
Prins
A WESTPORT COMPANY
General manual
Part 1/2
DIRECT LIQUI
max
HIGH PRESSURE
LIQUID LPG INJECTIO

2-2017

Table of contents

Required equipment / tools / materials for installing a complete system

- Complete workshop toolbox (wrenches, screwdrivers, cutters, pliers, ratchet, sockets)
- Car lift
- Portable computer with Prins diagnostic software
- Vehicle fuel system scan tool or OBD scan tool Prins (part nr. 099/99928)
- Exhaust gas analyser
- Multimeter
- Oscilloscope
- Prins diagnostic software
- Prins serial interface
- Torque wrench (5-50Nm)
- Torque wrench (200-250Nm)
- Portable light
- Assortment drill bits 4 to 12 mm
- Assortment cutters (ø 20, 30, 50, 70 mm)
- Portable drill or pneumatic drill
- Thread cutting device (male M6x1, M8x1, M10x1)
- Socket 46mm
- Air gun
- Vacuum cleaner
- Safety goggles
- Hot air gun
- Soldering iron, soldering tin
- Wire-stripping pliers
- Adhesive tape
- Adhesive sealant
- Thread locking compound
- Anti-corrosion agent / black body coating
- Gas leak detection device or foam leak spray
- Shrink sleeves

Vehicle check

- Check the vehicle drivability on petrol
- Check the fuel system for error codes (scan tool)
- Check if the catalytic converter is in good condition (exhaust LPG analyzer)
- Check the condition of the ignition system (spark plugs, cables, coil)

General instructions

- The installation of the system shall be done in accordance with the installation manual provided by Prins Autogassystemen.
- This manual is based on Dutch regulations, always install the system in accordance to the local regulations.
- For an optimal functioning of the Direct LiquiMax system, maintain a clean and organized work environment during installation and maintenance to prevent pollution of the DLM components.
- Always use this manual for instructions and diagrams next to the dedicated installation manual.
- Always disconnect the battery when installing the lpg system. Make sure the ignition key is outside the car. Be aware of central door locking, radio / telephone memory code and alarm system.
- Wear safety goggles when working on petrol filled system / connections (pressurized petrol)
- Do not place the main fuse into the fuse holder before having completed the installation of the system.
- The AFC has to be activated by means of the Prins diagnosis software.
- Never disconnect the AFC connector, unless you have removed the main fuse.
- When installing the wiring harness, ensure that it does not run near any of the ignition components.
- Solder and insulate all electrical connections.
  The wires in the loom are provided with numbers and text. The text on the wire explains the function of the wire. The wire harness is not model specific, therefore is it may be necessary to adjust the length of the wires. Ensure maximum care is taken when connecting wiring.
  Make professional joints using solder and shrink sleeve. Do not stretch the wiring harness.
- No component of the DLM system shall be located within 100 mm of the exhaust or similar heat source, unless such components are adequately shielded against heat.
- If holes have to be drilled (wear safety glasses) for installing brackets, etc., the drilled holes must always be treated with an anti-corrosion agent, after the chips have been removed (especially when mounting a exterior filler into body work).
- After having completed the installation, check the whole system for lpg leakage; use a lpg leak detection device. Also check for leak of engine coolant, petrol and air.
- Fitting and maintenance is only allowed by Prins Autogassystemen selected LPG engineers.
- Failure to follow the instructions in this manual can result in a poor or non-working lpg installation or a dangerous situation.
- For maintenance instructions and filter registration see owner manual.
- Prins Autogassystemen is not responsible for any damages to people or objects as a result of changes to Prins products.
- Check our website regularly for diagrams, certificates, updates, info-bulletins and product information.
- Register (warranty card) the system on the Prins warranty portal .

Work extremely clean!!

Tightening moments

Bolt	8.8 Torque (Nm)	Spanner Size
M 4 x 0,7	3.3	7
M 5 x 0,8	6.5	8
M 6 x 1,0	11.3	10
M 7 x 1,0	14.5	11
M8 x 1	24.5	12-13
M8 x 1.25	27.3	12-13
M10 x 1	52	15-16-17
M10 x 1.5	54	15-16-17
(Filtered) Banjo bolt	10	14
Supply line tank lock-off	15	13
Fuel module Allen bolts	20	7
Filler hose connection	50	22
HPP pump cover	220	46
Quick release type 2	20	19
Boost pump M6 mounting bolts	10	10
High pressure petrol line	24-35	17

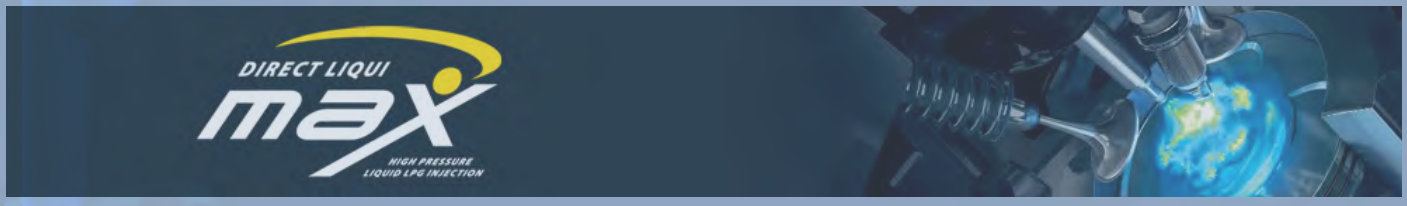
Symbol explanation

	Wear safety goggles when working on petrol / gas lines
	Caution ! Important !

1 ***Low pressure components***
– Tank + Frame + Filler
– Fuel module (Multi-valve , fittings, fuel pump)
– Fuel lines: low pressure lines + fittings
– Fuel Supply Unit (FSU)
– Fuel Return Unit (FRU)
– Boost pump
2 ***High pressure components***
– High pressure pump (OEM)
– High pressure lines + fittings (OEM)
– Injector rail (OEM)
3 ***Electrical components***
– Alternative Fuel Controller (AFC)
– Pump driver
– Fuel selector switch
– Wiring harness
– Pressure sensor

Approval numbers

Component	*Approval number*
Fuel Supply Unit (FSU)	E4-67R-010269
Fuel Return Unit (FRU)	E4-67R-010270
Fuel Management Unit (FMU)	E4-67R-010269
Pressure sensor (FRU)	E4-67R-010051
High Pressure Petrol Pump	E4-67R-010266
High Pressure Petrol Rail	E4-67R-010267
High Pressure Petrol Injectors	E4-67R-010309
AFC Alternative Fuel Controller	E4-67R-010098 / E4-10R-030507
Fuel lines, XD series	E4-67R-010247
Tank	E8-67R-010***
Tank cover	E20-67R-010733
Fuel Module	E8-67R-012255
Pump inside	E4-67R-010268
Pump driver	E4-10R-031837



Installation of the Boost pump:

- install clamp into the bracket
- install sleeve into the clamp or onto the boost pump
- install Boost pump into the sleeve / clamp
- tighten the clamp with a torque of 7 Nm

Boost pump sleeve
(used till 11-2014)

Boost pump clamp

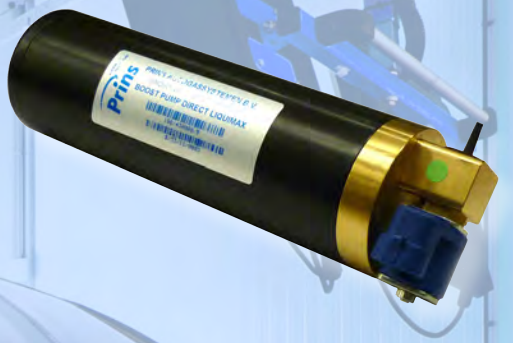
Boost pump bracket

Boost Pump

The boost pump increases the petrol pressure when switching from LPG to petrol and is connected in series with the original petrol fuel pump.
The boost pump is powered by the Prins AFC computer when switching back to petrol, hereby the fuel pressure will increase. With the lock-off on the boost pump it is possible to close the petrol supply during LPG mode.

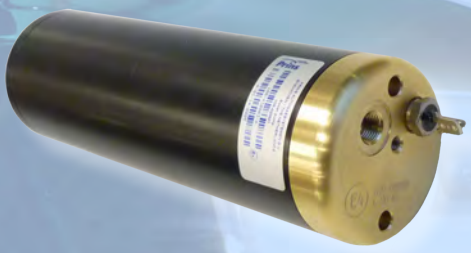
Function:

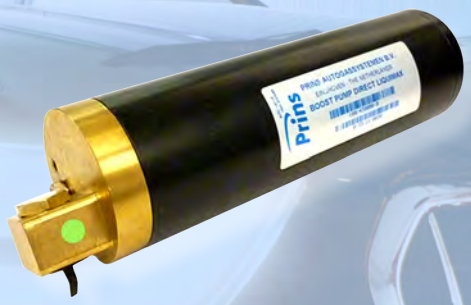
- Increase the gasoline supply pressure (pressure increase 10 Bar)
- DLM-2.0/AFC-2.0 : The lock-off valve provides closing the petrol supply to the FSU during petrol operation.
- DLM-2.0/AFC-2.1 : No lock-off valve.



Petrol supply out : to inlet Fuel Supply Unit

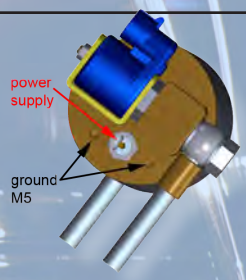
Petrol supply in : from original low pressure petrol line / petrol pomp





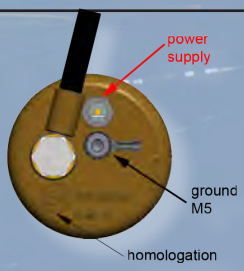
Electrical connections DLM-2.0 / AFC2.0:

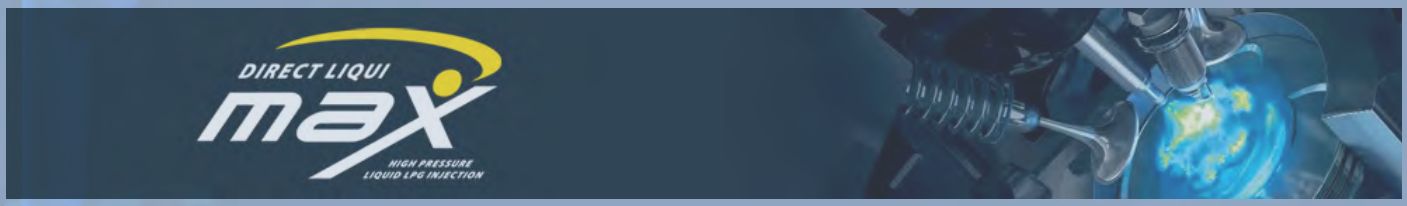
Wire:	Wire colour:	Connection:
106 + 12V Lock-off Boost Pump	red	2-pole connector
98 - Ground lock-off	white-yellow	2-pole connector
+12V power supply Boost pump	red	Connector
- Ground Boost pump	brown	M5 Allen bolt 6Nm



