendix A GCU Computer (re)programming procedure**.

IMPORTANT:
After (re)programming the computer, switch off the + after ignition (+APC) power supply and wait for the loss of communication message to appear on the PlusMaxRE diagnostic tool. If the message does not appear, wait for 60 seconds.
Failure to follow this procedure may cause the computer data to be corrupted.

5.2 Procedure to be applied after repair

This procedure must be applied after replacing or reprogramming the computer.

5.3 Injection computer initialisation

– Rigorously Clear any fault code using Clip connected to Gasoline ECU. (During the reprogramming of a generic vehicle computer this cannot send messages on the CAN Network; this could generate some DTCs in the ECU).
– Crank and stop the engine to initialize the computer and wait for the loss of communication message to appear on the diagnostic tool, if the message does not appear, wait for 60 seconds.
– The computer is automatically configured according to the GCU and options present on the LPG System.
– Verify the correct configuration of the LPG System.

5.4 Procedure to be applied during the reprogramming

This procedure must be applied during the reprogramming the Gas Control Unit (LPG Computer)
The operation replaces the Software and the Calibration inside the GCU with the latest version with the help of PlusMaxRE.
Reprogramming procedure concerns GCU already assembled in the vehicle and already operational, and GCU delivered already programmed by Spare Part Centers (Magasin Pièces de Rechanges).
The reprogramming operation avoids the systematic replacement of GCUs.

5.5 When reprogramming

The operation is done in the following sistuations:
When a well-defined Opération “Technique Spécifique” (OTS) or Note Technique Incidentielle (NTi) is put in effect in order to solve issues find in After Sales and/or an improvement of performances.
Following a RENAULT’s Techline request
Following RENAULT’s Technical Directive (Directives Techniques RENAULT)
Following a Landi Renzo’s Released Software Evolution
Following an ACTIS Solution

5.6 Operating Mode

The operating mode for both GCU Re-Calibration or GCU Reprogramming is strictly the same.
This operation must be done with PlusMaxRE diagnostic tools updated at the last version.

IMPORTANT:
Before any GCU Re-Calibration or GCU Reprogramming always update the tool downloading the latest Plus Max RE diagnostic tool from Landi Renzo Aftersales Center

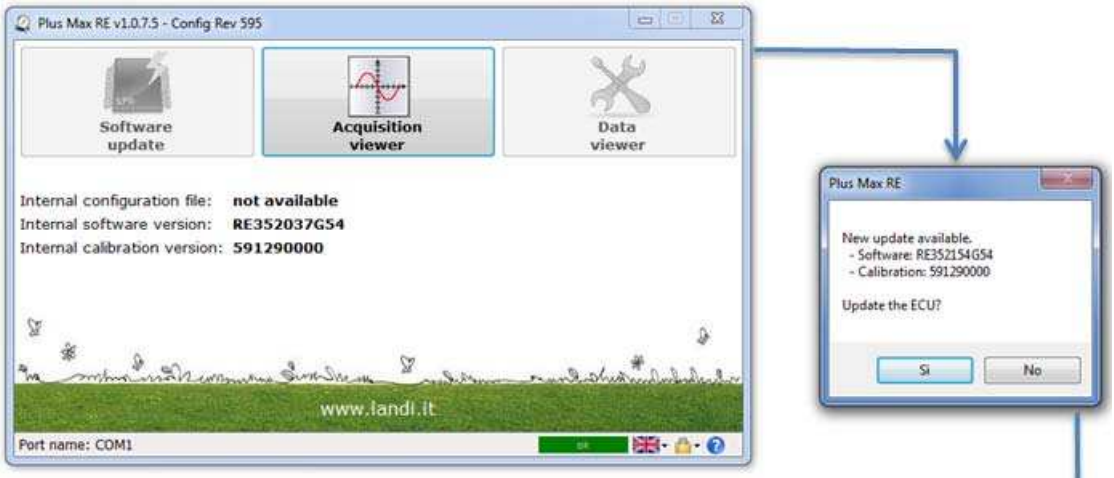
IMPORTANT:
In order to avoid any malfunctioning, outage and blockaged of the GCU, the procedures MUST be rigorously observed:
Procedure to be applied before replacement
Procedure to be applied after repair

IMPORTANT:
After GCU Re-Calibration or GCU Reprogramming always erase story of Gas Control Unit Stored Faults.

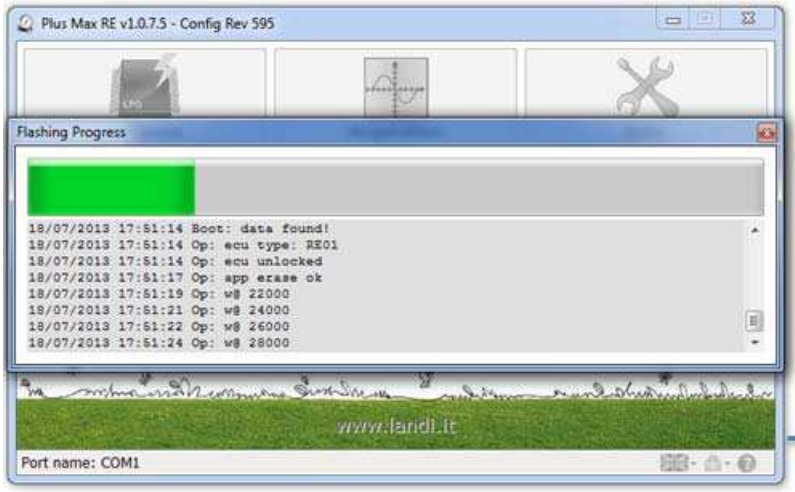
WARNING:
DO NOT WORK ON THE VEHICLE OR ON THE DIAGNOSTIC TOOL

6. AUTOMATIC GCU RE-CALIBRATION OR GCU REPROGRAMMING

The operation replaces the Software and the Calibration inside the GCU with the latest version released for the specific vehicle.



