ALTERNATIVE FUEL SYSTEMS

Prins

Quality, innovation and customer care, it's in our nature

Installation manual Dedicated PART 2/2

DIRECT LIQUI max-2.0 HIGH PRESSURE LIQUID LPG INJECTION

MANUFACTURER	Volkswagen
TYPE	Polo
ENGINE DISPLACEMENT	1200
NUMBER OF VALVES	16
ENGINE CODE / NUMBER	CBZB
VEHICLE CATEGORIES	M
TRANSMISSION	AT / DSG
VERSION	Direct LiquiMax-2.1
PETROL ECU MANUFACTURER / CODE	Continental Simos 10.22a
HIGH PRESSURE PETROL POMP	Hitachi type 2
HIGH PRESSURE PETROL INJECTOR	-
MODEL YEAR:	2012
SYSTEM APPROVAL NUMBER (R115)	E4-115R-000010 / DLM-LPG 03
LOCATION R115 SYSTEM STICKER	right side, centre door post
ENGINE SET NUMBER	366/070028/A
MANUAL NUMBER	076/2613600
DATE	2013-10-31

Version 2013-09-28 D

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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 / servicing** 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 the 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 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 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)

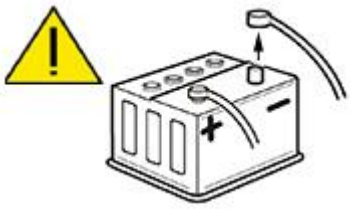
Tightening moments

		Nm	Spanner mm
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
Hitachi cover		220	46

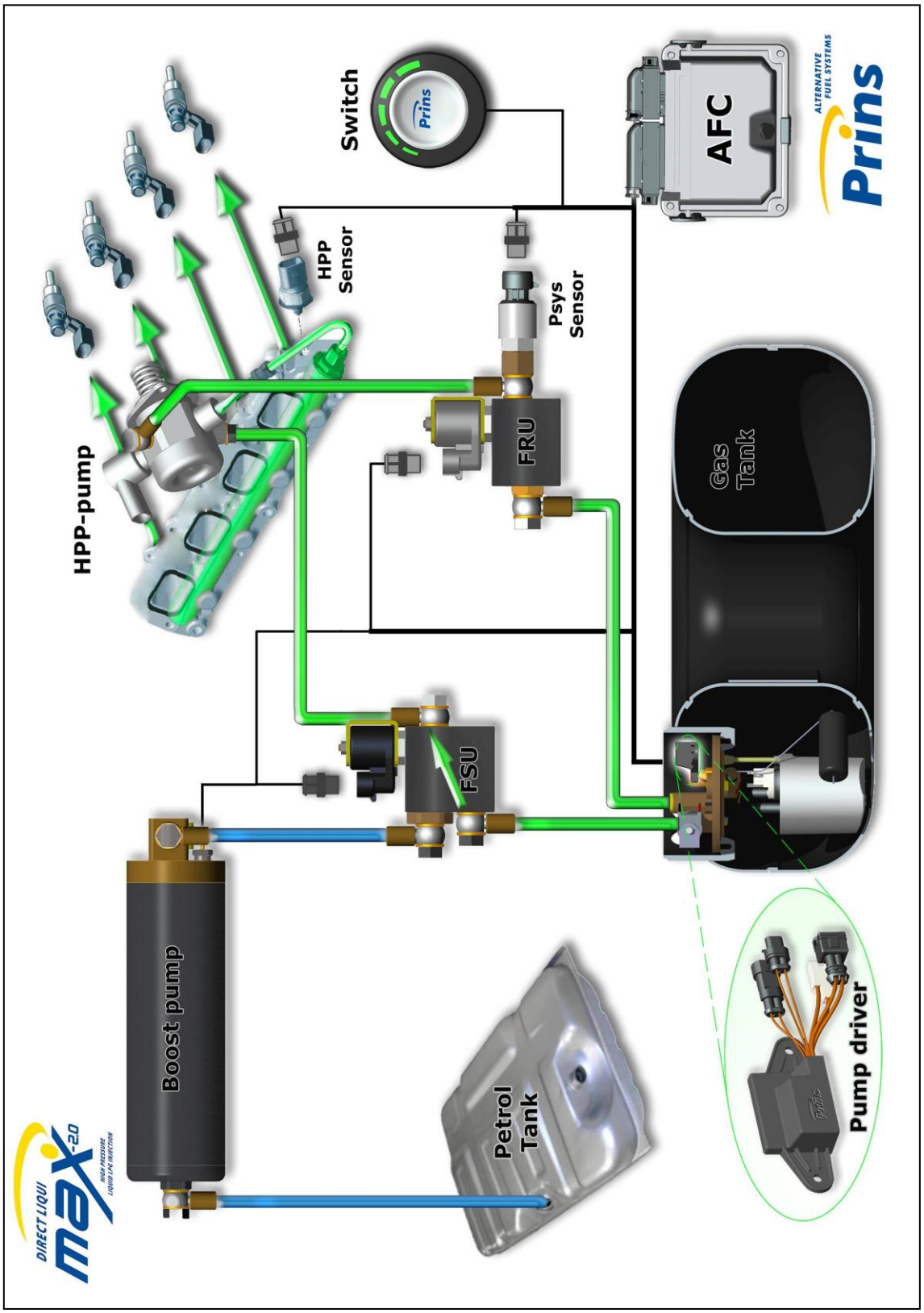
EXPLANATION OF SYMBOLS :