Electrical connections DLM-2.0 / AFC-2.1:

Wire:	Wire colour:	Connection:
+12V power supply Boost pump	red	Connector
- Ground Boost pump	brown	M5 Allen bolt 6Nm





Fuel Supply Unit 1st Generation

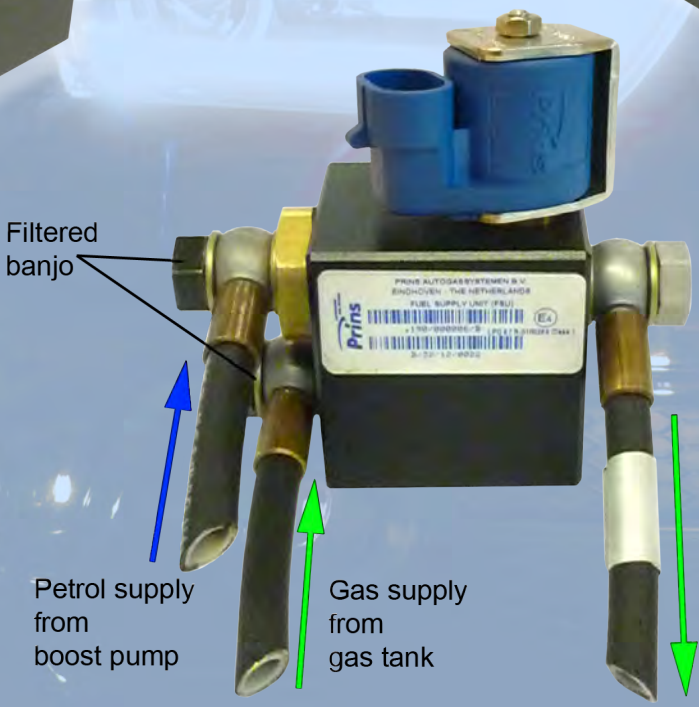
The Fuel Supply Unit is placed in the engine compartment and enables switching between petrol and gas.
The lock-off valve on the Fuel Supply Unit is controlled by the Prins AFC.

Function:

- FSU makes it possible to switch between petrol <=> gas (Bi-fuel).
- Banjo filters in the fuel gas supply prevents contamination of the FSU.

Connections:

The Fuel Supply Unit has three banjo connections. On one side two filtered banjo fittings are connected, one connection for the fuel line from the boost pump (petrol supply from boost pump) and one connection from the LPG tank (gas supply from LPG tank).
On the other side of the Fuel Supply Unit there is a connection to the high pressure pump (Fuel supply to high pressure petrol pump).
Tighten the banjo bolts with a torque of 10 Nm.



Fuel Supply Unit 2nd Generation

The Fuel Supply Unit is placed in the engine compartment and enables switching between petrol and gas.
The lock-off valve on the Fuel Supply Unit is controlled by the Prins AFC.

Function:

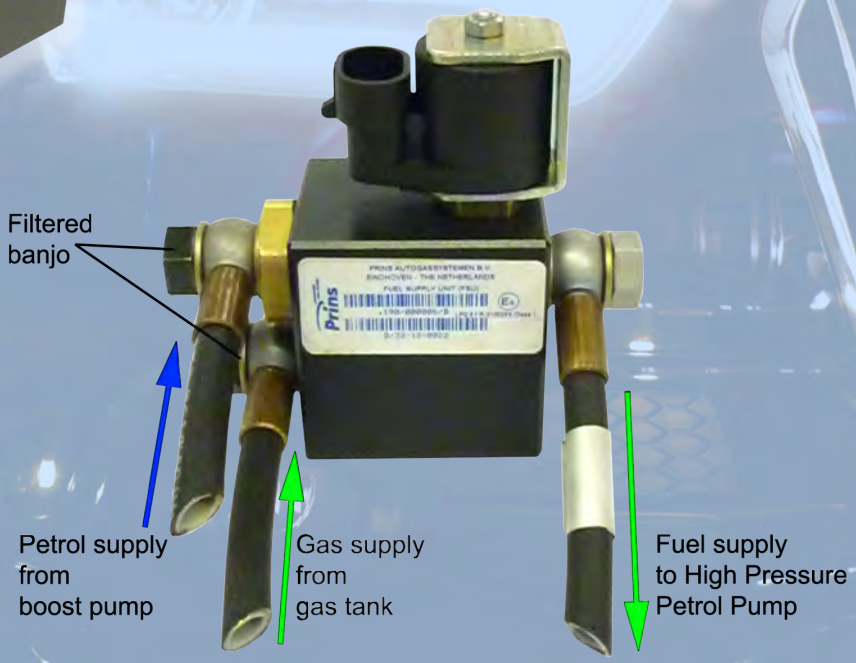
- FSU makes it possible to switch between petrol <=> gas (Bi-fuel).
- Banjo filters in the fuel gas supply prevents contamination of the FSU.

Connections:

The Fuel Supply Unit has three banjo connections. On one side two filtered banjo fittings are connected, one connection for the fuel line from the boost pump (petrol supply from boost pump) and one connection from the LPG tank (gas supply from LPG tank).
On the other side of the Fuel Supply Unit there is a connection to the high pressure pump (Fuel supply to high pressure petrol pump).
Tighten the banjo bolts with a torque of 10 Nm.

Changes :

- Only coil color



Fuel Return Unit 1st Generation

The Fuel Return Unit is placed in the engine compartment and makes it possible to control the gas return.
The lock-off valve on Fuel Return Unit is controlled by the Prins AFC.

Function:

- The FRU switches the return flow to the LPG tank.
- Offering housing for the pressure sensor.
- Integrated inlet filter in the sensor adapter prevents contamination of the FRU.

Connections:

The Fuel Return Unit has two banjo connections. On one side there is a connection for the return line from the high pressure pump and on the other side, a connection for the return line to the LPG tank.
Tighten the banjo bolts with a torque of 10 Nm.

Fuel Return Unit 2nd Generation

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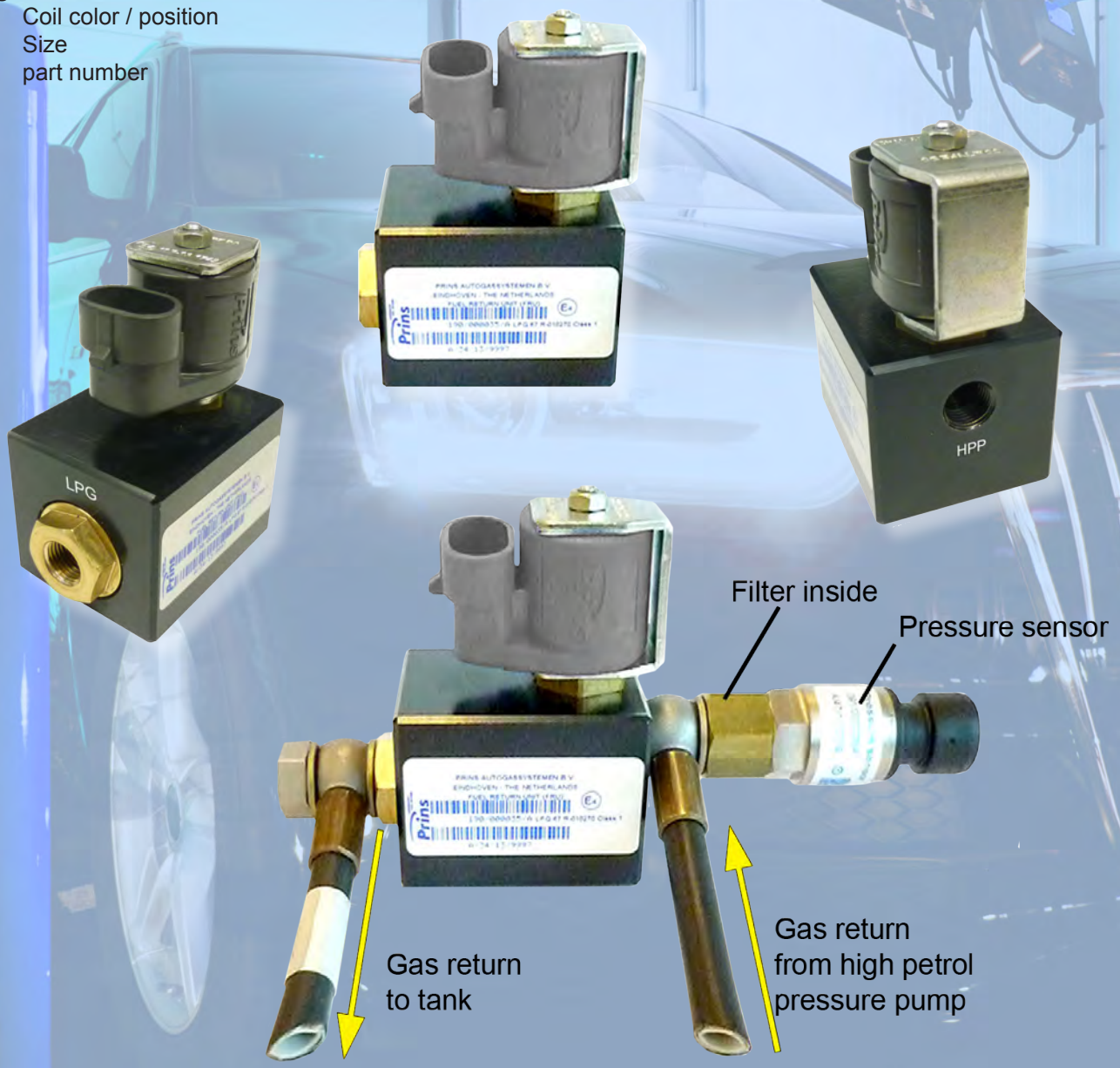
Changes :

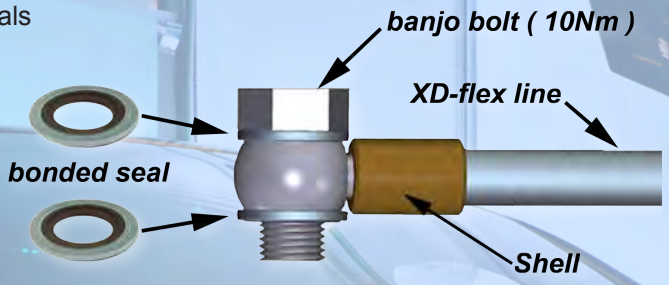
- Coil color / position
- Size
- part number



LPG / petrol XD-3
- Inside diameter 5 mm
- Outside diameter 8 mm

LPG / petrol XD-4
- Inside diameter 6.6 mm
- Outside diameter 9.8 mm

Design:
- Min. Burst pressure 370 Bar
- Allowed working pressure to 67,5 Bar (R67)
- Normal operating pressure 5-25 bar
- Pipelines are included length
- Sealing means bonded seals



Always check if the shell is correctly crimped / damage free and free of leakage.
Never use a hose assembly with an incorrect “8“-crimp. Correct crimp size :

XD3 : 9,9 ± 0,2 mm	XD5 : 14,9 ± 0,2 mm
XD4 : 12 ± 0,2 mm	XD6 : 16,6 ± 0,2 mm

Never reuse bonded seals after service and maintenance!
Banjo bolt tightening torque 10Nm!
Never change the length of the lines!

