

Prins

A WESTPORT COMPANY



Installation manual Dedicated PART 2/2



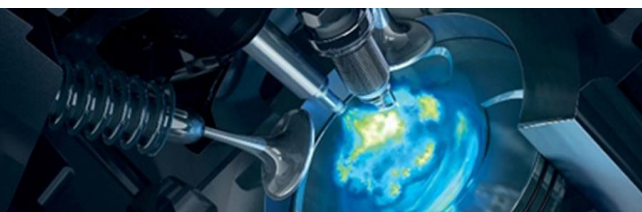
| | |
|---------------------------------|---|
| MANUFACTURER | Mazda |
| TYPE | 3 / 3 / 6 |
| ENGINE DISPLACEMENT | 1500 / 2000 / 2000cc |
| NUMBER OF VALVES | 16v |
| ENGINE CODE / NUMBER | PE-VPS (Skyactiv-G) |
| VEHICLE CATEGORIES | M |
| TRANSMISSION | AT / MT(6) |
| VERSION | Direct LiquiMax-2.1 |
| PETROL ECU MANUFACTURER / CODE | Mitubishi PE1T / PE03 |
| HIGH PRESSURE PETROL PUMP | Denso 295100-0294 (Mazda PE01 20 3F0F) |
| HIGH PRESSURE PETROL INJECTOR | x |
| MODEL YEAR: | 2012-2014 |
| SYSTEM APPROVAL NUMBER (R115) | E4-115R-000011 / DLM-LPG 04 |
| LOCATION SYSTEM STICKER | right side, centre door post |
| ENGINE SET NUMBER | 353/0700017/A // 353/0700021/A // 353/0700023/A |
| MANUAL NUMBER | 076/1307500 |
| DATE | 2015-06-22 |



TABLE OF CONTENTS

| | |
|---|----|
| General instructions..... | 2 |
| Required equipment / tools / materials for installing a complete system | 3 |
| Vehicle check..... | 3 |
| Tightening moments..... | 4 |
| Direct LiquiMax-2.1 | 5 |
| Direct LiquiMax-2.1 diagram | 6 |
| Direct LiquiMax parts / approval numbers | 7 |
| DLM-2.0 component location overview | 8 |
| Remove battery..... | 9 |
| Overview Filter removal..... | 10 |
| Petrol hose removal..... | 11 |
| Overview pump removal | 12 |
| Fuel Supply Unit / Fuel Return Unit..... | 13 |
| Preassemble system unit bracket | 14 |
| Preassemble system unit bracket with tank hoses (optional) | 16 |
| Installation preparation | 17 |
| Install wiring loom and hoses..... | 18 |
| Connection of the fuel hose to the boost pump. | 19 |
| Install the unit..... | 20 |
| Hose routing..... | 21 |
| Installation of the Bosch High Pressure Pump..... | 22 |
| High pressure pump installation..... | 23 |
| High pressure pump installation 2 | 24 |
| Pump hose routing | 25 |
| Lpg / petrol fuel lines | 14 |
| Mounting the AFC | 26 |
| Fuse / relay box location..... | 27 |
| Wiring routing..... | 28 |
| Mounting the fuel selection switch Mazda 6 | 29 |
| Mounting the fuel selection switch Mazda 3 | 30 |
| Electrical connections..... | 31 |
| Electrical connections..... | 32 |
| Electrical connections (solder) | 33 |
| Fuse Box..... | 34 |
| Electrical connections..... | 35 |
| Electrical connections..... | 36 |
| Checklist after installation | 37 |

FOR EXPLANATION AND CIRCUIT DIAGRAMS SEE : INSTALLATION MANUAL GENERAL PART 1 / 2



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-2.0 system, maintain a clean and organized work environment during installation and maintenance to prevent pollution of the LPG components.
- Always download the “general manual 1/2 “ from our website for basic instructions and diagrams.
- 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, 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 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 LPG-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 .



Required equipment / tools / materials for installing a complete system

- Complete workshop toolbox (wrenches, screwdrivers, cutters, pliers, ratchet, sockets)
- Car lift
- Portable computer : operating on Windows 98, W2000 or XP.
 - Internal memory : 16 Mb or more
 - Memory HD space : 5MB
 - Screen : 256 colours, advise colours 16 bits or more
 - Com port : 1 free COM port 1 or COM port 2 with a 9 or 25 pins connector
- 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)
- 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
- Engine coolant

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 gas analyzer)
- Check the condition of the ignition system (spark plugs, cables, coil)



Tightening moments

| | Nm | SW |
|-------------------------|------|----------|
| 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 |
| M 8 x 1 | 24.5 | 13 |
| M 8 x 1,25 | 27.3 | 13 |
| M 10 x 1 | 52 | 15-16-17 |
| M 10 x 1,5 | 54 | 15-16-17 |
| | | |
| (filtered)Banjo bolt | 10 | 14 |
| Supply line connection | 15 | 13 |
| Fuel module Allen bolts | 20 | 7 |
| Filler hose connection | 50 | 22 |
| Boost Pump Clamp | 7 | 10 |

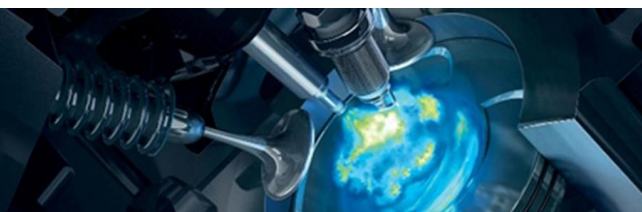
EXPLANATION OF SYMBOLS :