= IMPORTANT, CAUTION

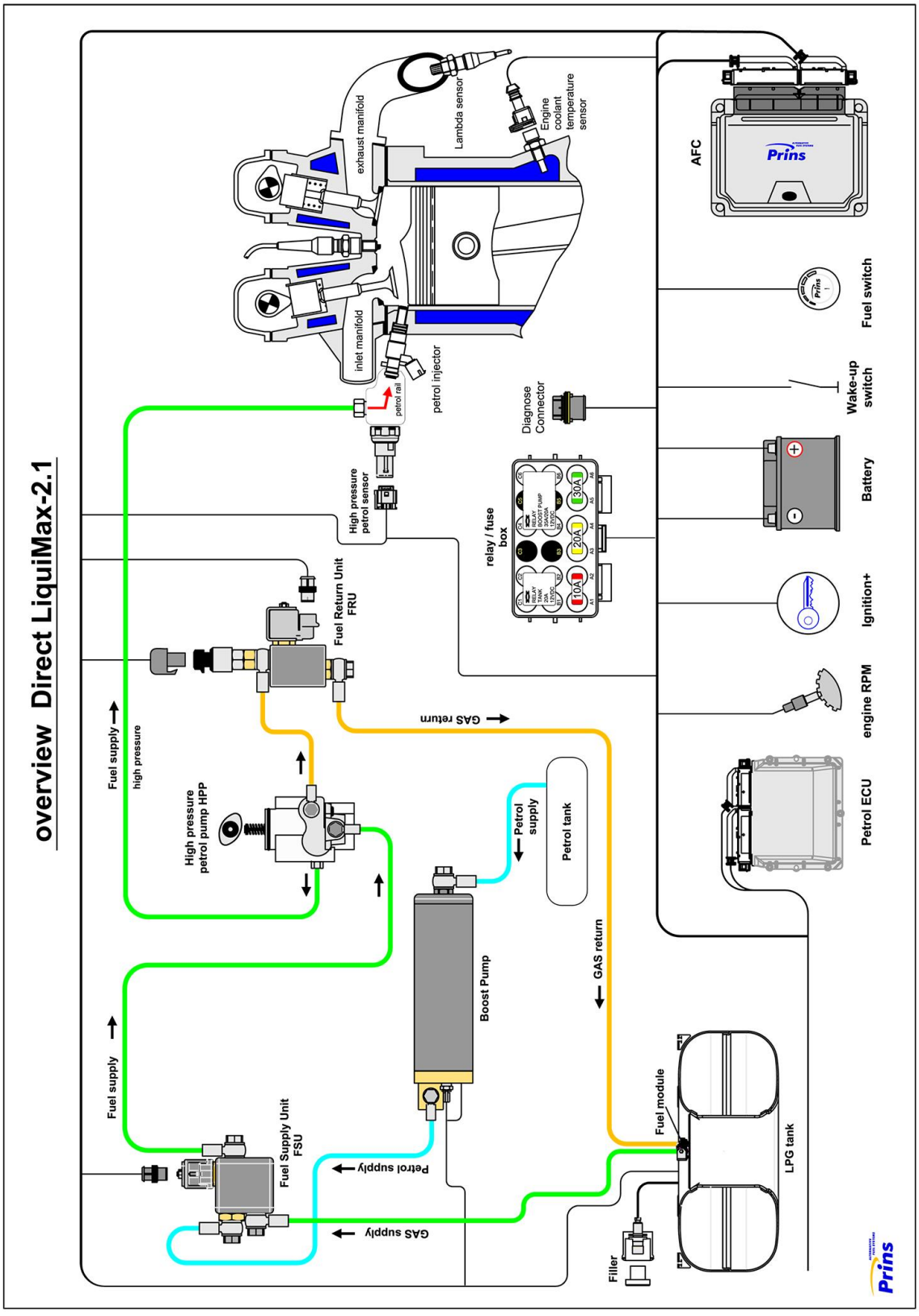
= WEAR SAFETY GOGGLES



Direct LiquiMax-2.1



Direct LiquiMax-2.1diagram



Direct LiquiMax parts / approval numbers

1st generation

2nd generation

Fuel Supply Unit : E4-67R-010269

1st generation

2nd generation

Fuel Return Unit : E4-67R-010270
Pressure Sensor : E4-67R-010051

Boost pump

High Pressure Pump : E4-67R-010266
High Pressure Rail : E4-67R-010267
High Pressure Injectors : E4-67R-010309

Prins AFC: E4-67R-010098
E4-10R-030507

Fuel lines series XD : E4-67R-010247 XD3
E4-67R-010247 XD4

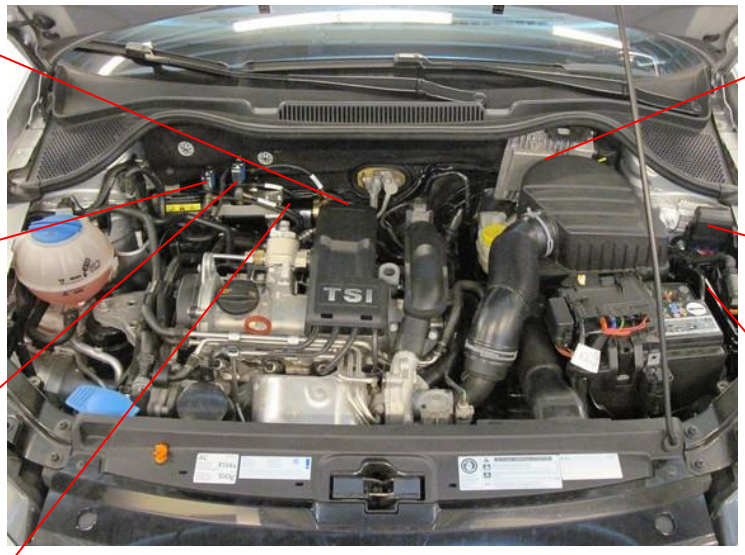
DLM-2.1 component location overview

HPP pump

FRU

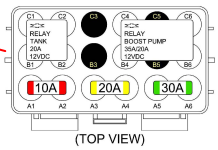
FSU

Boost pump



Petrol ECU

Fuse / relay box

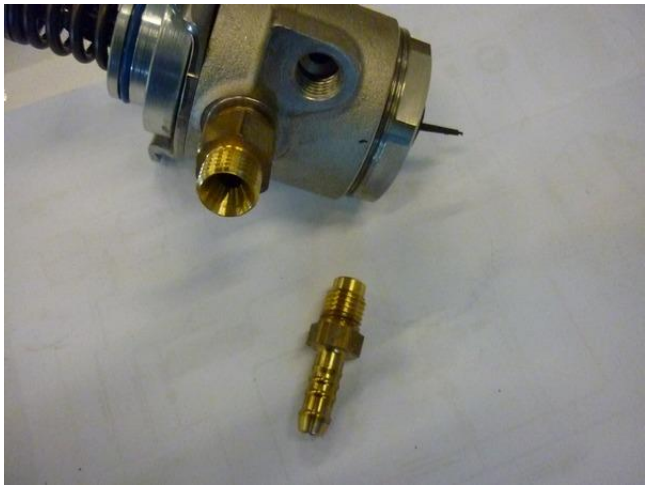


AFC

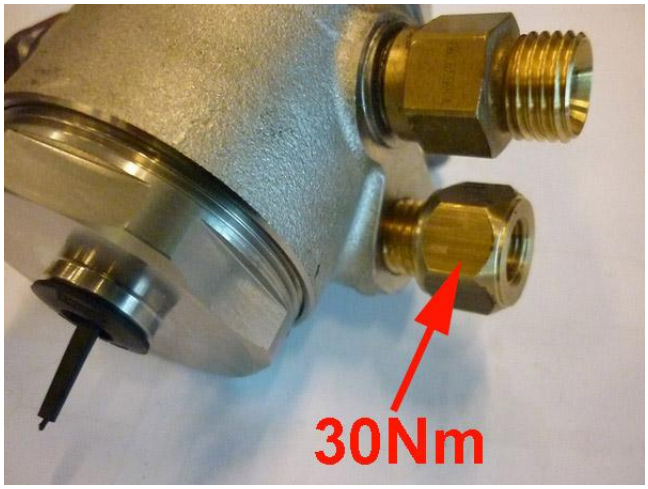
R115 approval sticker :
Right side centre door post

High pressure pump Supply

Remove the High petrol pressure pump. Careful : petrol !
(Follow the workshop manual of the car) also see next page.



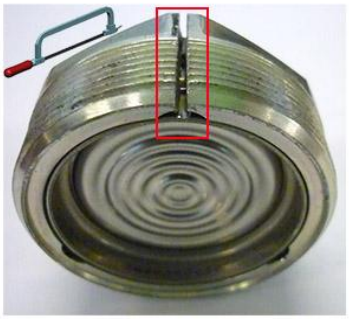
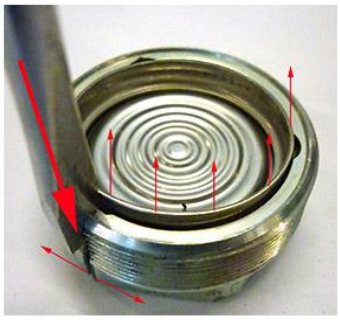
Remove petrol inlet.



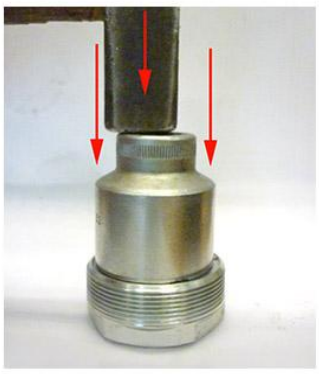
Mount supply inlet.

High pressure pump Return

Replace the high pressure pump cover (46mm) for the adapted high pressure pump. Careful : petrol !
Carefully cut the cover, remove shockers and install them into the new cover, 220Nm.

