Prins

A WESTPORT COMPANY

Installation manual
Dedicated
PART 2/2

DIRECT LIQUI max-2.0 HIGH PRESSURE LIQUID LPG INJECTION

MANUFACTURER	Renault
TYPE	Grand Scenic III
ENGINE DISPLACEMENT	1197cc
NUMBER OF VALVES	16
ENGINE CODE / NUMBER	H5F TCe130 (H5F-B404)
VEHICLE CATEGORIES	M
TRANSMISSION	MT-6
VERSION	AFC-2.1
PETROL ECU MANUFACTURER / CODE	Continental EMS3150
HIGH PRESSURE PETROL POMP	Denso 166304016R
HIGH PRESSURE PETROL INJECTOR	x
MODEL YEAR:	2013
SYSTEM APPROVAL NUMBER (R115)	E4-115R-000012 / DLM-LPG 06
LOCATION R115 SYSTEM STICKER	right side, centre door post
ENGINE SET NUMBER	359/070003/A
MANUAL NUMBER	076/1907500
DATE	2015-06-19

Version 2013-09-28 D

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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
- 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

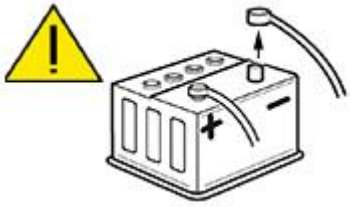
- Check the vehicle drivability on petrol
- Check the fuel system for error codes (scan tool)
- Check if the catalytic converter is in good condition (exhaust gas analyzer)
- Check the condition of the ignition system (spark plugs, cables, coil)

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

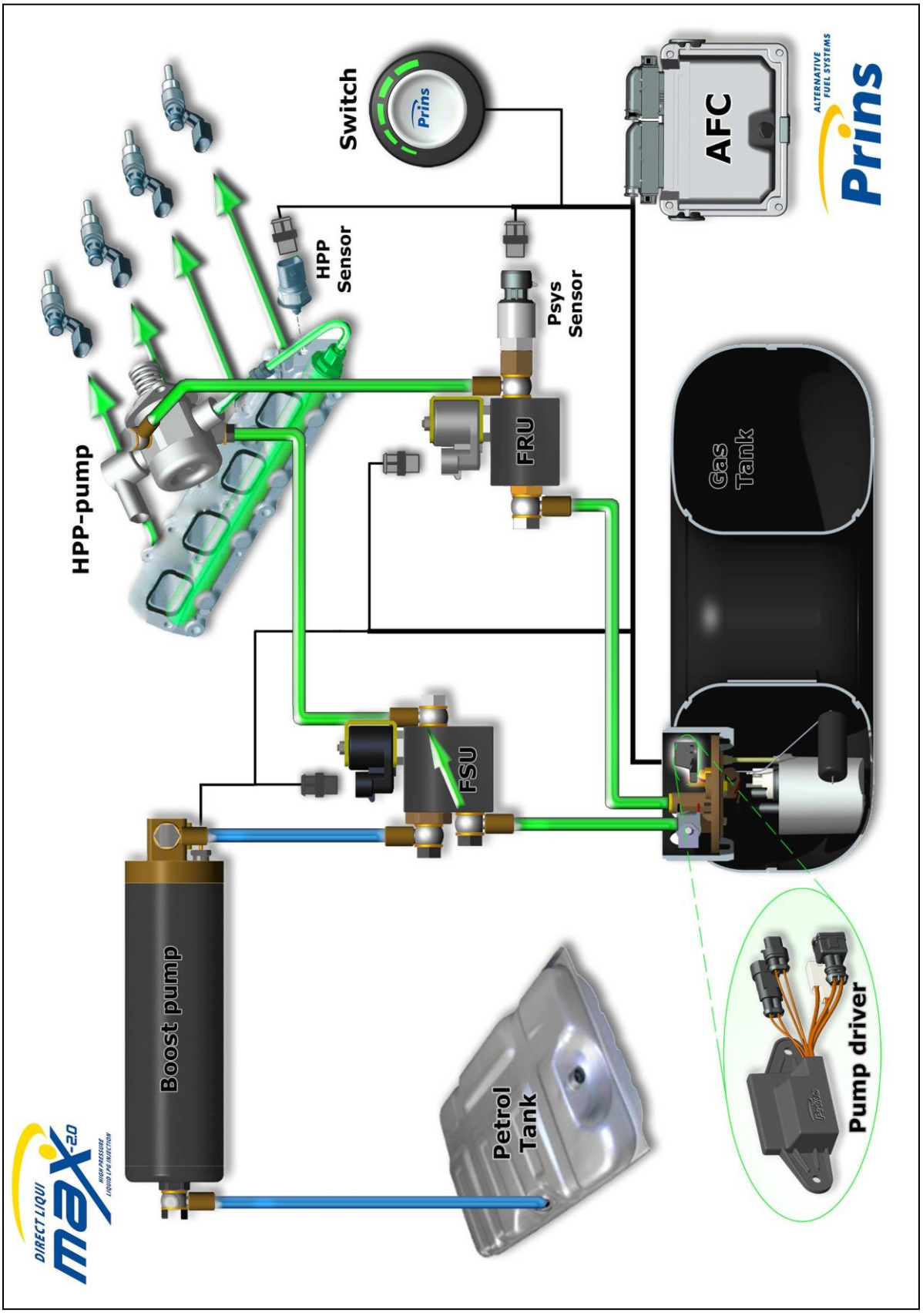
EXPLANATION OF SYMBOLS :