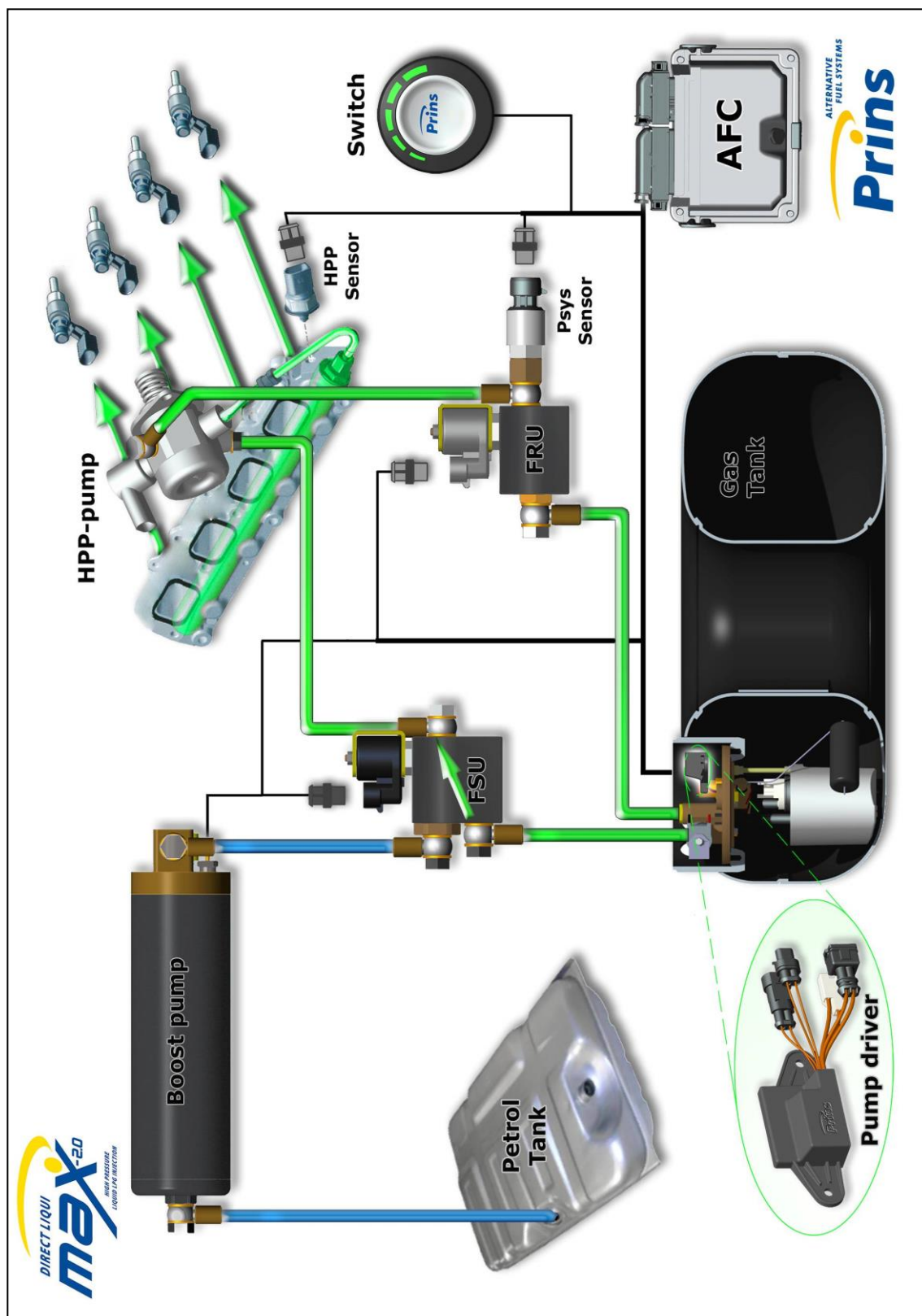
= IMPORTANT, CAUTION



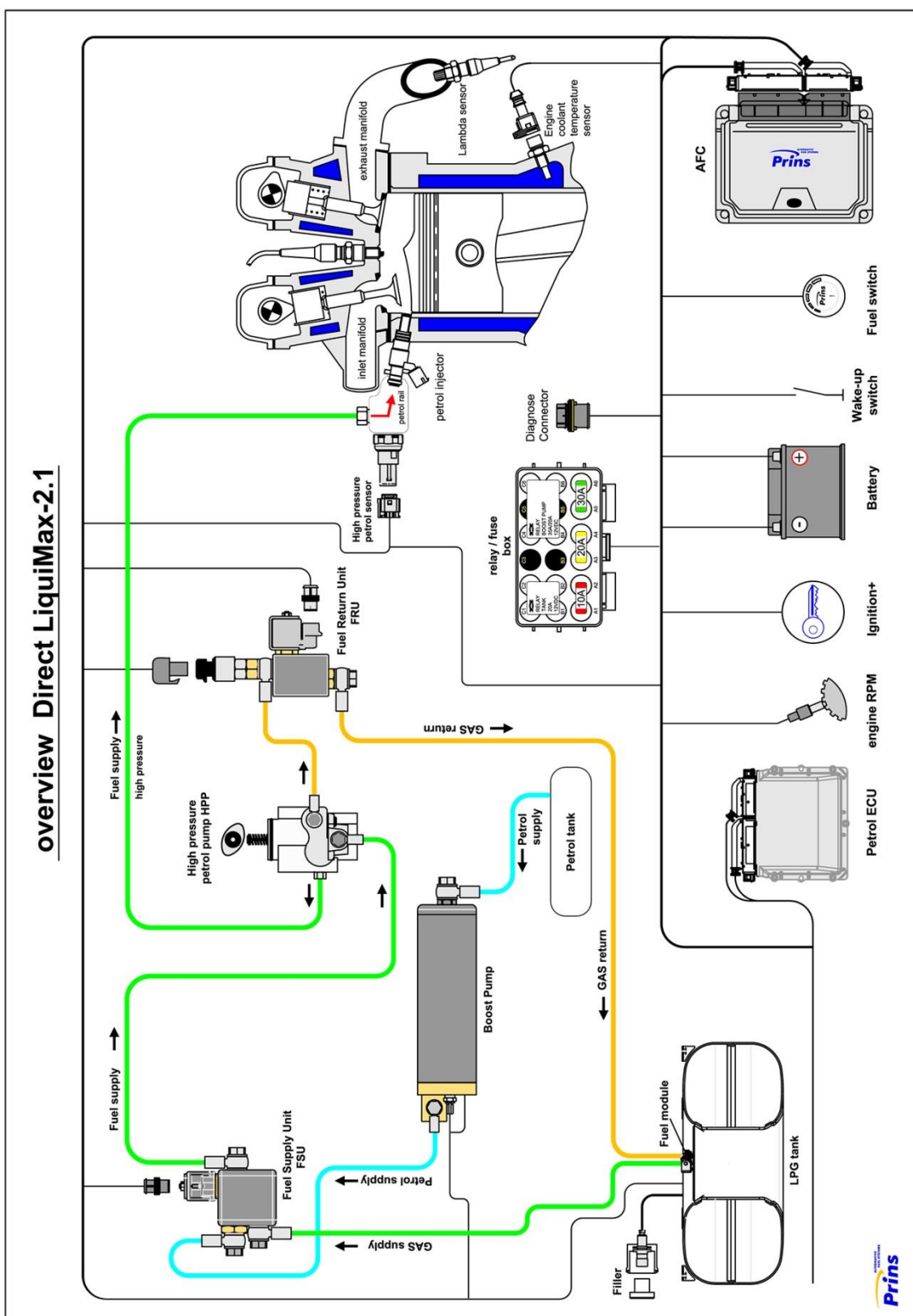
= WEAR SAFETY GOGGLES



Direct LiquiMax-2.1

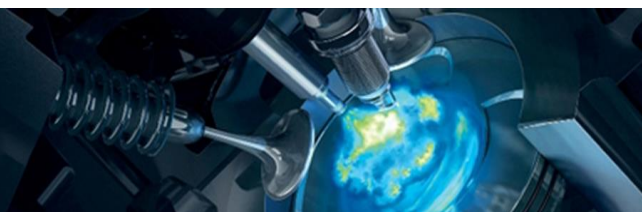


Direct LiquiMax-2.1 diagram

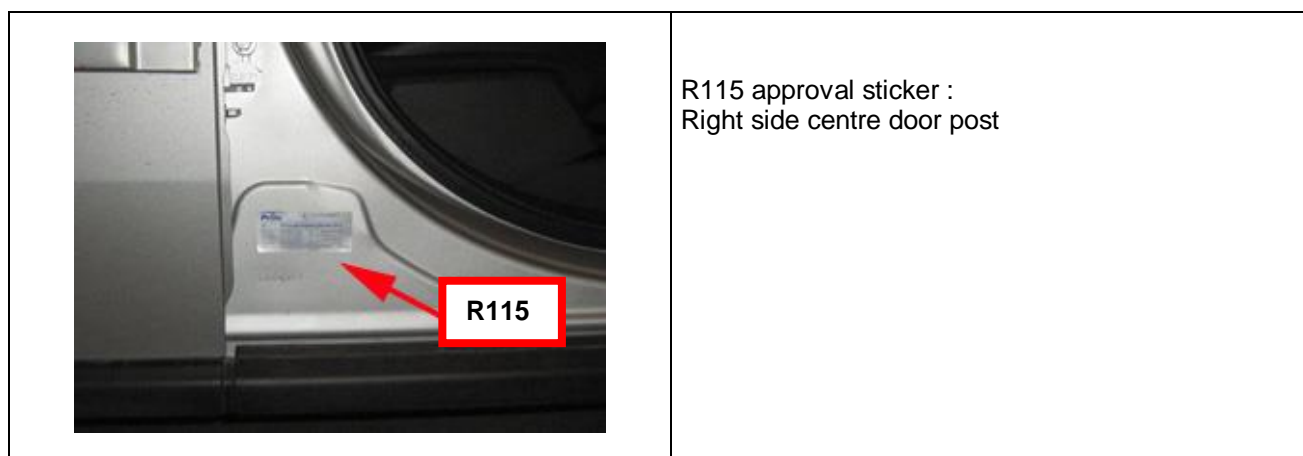
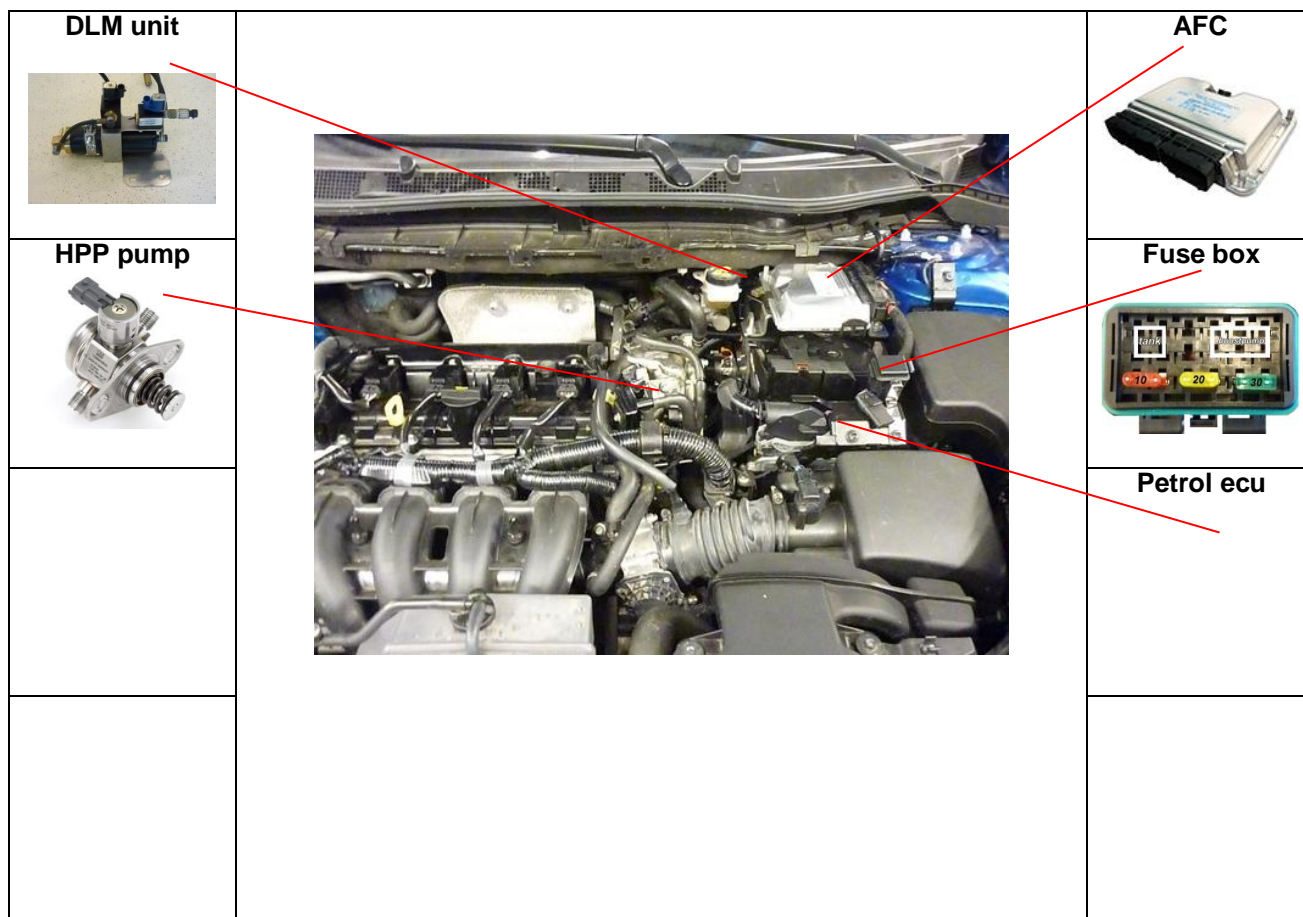