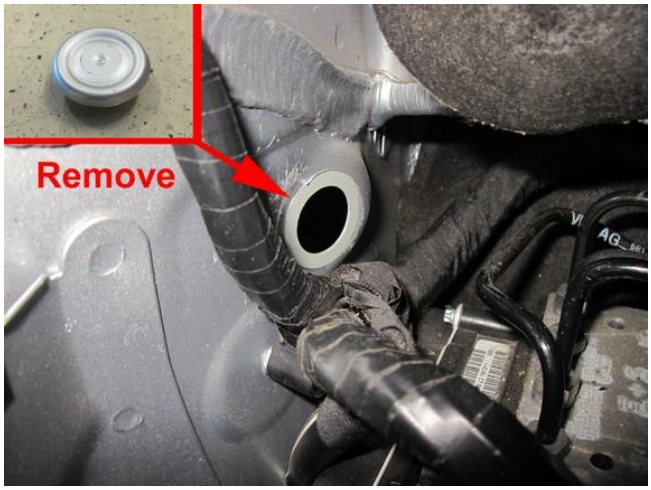



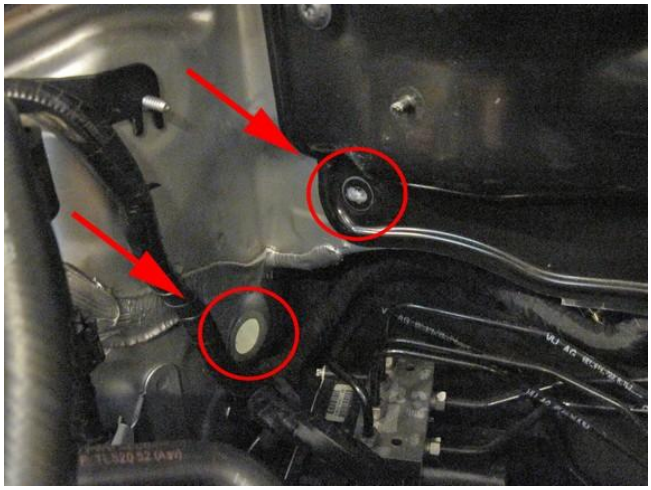




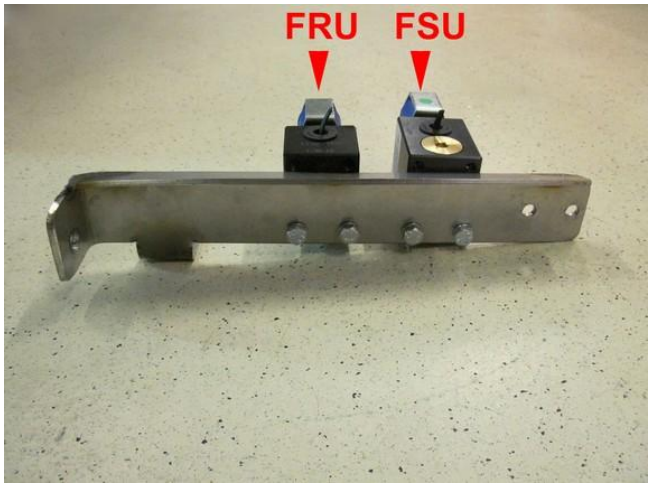
Tighten cover with 220 Nm, do not forget the sealing ring between pump and pump cover.

Mounting the Fuel Units

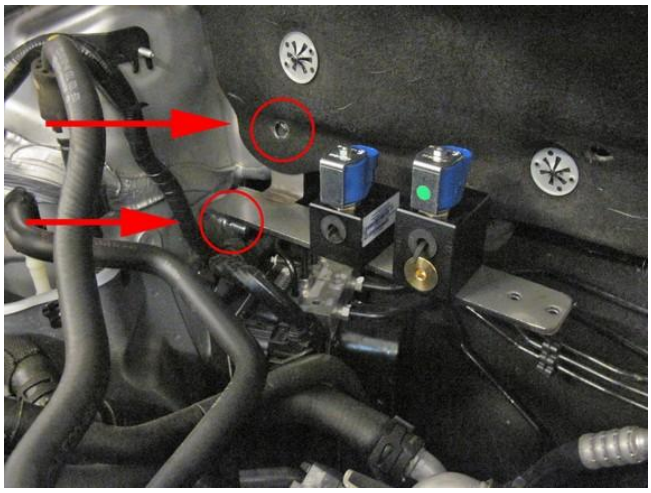




Mounting points

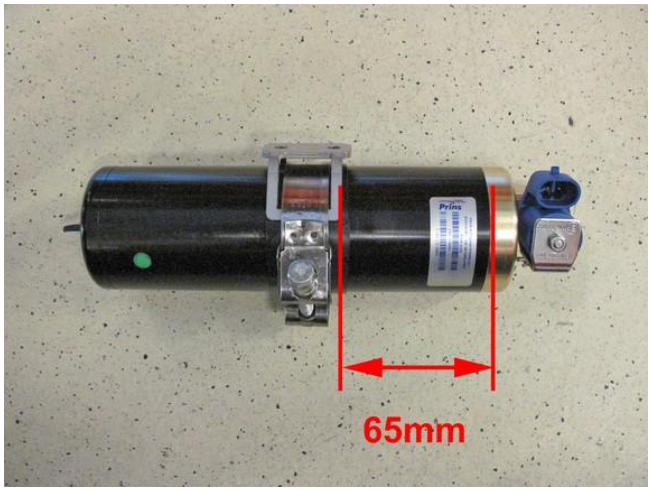


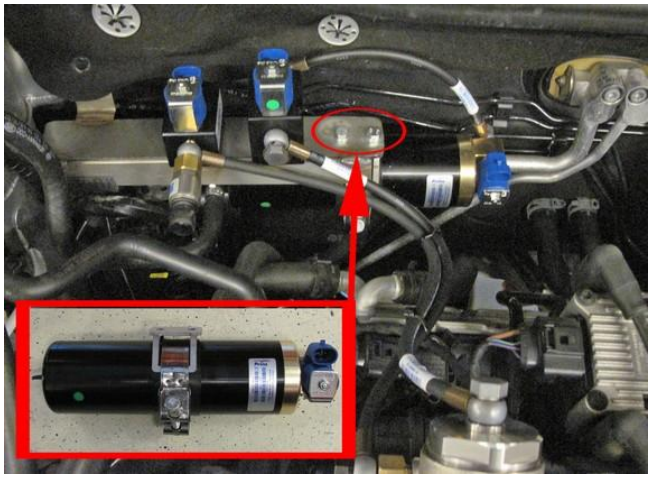
Mount FSU & FRU on bracket.



Mount bracket with FSU & FRU to vehicle.

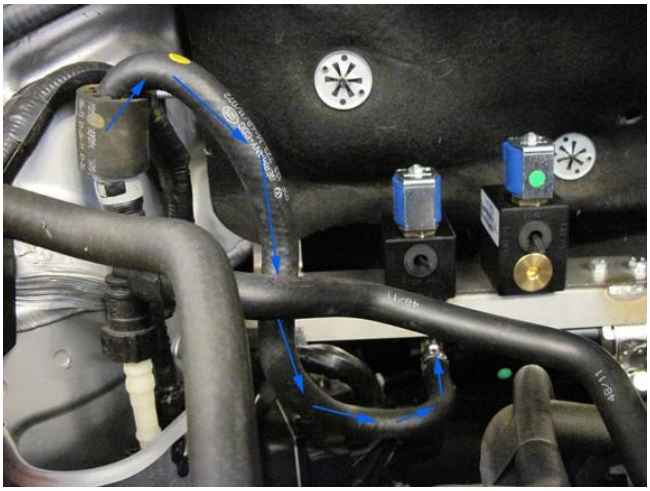
Boost pump / Fuel hose connection boost pump



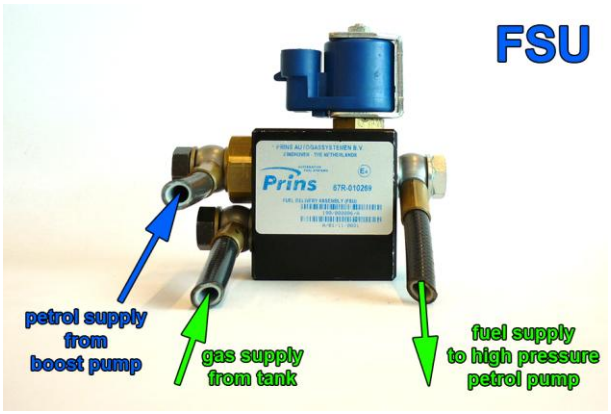


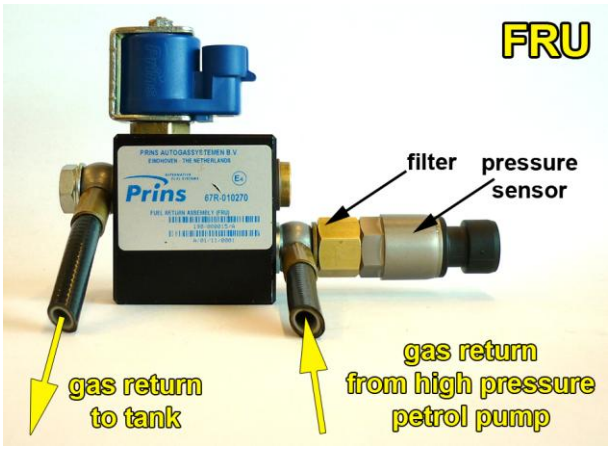
Mount boost pump to bracket with rubber sleeve and clamp. Mount bracket to bracket from FSU & FRU.