= IMPORTANT, CAUTION

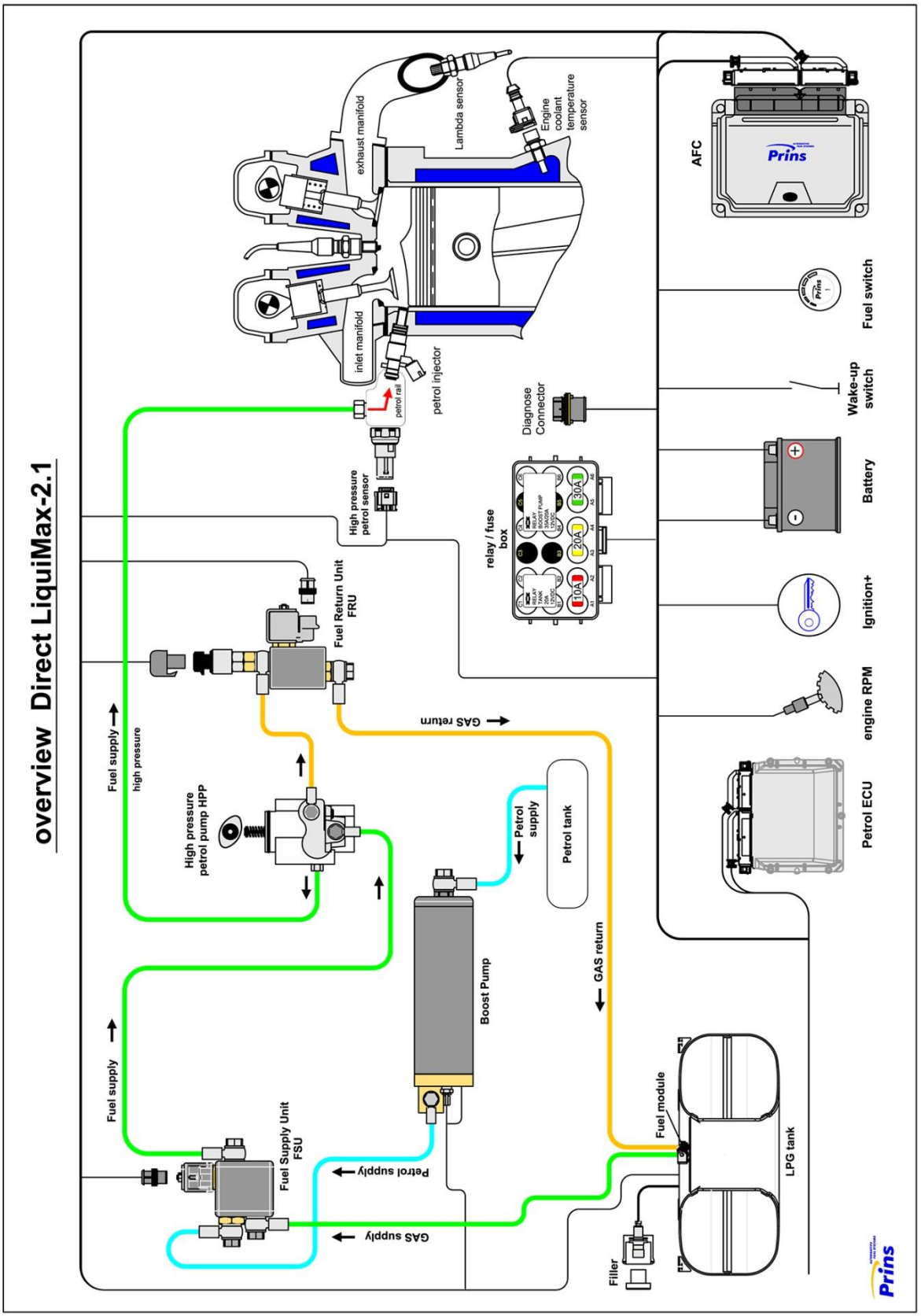


= WEAR SAFETY GOGGLES

Direct LiquiMax-2.0, AFC-2.1



Direct LiquiMax-2.0 diagram, AFC-2.1



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

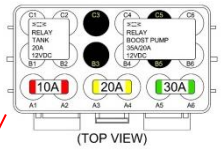
High Pressure Pump : E4-67R-010266
High Pressure Rail : E4-67R-010267
High Pressure Injectors : E4-67R-010309

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

Fuse / relay box



HPP pump

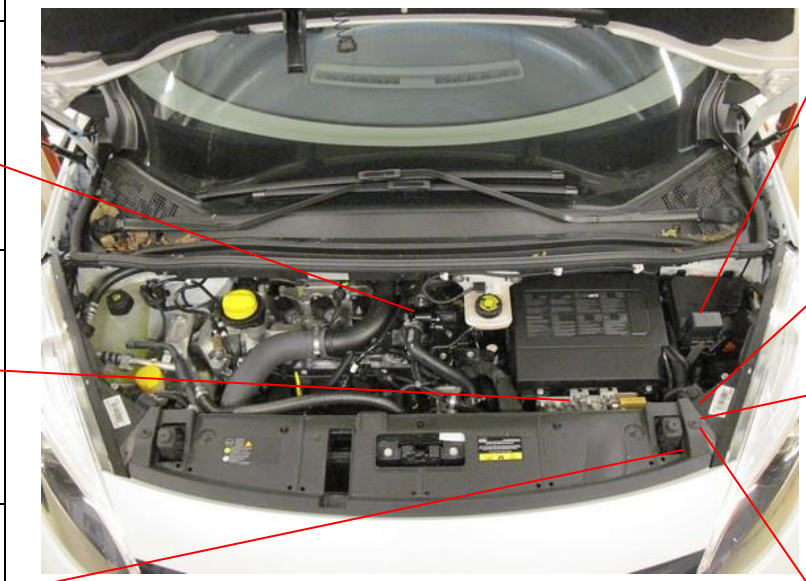
AFC

Petrol ECU

FRU

Boost pump

FSU



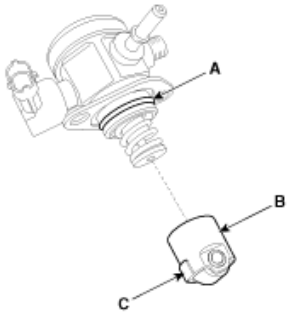
R115 approval sticker :
Right side centre door post

Installation of the Bosch High Pressure Petrol 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.

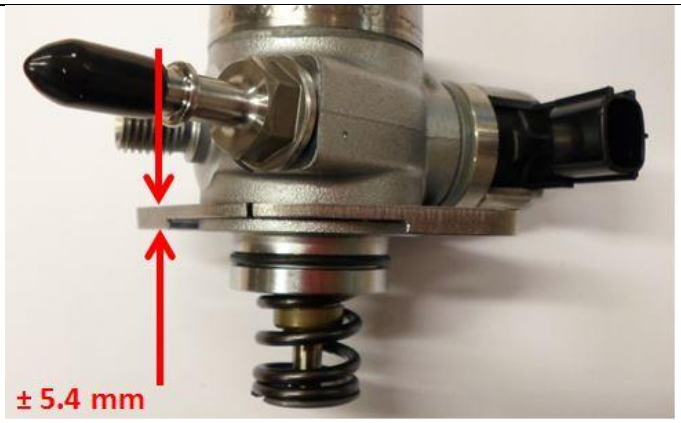
Apply engine oil to the O-ring (**A**) of the high pressure fuel pump, the roller tappet (**B**), and the protrusion (**C**). (roller tappet, only if removed from cylinder head)
Also apply engine oil to the groove on the location where the protrusion (**C**) is installed.

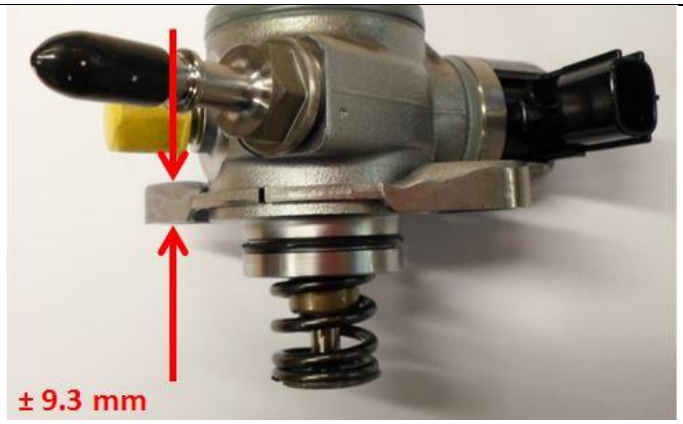


Installation bolts:
When tightening the installation bolts of the high pressure fuel pump, tighten and turn the bolts in small step (0.5 turns) after tightening them with hand-screwed torque.
High pressure petrol pump installation bolt: 12.8 ~ 14.7 N.m

Petrol 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. ***Mount the new fuel line free of tension.***
High pressure petrol pipe installation nut: 26.5 ~ 32.4 N.m

Installation is reverse of removal.