Direct LiquiMax parts / approval numbers

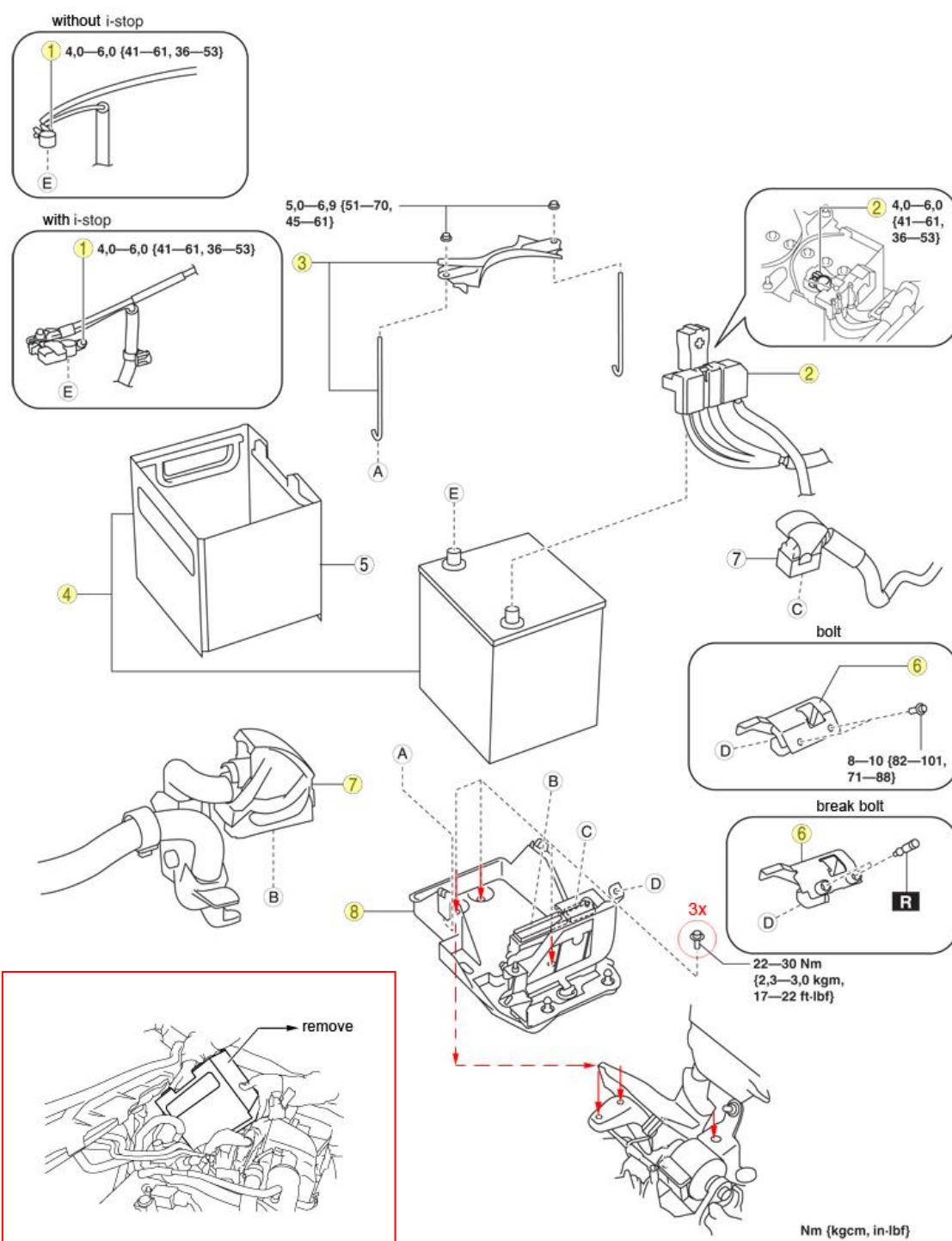
| | |
|---|---|
|  <p>1st generation</p>  <p>2nd generation</p> |  <p>1st generation</p>  <p>2nd generation</p> |
| <p>Fuel Supply Unit : E4-67R-010269</p> | <p>Fuel Return Unit : E4-67R-010270 Pressure Sensor : E4-67R-010051</p> |
|  |  |
| <p>Boost pump</p> | <p>High Pressure Pump : E4-67R-010266 High Pressure Rail : E4-67R-010267 High Pressure Injectors : E4-67R-010309</p> |
|  |  <p>XD-3 LPG</p>  <p>XD-4 LPG</p> |
| <p>Prins AFC: E4-67R-010098 E4-10R-030507</p> | <p>Fuel lines series XD : E4-67R-010247 XD3 E4-67R-010247 XD4</p> |



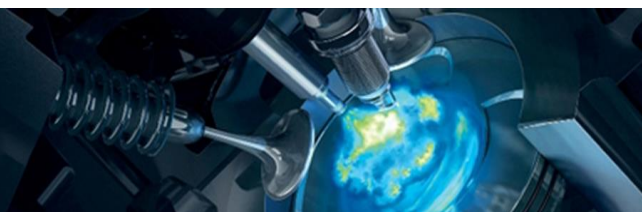
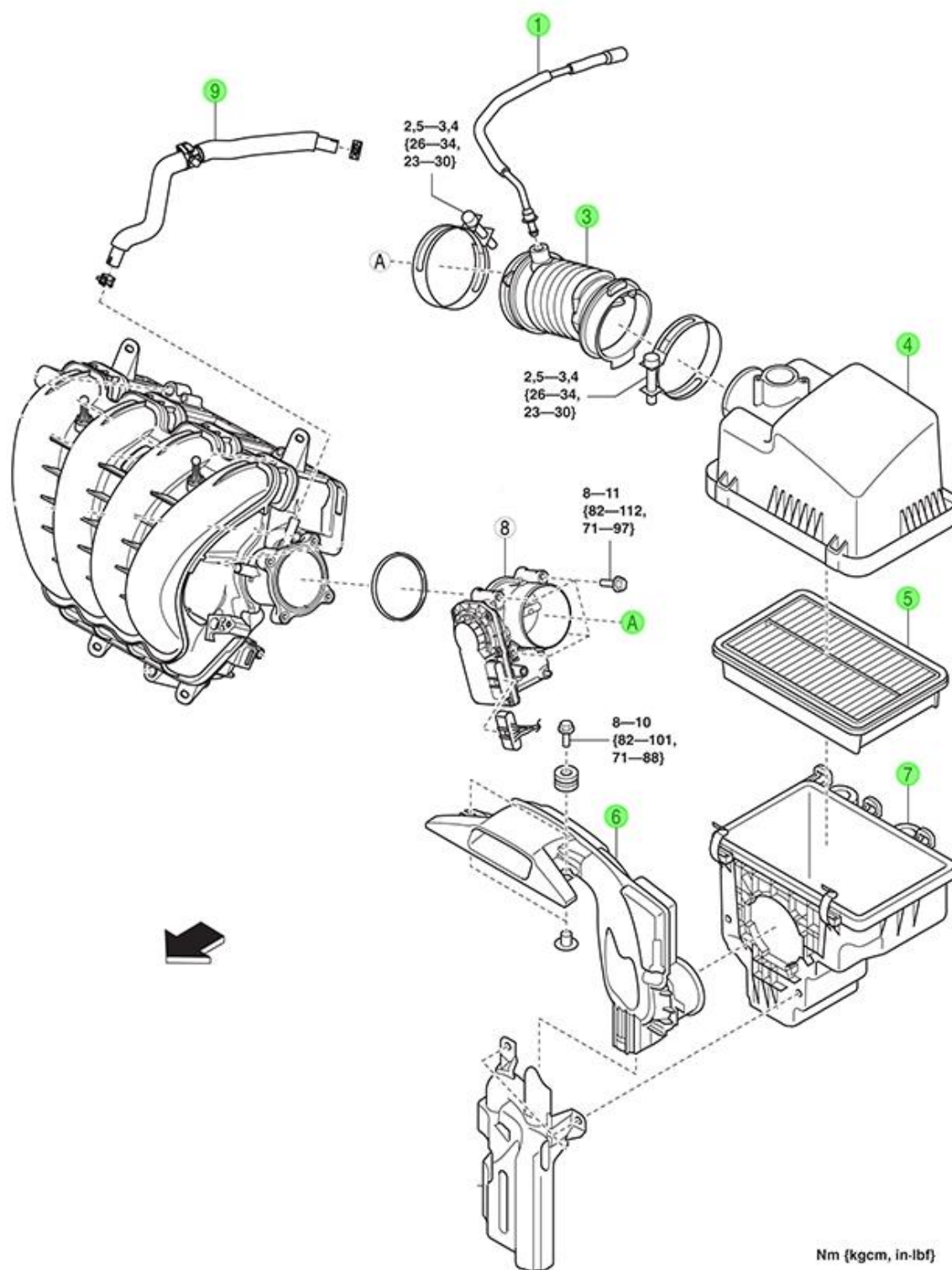
DLM-2.0 component location overview



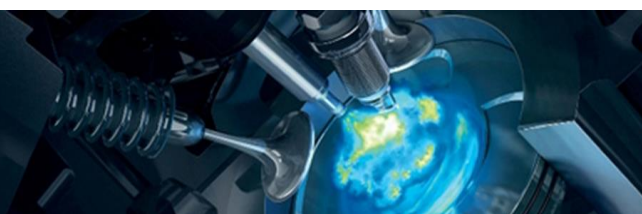
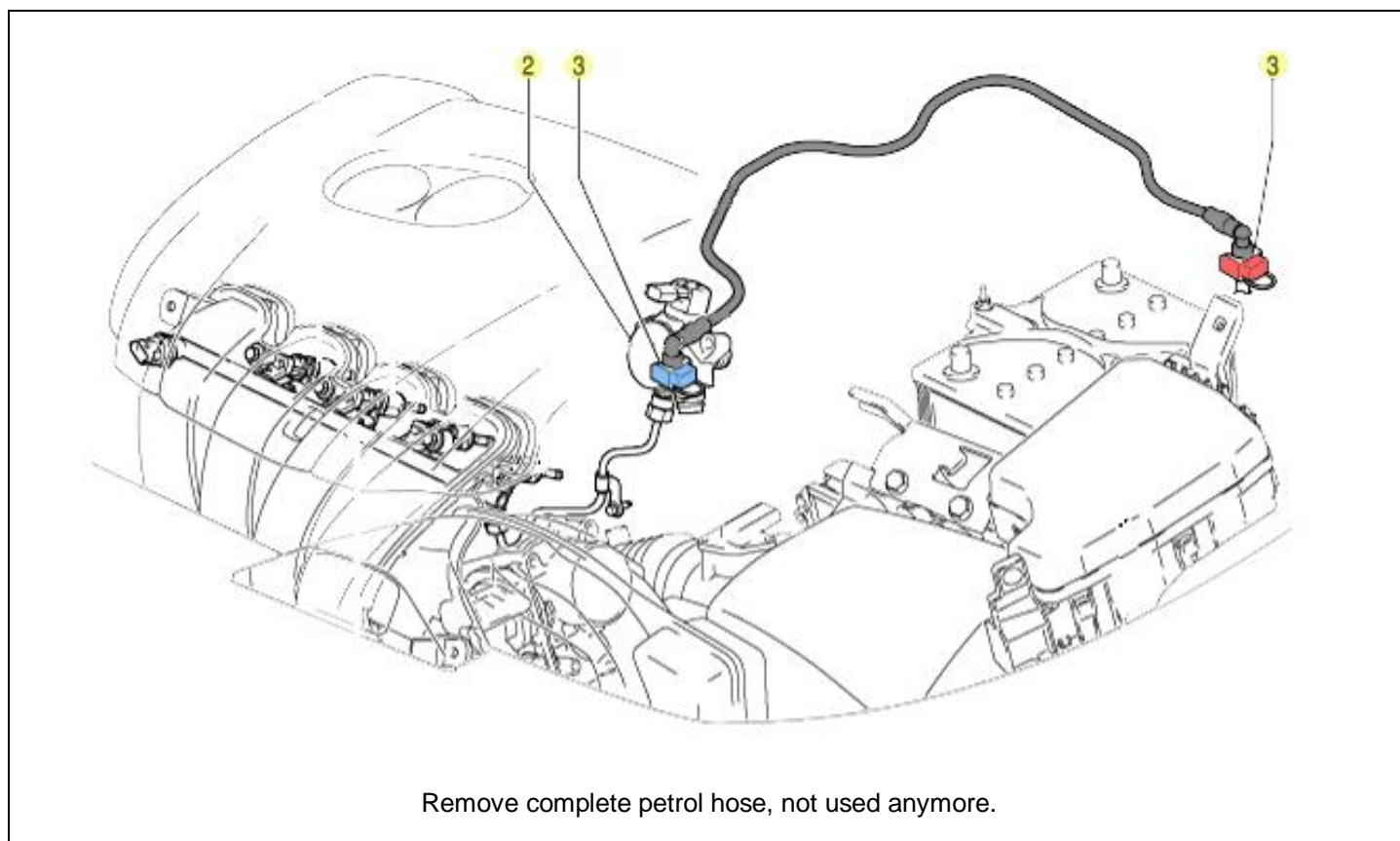
Remove battery