Banjo-Banjo

Banjo-Banjo 90°

Banjo-Screw

Banjo-Ball connection

Banjo-Quick connection

Petrol supply pump

The petrol fuel pump which is installed in the petrol tank is controlled by a pump module.
The pump module makes it possible to control the pressure of the petrol depending on the fuel demand. The petrol ECU controls the fuel pump module by a PWM signal. The pump speed is controlled depending on the required fuel supply so that the supply pressure is kept constant.

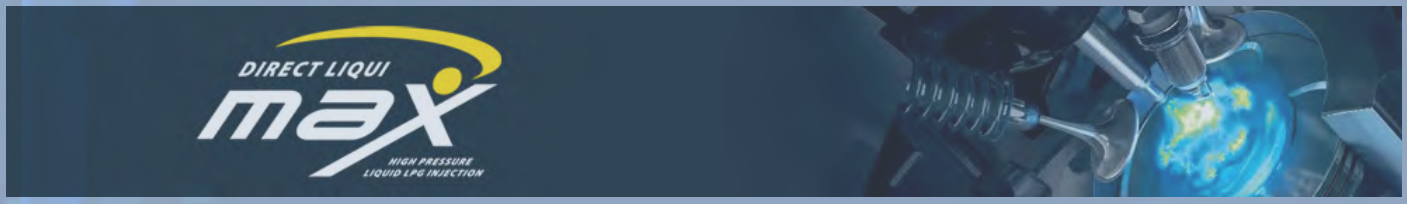
To boost the fuel pressure when switching from LPG to petrol, the pump speed can be momentarily increased by the Prins AFC.

High petrol pressure pump

In the high pressure section of the fuel system the pressure is adjusted by the high pressure pump depending on engine load. In practice, the fuel rail pressure varies between 30 and maximum 300 bar. The high pressure pump is driven by the camshaft. The high pressure pump can be easily used for liquid LPG. In most cases, the high pressure pump must be modified for LPG use. In fact, a return connection is required. In these cases, the high pressure pump has to be removed and a modified pump installed. Always follow the manufacturer's workshop manual for pump replacement.

Adjustments for the various HP pump suppliers:

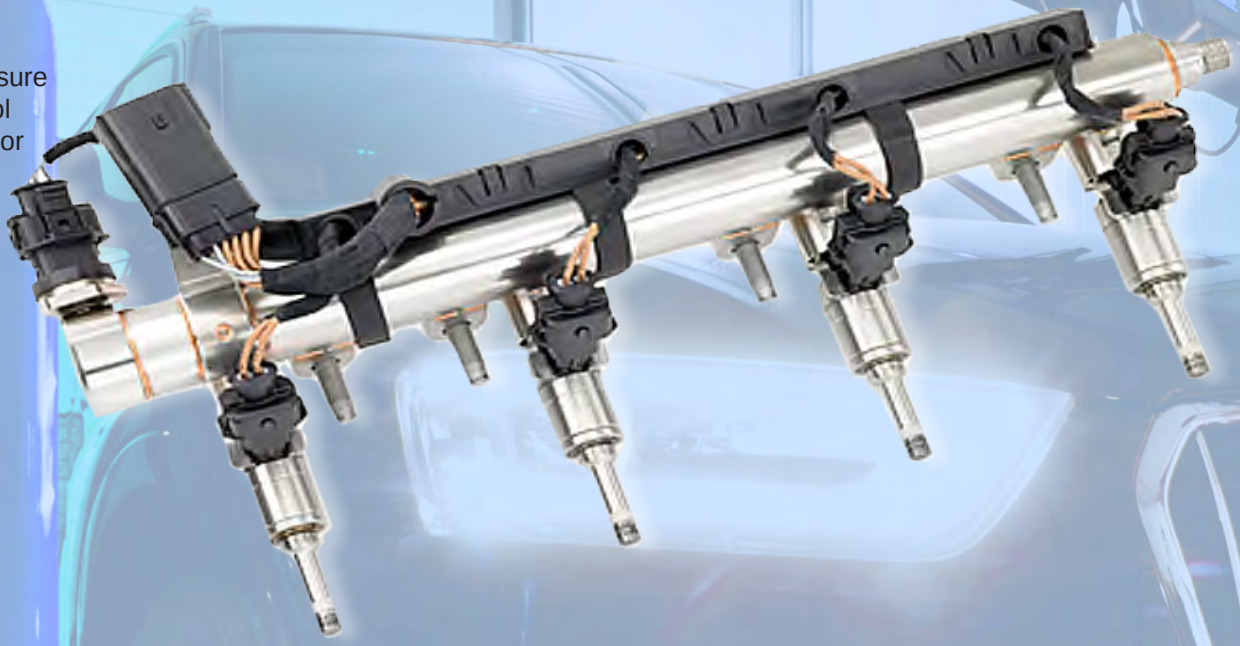
- AC Delco > new pump modified by Prins, delivered with the motor set
- Bosch > new pump modified by Prins, delivered with the motor set
- Continental > in development
- Denso > new pump modified by Prins, delivered with the motor set
- Hitachi > new top cover, modified by Prins, delivered with the motor set

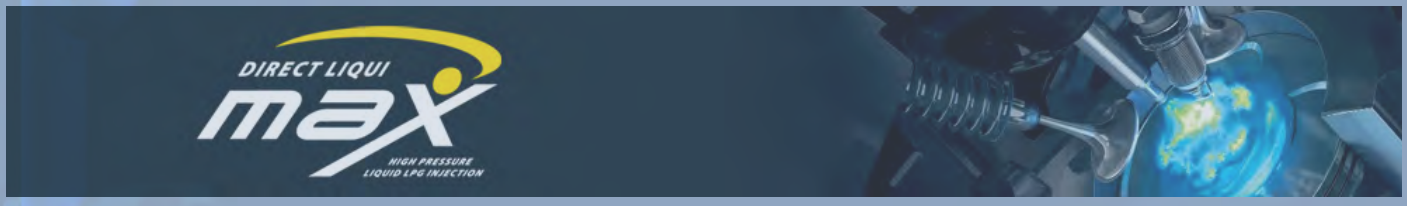


Petrol fuel rail

For the injection of the liquefied gas the original high petrol pressure rail will be used.
The high-pressure injector rail is extremely suitable for the injection of liquid LPG.
The use of LPG instead of gasoline will have no negative impact on the reliability and lifespan of the injectors!
Because the available injection time on a direct injected engine is much shorter than on a port injection, it is important that the response time of the nozzle is very short. The fast opening will be achieved by an operating voltage of approximately 65 Volt.

high pressure petrol sensor





Prins Alternative Fuel Controller, AFC-2.0

Operating the following components:

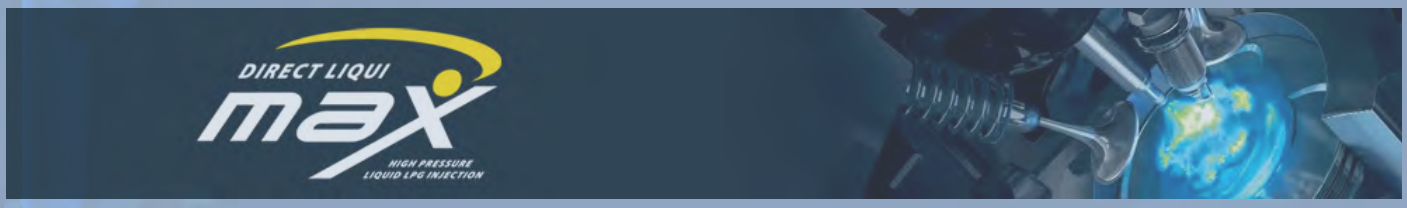
- Tank lock off valve
- Pump Driver / LPG pump
- Fuel Supply Unit
- Fuel Return Unit
- Boost pump
- Switch
- Sensor simulation
- Switch over strategy
- Heat balance control LPG
- Diagnosis / safety control
- CAN communication

The Prins AFC-2.0 is the first Prins computer for the DLM-system.
This new design offers greater functionality and is used for the new platforms like the Direct LiquiMax System.
The Prins AFC has a fast processor and has more input, output and simulation capabilities.

Prins Alternative Fuel Controller, AFC-2.1

The Prins AFC-2.1 is used for the DLM-2.0 system.
The Prins AFC-2.1 has more input, output and simulation capabilities then the first AFC-2.0.
Different print layout, so different pin-outs, through this, only one wiring connector (connector A) is needed.

Connector A pin 1-81 ***Connector B pin 82-121***



Fuel return pressure sensor

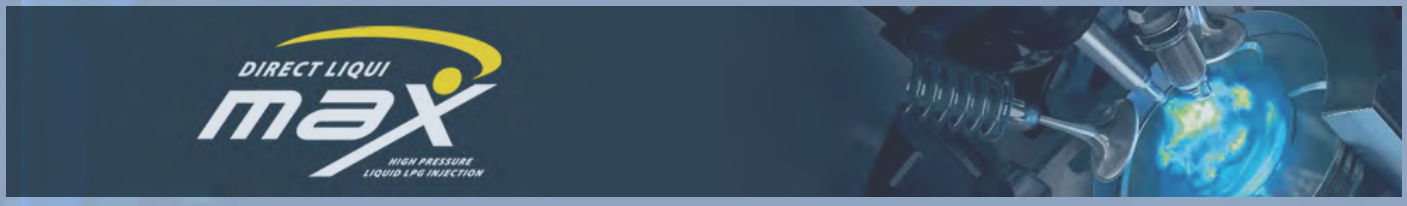
The sensor is mounted on the Fuel Return Unit (FRU on HPP side).
Using this sensor, the system pressure can be monitored (during petrol mode the petrol pressure and during LPG mode LPG pressure). Based on this value the Prins AFC performs the system control / diagnostics.
The sensor is installed into a banjo-adapter with filter.