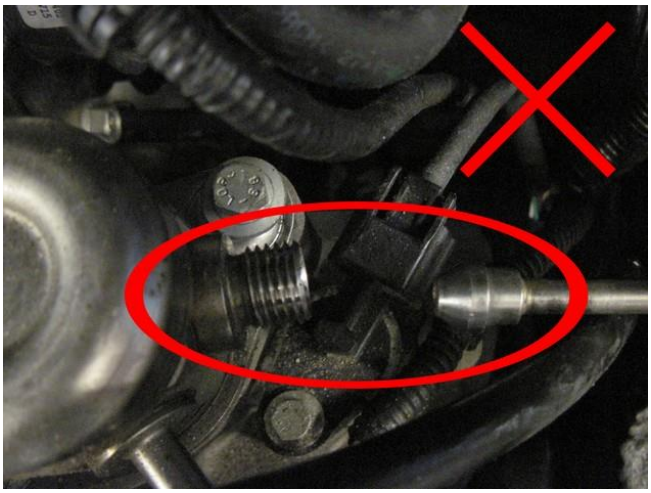
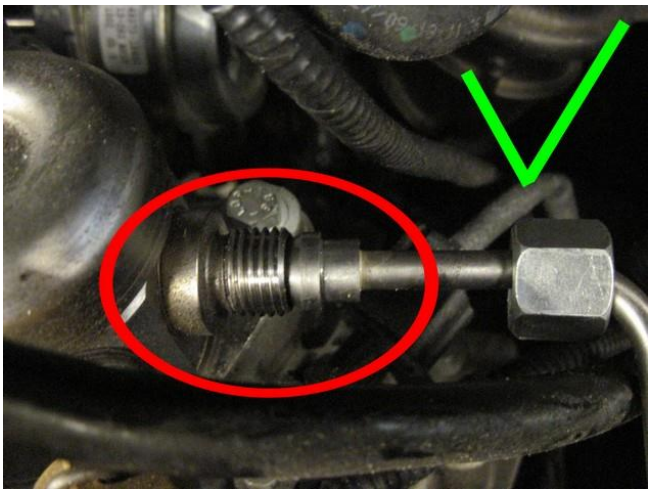




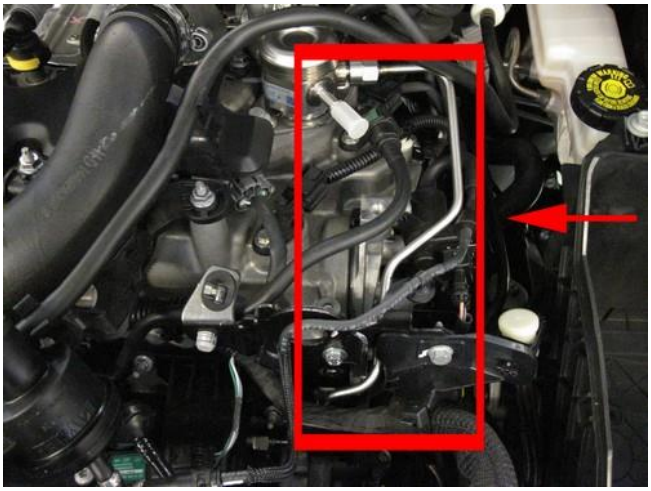
It's possible that the new high pressure pump has another thickness of the mounting plate. This deviation in thickness needs your attention and requires an adaption of the mounting bolts. When the new mounting plate has the same thickness as the original, use the original bolts. When the new mounting plate is thicker as the original, use the longer supplied bolts and when the new mounting plate is thinner as the original plate use the shorter supplied bolts. Always check if the new high pressure pump is mounted properly!!

High pressure pump / Fuel line installation


Replace the High Pressure Pump. Replace the Fuel Line between HP pump and petrol injector rail.
For easier mounting of the new fuel line, remove the throttle body.

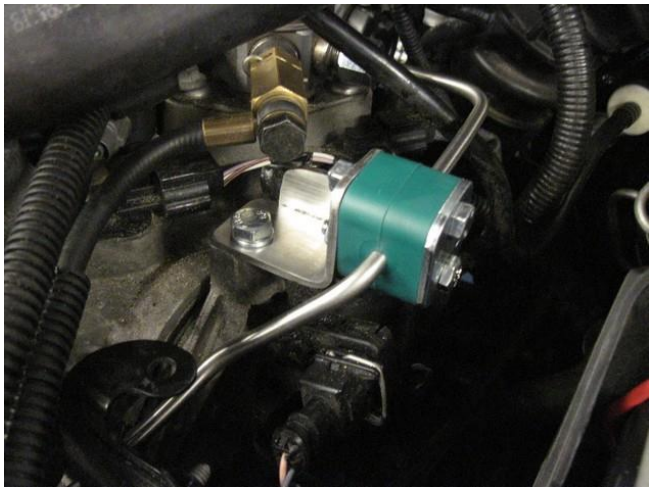
Mount the new fuel line between HP pump and petrol injector rail.
Mount the new fuel line free of tension. If the fuel line does not fit correctly, adapt the fuel line.

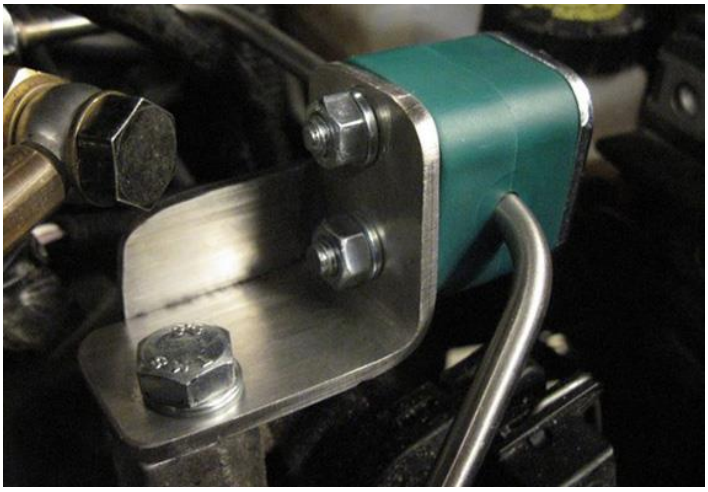


Mount the new fuel line between HP pump and petrol injector rail.

Fuel line installation 2 / Connector

. Mount the fuel line support bracket with clamp to the fuel line.