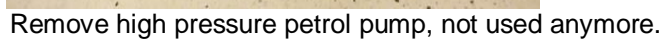
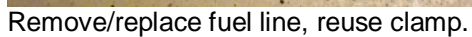
Overview Filter removal



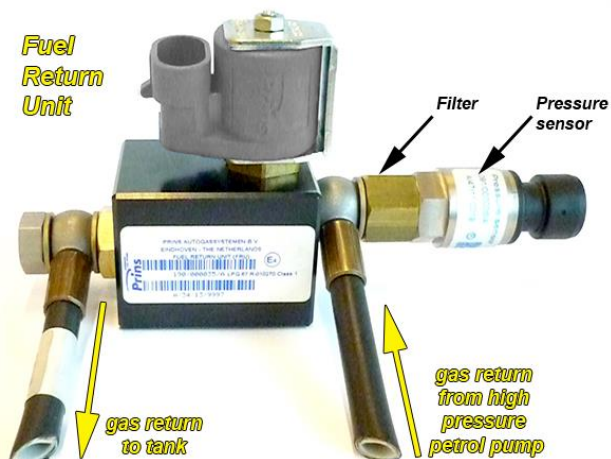
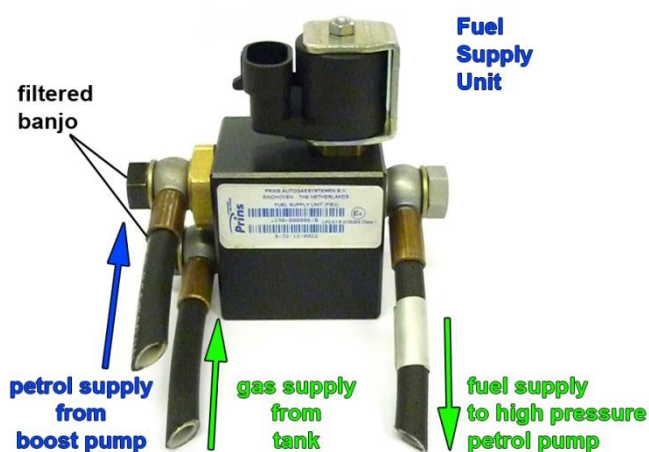
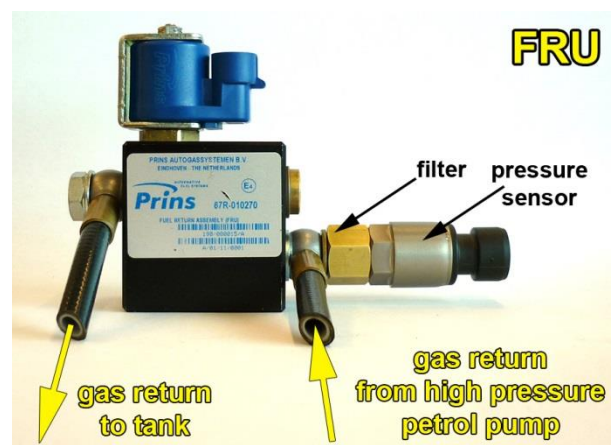
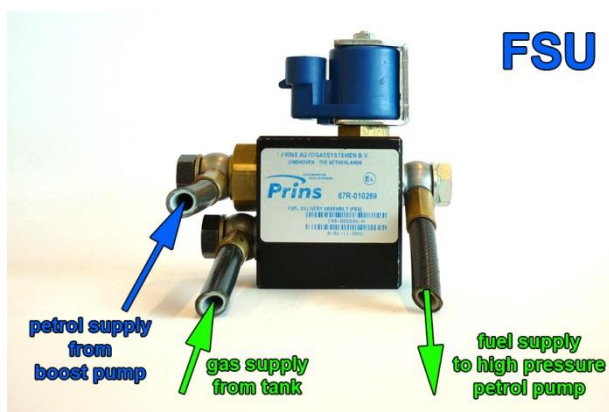
Petrol hose removal



Overview pump removal



Fuel Supply Unit / Fuel Return Unit



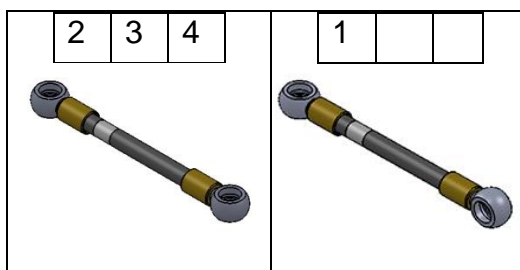
Black filtered banjo will only be used on inlet connections !

Filter inside sensor banjo



Lpg / petrol fuel lines

| | Hose | from | to | Length (cm) |
|---|------|--------------------------|---------------------------|---------------|
| 1 | XD-3 | Adapter quick connection | Petrol boost pump | 30 |
| 2 | XD-3 | Fuel supply unit | High pressure petrol pump | 80 |
| 3 | XD-3 | Petrol boost pump | Fuel supply unit | 13 |
| 4 | XD-3 | Fuel return unit | High pressure petrol pump | 110 |



Install the fuel line using two bonded seal washers and banjo bolt :

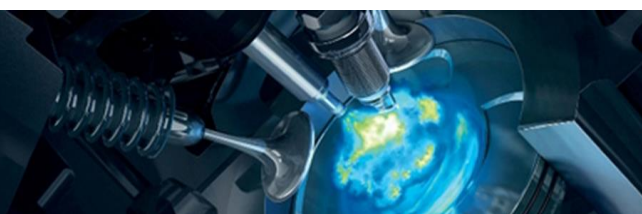


081/300002

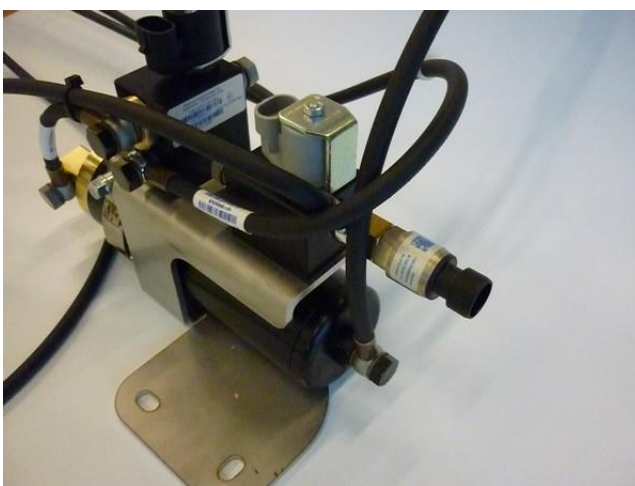
Filtered banjo: (FSU supply inlets / boost pump inlet : black filtered banjo) :



181/300009/A



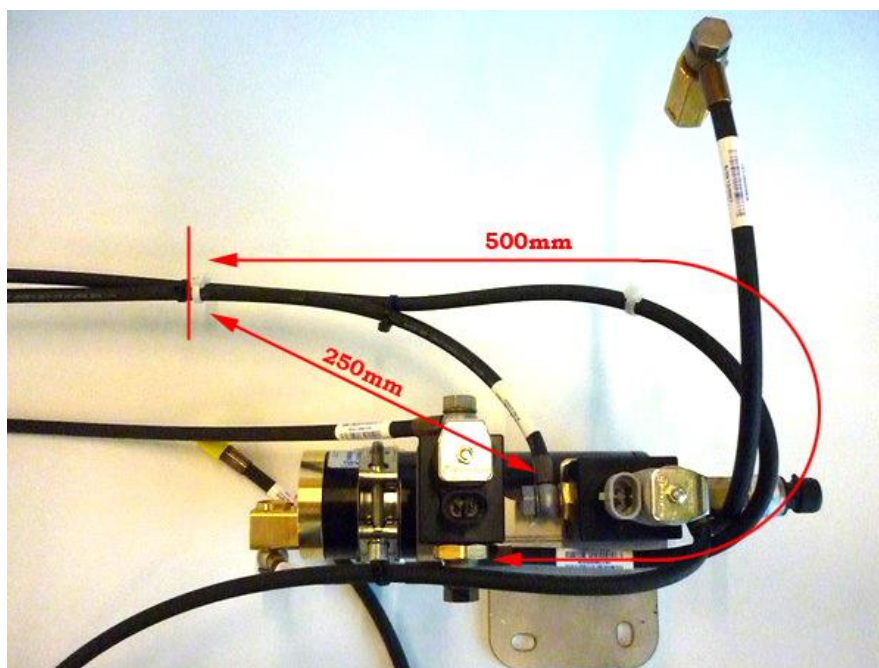
Preassemble system unit bracket



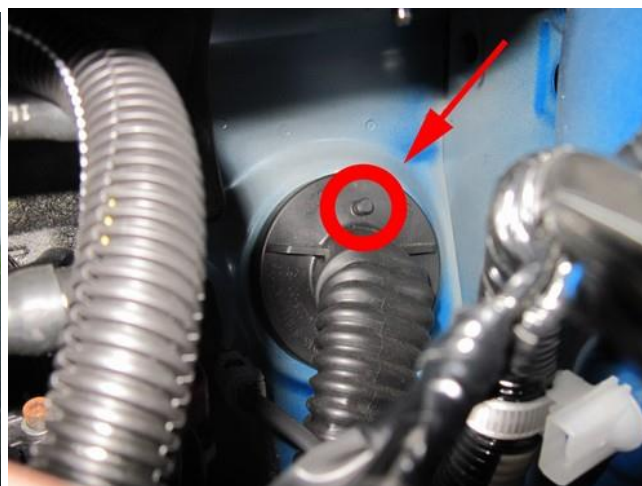
SEE NEXT PAGE



Preassembly system unit bracket with tank hoses (optional)