Engine Coolant Temperature

The petrol engine management system, calculates corrections based on the Engine Coolant Temperature (ECT). Because LPG has different physical characteristics the Prins AFC will also calculate corrections based on the engine coolant temperature.

High petrol pressure sensor

The high pressure sensor measures the pressure in the high-pressure section of the DI system.
The high pressure sensor is placed on the high pressure pump or the high pressure rail. The high pressure is variable and can vary between 30 and 300 bar depending on the operating conditions and system characteristics.
The AFC will read in the actual pressure value, and when the system is running on LPG it will send out a simulated pressure to the petrol ECU. By simulating (raising or lowering) the high pressure signal the injection quantity can be affected.



Fuel selection switch

Function of the switch:

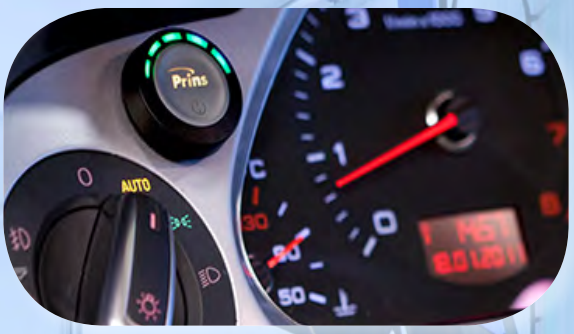
-Fuel status selection Petrol <> LPG
-Prins logo / fuel status LED:
- ♦ Petrol mode: status LED off
- ♦ LPG mode: status LED on

-Switch over indication:
- ♦ LPG <> Petrol : status LED off/beeper beeps 1x
- ♦ Petrol <> LPG : status LED on/ beeper beeps 2x

-Tank level indication (always on)
- ♦ 5 indication LED's (colour application depending)

-Diagnostic warning
- ♦ Switch back to petrol mode
- ♦ Diagnose/system check LED illuminates
- ♦ Beeper activated

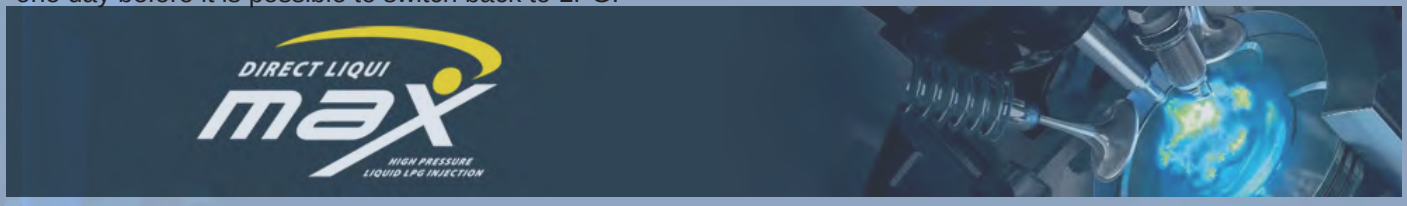
-Diagnostic warning: system limits are reached
- ♦ System switches back to petrol modes
- ♦ Diagnosis / system check LED illuminates orange
- ♦ Prins logo flashes at 1 Hz
- ♦ Beeper activate



By using the selector switch it is possible to switch between the LPG and petrol mode.
The fuel status LED indicates the selected fuel. If the Prins logo illuminates then LPG is selected, if the status LED does not illuminate petrol is selected.
By means of the tank indication LED's, the fuel level can be read out.
During low level (LPG tank empty) the system will automatically switch back to petrol mode. A beeping sound in combination with a blinking fuel status LED indicates that the system has switched back to petrol mode.

Furthermore, the switch has a diagnostic / system check LED. During the start a system check will be carried out and the LED will illuminate (red).
This LED switches off when there are no system errors detected.
When the system detects a fault the limp home procedure will be started. The system will automatically switch over to petrol mode, the diagnostic LED will illuminate (red), the fuel status LED will blink and the beeper will beep.
The beeping sound and the blinking status LED can be switched off by pressing the switch (switch back to petrol mode).
Extreme temperatures in combination with fuel composition may affect the operation of the LPG system. It is possible that under specific conditions the Direct LiquiMax system operates outside its specified operating conditions. To ensure the reliability of the vehicle under all circumstances the system will switch back to petrol mode, the diagnostic LED will flash (orange), the status LED flashes and the beeper will be activated.
The following conditions can cause this problem:
- Extremely high temperatures
- Extremely high system pressure
- High propane content

If this error occurs it will not initially be possible to switch back to LPG. In practice, this means that it may take up to one day before it is possible to switch back to LPG.

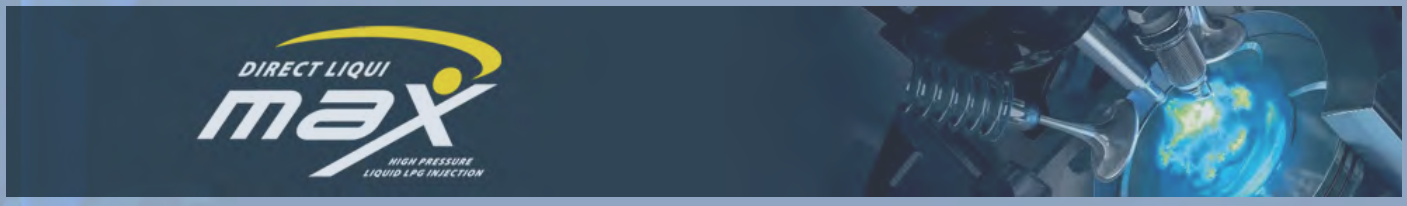


Emergency Procedure:

If the car does not start, the following emergency procedure must be followed (**forced petrol start**):

Engine off -> ignition on -> press the fuel switch for 5 seconds -> release switch -> beeper warning sound -> start the engine -> forced petrol start.

Operation mode	Fuel selection	Active fuel	Status LED	Tank LEDs	Beeper	Diagnose LED
Engine off	gas / petrol	no	off	off	off	off
Ignition+ on / engine off	petrol	petrol	off	on	off	on (red) system check
Ignition+ on / engine off	gas	gas	on	on	off	on (red) system check
Petrol mode	petrol	petrol	off	on	off	off
Gas mode	gas	gas	on	on	off	off
Tank empty, switched back to petrol mode	gas	petrol	blinking	LED 1 on	3x	off
Tank empty, conformation by pressing switch	petrol	petrol	off	LED 1 on	off	off
Switch Over, petrol -> gas	gas	SO gas	on	on	2x	off
Switch Over, gas -> petrol	petrol	SO petrol	off	on	1x	off
Non critical error	gas	gas	on	on	off	blinking (red, 1Hz)
Critical error	gas	petrol	blinking	on	on (till conforma-tion)	on (red)
Critical error, conformation by pressing switch	petrol	petrol	off	on	off	on (red)
System limit reached	gas	petrol	blinking	on	2x	on
System limit reachead conformation by pressing the fuel switch.	petrol	petrol	off	on	off	on (orange)
Service interval warning	gas	gas	on	on	off	blinking (yellow)
Service interval limit (optional)	gas	petrol	blinking	on	on (till conformation)	on (red)



Fuel module Gen1 & Gen2

The fuel module is mounted inside the LPG tank.

Function:

- Housing for all fittings
- Mounting facility for turbine pump
- Swirl pot prevents suction of vapour
- Gas tight sealing between tank and fuel module by o-ring
- Fuel metering
- 80% fill stop
- Electric Lock off valve
- Pressure Relief Valve (PRV)
- Non Return Valve (NRV)
- Excess flow valve
- Long life filter [10 micron]

Parts:

1. Fuel module
2. Level indicator
3. Power supply pump
4. Lock-off valve
5. Fuel return connection
6. Fuel supply connection
7. Filler hose connection
8. Pressure relief valve
9. Gas pump inside
10. Swirl pot
11. 80%-stop floater
12. Tank identification plate

LPG pump driver

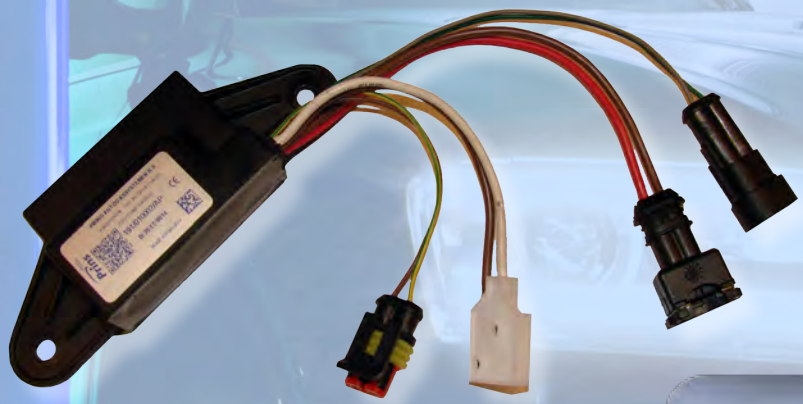
The pump driver provides an infinite variable control of pump speed. The pump speed is calculated by the Prins AFC and sent to the pump driver by means of a PWM signal.
The pump driver controls the power output to the turbine pump and sends back the actual power output to the Prins AFC for control and diagnostic purposes.

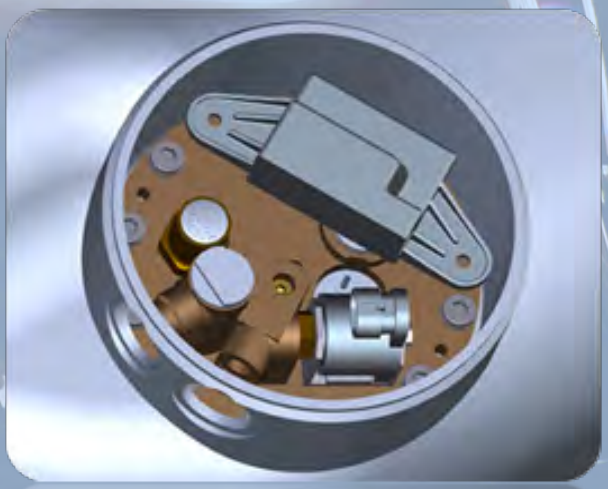
Function:

- Controlling the pump rpm/flow to guarantee that the LPG remains in its liquid state.
- Monitoring the current output to detect if the pump motor is running dry or has quality loss (tank empty detection).
- Controlling the LPG heat balance.

Feature:

- Step less controlled by a PWM signal (Pulse Width Modulation).
- When the pump driver detects a fault / problem it sends back a fault code by the PWM input signal.
- Changes the PWM ration to compensate the voltage-difference when the supply voltage is higher than 13,5V.
- Integrated current limiter and turns off the pump by short-circuit.
- Reduces the output current when it detects high temperature and turns off when the temperature reaches a temperature higher than 175°C.