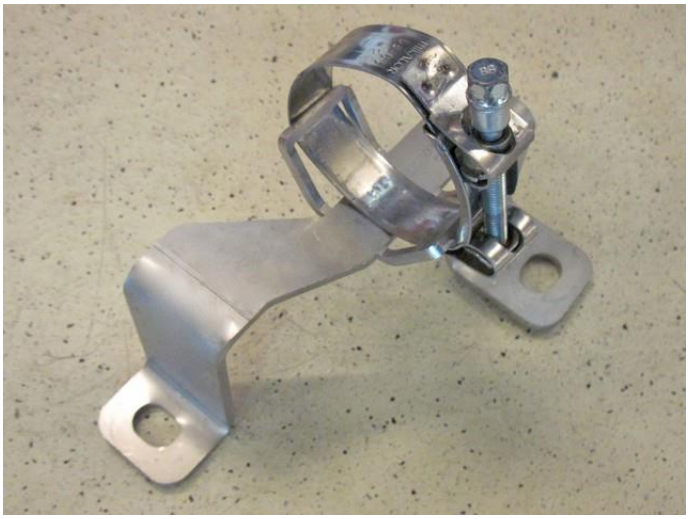
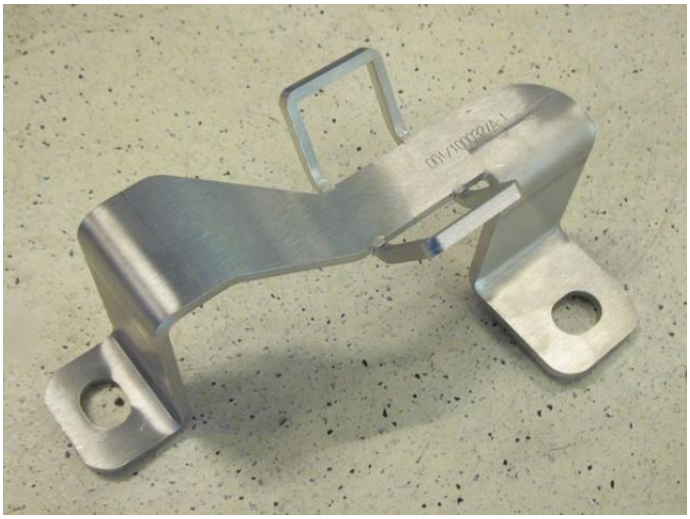




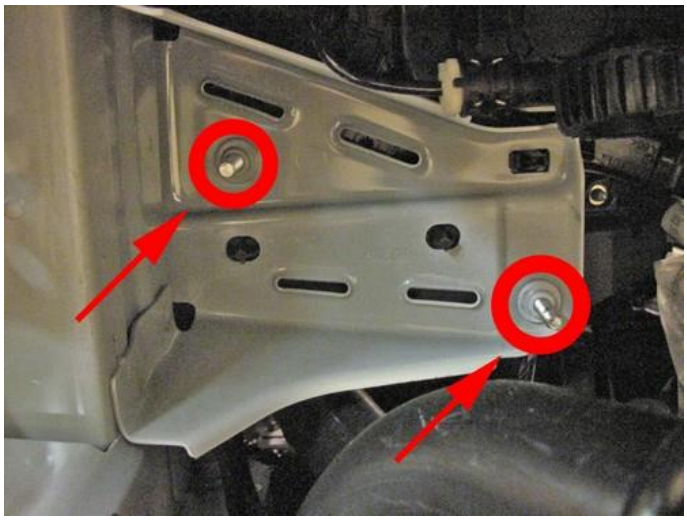
Mount bracket onto engine, also free of tension.

Extend the original wiring by cutting of the original connector. Extend the wiring and connect the new connector. Connect pin 1 from the old connector to pin 1 from the new connector. Mount connector to new HP pump.

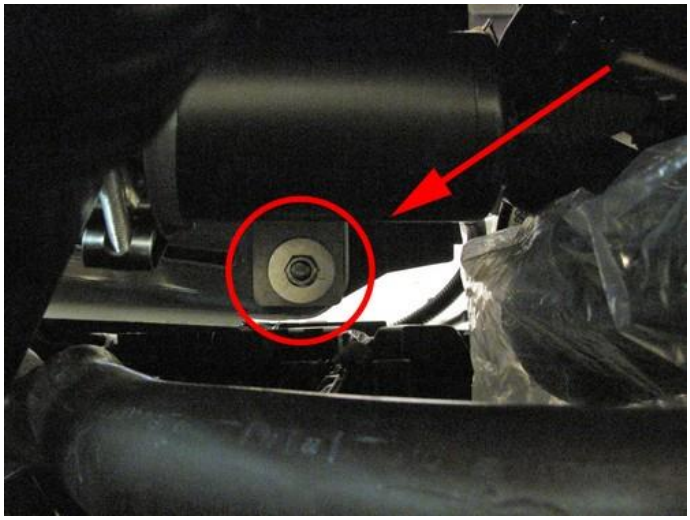
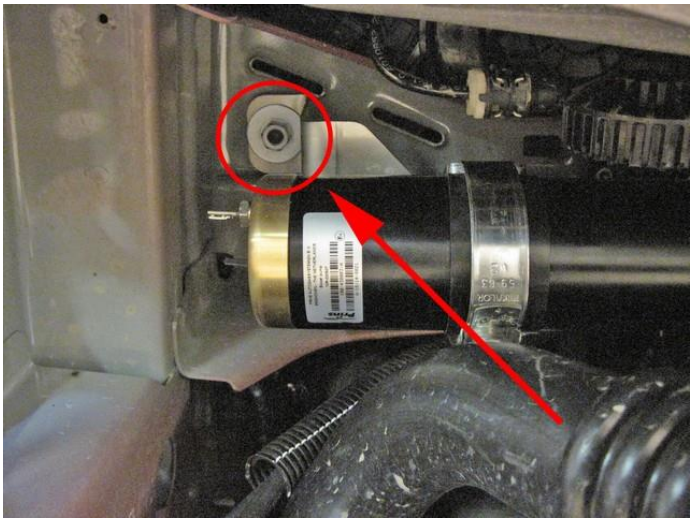
Mounting boost pump

Mount boost pump clamp on bracket.