If new update available message appears, update the GCU clicking on Si / Yes



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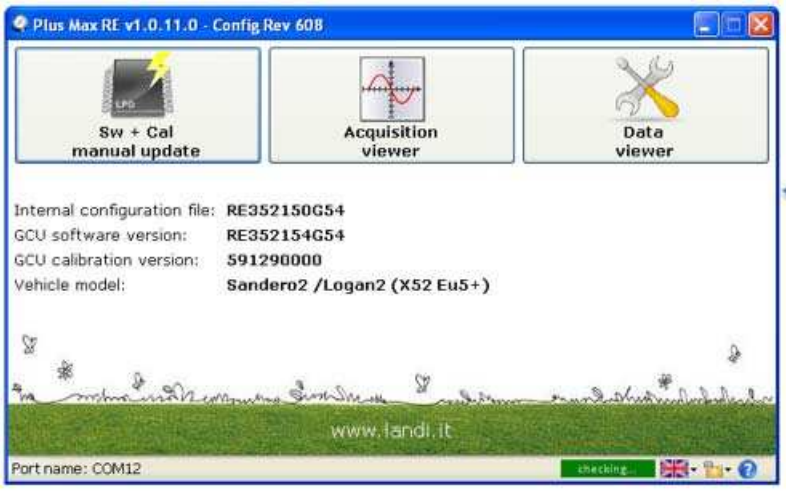


At the end of the download it will appear the main page with new SW version.
After (re)programming the computer, switch off the + after ignition (+APC) power supply and wait for the loss of communication message to appear on the PlusMaxRE diagnostic tool, if the message does not appear, wait for 60 seconds.

7. MANUAL EMERGENCY PROCEDURE FOR GCU RE-CALIBRATION OR GCU REPROGRAMMING

This Manual Emergency Procedure must be applied when:

The operation of GCU Re-Calibration or GCU Reprogramming is interrupted by an Error Message (Example ER-ROR 110, ERROR 103, etc)
When the PlusMaxRE tool cannot automatically detects the vehicle, the original GCU Hardware Version, SW Version and Calibration version.

The operation replaces the Software and the Calibration inside the GCU with the latest version released for the specific vehicle.

The Manual Emergency Procedure consists in the Manual Selection of the vehicle for GCU Re-Calibration or GCU Reprogramming.
The procedure must be authorized by Renault Techline and registered on FIC to report following parameters:

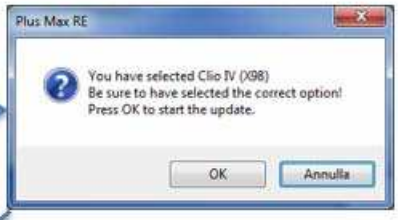
The VIN of the vehicle.
The fabrication number of the vehicle.
The code of error message specified in PlusMaxRE or error description
The SW and CAL number present on the label of the GCU

IMPORTANT:
The speed and relevance of the solution provided by Techline will depend on the accuracy with which this information is entered into the customer fault log.

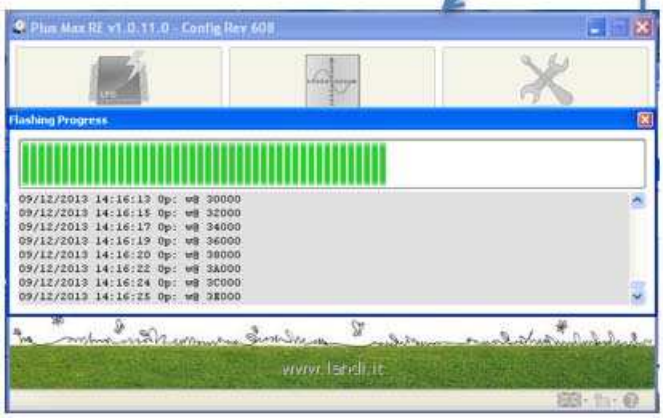
After Techline analysis of the fault, you are authorized to apply the Manual Emergency Procedure for GCU Re-Calibration or GCU Reprogramming; depending on type of fault, this procedure can only be unlocked by a 6 character code (eg:F4A0B9).
This code is also necessary to perform all the diagnosis show in next chapter (in other word to open “parameter visualization” page)

On the main page, select SW+CAL Manual Update

Select the vehicle



Check the correct vehicle is selected and start GCU Re-Calibration or d



Waiting for download completion (100%)

At the end of the download it will appear the main page with new SW version.
After (re)programming the computer, switch off the + after ignition (+APC) power supply and wait for the loss of communication message to appear on the PlusMaxRE diagnostic tool, if the message does not appear, wait for 60 seconds.

8. GENERAL INFO TO FAULT FINDING USING PLUS MAX RE

Always use the official diagnostic tool (Renault Clip) supplied by the manufacturer of the vehicle as primary diagnostic and repairing tool.
Always **clear any fault code using Clip** connected to Gasoline ECU and not using the Reset Pushbutton on the Diagnosis Page of PlusMaxRE.

9. DESCRIPTION FAULT PAGES IN PLUS MAX RE

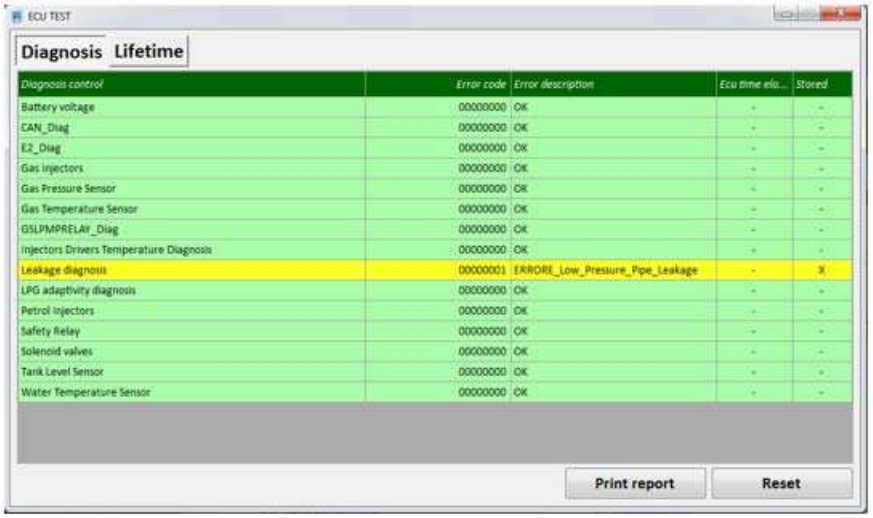
As in Clip, faults are displayed as present or stored (they appeared in a certain context and remain present since they are fix, or they are still present but cannot be diagnosed in the current context).

The **present** or **stored** status of faults should be taken into consideration when the diagnostic tool is used after the + ignition power supply is switched on (without acting on the system components).

If the fault is **confirmed** when the instructions are applied, the fault is present. Deal with the fault.

If the fault is **not confirmed**, check:
– the electrical lines which correspond to the fault,
– the connectors for these lines (for oxidation, bent pins, etc.),
– the resistance of the component detected as faulty,
– the condition of the wires (melted or split insulation, wear).