Installation preparation



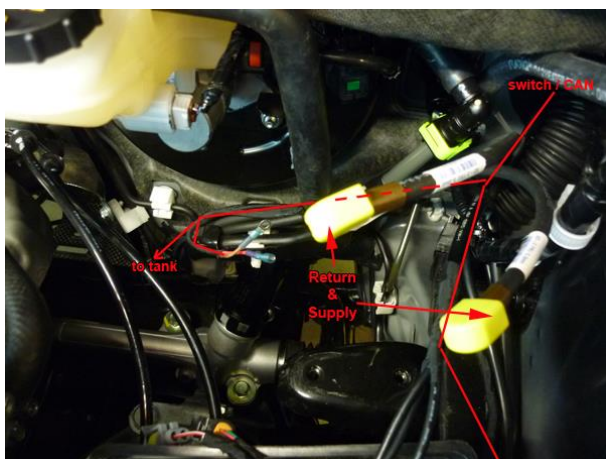
Grommet for putting through the Switch and CAN wiring (prepare before unit installation)



Replace white cable clamp, wiring loom moves to front

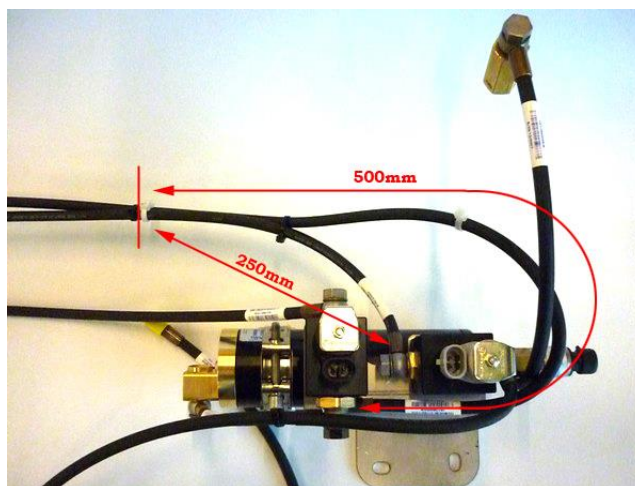


Install wiring loom and hoses



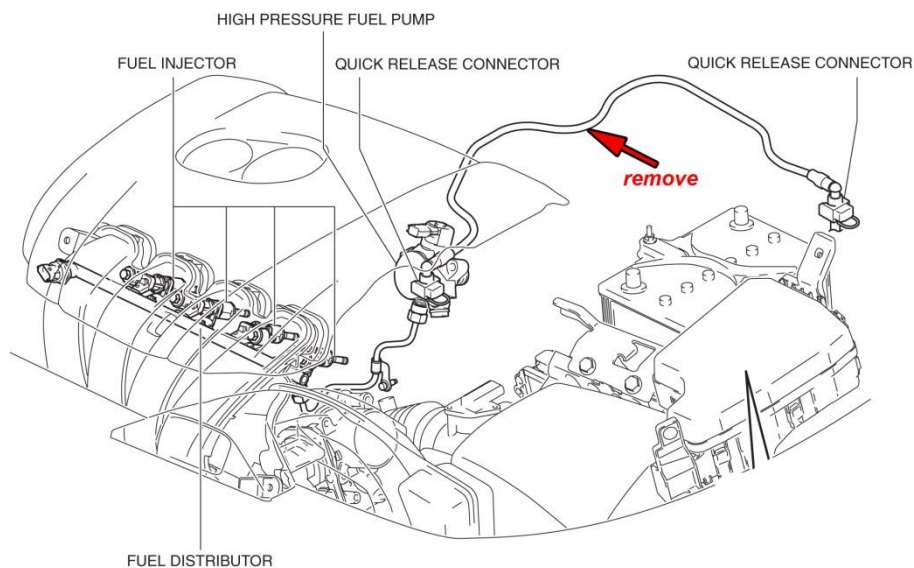
Install wiring harness / supply/return hose, before installing the unit

Or unit and hoses at ones.
Hoses will follow the original petrol fuel line !

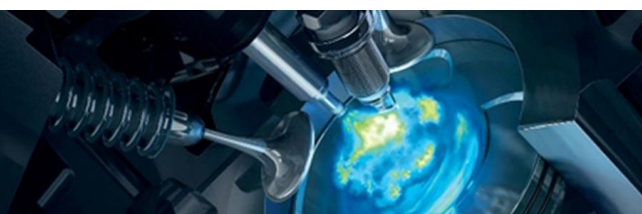


Connection of the fuel hose to the boost pump.

Remove the original petrol supply line.



See next page



Install the unit



Connect the petrol supply quick connector (**install lock spring !**) to the fuel pipe.

Connect the tank supply and return hose to FSU and FRU

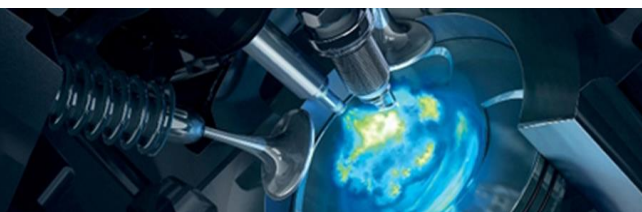
Insert the unit bracket under battery plate and bolt back on the plate



Hose routing



DLM Lines with tie-clip -> only to petrol line !
DLM Lines with clamps and screws -> chassis beam / floor.

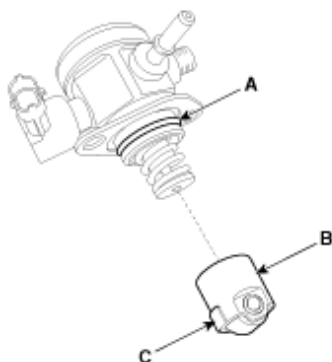


Installation of the Bosch High Pressure Pump

INSTALLATION

Before installing the high pressure fuel pump, position the roller tappet (**B&C**) in the lowest position by rotating the crankshaft. Otherwise the installation bolts may be broken because of tension of the pump spring.

Apply engine oil to the O-ring (**A**) of the high pressure fuel pump, the roller tappet (**B**), and the protrusion (**C**). (roller tappet, only if removed from cylinder head)
Also apply engine oil to the groove on the location where the protrusion (**C**) is installed.



Installation bolts:

When tightening the installation bolts of the high pressure fuel pump, tighten and turn the bolts in small step (0.5 turns) after tightening them with hand-screwed torque.

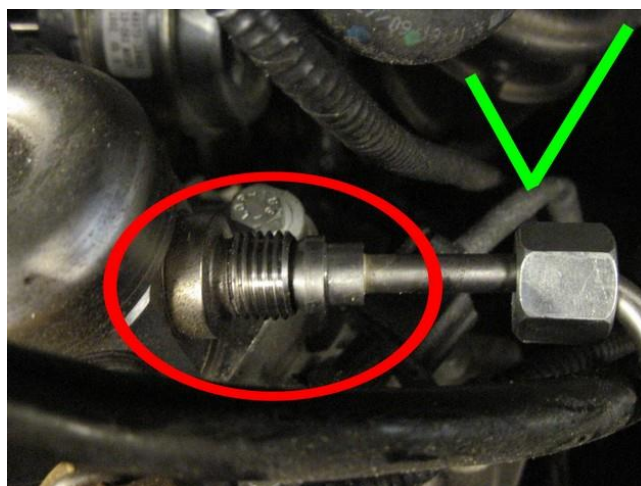
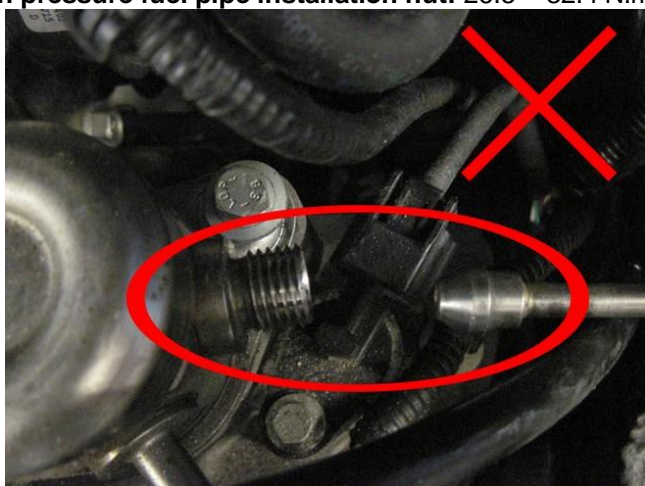
High pressure fuel pump installation bolt: 12.8 ~ 14.7 N.m

Fuel pipe:

First hand-tighten the nut(s) fully until they are not fastened any more in order to have them inserted in place and then completely tighten to the specified torque using a torque wrench.

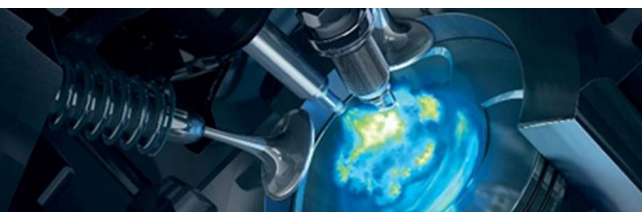
If not tightening the bolts or nuts in a straight line with the mating bolt holes or fittings, it may cause a fuel leak due to broken threads.