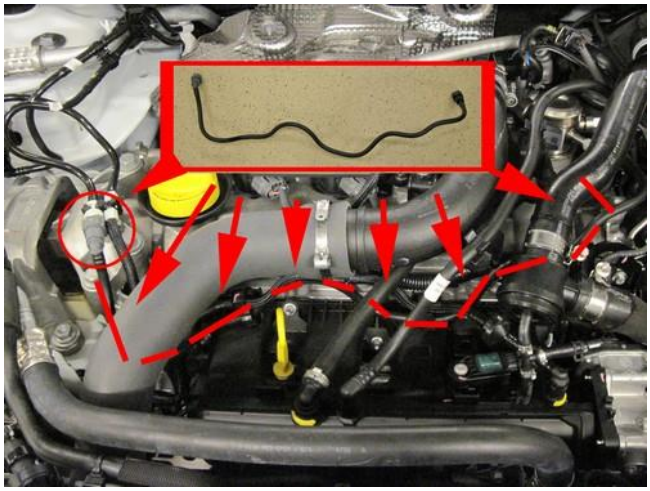
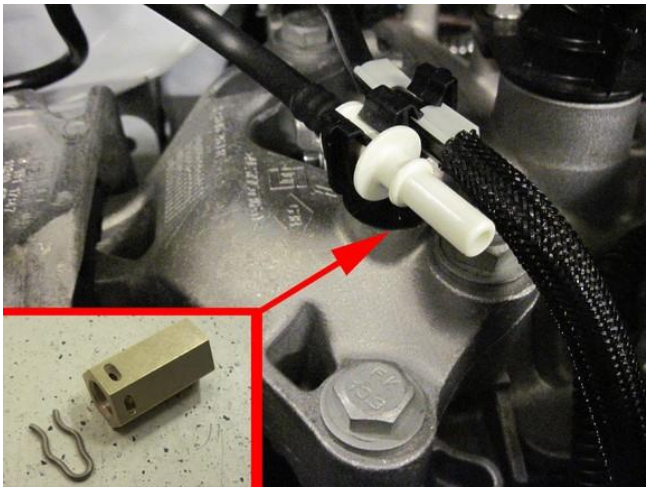



Mount boost pump in clamp with rubber ring in between. Mount bracket to vehicle below battery on 2 original bolts.

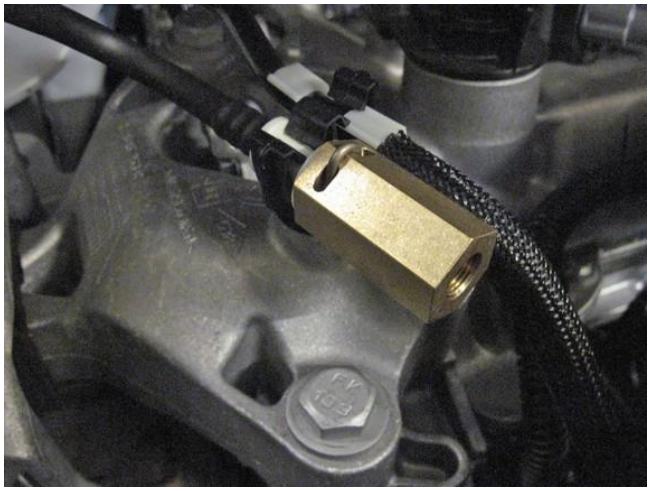



Mount bracket to vehicle below battery on 2 original bolts with big washers, spring washers and nuts.

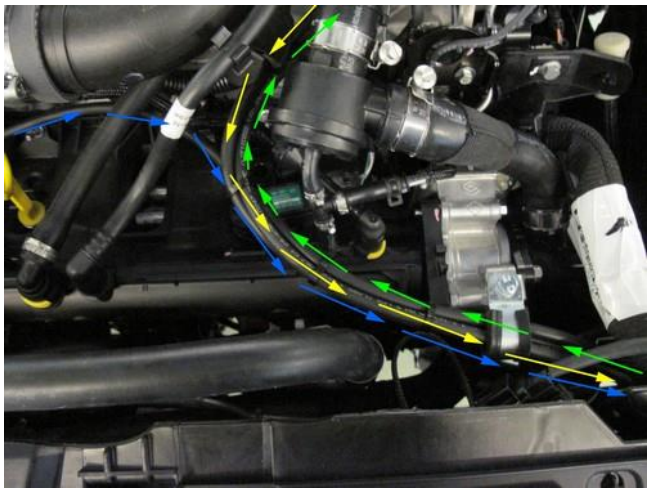
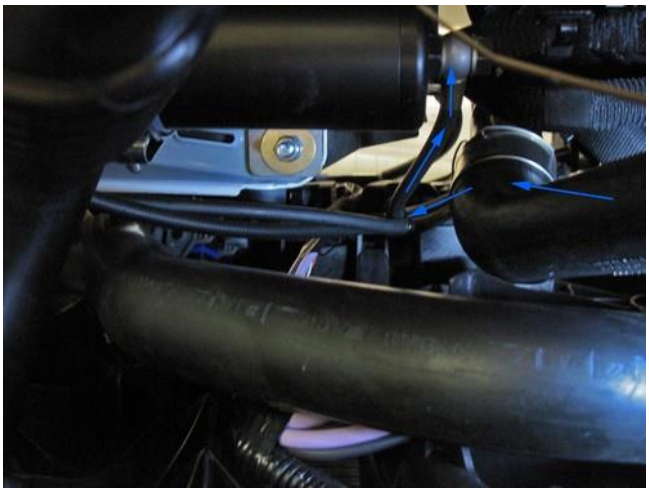
Connection of the fuel hose to the boost pump.

Remove original fuel line to HP pump. Mount adapter to original connection.

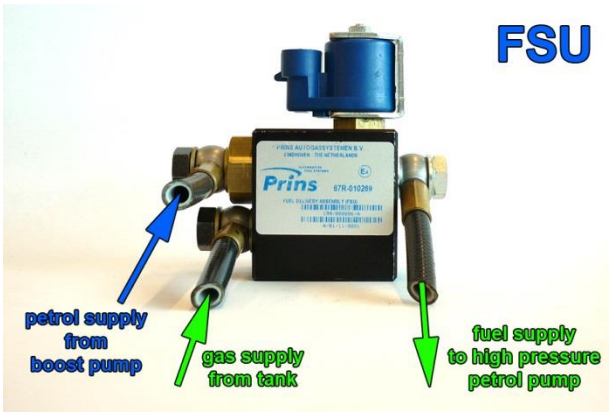


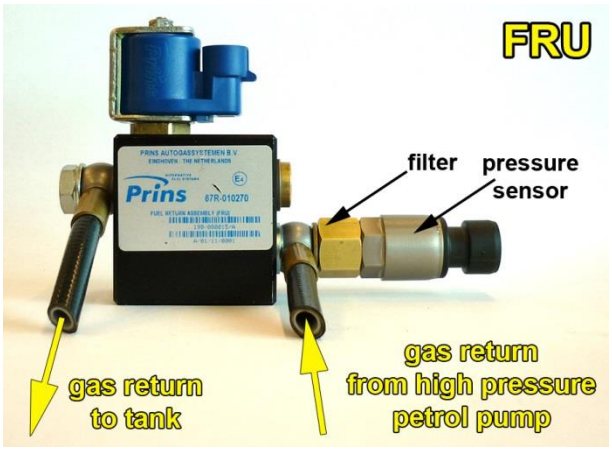

Mount adapter to original connection. Mount fuel line (blue arrows) from adapter to the boost pump.