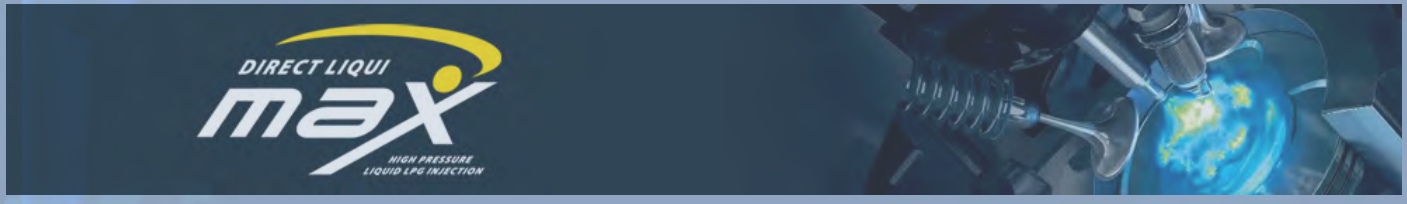


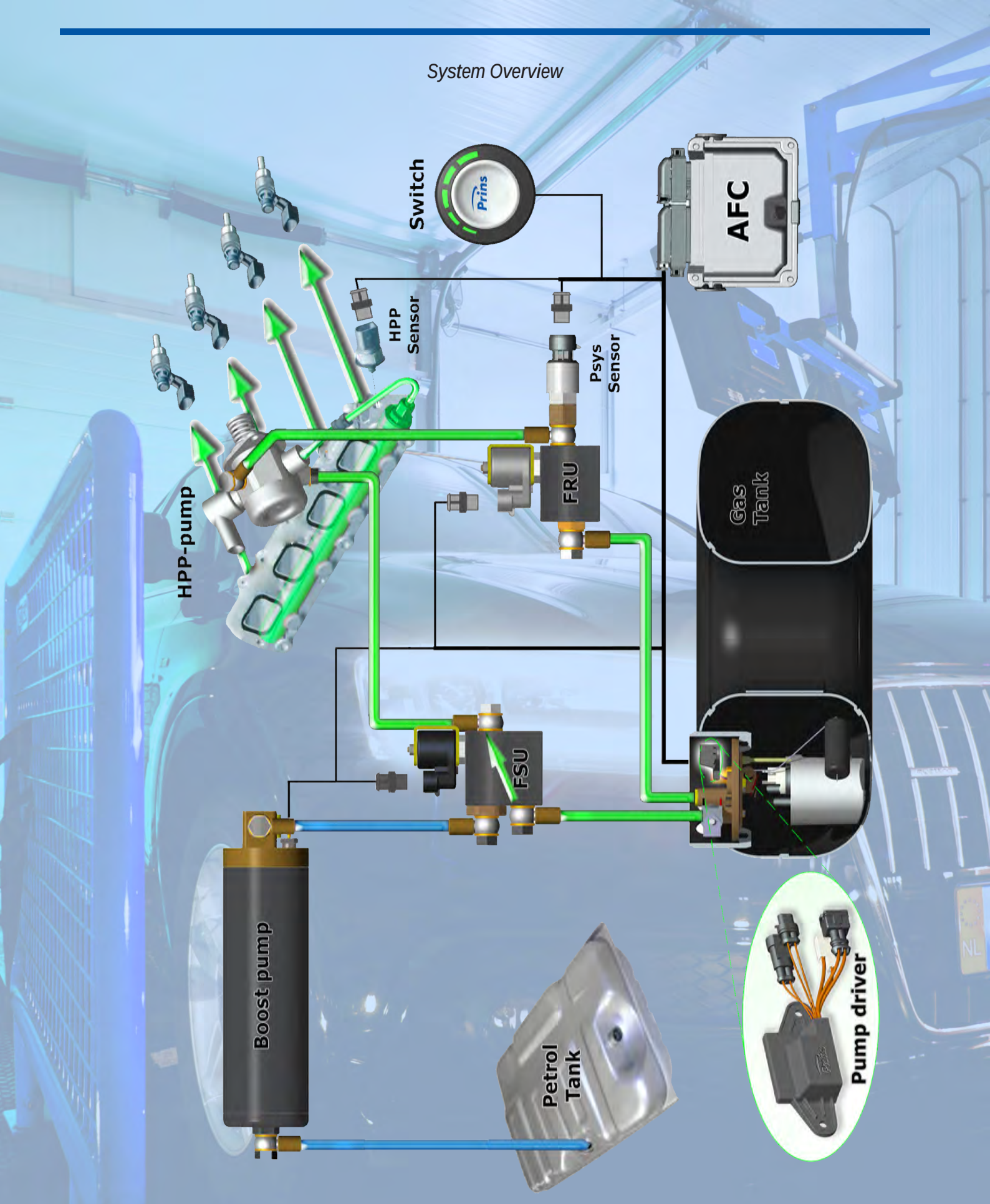


Warning sticker on tank cover:

Warning sticker in engine room :

When working on the car, beware of moving and rotating parts in the engine compartment.
Even when the engine is not running !
Before working on the DLM sytem, remove the system fuses and disconnect the battery ground.
Always wear safety goggles.

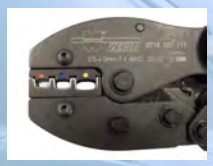




- Always disconnect the battery when installing / servicing the LPG system. Make sure the ignition key is out side the car. Be aware of central door locking, radio / telephone memory code and alarm system.
- Do not place the main fuse into the fuse holder before having completed the installation of the system.
- Solder and insulate all electrical connections. Make professional joints using solder and shrink tubing.
  The wires in the loom are provided with numbers and text.
  The text on the wire explains the function of the wire.
  The wire harness is not model specific, therefore is it may be necessary to adjust the length of the wires.
  Ensure maximum care is taken when connecting wiring.
  Do not stretch the wiring harness.
- Never disconnect the AFC connector, unless you have removed the main fuse.

Correctly crimping and insulating a cable eye terminal:

wire stripper

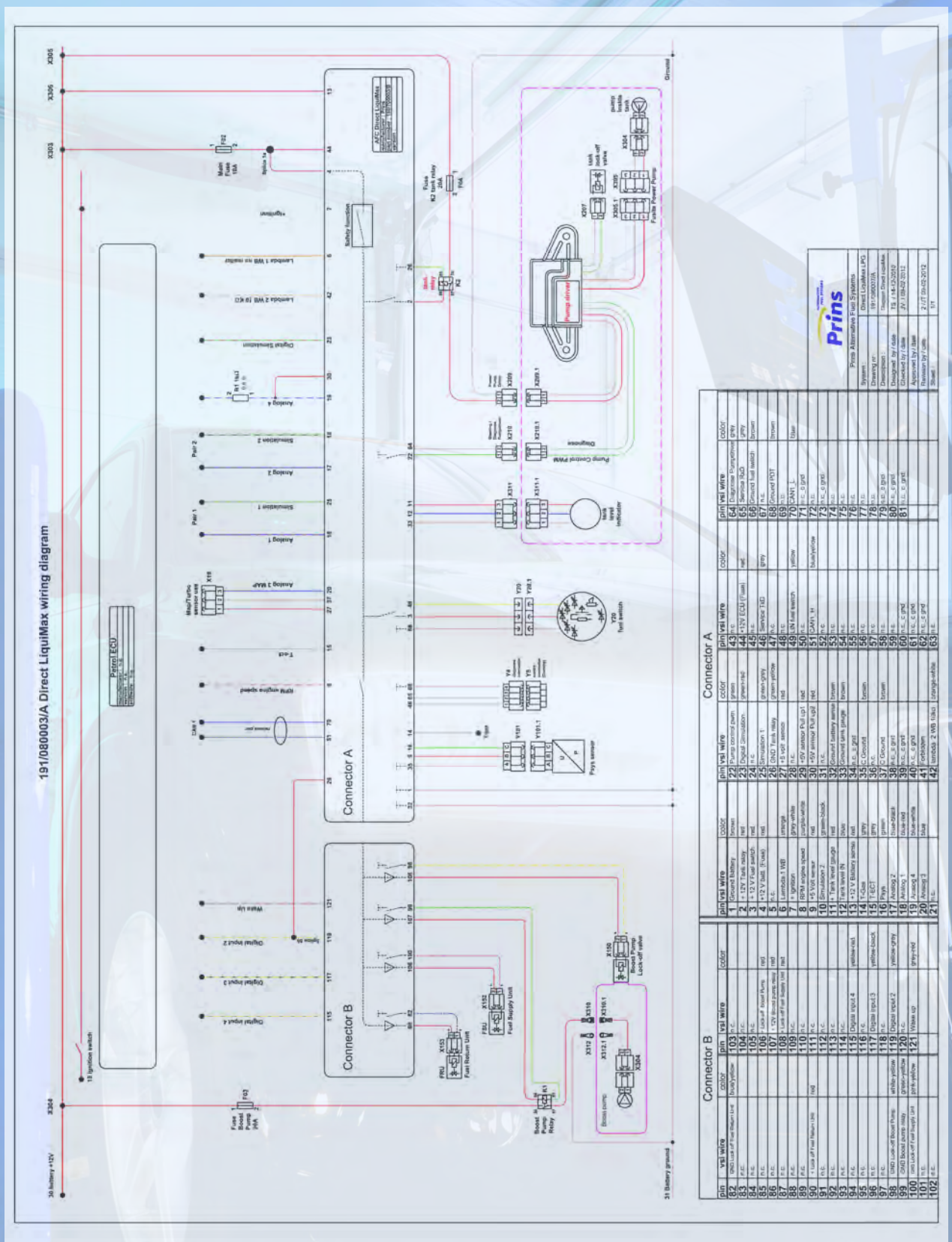


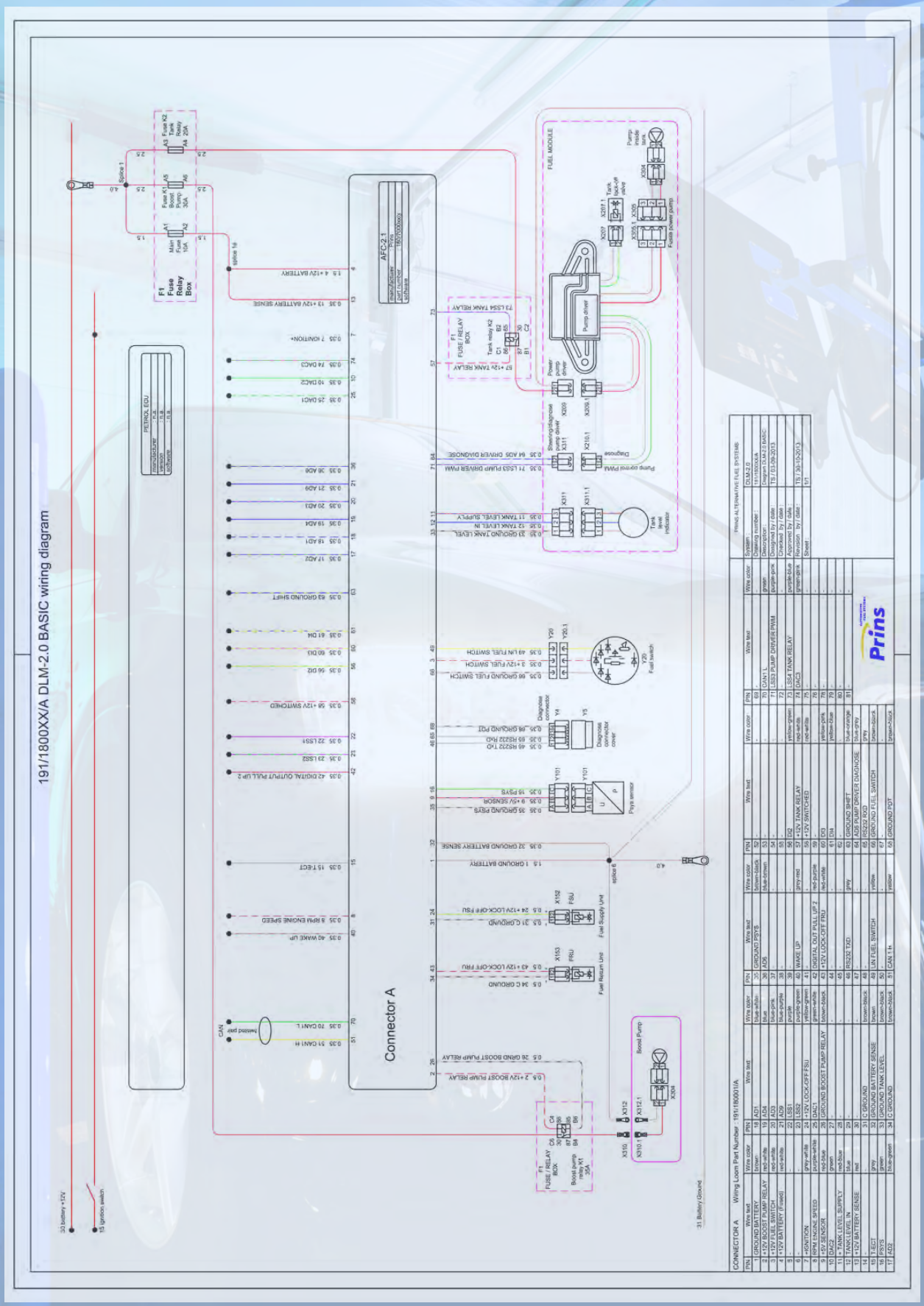
crimping tool

hot air gun

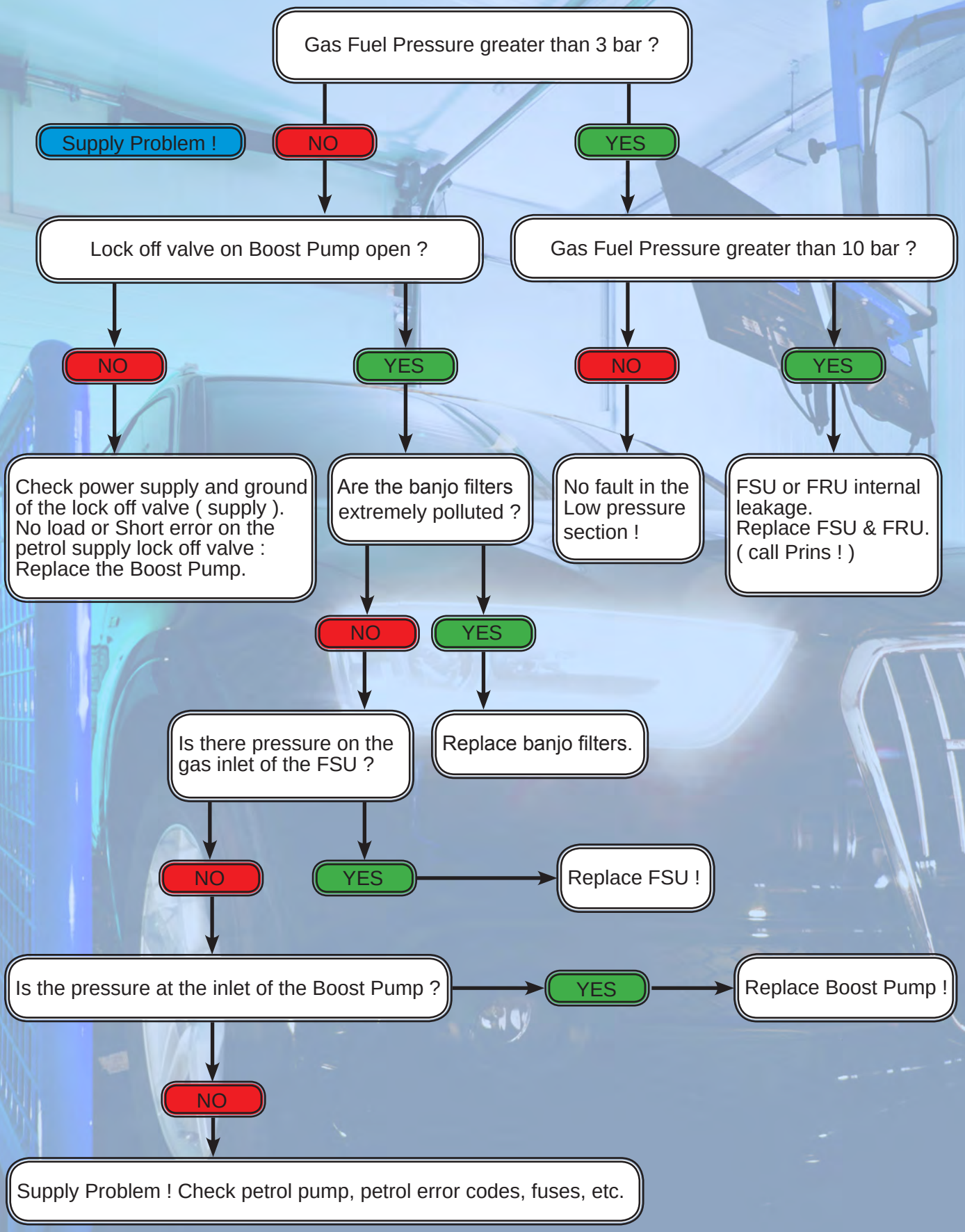
Application:

- Use this application for **battery+ and ground** connections.
- Put the adhesive lined heat shrink tubing over the spot that needs the **water tight** insulation.
- Use a heat gun to shrink the tubing.
- Heat the tubing until glue comes out of both ends.
- Let the tubing cool down until the glue is solidified.
- (information bulletin 254)