High pressure fuel pipe installation nut: 26.5 ~ 32.4 N.m



Mount the new fuel line free of tension. If the fuel line does not fit correctly, adapt the fuel line.

Installation is reverse of removal.



High pressure pump installation



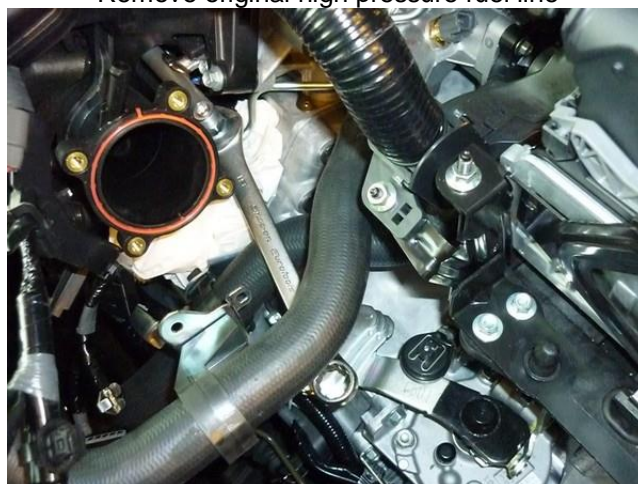
Replace the high pressure pump for the adapted high pressure pump.
(Follow the workshop manual of the car)



Remove hose from air filter to throttle body. Remove throttle body & brackets/hoses next to the HP pump.



Remove original high pressure fuel line



High pressure pump installation 2



Mount the supplied HP pump with the new Allen bolts & (spring) washers with 25Nm.

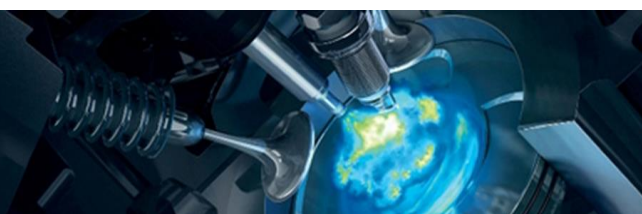
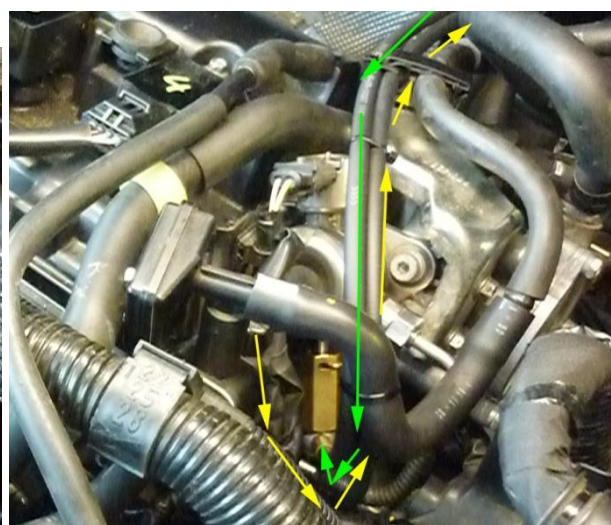
After mounting pump, tighten return hose banjo 10Nm, hose facing down.

Use the flat head banjo on the return line.



Installation of the new high pressure petrol line, with clamp.

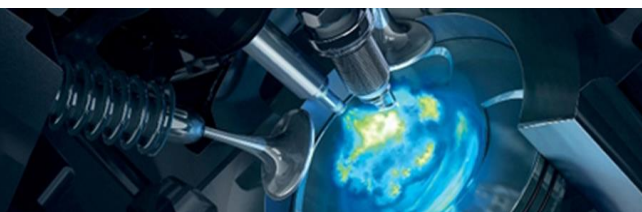
Mount the new fuel line free of tension. If the fuel line does not fit correctly, adapt the fuel line.



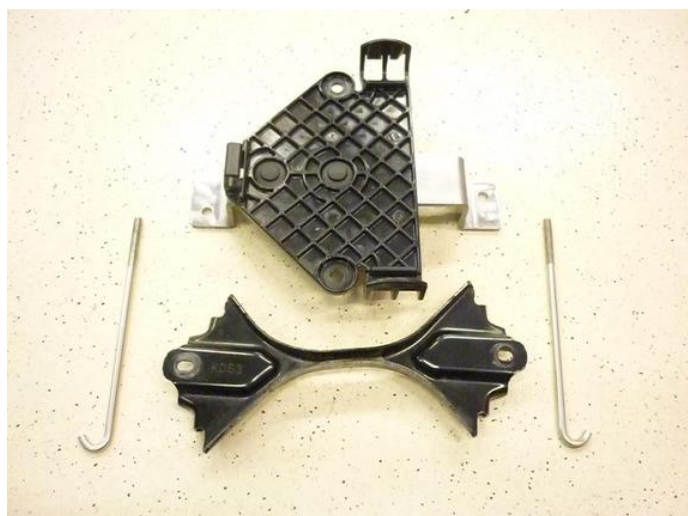
Pump hose routing



Re-connect with the new plug-play connector



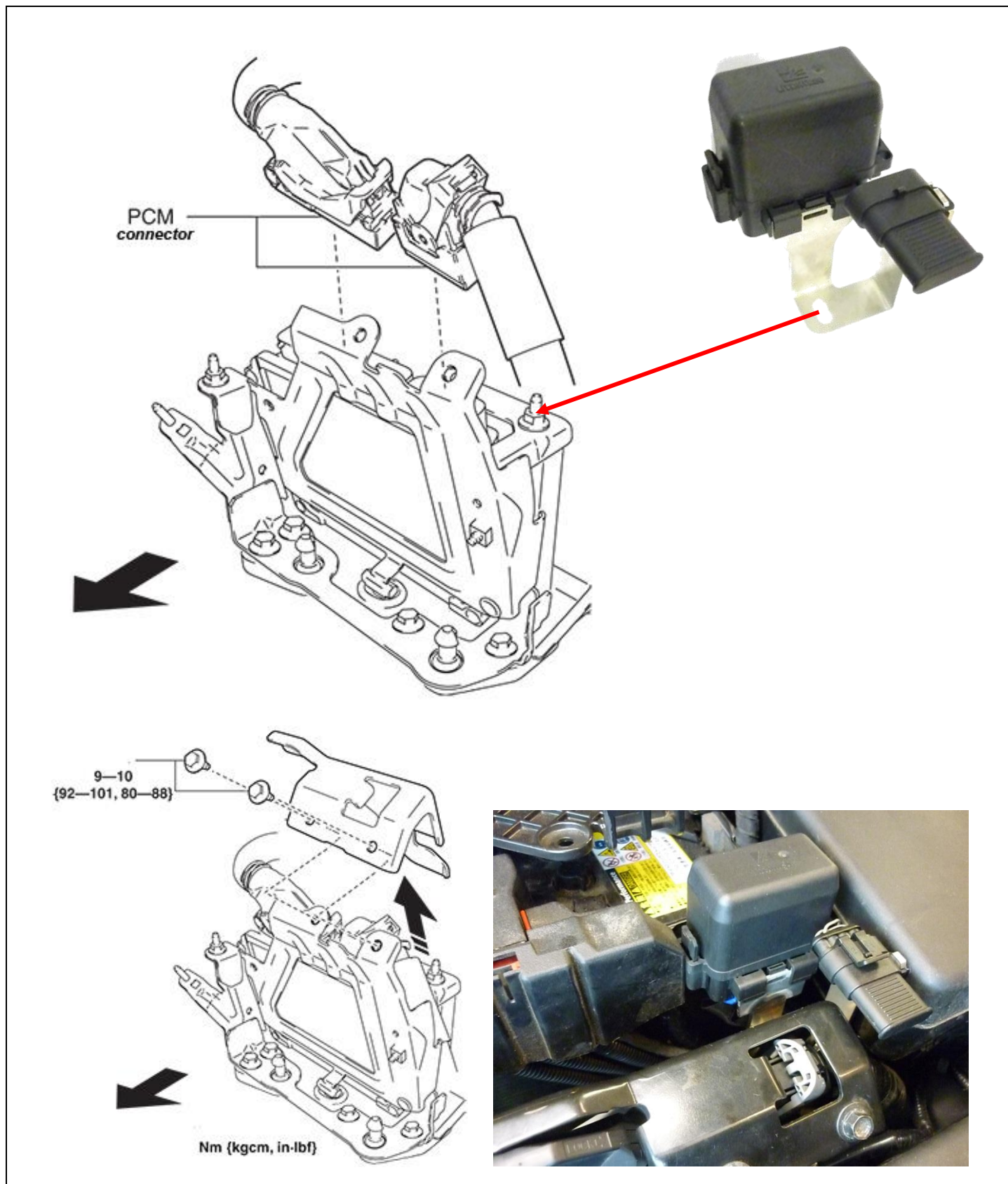
Mounting the AFC



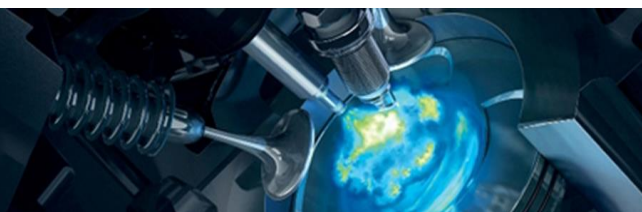
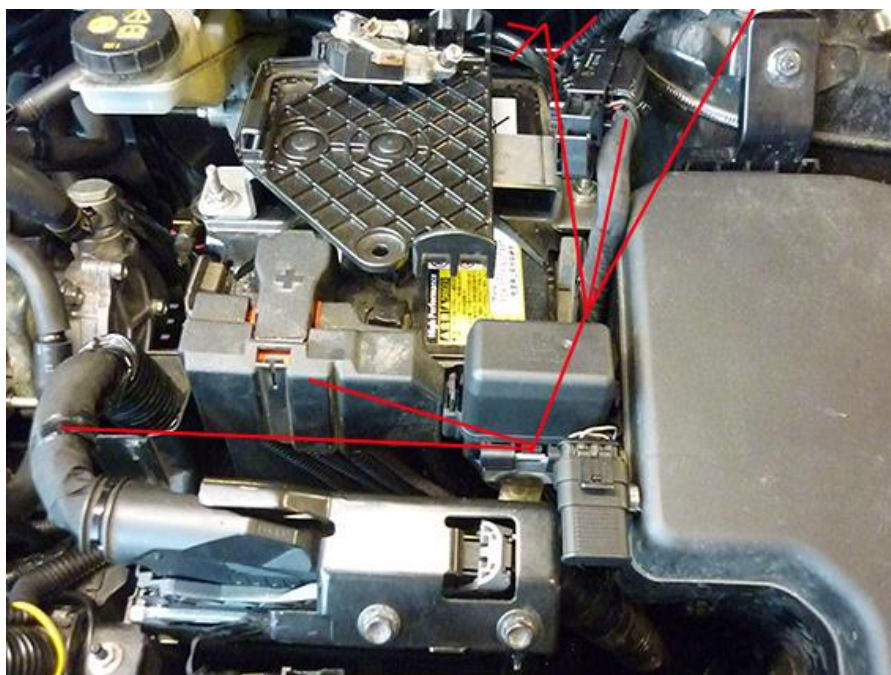
Connect battery ground only when completely finished the installation !