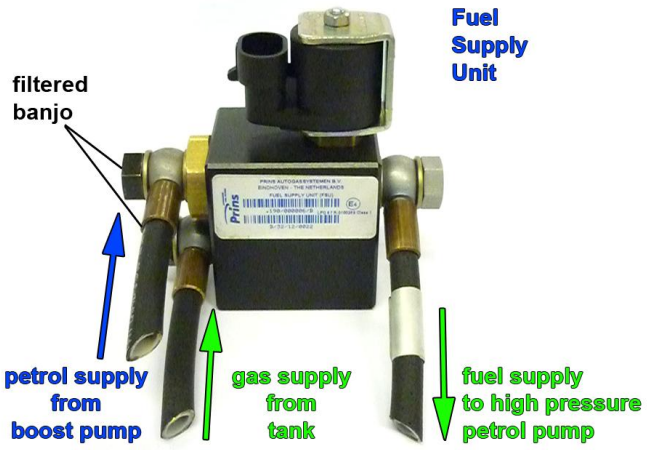
Connect the fuel hose with the XD-5 banjo eye to the inlet of the boost pump.

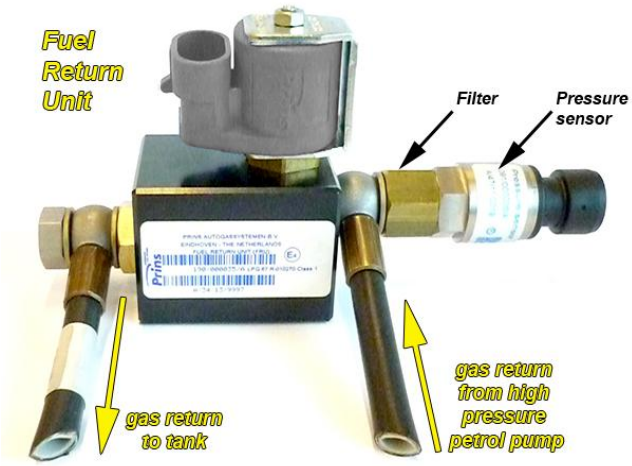


Fuel Supply Unit / Fuel Return Unit





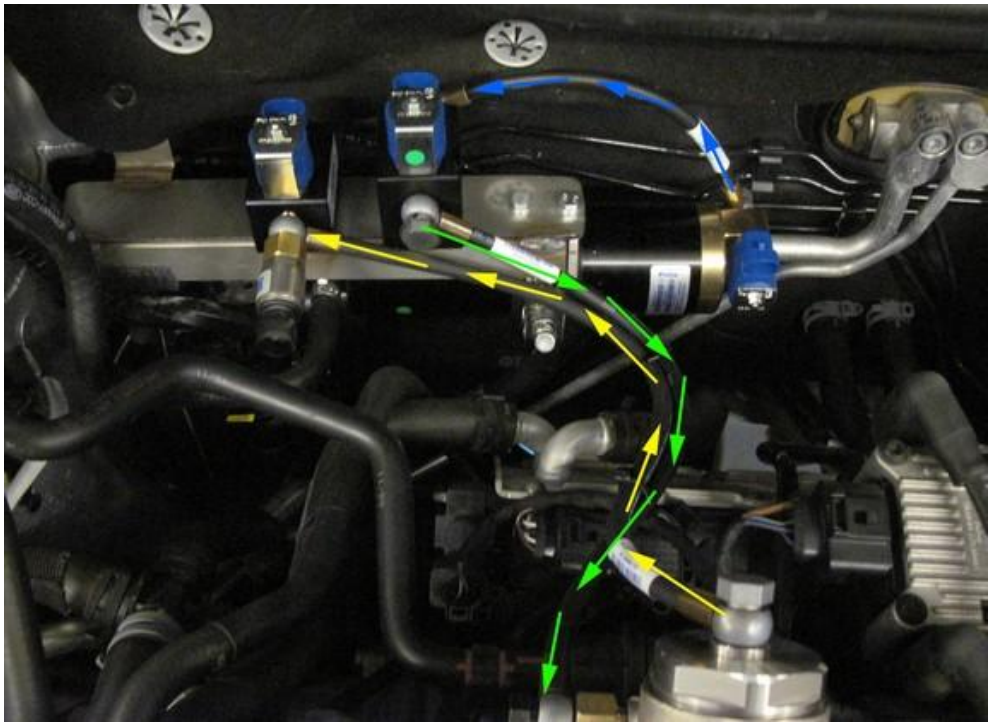


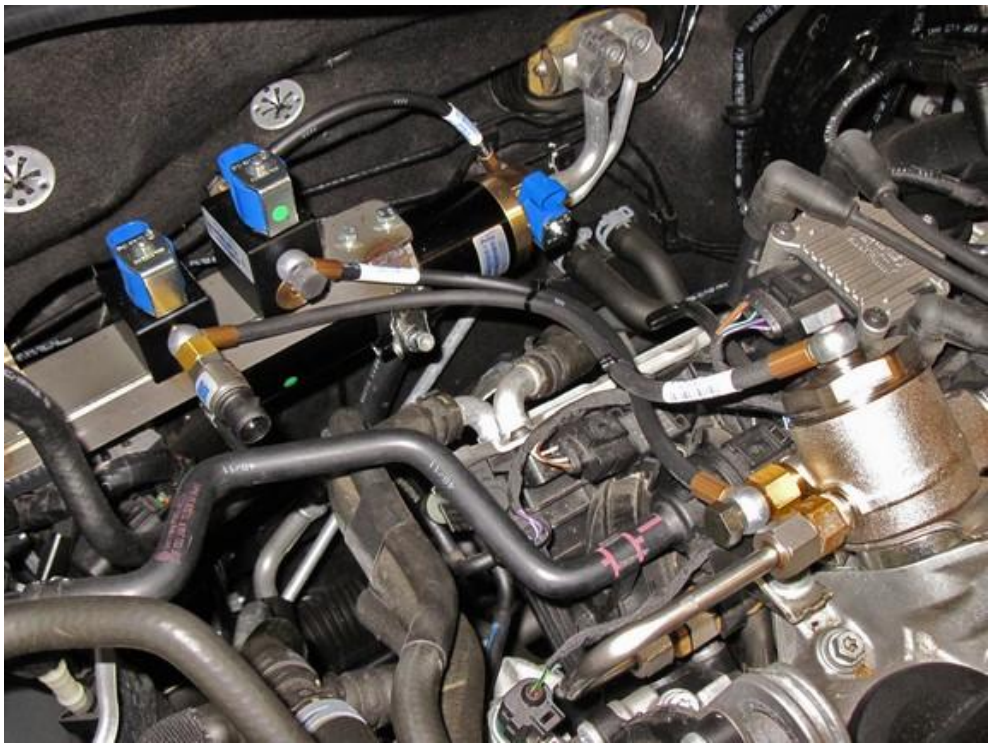


Black filtered banjo will only be used on inlet connections !