Using PlusMaxRE to access the diagnostic page, click the "Fault List Page" link on top right of the main page. Present **faults** are **highlighted in yellow**; stored faults are **highlighted in white. Stored faults cannot be erased**. On stored faults the **"ECU time elapsed"** column indicates the GCU time elapsed from the moment when the fault appeared the last time. So a fault with an ECU time elapsed = 0h 01m appears just 1 minute before, while a fault with ECU time elapsed = 16 h 44 m appear 16 hours and 44 minutes before.



Example of present fault Highlighted in yellow

Example of stored fault Highlighted in white

10. COMPONENTS CONFORMITY CHECKS ASSISTED BY PLUSMAXRE

The aim of the conformity check is to check main LPG components in order to avoid wrong diagnostic and incorrect replacement of components.
This section gives the fault finding procedures supported by LR PlusMaxRE diagnostic Tool for behavior and parameters and the conditions for checking them.
If a behavior is not acting normally or a parameter is outside the permitted tolerance values, consult the corresponding fault finding page.

11. CUSTOMER COMPLIANT – CONFORMITY CHECK

NOTES	Only check the Interpretation of Fault with PluxMaxRE tool after performing a complete check with the RENAULT's CLIP diagnostic tool. To open PlusMaxRE parameter page the unlock code is necessary.
	NOTE For any operation on a component of the LPG supply circuit, consult the safety instructions (see 17C).

NO DIALOGUE BETWEEN GCU AND TOOL	LPG 1
FUEL SUPPLY CONFORMITY CHECK	
LEAKAGE TEST	LPG 2
LOW PRESSURE	LPG 3
PRESSURE AND TEMPERATURE SENSOR CHECK	LPG 4
PRESSURE REGULATOR CHECK	LPG 5
INJECTORS CHECK	
MISFIRES	LPG 6
FUEL ADAPTATION	LPG 7
LPG LEVEL SENSOR CHECK	LPG 8
ALL LEDs TURNED OFF ON THE SWITCH BUTTON	LPG 9

LPG 1	NO DIALOGUE BETWEEN GCU AND TOOL

NOTES	Use USB interface to connect your laptop to the diagnosis plug present in the GCU harness

This fault happens when the Tool isn't able to connect the diagnostic

The Area "Connection Status" must be green and parameters shown in the central part of the page.

If this area is red and parameters show "not connected message" there are no connection between PC and GCU, when key is ON.

Check:
GCU Power Supply: check if the GCU is properly supplied (check if the LPG push button is ON)
USB connection: maybe the interface isn't recognized by the PC USB port; restart the PC if necessary.
Cable connection: maybe the USB interface cable is damaged or unplugged; check cable connection.

Make sure that the cable connecting the battery to the GCU, the battery Ground cable to the chassis and the chassis grounding cable to the engine and transmission assembly are in good condition.
Repair if necessary.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.

With the engine running in gasoline mode and the LPG Pushbutton selected, **check for the presence of +12 volts on the correct Track (17 or 18 for LC03 GCU and 23 or 24 for LC02 GCU) of the TANK and VAPORIZER SHUT OFF VALVE output**.

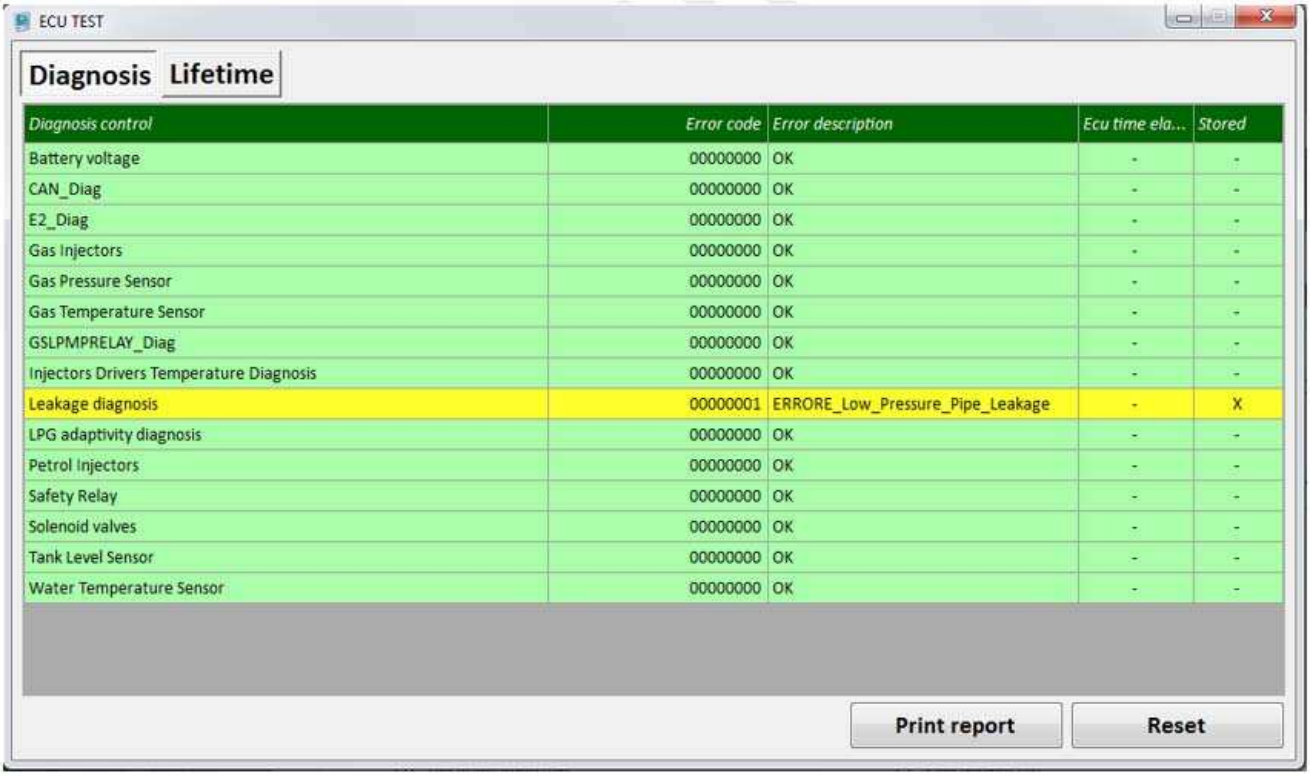
LPG 2	*FUEL SUPPLY CONFORMITY CHECK: LEAKAGE TEST [DTC 2293-64]*

NOTES	GCU Integrates a strategy to check if the functionality of fuel supply lines are verified. In case this check isn't successful an LPG fault is generated and sent to ECU.