Fuse / relay box location

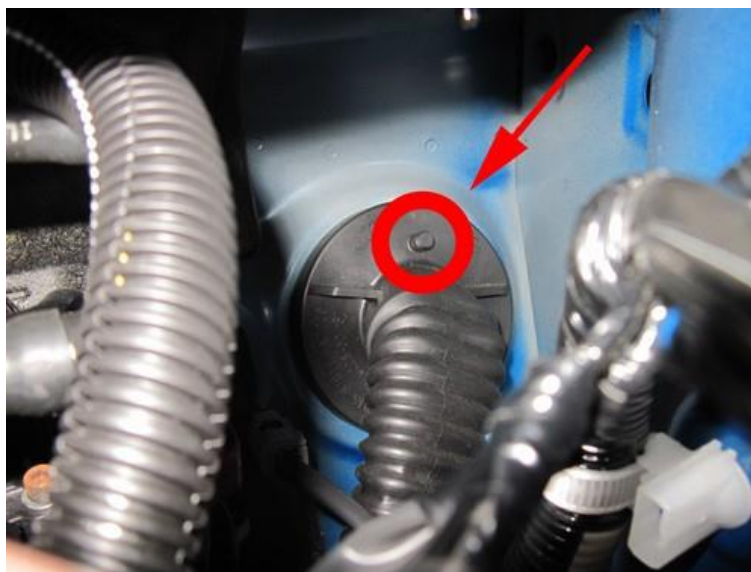


Wiring routing

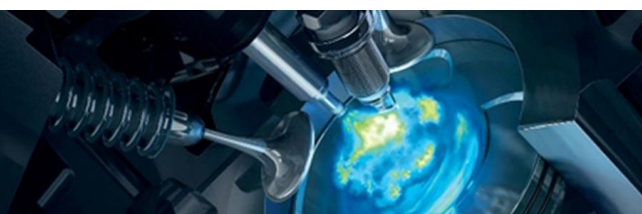



 Mount the switch.

Mounting the fuel selection switch Mazda 6

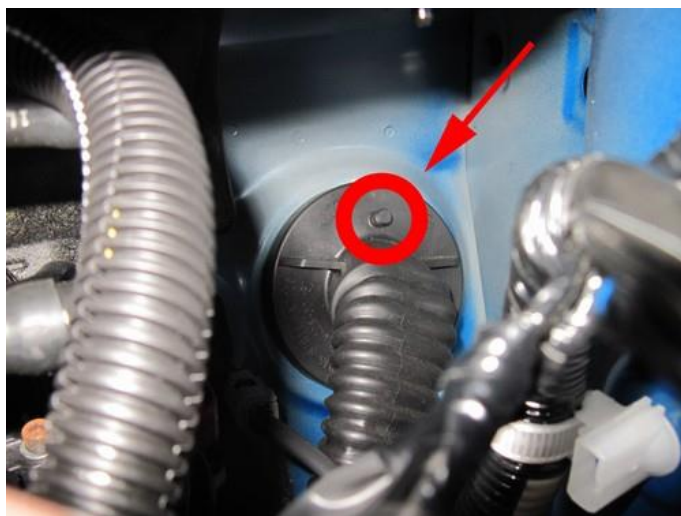


Drill Ø8.2mm

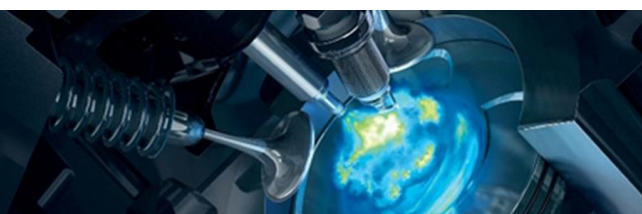


 Mount the switch.

Mounting the fuel selection switch Mazda 3



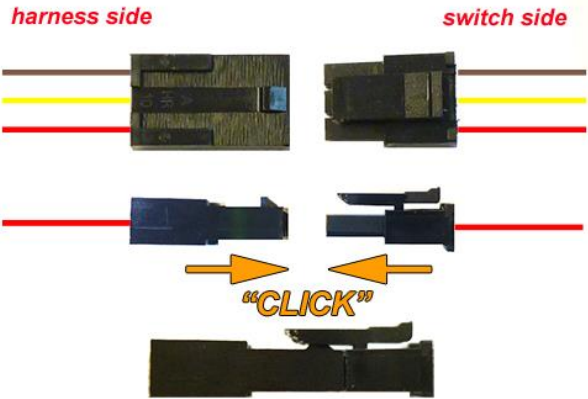
Drill Ø8.3mm



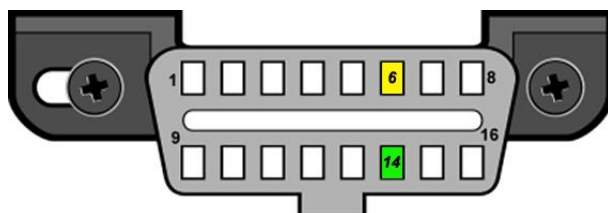
Electrical connections

Check and measure the wiring in case of changes in the cars wiring colours.
Insulate not used wires.

Driver room

| Wire number / code | Wire colour | Connection |
|---|------------------------------------|--|
| 3-pole micro connector 66 Ground fuel switch 3 +12V fuel switch 49 LIN fuel switch | Brown-black Red-white Yellow | Connect the 3-pole connector to the Prins fuel selection switch. |
| | |  |

| | | | |
|----|----------|--------|-----------------------------|
| 51 | CAN-High | Yellow | EOBD connector pin 6, WHITE |
| 70 | CAN-Low | Green | EOBD connector pin 14, RED |

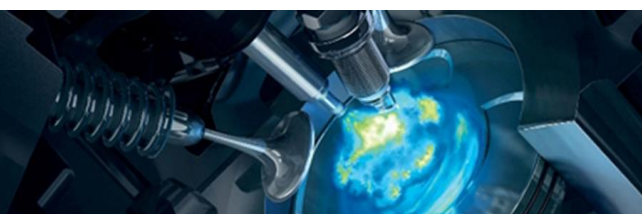


Electrical connections

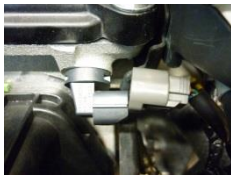


| | | |
|---|-------|---|
| 1-32 MAIN GND ecu MAIN GROUND SENSE | Brown | Connect to the '-' of the battery (-31) ; use a ring terminal Ø6mm. Wire location : left suspension strut, original ground. |
|---|-------|---|

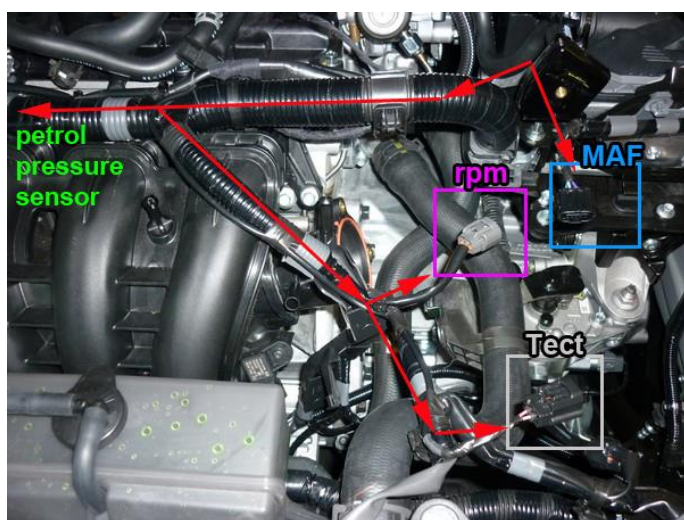


| | | |
|---|-----|---|
| 4 – 13 +12V BATT sense +12V BATT fused +12V BATT boost pump +12V BATT pump driver | Red | Connect to the '+' of the battery (+30) ; use a ring terminal Ø6mm. Do not place the fuse in the holder before having completed the installation of the lpg system. |
|---|-----|---|