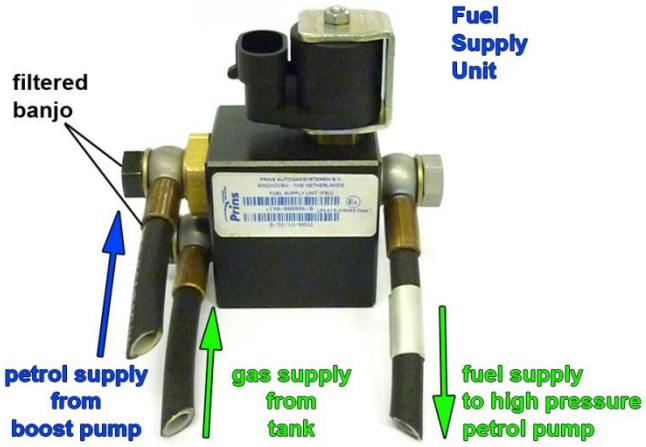



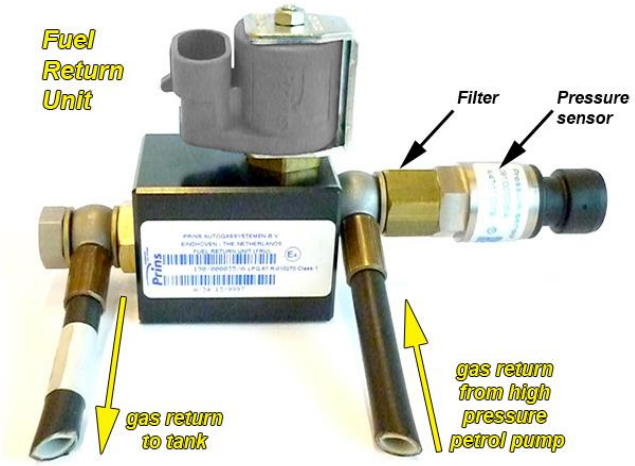
Mount the fuel line (blue arrows) from the adapter to the boost pump.
Use a banjo with filter (black) to connect the fuel line to the boost pump.

Fuel Supply Unit / Fuel Return Unit





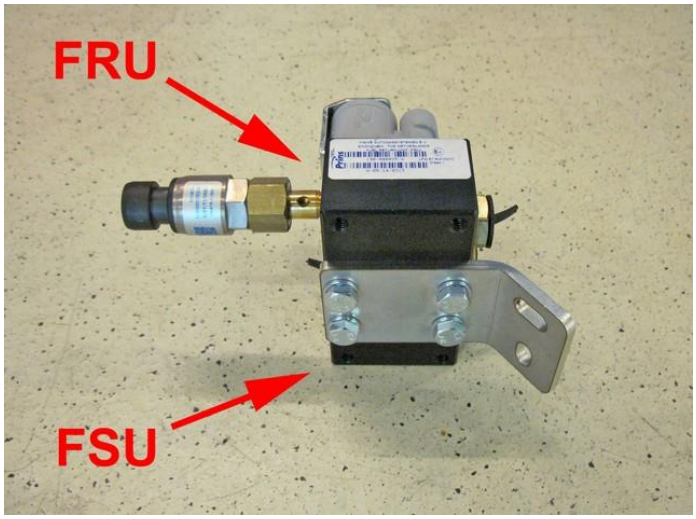




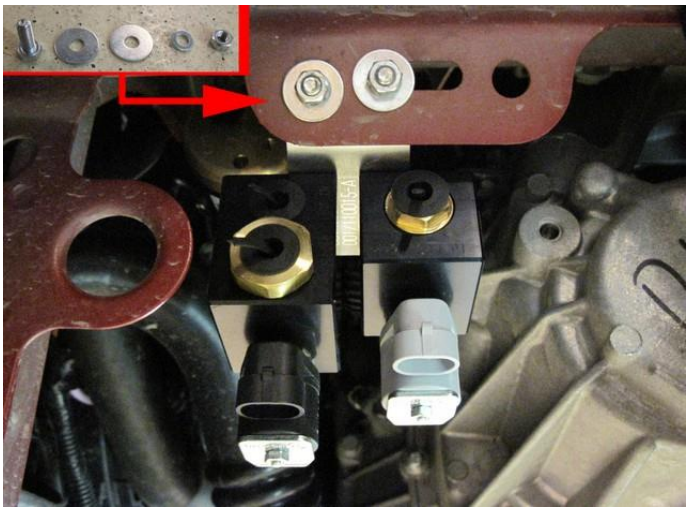
Black filtered banjo will only be used on inlet connections !

Filter inside sensor banjo

Mounting the FSU & FRU



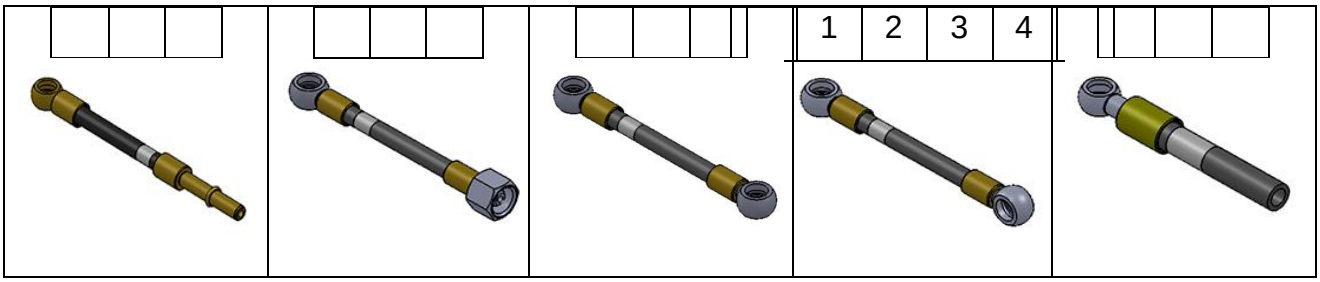
Mount the FSU / FRU to the bracket.



Mount the bracket with FSU / FRU to vehicle with M6 bolts, (spring)washers, and nuts.

Lpg / petrol fuel lines

Hose		from	to	Length (cm)
1	XD-3	Adapter original petrol hose	Petrol boost pump	100
2	XD-3	Fuel supply unit	High pressure petrol pump	100
3	XD-3	Petrol boost pump	Fuel supply unit	30
4	XD-3	Fuel return unit	High pressure petrol pump	110

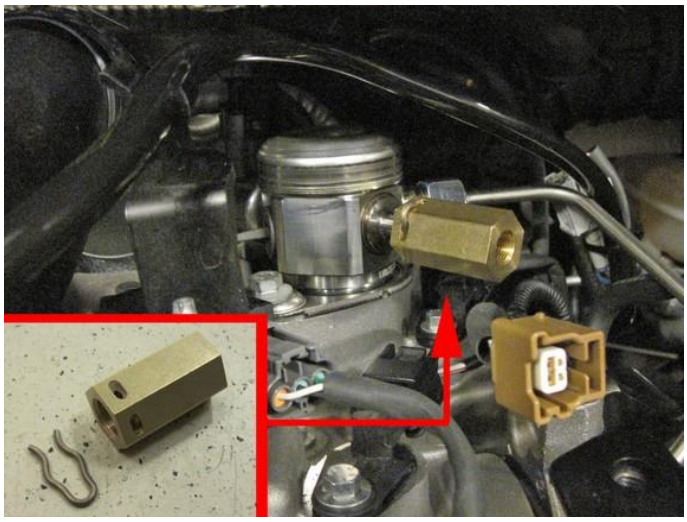


Install the fuel line using two bonded seal washers and banjo bolt :