When test is performed:

Injector pre-heating (Antisticking function) NOT active
Tank level > 20%
At least 10 engine cranking and powersafe (60sec) after vehicle assembling or after SW reflashing.
Engine run in gasoline mode
Engine-on by at least 2 sec
Coolant water temperature at cranking > 30 °C
No other fault on Tank Level Sensor, Regulator EV, Tank EV.

Failure appears as "Leakage diagnosis" in the PlusMaxRE GCU Test page.
The fault can happen only during petrol mode.



Diagnosis control	Error code	Error description	Ecu time ela...	Stored
Battery voltage	00000000	OK	-	-
CAN_Diag	00000000	OK	-	-
E2_Diag	00000000	OK	-	-
Gas Injectors	00000000	OK	-	-
Gas Pressure Sensor	00000000	OK	-	-
Gas Temperature Sensor	00000000	OK	-	-
GSLPMPRELAY_Diag	00000000	OK	-	-
Injectors Drivers Temperature Diagnosis	00000000	OK	-	-
Leakage diagnosis	00000001	ERRORE_Low_Pressure_Pipe_Leakage	-	X
LPG adaptivity diagnosis	00000000	OK	-	-
Petrol Injectors	00000000	OK	-	-
Safety Relay	00000000	OK	-	-
Solenoid valves	00000000	OK	-	-
Tank Level Sensor	00000000	OK	-	-
Water Temperature Sensor	00000000	OK	-	-

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

Test is performed in 2 different phases:
Few seconds after crank both LPG electrovalves open for 1 second (if the condition to perform the test are verified). In this phase the GCU check that the pressure reach at least 1.15 bar.
After both electrovalves closure the GCU monitor the LPG pressure for some seconds to verify if there is a pressure drop higher than a calibrated threshold.

The pressure doesn't reach 1.15 bar after EV opening:

LC03	**EV blocked:** the current supplies the coil but the EV of the regulator don't open	Replace mobile element
LC03	**Wrong level indication:** if no LPG is present in the tank but the sensor indicates more than 20% (not so common)	Fill the tank and check if the behavior is still present
LC03	**Low Pressure pipe disconnected:** a pipe is completely disconnected and LPG pressure sensor read atmospheric value	Reconnect the pipe
LC03	**Component or pipe clogged:** it can interrupt the flow of LPG inside the pipes, avoiding the rise of pressure	Not easy to detect, check if a pipe has an internal part that block it
LC03	**LPG Pressure/Temperature Sensor fault**	Check for DTC018A or DTC0185 present at the same time and deal with.

Drop of pressure during leakage test phase higher than the limit.

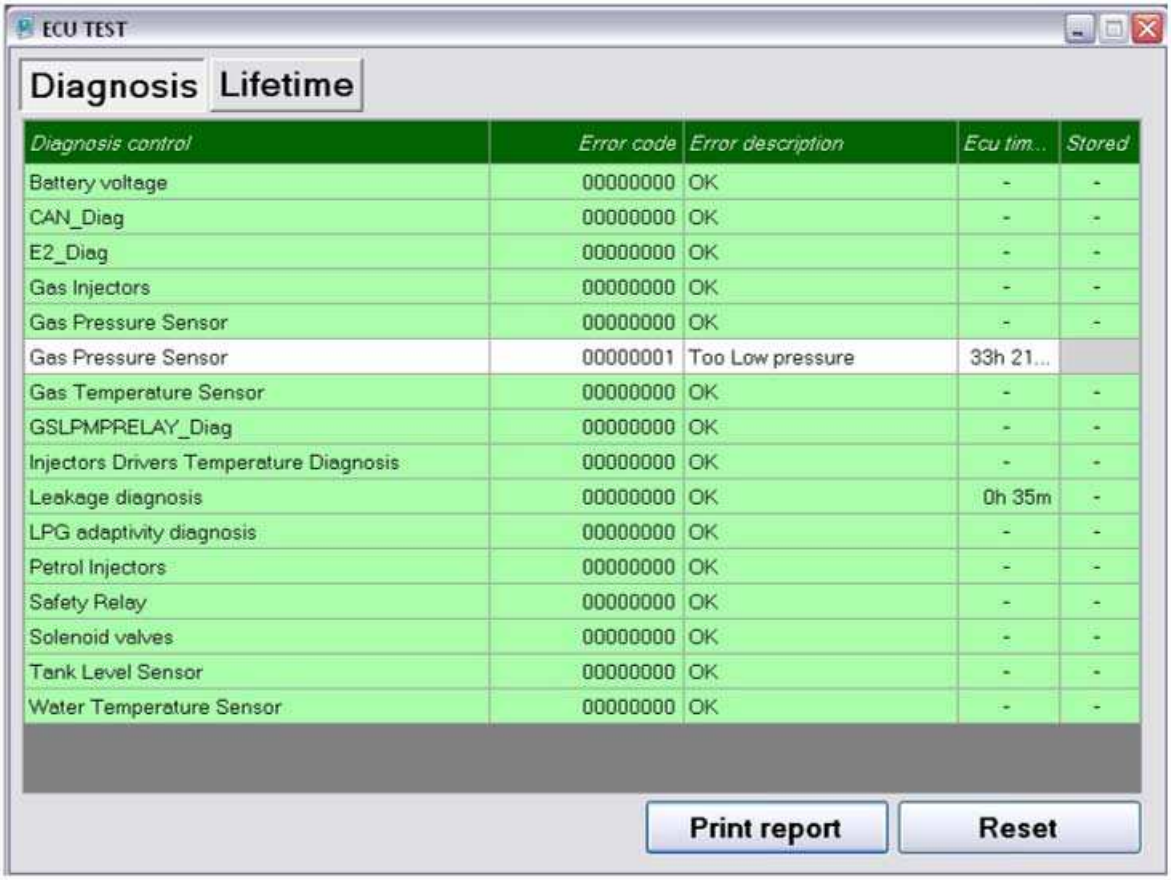
LC03	**Injector leakage in the manifold:** can create a drop of pressure and produce driveability issue during the test phase or during crank	Confirm the leakage from one single injector and replace it
LC03	**Hoses leakage:** Hose Clips, Double Wire Clips and Spring Band Clamps (Mubea Clamps) can be not correctly fixed	Fix correctly hoses or clamps
LC03	**Safety valve leakage:** the component not close correctly. If you remove the pipe you can smell LPG odour	Replace the regulator
LC03	**Regulator leakage:** if the membrane of the regulator is broken you can smell LPG odour from the MAP connection (after removing pipe)	Replace the regulator

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 3	*FUEL SUPPLY CONFORMITY CHECK: TOO LOW PRESSURE [DTC 2293-64]*

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.