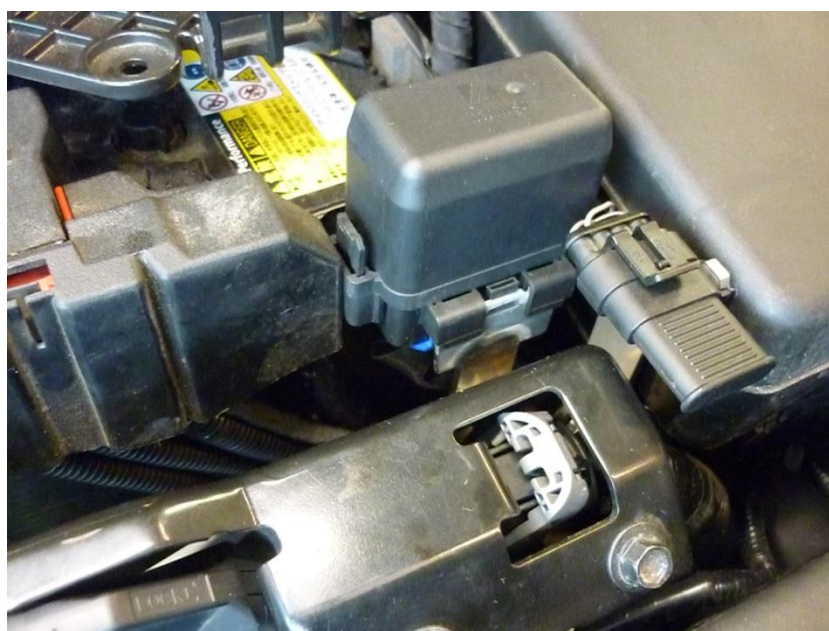
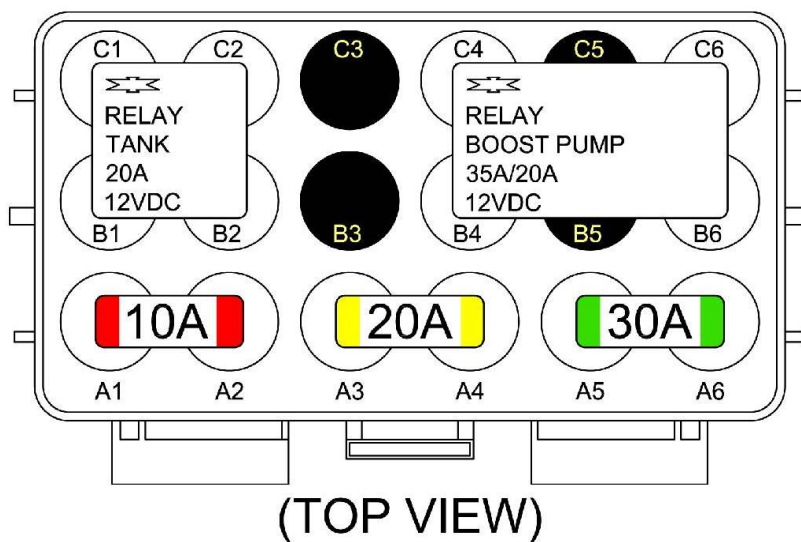


Electrical connections (solder)

| Wire number / code | Wire colour | Connection | |
|--------------------|--------------|--|---|
| 8 RPM engine speed | Purple-white | For measuring the engine speed signal. Wire colour :green Wire location : 3-pole grey connector, pin 1 |  |
| 15 Tect | Purple-white | For measuring the engine coolant temperature. Wire colour : Tan Wire location : 2-pole connector, pin 1 |  |
| | | High pressure petrol sensor signal interruption 3-pole connector high pressure petrol sensor Wire colour : Green, 3-pole connector, pin 2 Wire location : petrol rail | |
| 25 DAC 1 | Green-white | Petrol ecu side, | |
| 36 AD 6 | Blue-brown | Sensor side, | |
| 63 Ground Shift | Blue-orange | High pressure petrol sensor ground shift 3-pole connector high pressure petrol sensor Wire colour : Tan, 3-pole connector, pin 1 Wire location : petrol rail | |
| 7 +12V IGNITION | Grey-white | WAKE-UP, 3-pole connector high pressure petrol sensor Wire colour : Pink, 3-pole connector, pin 3 Wire location : petrol rail | |
| 21 AD9 | Blue-brown | For measuring the Air Flow signal MAF . Wire colour : Black or brown Wire location : 5-pole connector, pos 3. |  |



Fuse Box

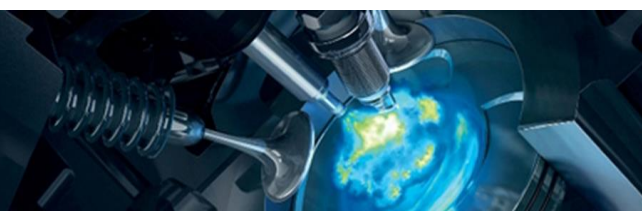
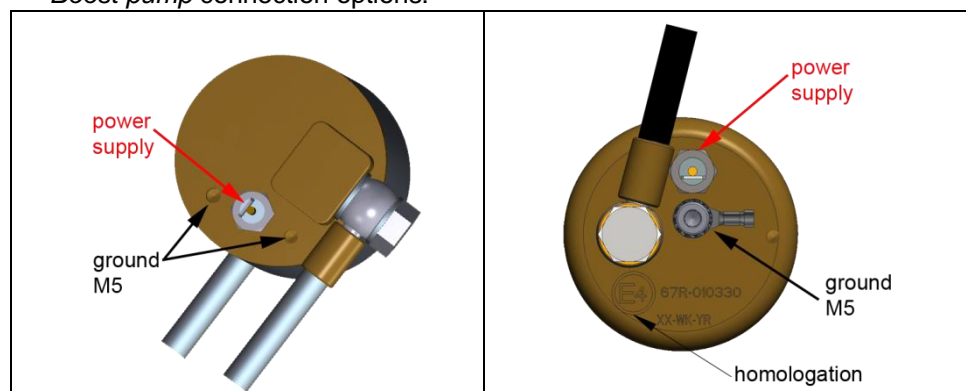


Electrical connections

Engine room

| Wire number / code | Wire colour | Connection |
|--------------------------------------|--------------|---|
| 3-pole connector | | |
| 35 Ground Psys pin A | Brown | Connect the 3-pole connector to the Psys sensor positioned into the Fuel Return Unit. |
| 9 +5V sensor pin B | Red-blue | Sensor wire pin A |
| 16 Psys pin C | Green | Sensor wire pin B |
| | | Sensor wire pin C |
| 2-pole connector FSU, black | | |
| 24 + Lock-off FSU | Yellow-green | Connect the 2-pole connector to the lock-off valve of the Fuel Supply Unit |
| 31 C Ground | Brown-black | |
| 2-pole connector FRU, grey | | |
| 43 + Lock-off FRU | Red-white | Connect the 2-pole connector to the lock-off valve of the Fuel Return Unit |
| 34 C Ground | Brown-black | |
| 4-pole diagnose connector | | |
| 46 Service TxD | Grey | Diagnose connector for service / diagnosis |
| 65 Service RxD | Grey | Connector pin 1 |
| 68 C Ground | Brown-black | Connector pin 2 |
| | | Connector pin 4 |
| Boost pump relay | | |
| 2 + relay boost pump | Red-white | Pin 86 of the boost pump relay C4 |
| 26 Ground BP relay | Purple-blue | Pin 85 of the boost pump relay B6 |
| +12V fused BATT | Red 2.5mm2 | Pin 30 of the boost pump relay C6-A5 |
| +12V Boost pump | Red 2.5mm2 | Pin 87 of the boost pump relay B4 |
| Wiring tank pump driver relay | | |
| 57 + driver relay | Red-white | Pin 86 of the driver relay C1 |
| 73 LSS 4 tank relay | Purple-blue | Pin 85 of the driver relay B2 |
| +12V BATT fused | Red 2.5mm2 | Pin 30 of the driver relay C2-A4 |
| +12V driver | Red 2.5mm2 | Pin 87 of the driver relay B1 |

Boost pump connection options:

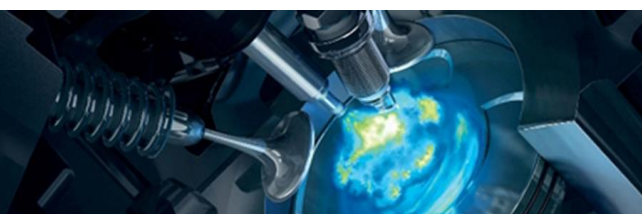
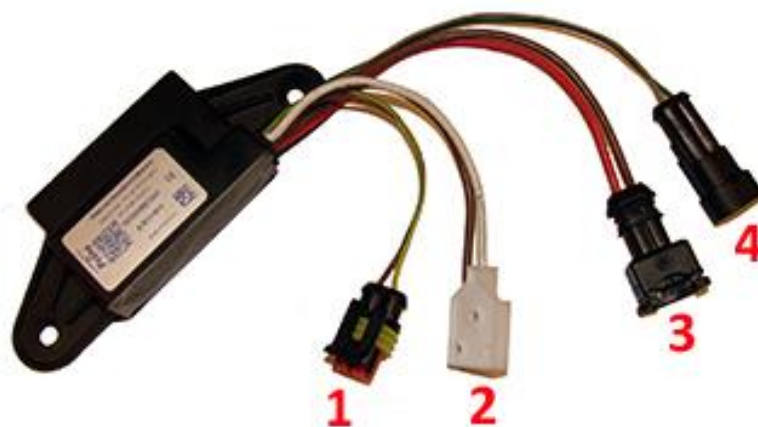


Electrical connections

Check and measure the wiring in case of changes in the cars wiring colours.
Insulate not used wires.

Lpg tank housing

| Wire number / code | Wire colour | Connection |
|---|--|--|
| 3-pole tank level connector 33 Ground tank gauge 12 Tank level in 11 + tank level supply | Brown-black Blue Red-blue | Connect the 3-pole connector to the tank level sensor. |
| 2-pole driver connector 71 LSS 3 PWM driver 64 AD 5 driver diagnose | Purple-pink Blue-grey | Connect the 2-pole connector to the pump driver (4). |
| 1. 2-pole connector tank lock-off | Green-yellow Brown | From tank pump driver From tank pump driver |
| 2. 3-pole connector tank pump | Red 2.5mm ² Brown 2.5mm ² | From tank pump driver From tank pump driver |
| 3. 2-pole connector power driver | Red 2.5mm ² Brown 2.5mm ² | From tank pump relay 87 From main ground |
| 4. 2-pole connector driver | Green Grey | From AFC pin 71 pwm From AFC pin 64 diagnose |



Checklist after installation

1. Install the system fuses.
Turn on ignition.
Connect the Prins interface wire and run the Prins diagnosis program.
When working on the car, beware of moving and rotating parts in the engine compartment (even when the engine is not running !!).
2. When commissioning the LPG system, you must activate the AFC with the diagnosis software.
3. Check whether the program in the AFC matches with the car (dedicated engine set):
See "Identification" in the diagnosis program.
4. Check all components and connections for any LPG leakage, use a LPG leak detector device or a fluid detection like soap. Also check for petrol leakage. Make sure the solenoid valves are in open position.
No evidence of leakage is permitted.
Caution for moving and rotating parts in the engine compartment !
5. Use the diagnosis software to check again all input and output signals.
6. Check the system for error codes and solve these, if required.
Check the petrol MMS for EOBD error codes.
Place the protection connector back on the diagnose connector.
7. Make a test drive and check the cars drivability on LPG and petrol.