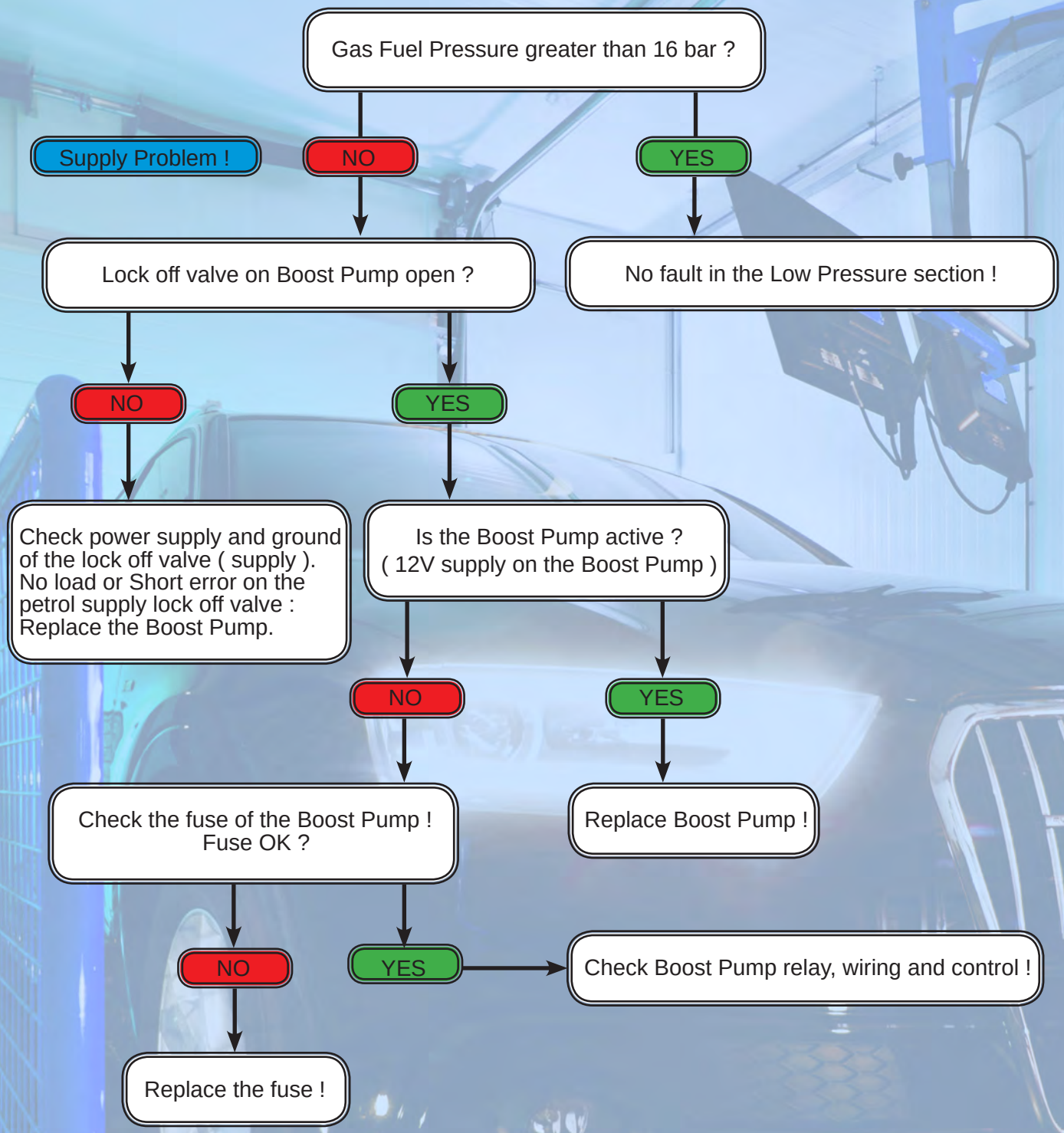




Flow Chart : System Status : Petrol

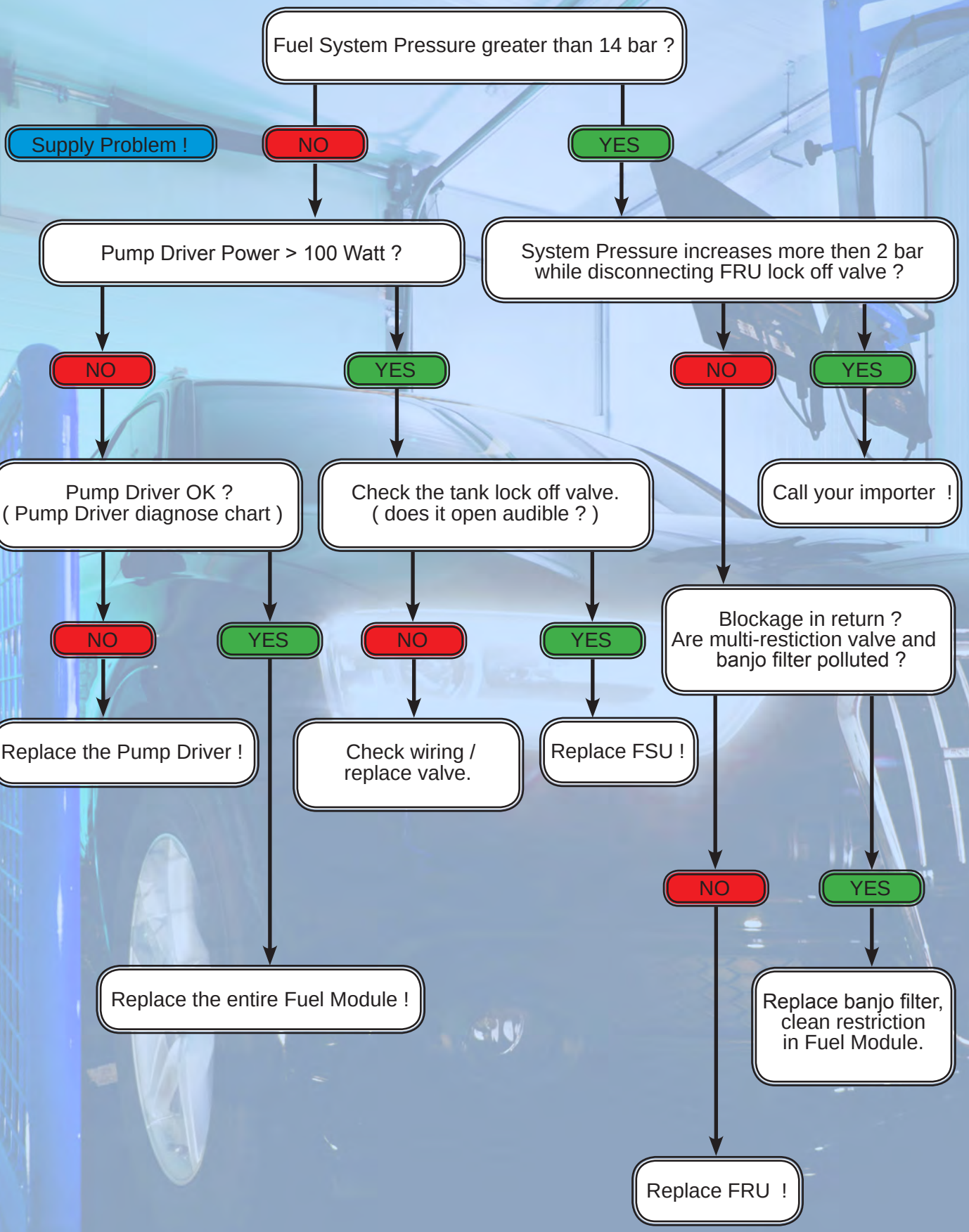


Flow Chart : System Status : Petrol Gas Delay / Petrol Flush / Petrol Gas Boost / Petrol after Flush

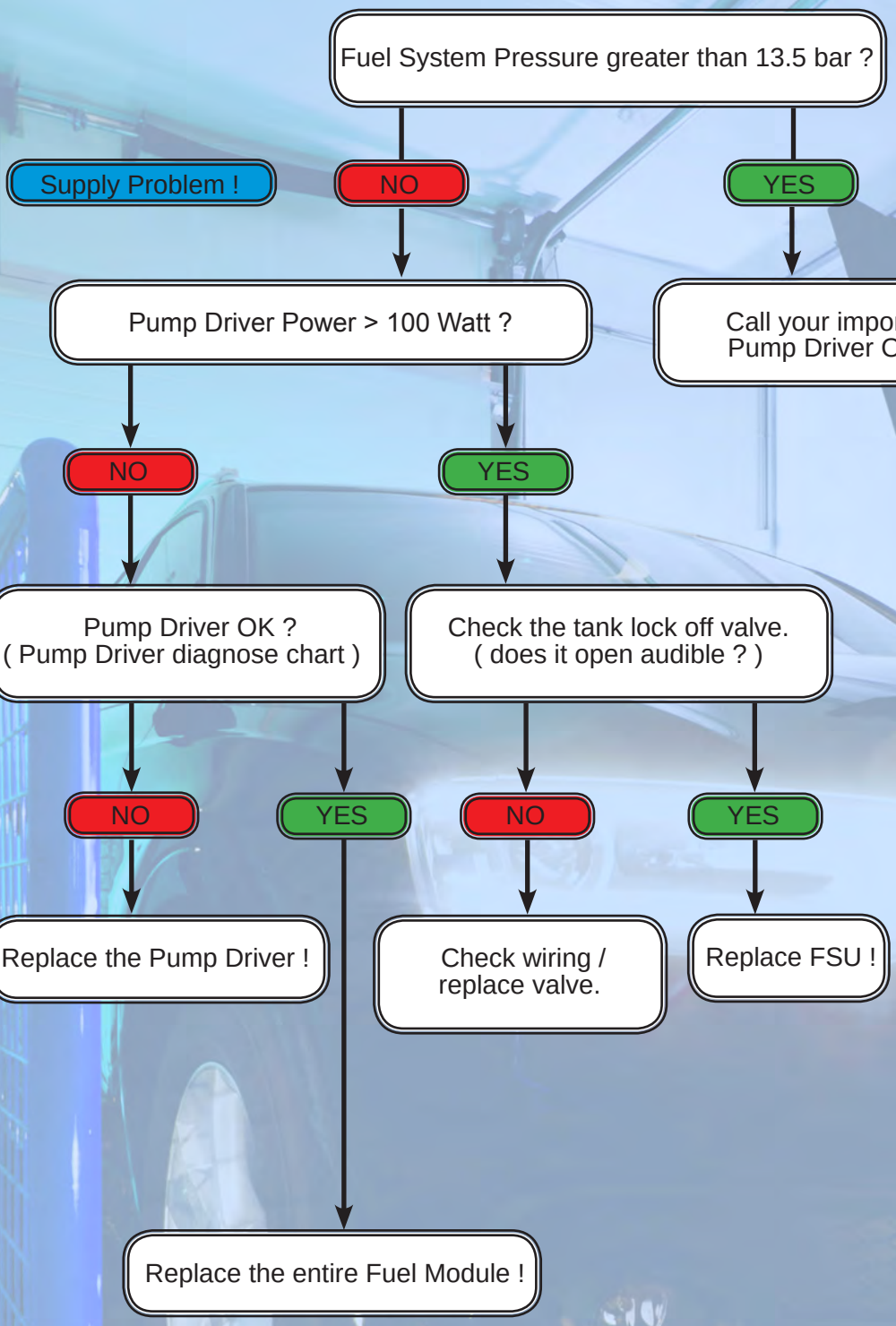


Flow Chart : System Status : GAS

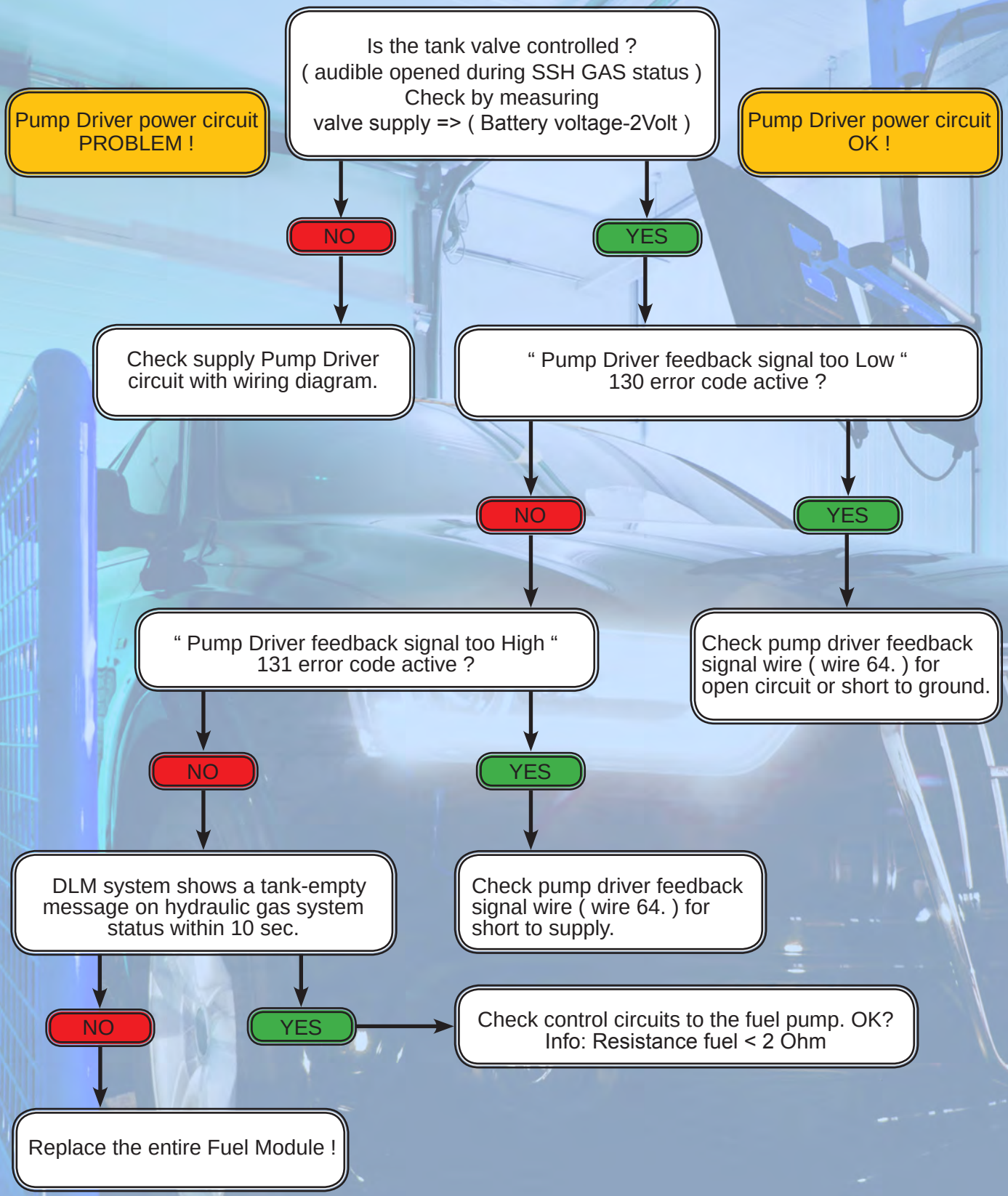
Flow Chart : System Status : Gas Hot Fuel