Failure appears as “Too low pressure” in the PlusMaxRE ECU Test page.
The fault can happen only in LPG mode.



Low pressure error:

LC03	**EV blocked:** Due to cranking condition, leakage test wasn’t performed in the current trip and EV don’t open when we switch to LPG	Replace mobile element
LC03	**Tank valve manually closed**	Open the valve and test again the system
LC03	**Hoses blocked:** if a pipe is clogged or bended, LPG flow can drop and decrease LPG pressure	Fix the pipes

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 4	*PRESSURE AND TEMPERATURE SENSOR CHECK*

NOTES	**Note the difference between functional and electrical error.**

DTC 2293 and DTC 0184 are related to **functional errors** and you **don't have** to replace the sensor in these cases.

"IMPOSSIBLE SWITCHING IN LPG MODE" Chart 3 and/or "IMPOSSIBLE TO SWITCH IN LPG MODE AND LPG SWITCH IS BUZZING" Chart 8.

With the vehicle stopped remove the sensor from the LPG rail
Leave the plug connected to be able to read the signals
After some minutes put the vehicle in key ON mode to supply the sensor
Check on the plus max RE the pressure and temperature value, they have to be coherent with the atmospheric value

Continuity check

LC03	Track 1 of LPG p/T sensor with ground Track 2 of LPG p/T sensor with pin 46 of the GCU Track 3 of LPG p/T sensor with pin 19 of the GCU Track 4 of LPG p/T sensor with pin 45 of the GCU
LC02	Track 1 of LPG p/T sensor with ground Track 2 of LPG p/T sensor with pin 6 of the GCU Track 3 of LPG p/T sensor with pin 9 of the GCU Track 4 of LPG p/T sensor with pin 8 of the GCU

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 5	*PRESSURE REGULATOR CHECK*

NOTES	**Note the difference between functional and electrical error.**

DTC2293-21 → Too low pressure
This error is never present on petrol ECU. When the GCU store this fault it consider the problem has a finish of LPG in the tank and didn't send any DTC to petrol ECU (if LPG level is different from 0 the error will be DTC2293-64)
DTC2293-22 → Too high pressure
DTC2293-64 → Incoherence between LPG level and pressure
This error appear when LPG pressure is too low but a normal value of pressure is attended (there is LPG inside the tank)

Regulator checks

TEST	EXPECTED PRESSURE VALUE
The **operating pressure** of the LPG displayed on the DIAGNOSTIC TOOLS should be between **1.15 & 1.36 bar**, when the vehicle is running in LPG mode, at idle speed (750 rpm) and when the temperature of the coolant is over 70°C,with all auxiliary load (AC, fan,..) **switched off**. [Usually the LPG pressure should be 0,9 - 0,95 bar over the manifold pressure].	**1.15 & 1.36 bar**
Idle, LPG mode, auxiliary load ON (AC, defrost, …), and when the temperature of the coolant is over 70 °C,	**1.35 & 1.55 bar**
Remove vacuum pipe, when the vehicle is running in LPG mode, at idle speed (750 rpm) and when the temperature of the coolant is over 70 °C,	**1.85 & 2.05 bar**
When the vehicle is running in LPG mode, gear in neutral position, push accelerator pedal driving	Pressure moves from **1.15 to 2 bar** according to manifold pressure
Open regulator's EV with +12V power supply (cold engine, only key ON) and check if you can immediately hear the sound of the opening	Not related with pressure value but to EV functionality

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 6	*LPG INJECTOR CHECK: MISFIRE*

NOTES	Injector issue, both electrical or functional, are always related to MIL lamp presence

If a fault code related to misfire occurs DTC030(x) (gasoline mode) or DTC130(x) (LPG mode) is stored in the petrol ECU.
Misfires can happen for different reasons, not only related to LPG injectors.

Customer Complain

Check if the issue happen during cold conditions (eg: low external temperature) and/or after few minutes from the switch to LPG.
Verify if the issue disappears when the engine is warm (coolant temperature over 70 °C).
If so a not correct vaporization of the regulator can be occurred.
In this case don't replace injector rail because they aren't responsible for the misfire.

DTC check

Check if there are other errors related to fuel combustion, for example related to lambda sensor or lean/rich combustion