Filter inside sensor banjo

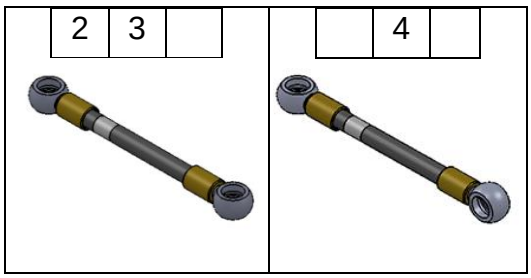
Fuel units hose routing





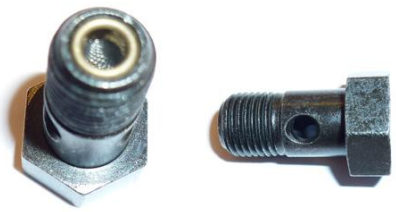
LPG / petrol fuel lines

Hose	from	to	Length (cm)
1 XD-5 eye	Adapter original petrol hose	Petrol boost pump	-
2 XD-3	Petrol boost pump	Fuel supply unit	20
3 XD-3	Fuel supply unit	High pressure petrol pump	35
4 XD-3	High pressure petrol pump	Fuel return unit	40



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

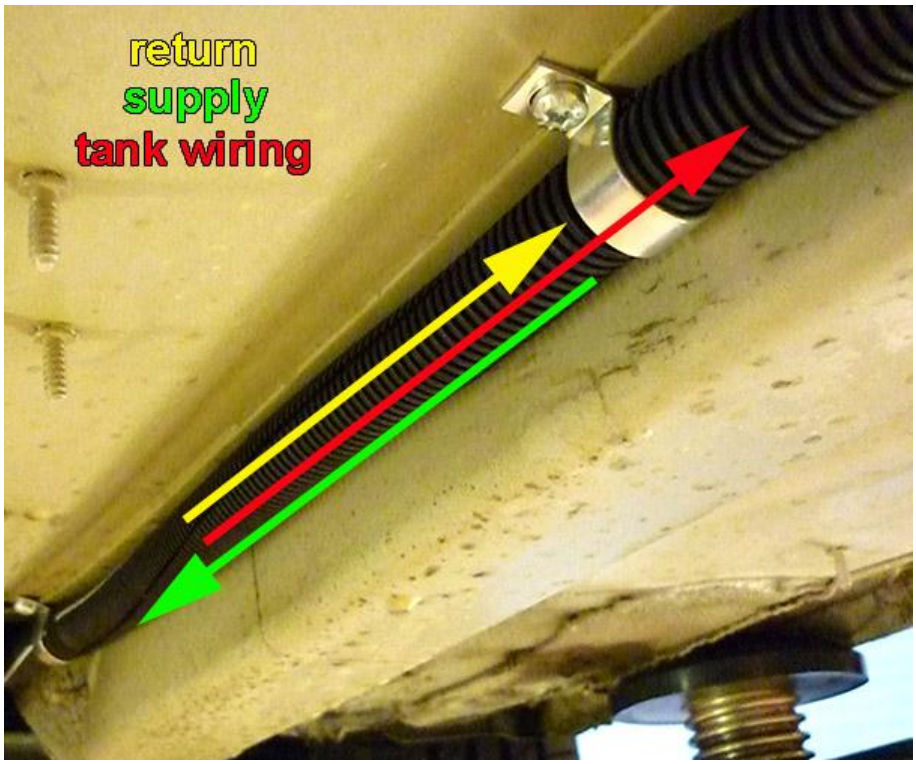
<u>Filtered banjo:</u> (FSU supply inlets / boost pump inlet / HPP inlet : black filtered banjo) :

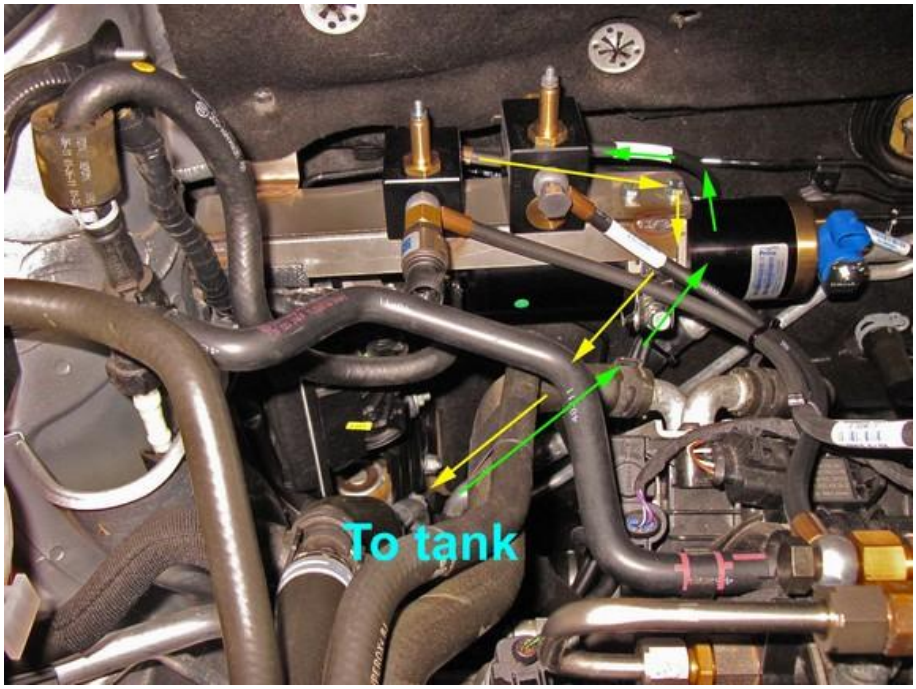


181/300009/A

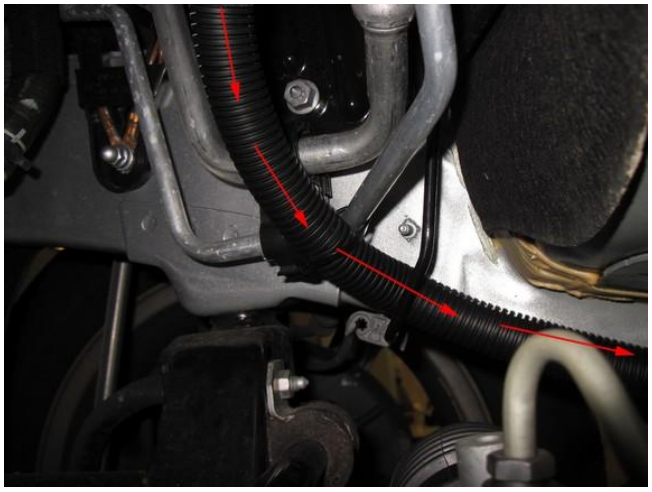
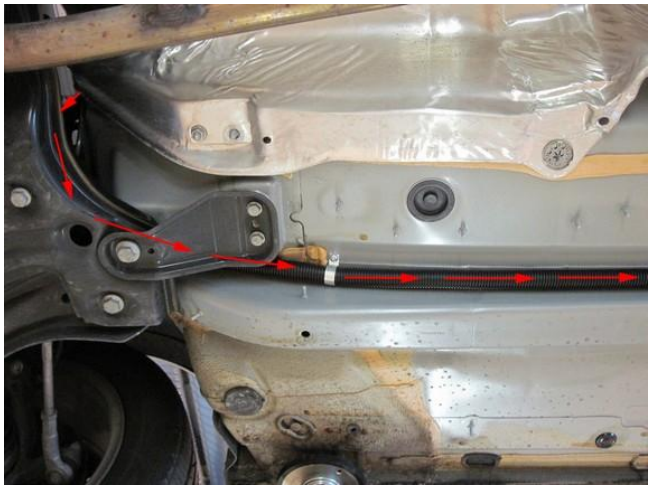
Supply hose – Return hose – Tank wiring 1