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

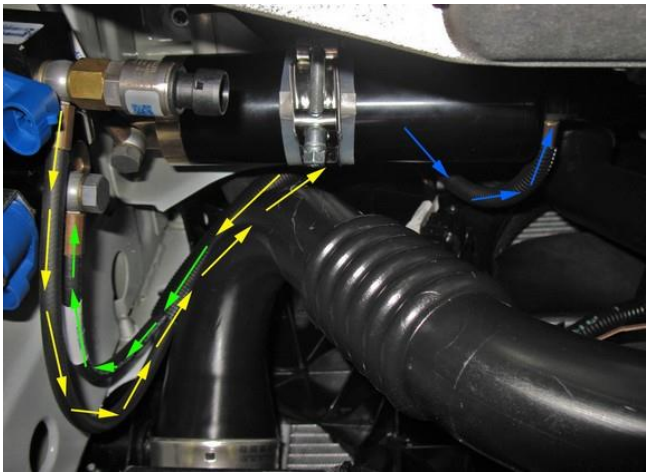
181/300009/A

Hose routing Boost pump / FSU / FRU - 1



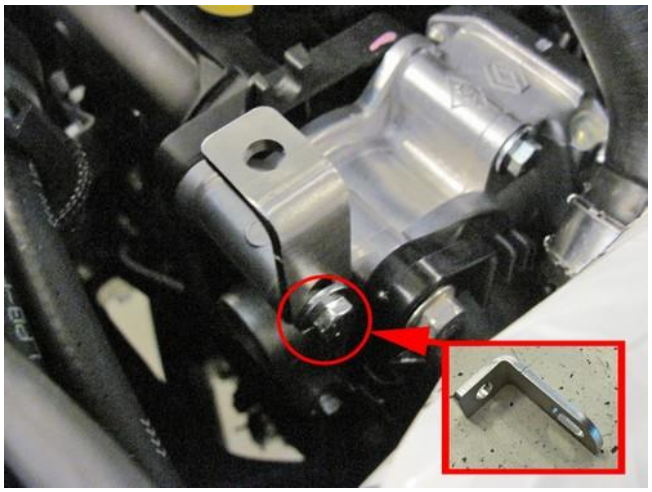
Mount hose from boost pump to FSU. Mount adapter to HP pump. Mount hoses to HP pump.

Mount hoses from HP pump to FSU & FRU.

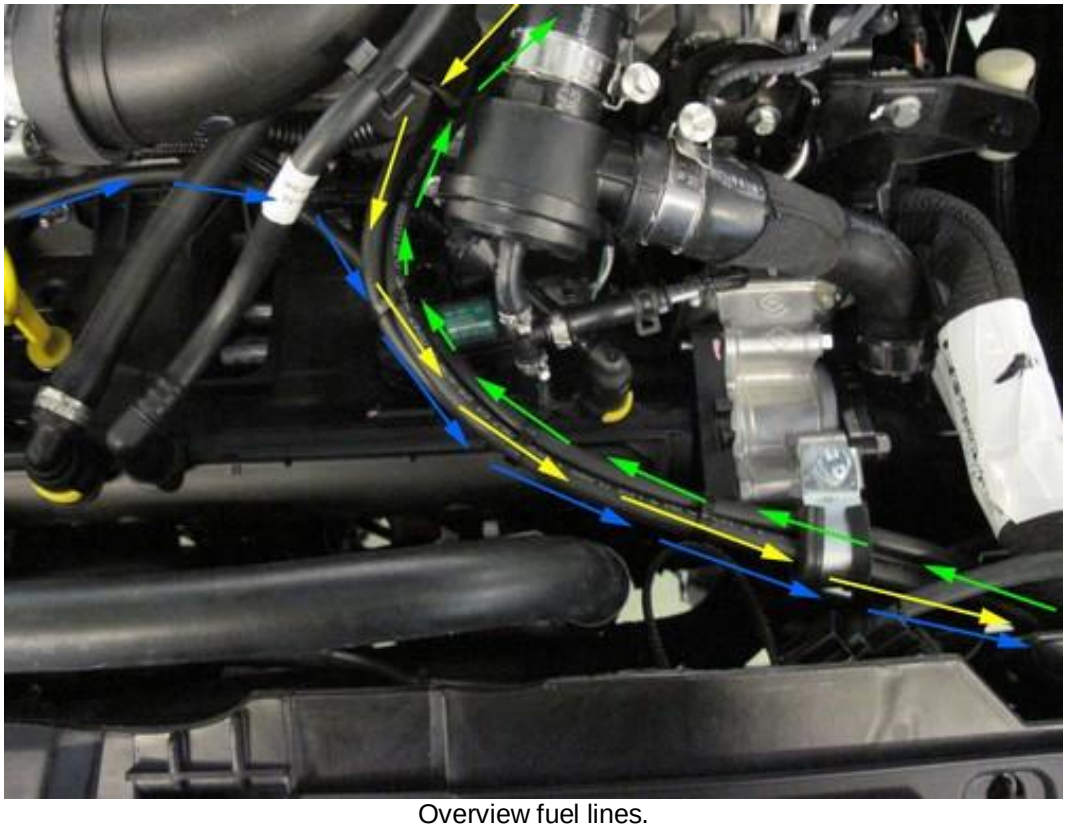


Mount hoses from HP pump to FSU & FRU.