Injectors check

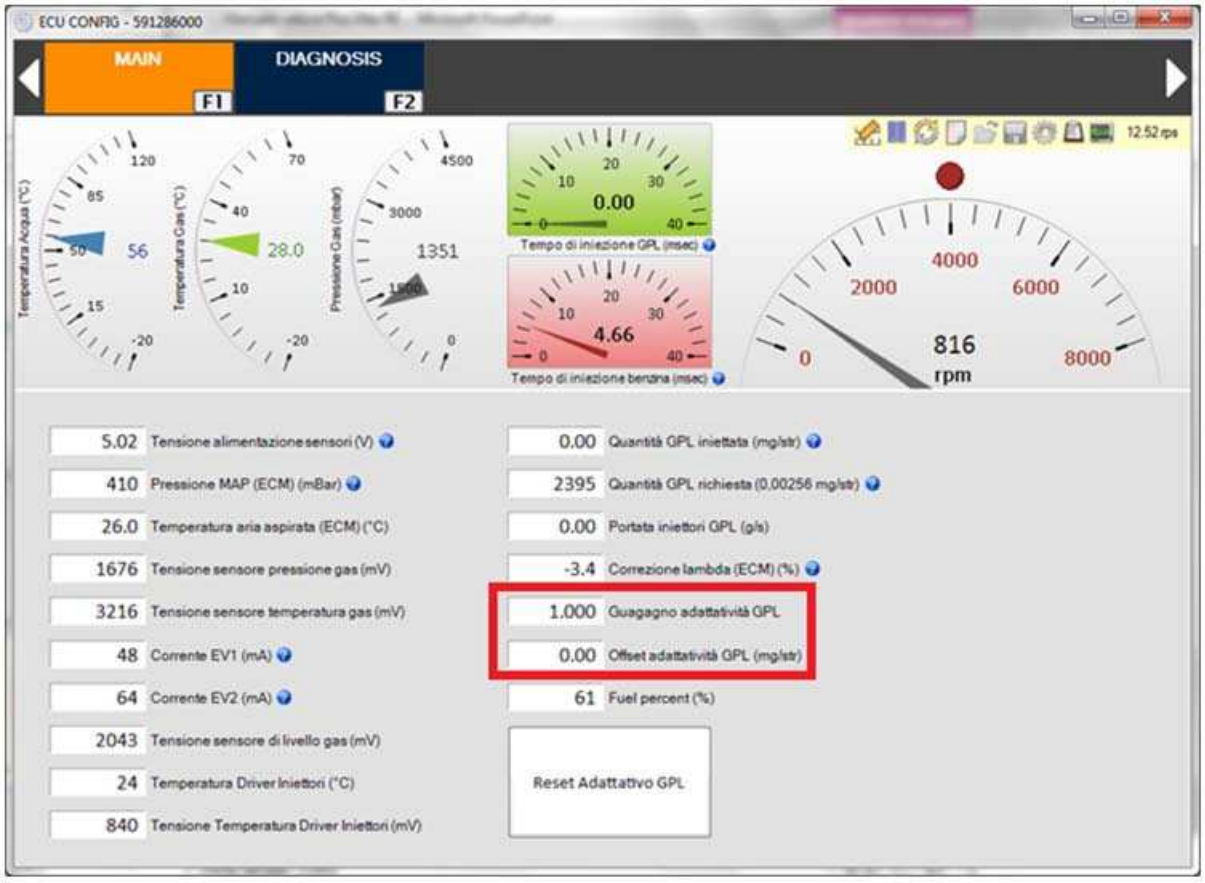
Check the **resistance value** of the injector by measuring between **tracks 1 and 2 of the LPG injector**.
Replace the interested LPG Injector if the resistance is not approximately: **1.2 Ω ± 0.2 Ω at 25 °C**. (For more details, consult the electrical properties of the LPG injector in the Repair method).

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 7	*LPG INJECTOR CHECK: FUEL ADAPTIVITY*

NOTES	Injector issue, both electrical or functional, are always related to MIL lamp presence

LPG system has adaptive parameters similar to petrol that correct LPG fuel mass injected.
Gain: default value is 1. For value higher than 1 mass flow rate will be increased; for values lower that 1 mass flow rate will be decreased. Expected value are between 0.8 and 1.2
Offset: default value is 0. Expected value are between -2 and +2



When adaptivity reaches its own limits an error appears.
If this happen replace the injectors.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 8	*LEVEL SENSOR AND FUEL INDICATION CHECK*

NOTES	Remember that electrical fault and bad level indication should be manage in different ways

First of all analyze the costumer complaint: if the issue is related to blocked level indication (always 3 led for example), it can be a mechanical issue of the multivalve; if the complaint is about a bad or not coherent indication the system can be conform anyway.

As described in “Fault Finding – System Description” there are 3 different level sensors:

1) “3 wires” level sensor for internal tanks (X52 – Sandero II, Logan II)
2) “3 wires” level sensor for external tanks (Clio IV, Duster II, Lodgy, Dokker)
3) “2 wires” level sensor for old Euro5 tanks (Clio III, Sandero I, Logan I, Duster I)

Check if there are errors related to electrical fault of the level sensor and, if so, check the correct connection of the wiring.

On Plus Max RE it is also showed the voltage related to the sensor.

LC03	**This sensor has a continuous output that moves from less than 200 mV to more than 4 V**
LC02	**This sensor has only 5 discrete levels that correspond to LED on the switch (on full tank the resistance between the 2 pins is 21.8 kOhm**

During the vehicle driving you can see the value that moves during long turn or during slopes: **this indicates that the leverage inside the tank isn’t blocked**. Consider that the voltage has an hysteresis inside the GCU so the plus max value moves slower that the mechanical behavior of the leverage (this means that, also if you see a fixed value on the plus max, the leverage can’t be free to move).

If the leverage isn’t blocked and no electrical fault is present the system is conform and the indication should be consider coherent.

If you think, after previous test, that the leverage is blocked remove the tank MultiValve unit from the tank and manually test it (you can again check the coherence with the position of the level sensor and the switch).

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

LPG 9	*ALL LEDs TURNED OFF ON THE SWITCH BUTTON*

NOTES	**When all LEDs on the Pushbutton are turned off this could be due to several failures**

Electrical wiring harness not connected.

Remove pushbutton and check for integrity of the connection between wiring harness and pushbutton;
Connect connector on wiring harness to the Electronic pushbuttons connector. During connector installation, DO NOT force the on the connector housing and DO NOT use not approved assembling tooling. To do so will result in damage to the connector of parts.
Carefully follow Landi Renzo assembling instruction (IOT) to put in place the pushbutton in the hole as specified in the installation instruction.

GCU not correctly flashed

Apply “Fault Finding – Conformity check assisted with Plus Max RE” LPG 1 - NO DIALOGUE BETWEEN GCU AND TOOL.
Apply “MANUAL EMERGENCY PROCEDURE FOR GCU RE-CALIBRATION OR GCU REPROGRAMMING”

If the fault persists after these checks, **contact Techline**.

AFTER REPAIR	Deal with any other possible faults. Clear the faults from the computer memory only using CLIP. Switch the ignition off and carry out a road test followed by a test using diagnosis tool.

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

UNEXPECTED SWITCH BACK TO PETROL	Chart 1
WRONG GAS TEMPERATURE	Chart 2
IMPOSSIBLE SWITCHING TO LPG MODE	Chart 3
IMPOSSIBLE TO CRANK THE ENGINE	Chart 4
GAS LEVEL INDICATOR: INCOHERENT WRONG LEVEL INDICATION	Chart 5
ENGINE STALL AT SWITCHING IN LPG MODE	Chart 6
MISFIRE – BAD DRIVEABILITY	Chart 7

CHART 1	*UNEXPECTED SWITCH BACK TO PETROL*
NOTES	Only consult this customer complaint after a complete check using the diagnostic tool

Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type

↓

Fuel pressure sensor check:
– Remove the sensor from the gas rail and check that the pressure value is approximately at atmospheric value with +APC (1 bar at sea level, engine temperature isn't relevant).
If the value is considerably different replace the sensor.

↓

Tank Multivalve electrovalve check:
– Open EV reducer from the software or with +12V power supply (cold engine, only key ON) and check if you can immediately hear the clack noise of the opening.