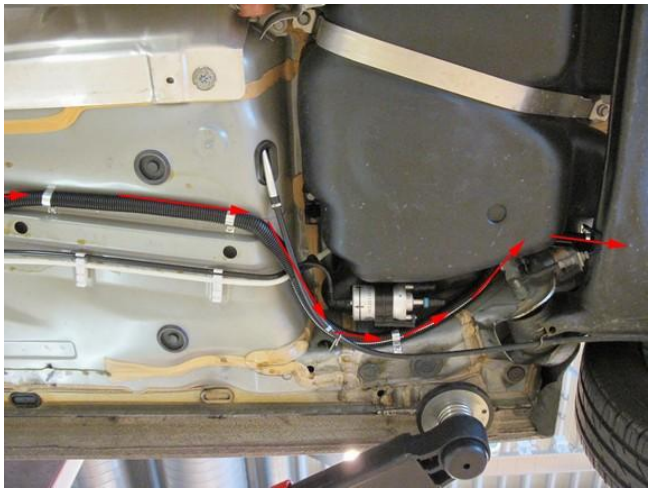
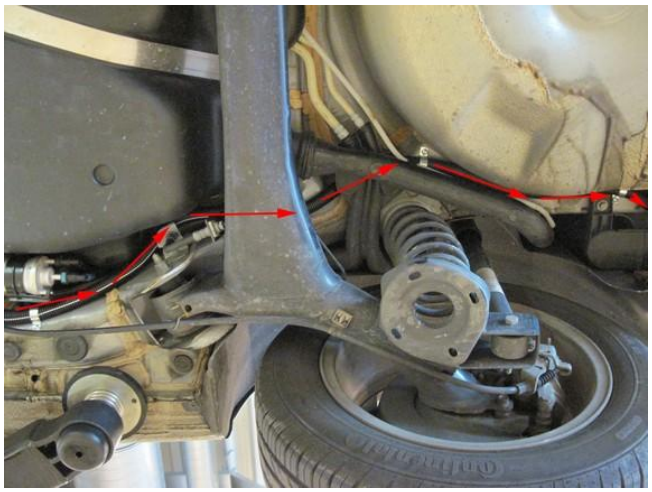
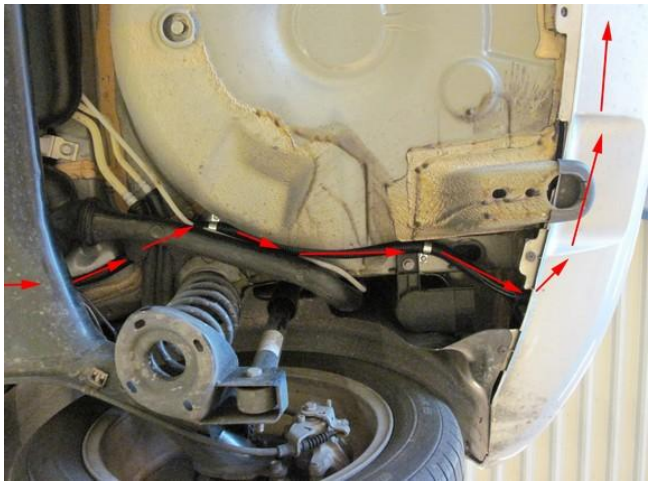
Protect the supply- and return hose together with tank-wiring using the Ø16 split tube.
Mount the “hose assembly “ with clamps, with a maximum distance of 40cm.



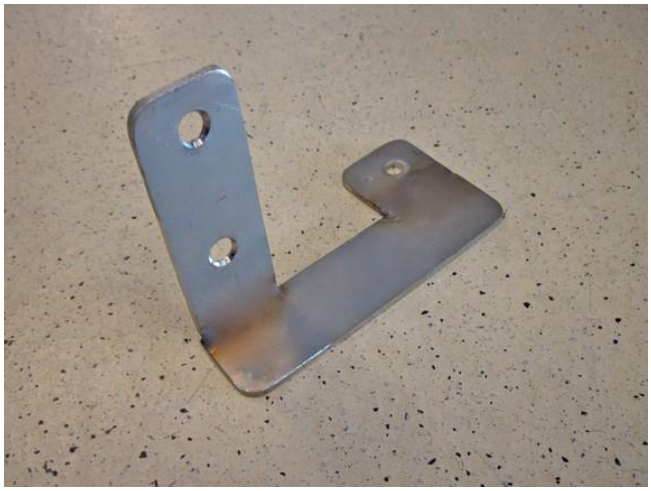


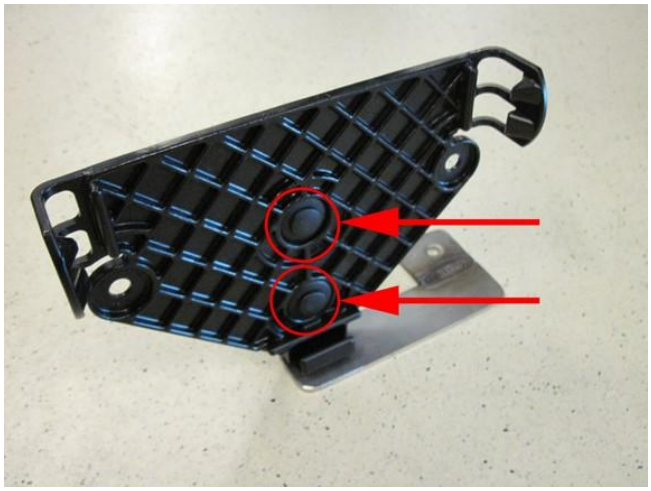
Supply hose – Return hose – Tank wiring 2

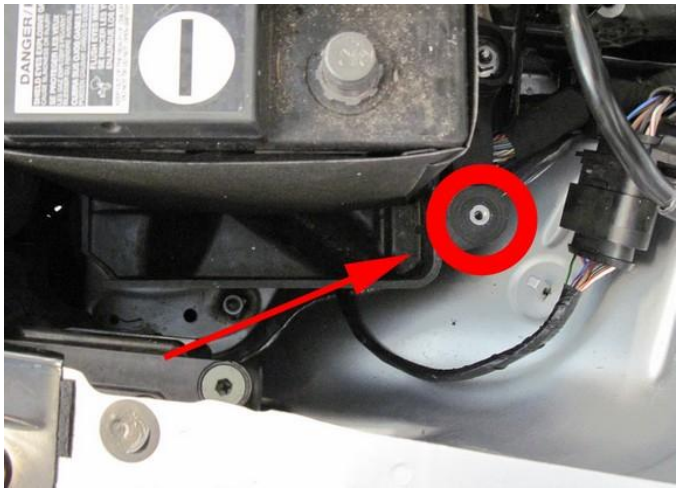




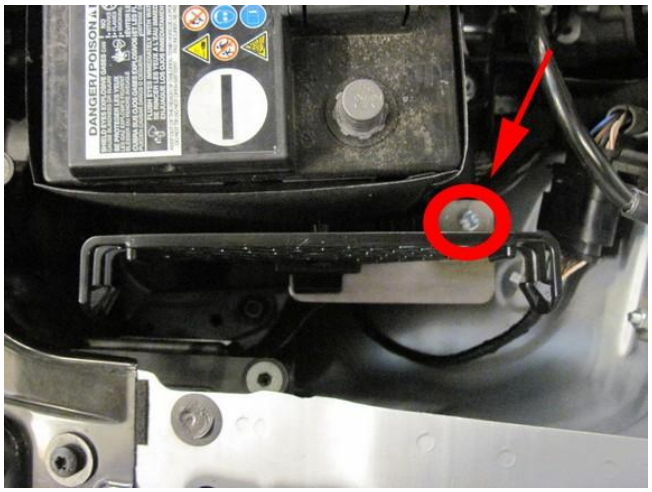
Mounting the AFC



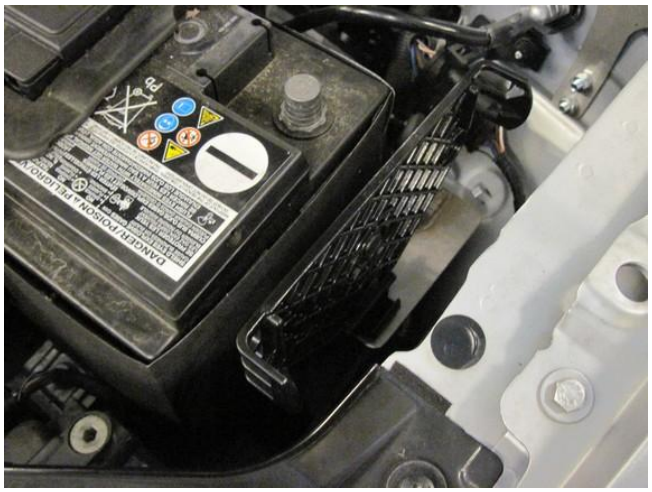


Mount plastic AFC clip to bracket with quick clips.