Flow Chart : System Status : Gas Supply Control / Gas Return Closed

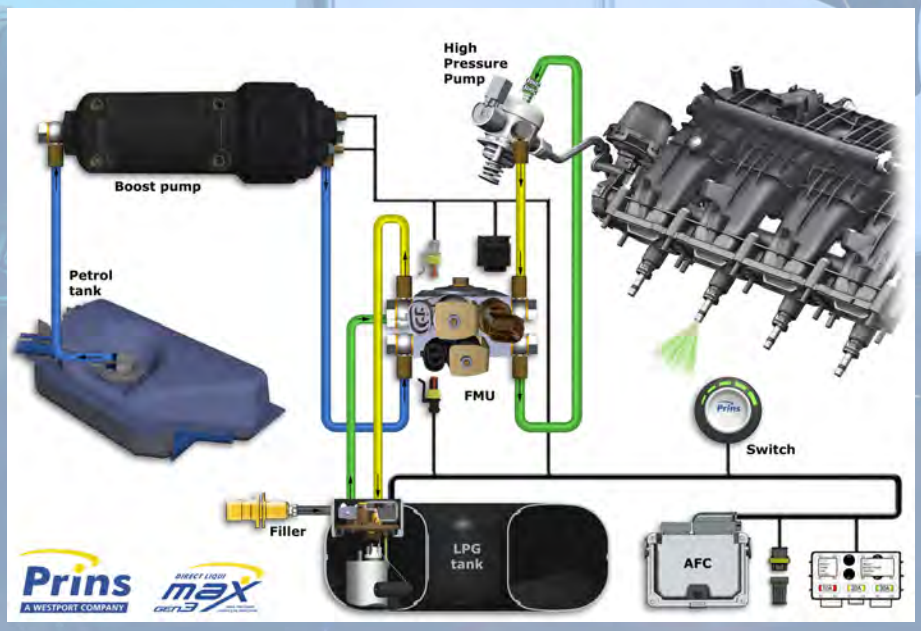


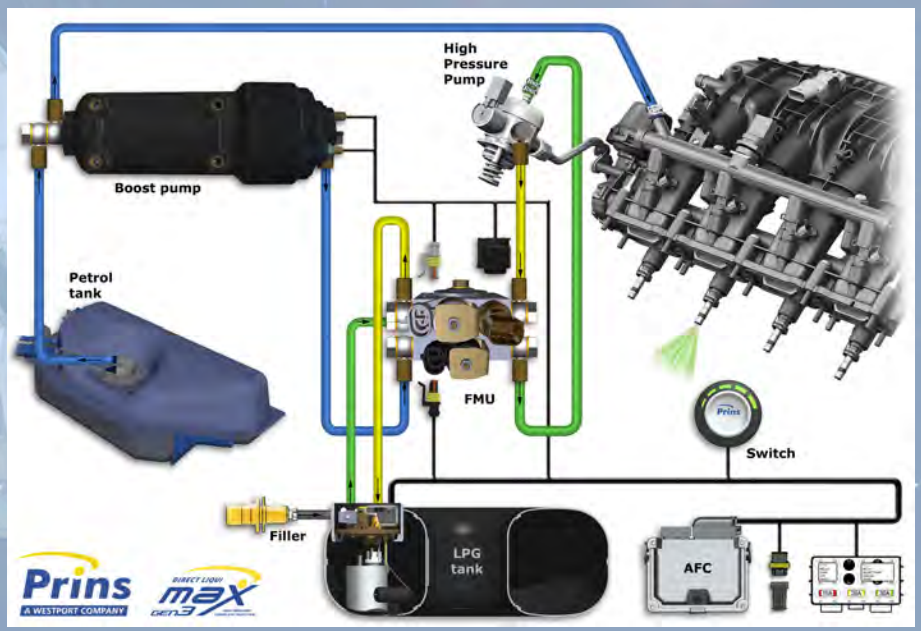
Flow Chart : Pump Driver Diagnose



New improved component design:

- Fuel Management Unit (Fuel Supply Unit + Fuel Return Unit)
- Boost pump
- Fuel module
- Improved vehicle range (+10%)
- Fuel module with Jet-pump principle
- More stable tank-empty behaviour
- Improved system diagnosis
- Auto diagnose function
- Improved calibration stability
- New software model for low pressure and high pressure control
- Less sensitive to fuel quality and fuel composition variation (Propane / Butane)
- Improved filter plan
- P/T sensor implemented in Fuel module



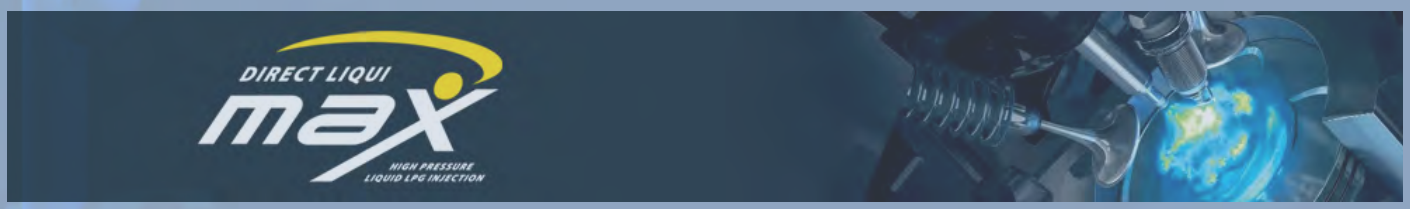


1 ***Low pressure components***
– Tank + Frame + Filler
– Fuel module (Multi-valve , fittings, fuel pump)
– Fuel lines: low pressure lines + fittings
– Fuel Management Unit (FMU)
– Boost pump
2 ***High pressure components***
– High pressure pump (OEM)
– High pressure lines + fittings (OEM)
– Injector rail (OEM)
3 ***Electrical components***
– Alternative Fuel Controller (AFC)
– Pump driver
– Fuel selector switch
– Wiring harness
– Pressure sensor

Boost Pump type 5

The boost pump is installed in line with the petrol supply line. During the switchover from LPG to petrol, the LPG [remaining] in the fuel supply line between the Fuel Management Unit and high pressure pump has to be purged back to the LPG tank. As the LPG supply line pressure is higher than the petrol supply line pressure a boost pump is needed. While switching from LPG to petrol the boost pump will increase the petrol supply line pressure so that the LPG in the fuel supply line will be purged through the return and is fed back to the LPG tank.

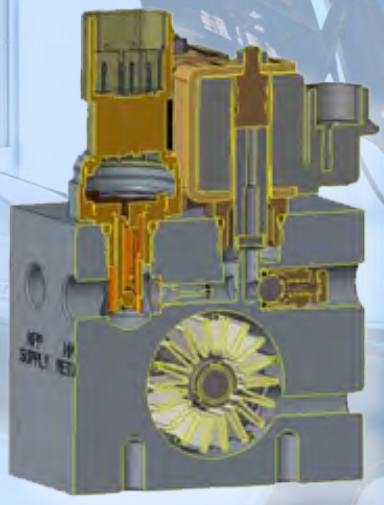
- Increase the gasoline supply pressure
- New compact light weight design
- Increased boost pressure
- Easy mounting system
- Improved electrical connections
- Integrated inlet filtering (Banjo-bolt filters no longer necessary)
- Not compatible with 1st generation type 1 & 2 boost pump !
- Compatible with 2nd generation type 3 & 4 boost pump !

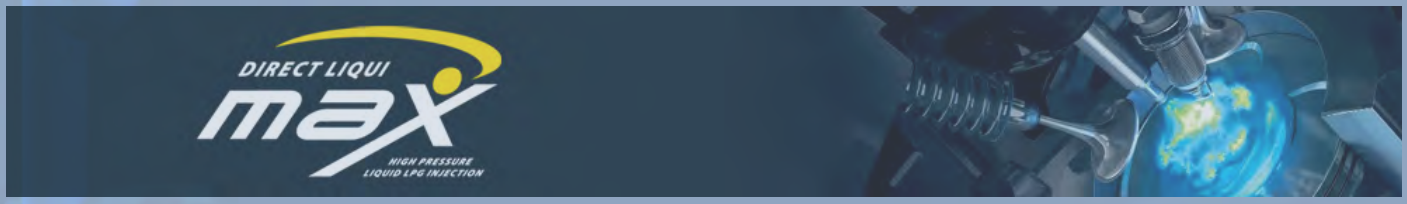


Fuel Management Unit

The Fuel Management Unit (FMU) is designed to allow switching between petrol and gas. By controlling the supply lock off valve on the Management Unit the LPG supply to the high pressure pump can be controlled. During LPG mode the return lock off valve on the Management Unit opens the return line to the LPG tank. The return line makes it possible to feed the liquid LPG back to the LPG tank. During petrol operation the fuel return line to the LPG tank will be closed by the lock off valve on the Management Unit.
The Fuel Supply and the Fuel Return are both controlled by the AFC.

- New compact design
- Combination of FSU + FRU
- Integrated LPG supply filter (service filter)
- Integrated permanent inlet filters (Banjo-bolt filters no longer necessary)
- Integrated Pressure/Temperature sensor





Fuel Module type 3

Function:

- Provide housing for all fittings
- Mounting facility for turbine pump
- Swirl pot prevents vapour suction during dynamic driving
- Gas tight sealing between tank and fuel module by o-ring
- Fuel metering
- 80% fill stop
- Electric Lock off valve
- Pressure Relief Valve (PRV)
- Non Return Valve (NRV)
- Excess flow valve
- Long life filter inside swirl pot [10 micron]

1. Fuel Module
2. Level indicator
3. Lock-off valve
4. Pressure relief valve
5. Power supply pump
6. Fuel return connection
7. Pressure/Temperature sensor
8. Filler hose connection
9. Fuel supply connection
10. LPG pump inside
11. 80% / Level floater
12. Swirl pot
13. Filter