↓

Fuel supply hoses check:
– Check that no low pressure hoses are pinched (especially after a removal operation).
– Check that no low pressure hoses are damaged and clips or strips are correctly closed
– Check that no foreign body is inside the low pressure hoses
– Check the condition of the fuel filter; change it if necessary.

– Engine in LPG mode, running in idle and auxiliary load OFF → **gas pressure target 1.15 - 1.36 bar**.

– Switch off the engine and check the pressure is still the same after 5 minutes, to assure that no leakage is present (don't switch on engine, only +APC to give power supply to the sensor)

↓

Pressure regulator check:
– Open EV reducer from the software or with +12V power supply (cold engine, only key ON) and check if you can immediately hear the clack noise of the opening.
– Check pressure on idle,GPL mode, AUX load OFF,warm engine → **gas pressure target 1.15 - 1.36 bar**.
– Remove vacuum pipe, idle, LPG mode → **pressure target 1.9 - 2 bar**
– In LPG mode, push accelerator and check that the pressure moves between **1.1 and 2 bar and Manifold Pressure reference shall be approximately 0,95 bar less than LPG pressure**.

CHART 2	*WRONG GAS TEMPERATURE*
NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type.

↓

Fuel temperature sensor check:
– Park the car inside the garage, remove the sensor from the LPG pipe, but leave it electrically connected. Wait 15 minutes and check the LPG temperature using the diagnostic tool: it should be the same as ambient temperature. If the value is different replace the sensor (more than 15°C)

↓

Harness check:
– check that the plug of p/T sensor is correctly fixed
– check that wiring isn't damaged or broken.

↓

Customer complaint:
– Analyze the customer complaint: if the error occur at really low temperature (-10°C) consider the behavior has normal (at -10°C there is the diagnosys of too low temperature)

CHART 3	*IMPOSSIBLE SWITCHING TO LPG MODE: SWITCH BLINKING IN WAITING CONDITION OR LEDS SWITCHED OFF*
NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.
	Important: remember that the switch to LPG isn't allowed immediately after pressing the button. The system need to reach determinate conditions before switch to LPG mode, as described in chapter 6.

Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type.?

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Pushbutton check:
– Check that the LEDs on the switch are ON; if not check the harness connection of the switch.

↓

Switching condition check:
To allow LPG switch a lot of condition must be reached.
Check that
– The driver has selected the LPG fuel switch mode in the current trip or in the previous trip the engine stopped in LPG mode.
– Coolant water temperature must be higher than set threshold; this threshold depends on the temperature at the crank; usually the threshold is between 20 and 25 °C.
– A calibrated delay is elapsed from the cranking. The delay depends on the temperature at the crank: usually cranking at a coolant temperature of 20 °C the delay is 60s.
– Gas Temperature must be higher than the tuned threshold usually between 2 and 5 °C. Please note that with low winter temperature (for example -10 °C), the delay requested to the LPG temperature to reach the threshold could be long and sometimes more than 5 minutes.
– RPM value must be greater than the tuned RPM threshold usually around 1500 RPM.
– LPG switching isn’t allowed at very high engine loads, for example in full acceleration.

If costumer complains on delayed switch explain him that in some cases we need more than 5 minutes to reach all the conditions. It is really important that the system reach the right temperature to have a correct vaporization of the gas, even it's in the tank LPG can have really low temperature.

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GCU Status check:
– Using diagnostic tool, check on diagnosis page if there are any errors.
– Check on diagnosis page if there are any errors.

↓

LPG Fuel Trim check:
– Deal with the faults **DF633/DTC1170, DF635/DTC1301, DF636/DTC1302, DF637/DTC1303, DF638/DTC1304** and **DF639/DTC1300** if are present at the same time.
– Contact Techline with the completed fault finding log.

CHART 4	*IMPOSSIBLE TO CRANK THE ENGINE*

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type.

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Battery and Fuse check:
– Make sure that **the battery is correctly charged**. If it is not, carry out fault finding on the charging circuit.

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GCU Status check:
– Using diagnostic tool, check on diagnosis page if there are any errors.
– If you experienced troubles to connect diagnostic tool, proceed with **GCU Power supply and Fuses check**.

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GCU Power supply and Fuses check:
Make sure that the cable connecting the battery to the GCU, the battery Ground cable to the chassis and the chassis grounding cable to the engine and transmission assembly are in good condition.
Repair if necessary.

Make sure that the battery is correctly charged. If it is not, carry out fault finding on the charging circuit.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance of the connections**:

LC03	+30_POWER SUPPLY FROM BATTERY GCU track 15	→	BATTERY FUSE
LC03	+30_POWER SUPPLY FROM BATTERY GCU track 43	→	BATTERY FUSE
LC03	POWER GROUND GCU track 22	→	CHASSIS GROUND
LC03	POWER GROUND GCU track 7	→	CHASSIS GROUND
LC03	LOGIC GROUND GCU track 48	→	CHASSIS GROUND

Repair if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance of the connections**:

LC02	+30_POWER SUPPLY FROM BATTERY GCU track 15	→	BATTERY FUSE
LC02	+30_POWER SUPPLY FROM BATTERY GCU track 43	→	BATTERY FUSE
LC02	POWER GROUND GCU track 25	→	CHASSIS GROUND
LC02	POWER GROUND GCU track 53	→	CHASSIS GROUND
LC02	LOGIC GROUND GCU track 22	→	CHASSIS GROUND

Repair if necessary.

CHART 5	*GAS LEVEL INDICATOR: INCOHERENT WRONG LEVEL INDICATION*

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type.

↓

GCU Status check:
– Using diagnostic tool, check on diagnosis page if there are any errors.
– On Plus Max RE note which percentage is indicated for the LPG level
– During driving monitor the level sensor voltage (you can also record the signal on Plus Max RE) to understand if it is moving or not: if so the leverage of the multivalve isn't blocked (take into account the difference between the 2 level sensor, 2 or 3 wires)

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Customer complaint check:
– Analyze the costumer complaint in order to understand if there was a temporary block of the level gauge or the complaint is only due to the fluctuation of the LEDs of level indicator during the driving (uphill, downhill, roundabout); in this second case explain to the customer that the behavior is unfortunately normal and the best choice is to use the odometer to know accurately the mileage he can drive.