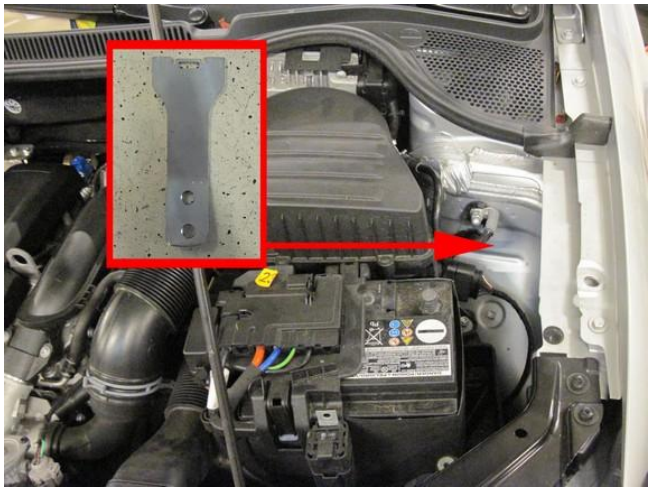


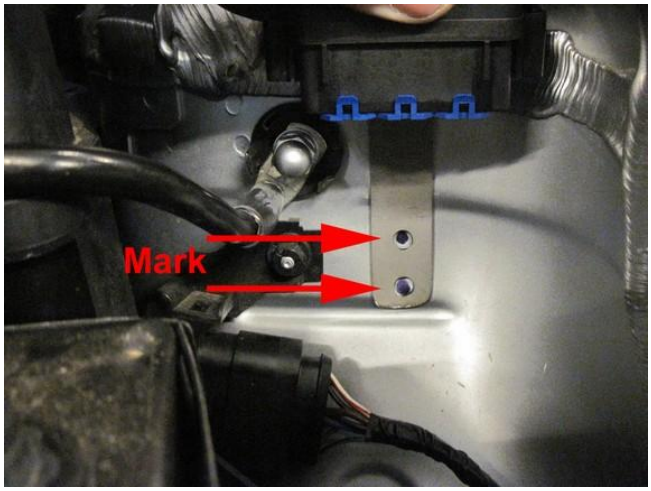


Mount bracket to original bolt from air filter housing.

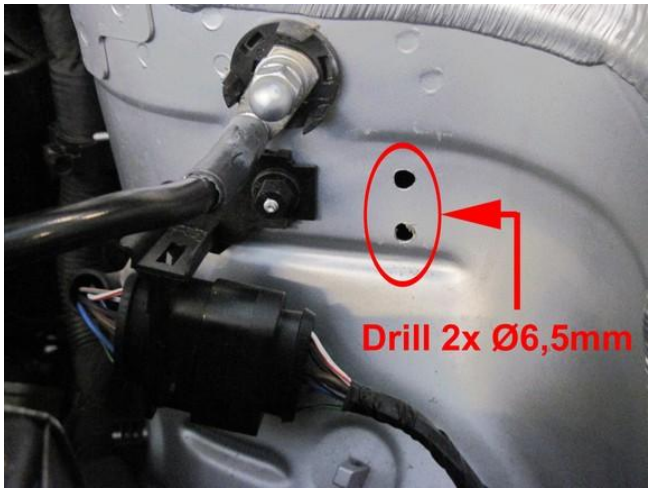


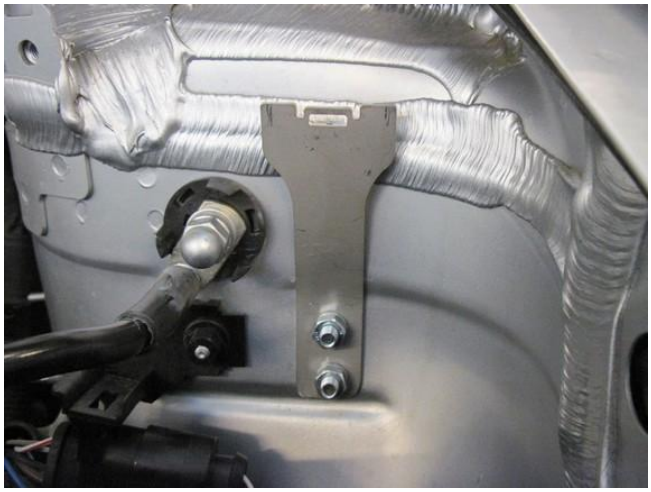
Mounting the fuse / relay box





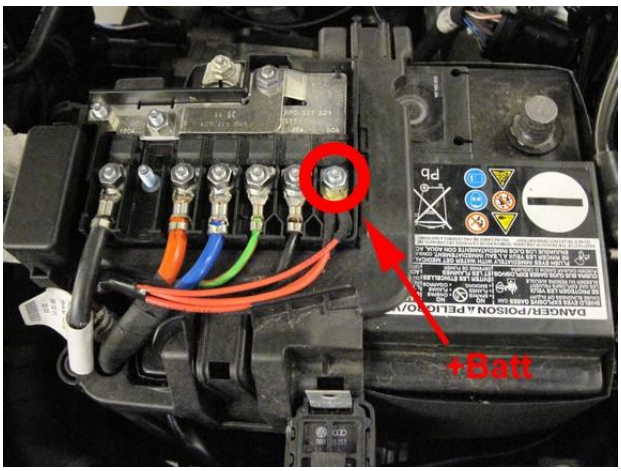
Mark holes for drilling.

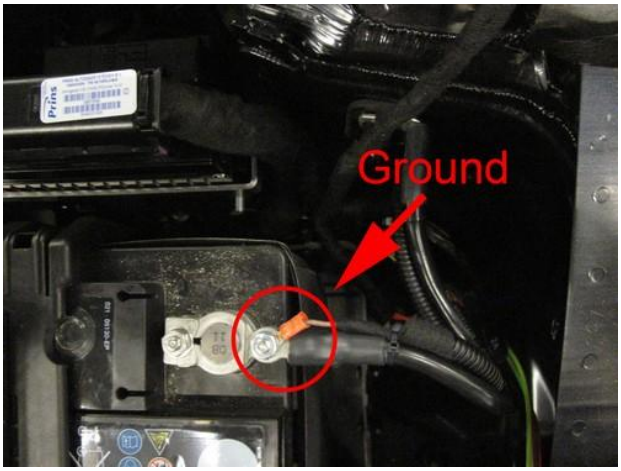




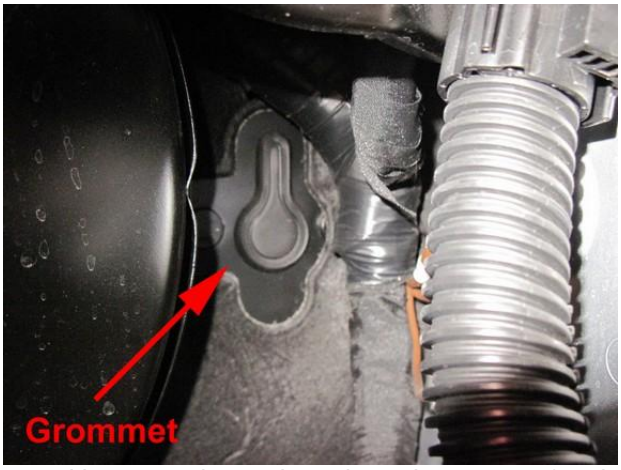
Drill holes Ø6,5mm and treat anti-rust. Mount bracket.

Wiring AFC / +Battery / ground





Wiring grommet

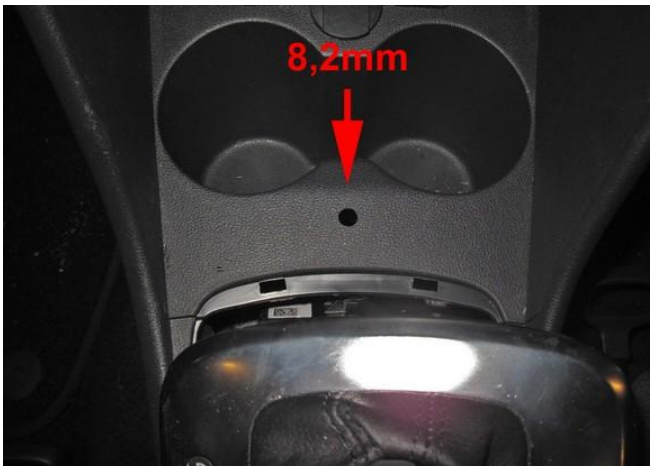


Option 1: Car with automatic gearbox, through grommet for clutch pedal.

Option 2: Switch wiring next to bonnet release cable (secure wiring with straps to the cable)

Mounting the fuel selection switch

Mount the switch.

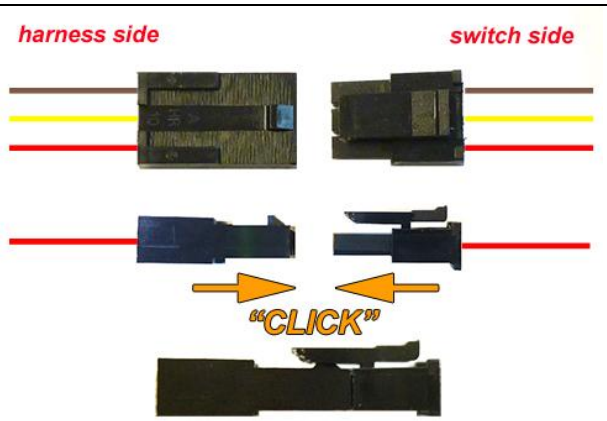


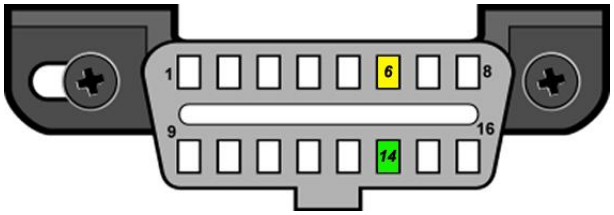
Drill hole Ø8,2mm and mount switch

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
70	CAN-Low	Green	EOBD connector pin 14
			

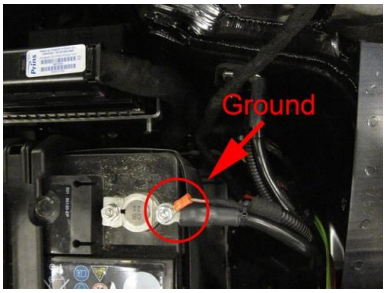
Electrical connections

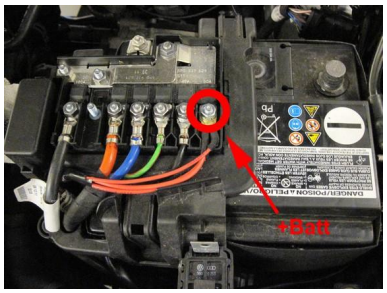
Insulate not used wires.

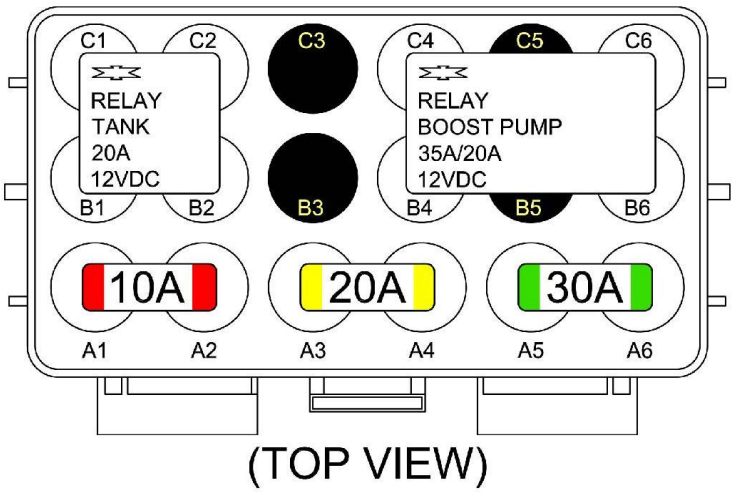
Wire number / code	Wire colour	Connection
22 LSS 1	Purple-white	Insulate
23 LSS 2	Purple-green	Insulate
42 Digital out pull up 2	Red-purple	insulate
58 +12V switched	Red-white	insulate
56 DI 2	Yellow-green	insulate
60 DI 3	Yellow-grey	insulate
20 AD 3	Blue-pink	insulate
19 AD 4	Blue	insulate
21 AD 9	Blue-purple	insulate
74 DAC 3	Green-pink	insulate
10 DAC 2	Green	insulate

Electrical connections

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

1-32 MAIN GND ecu MAIN GROUND SENSE	Brown	Connect to the '–' of the battery (-31) ; use a ring terminal. 

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. **Do not place the fuses** before having completed the installation of the lpg system. 



(TOP VIEW)

Electrical connections

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

Wire number / code	*Wire colour*	*Connection*
40 Wake-up	Grey-red	*Wake-up* Wire colour : **green-black** Wire location : 14-pole connector behind battery: **Pin 1** 
63 Ground Shift	Blue-orange	*High pressure petrol sensor ground* Wire colour : **white** Wire location : petrol ecu, connector **T60**, pin **13**
61 DI 4	Yellow-blue	*Digital Input 4, 5Volt* Wire colour : **red-blue** Wire location : petrol ecu, connector **T60**, pin **29**
36-25		*High pressure petrol sensor signal interruption* Wire colour : **yellow-blue** Wire location : petrol ecu, connector **T60**, pin **40**
36 AD 6	Blue-brown	Sensor side
25 DAC 1	Green-white	Petrol ecu side
17 AD 2	Blue-green	*Intake air temperature* Wire colour : **white** Wire location : petrol ecu, connector **T60**, pin **42**
8 RPM engine speed	Purple-white	*For measuring the engine speed signal.* Wire colour : **yellow** Wire location : petrol ecu, connector **T60**, pin **53**
18 AD 1	Blue-white	*Analog in (sensor side) MAP sensor in* Wire colour : **white** Wire location : petrol ecu, connector **T60**, pin **55**
15 T-ect	Grey	*For measuring the engine coolant temperature.* Wire colour : **green** Wire location : petrol ecu, connector **T60**, pin **57**
7 +12V IGNITION	Grey - white	*Make a connection to +ignition / contact+ (+15).* **Do not place the fuses** in the holder before having completed the installation of the lpg system. Wire colour : **bruin-blue** Wire location : petrol ecu, connector ***T94***, pin **87**

Electrical connections

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

Engine room

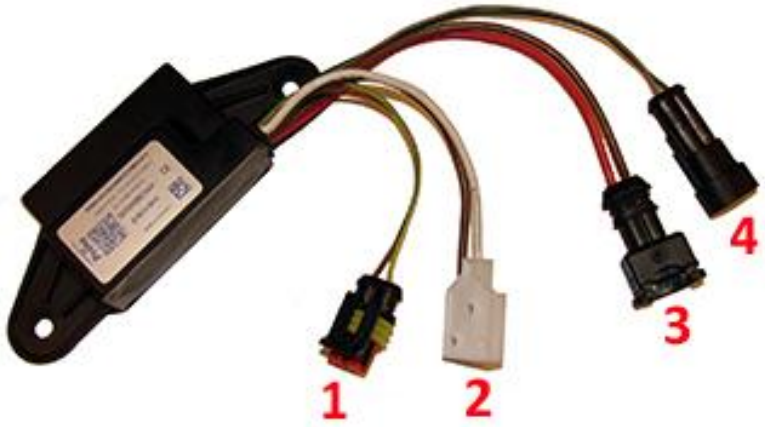
Wire number / code	Wire colour	Connection
3-pole connector		Connect the 3-pole connector to the Psys sensor positioned into the Fuel Return Unit.
35 Ground Psys pin A	Brown	Sensor wire pin A
9 +5V sensor pin B	Red-blue	Sensor wire pin B
16 Psys pin C	Green	Sensor wire pin C
2-pole connector FSU, black		
24 + Lock-off FSU	Yellow-green	Connect the 2-pole connector to the lock-off valve
31 C Ground	Brown-black	of the Fuel Supply Unit
2-pole connector FRU, grey		
43 + Lock-off FRU	Red-white	Connect the 2-pole connector to the lock-off valve
34 C Ground	Brown-black	of the Fuel Return Unit
4-pole diagnose connector		Diagnose connector for service / diagnosis
46 Service TxD	Grey	Connector pin 1
65 Service RxD	Grey	Connector pin 2
68 C Ground	Brown-black	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

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.