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Level indicator check:
– Drive the vehicle with PlusMaxRE connected and record Tank Level Sensor Electrical Signal; during acceleration, braking and turning, the electrical signal must change.
– Remove level indicator and check it can move freely and the position is correctly shown on the switch (wait 30 seconds for each position)
– If level sensor is "2 wires" version check the resistance is 21.8 kOhm at full level; if level sensor is "3 wires" version check the correct wiring connection (ground, +5V, signal)

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Multivalve check:
If the voltage of level sensor is fixed remove the multivalve from the tank to check it.
Check that
– The driver has selected the LPG fuel switch mode in the current trip or in the previous trip the engine stopped in LPG mode.
– Coolant water temperature must be higher than set threshold; this threshold depends on the temperature at the crank; usually the threshold is between 20 and 25°C.
– A calibrated delay is elapsed from the cranking. The delay depends on the temperature at the crank: usually cranking at a coolant temperature of 20°C the delay is 60s.
– Gas Temperature must be higher than the tuned threshold usually between 2 and 5°C. Please note that with low winter temperature (for example -10°C), the delay requested to the LPG temperature to reach the threshold could be long and sometimes more than 5 minutes.
– RPM value must be greater than the tuned RPM threshold usually around 1500 RPM.
– LPG switching isn't allowed at very high engine loads, for example in full acceleration.

CHART 6	*ENGINE STALL AT SWITCHING IN LPG MODE*

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.
	Typically this issue is due to a lack of LPG in the low pressure side: during the switch pressure regulator needs few instants for fill the pipes (they should be already fill if no problem occurs)

Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type.

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GCU Status check:
– Using diagnostic tool, check on diagnosis page if there are any errors.

↓

Pressure in idle check:
– Check LPG pressure when:
  – Water temperature over 80°C
  – Engine is running in LPG mode in idle (≅ 750 RPM)
  – Auxiliary electrical loads OFF,

The **operating pressure** of the LPG displayed on the Diagnostic should be between **1.15 & 1.36 bar**, [usually the LPG pressure should be 0,9 - 0,95 bar over the manifold pressure].

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Tank Multivalve electrovalve check:
– Check that manual valve on the tank MultiValve unit is completely open.
– Open EV reducer from the software or with +12V power supply (cold engine, only key ON) and check if you can immediately hear the clack noise of the opening.

↓

Fuel supply hoses check:
– Check that no low pressure hoses are pinched (especially after a removal operation).
– Check that no low pressure hoses are damaged and clips or strips are correctly closed
– Check that no foreign body is inside the low pressure hoses
– Check the condition of the fuel filter; change it if necessary.
– Crank the engine monitoring:
  Gas Level (mV)
  Gas Pressure (mbar)
– Engine in LPG mode, running in idle and auxiliary load OFF → **attended pressure 1.3 bar**.
– Switch off the engine (leave key on to stay connected with the software) and check the pressure is still the same after 5 minutes, to assure that no leakage is present.

↓

Pressure regulator check:
- Open EV reducer from the software or with +12V power supply (cold engine, only key ON) and check if you can immediately hear the clack noise of the opening.
- Check pressure on idle,GPL mode, AUX load OFF,warm engine → **gas pressure target 1.15 - 1.36 bar**.
- Remove vacuum pipe, idle, GPL mode → **pressure target 1.9 - 2 bar**
- In LPG mode, push accelerator and check that the pressure moves between **1.1 and 2 bar and MAP reference shall be approximately 0,95 bar less than GPL pressure**

LPG Fuel Trim check:
- Deal with the faults **DF633/DTC1170, DF635/DTC1301, DF636/DTC1302, DF637/DTC1303, DF638/DTC1304** and **DF639/DTC1300** if are present at the same time.
- Contact Techline with the completed fault finding log

CHART 7	*MISFIRE – BAD DRIVEABILITY*

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.
	Priority for dealing with a number of faults: First deal with petrol faults cylinder coils control, engine speed sensor; downstream and upstream oxygen sensors, heating of upstream and downstream oxygen sensors, if they are present or stored.

Petrol fuel supply check:
– Check the petrol fuel system:
  – If requested in the petrol repairing manual, check ignition system by checking the condition of the plug and the low and high voltage contacts of the cylinder coil. Replace any faulty components.
  – If requested in the petrol repairing manual, check the compression ratio of cylinders. Repair if necessary.
  – If requested check the flywheel target (warping or cracks). Replace the flywheel if necessary.
  – Ensure that there are no leaks on the inlet manifold. Repair if necessary.

↓

If no fault is found, then there must be a problem with the LPG fuel system. Therefore check:
– the conformity of LPG fuel.
– the condition of the LPG fuel filter,
– the LPG flow and pressure
– the Tank manual valve check,
– the Tank and Regulator Electrovalves
– the Fuel supply hoses check,
– the LPG Fuel Trim check,
Replace the defective component.

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Conformity of LPG Fuel check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type

↓

Fuel filter check:
– Check that there is LPG present (the LPG gauge may be faulty).
– Check that the LPG is of the proper type.

↓

Pressure in idle check:
– Check LPG pressure when:
  – Water temperature over 80 °C
  – Engine is running in LPG mode in idle (≅ 750 RPM)
  – Auxiliary electrical loads OFF,

The **operating pressure** of the LPG displayed on the diagnostic tool should be between **1.15 & 1.36 bar**, [usually the LPG pressure should be 0,9 - 0,95 bar over the manifold pressure].

Tank Manual Valve Check:
– Check that manual valve on the tank MultiValve unit is completely open.

Fuel supply hoses check:
– Check that no low pressure hoses are pinched (especially after a removal operation).
– Check that no low pressure hoses are damaged and clips or strips are correctly closed
– Check that no foreign body is inside the low pressure hoses
– Check the condition of the fuel filter; change it if necessary.

– Engine in GPL mode, running in idle and auxiliary load OFF → **attended pressure 1.3 bar**.
– Switch off the engine (leave key on to stay connected with the software) and check the pressure is still the same after 5 minutes, to assure that no leakage is present.

Pressure regulator check:
– Open EV reducer from the software or with +12V power supply (cold engine, only key ON) and check if you can immediately hear the clack noise of the opening.
– Check pressure on idle,GPL mode, AUX load OFF,warm engine → **gas pressure target 1.15 - 1.36 bar**.
– Remove vacuum pipe, idle, GPL mode → **pressure target 1.9 - 2 bar**
– In GPL mode, push accelerator and check that the pressure moves between **1.1 and 2 bar and MAP reference shall be approximately 0,95 bar less than GPL pressure**

LPG Fuel Trim check:
– Deal with the faults **DF633/DTC1170, DF635/DTC1301, DF636/DTC1302, DF637/DTC1303, DF638/DTC1304** and **DF639/DTC1300** if are present at the same time.
– Contact Techline with the completed fault finding log