Hose routing Boost pump / FSU / FRU - 2



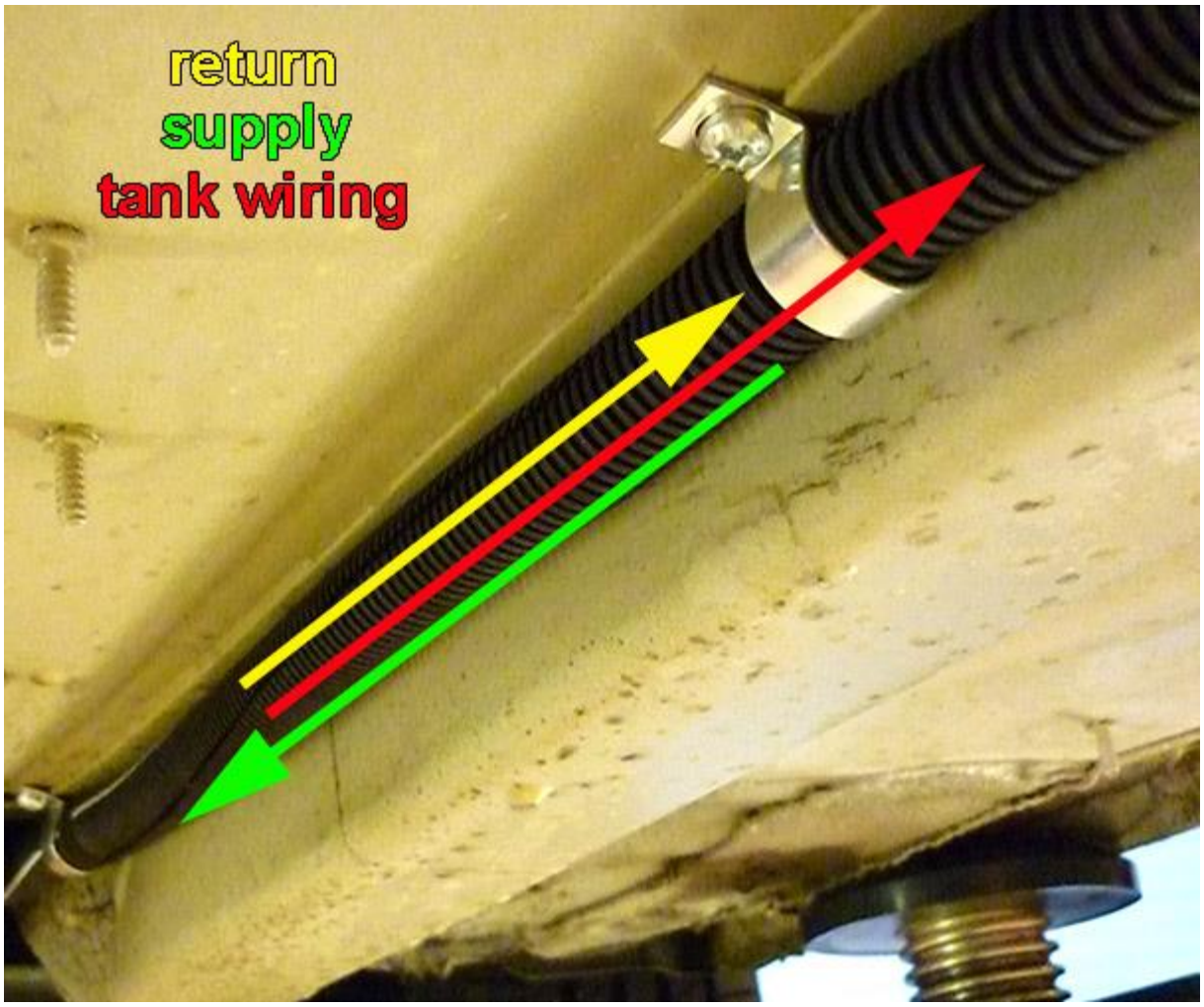
Mount fuel line support bracket to throttle body with original bots. Use clamp to fixate fuel lines (all three lines).



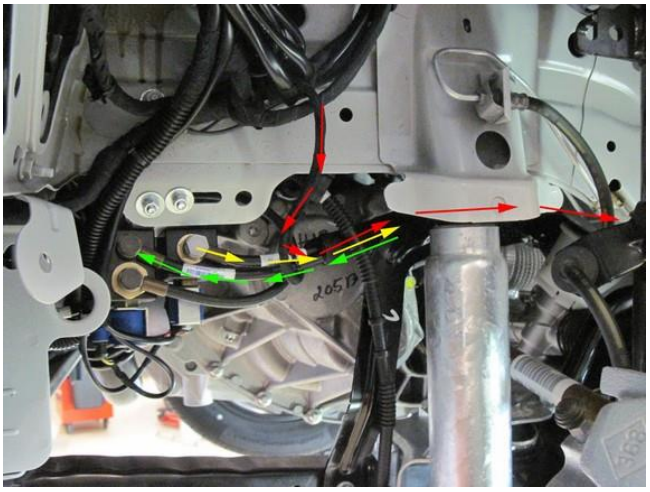
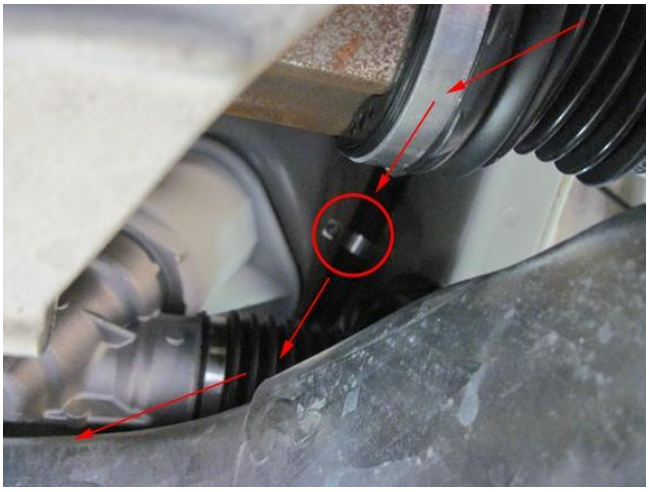
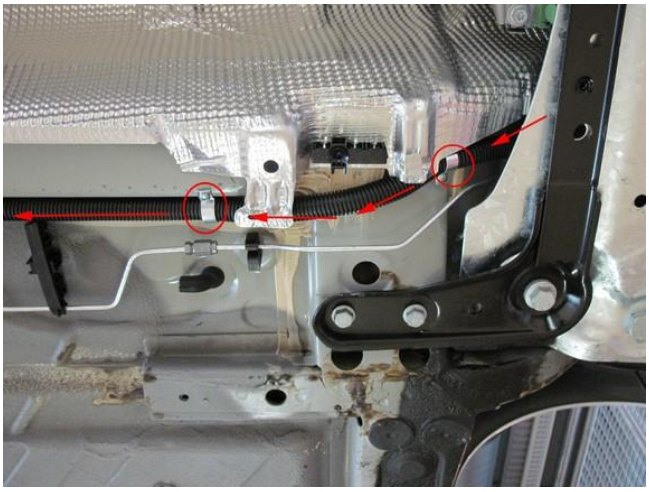
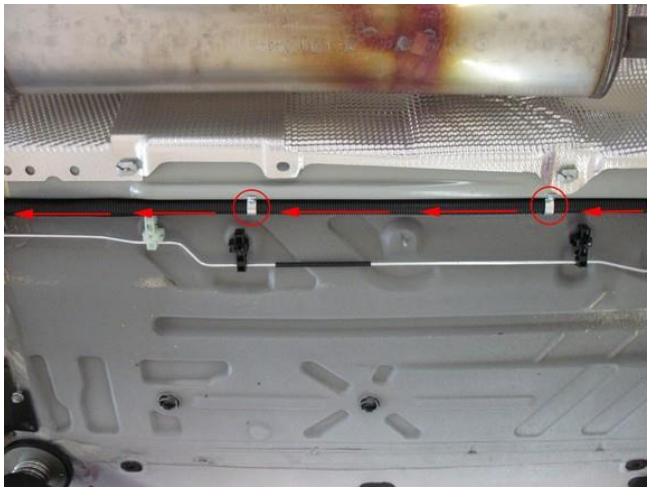
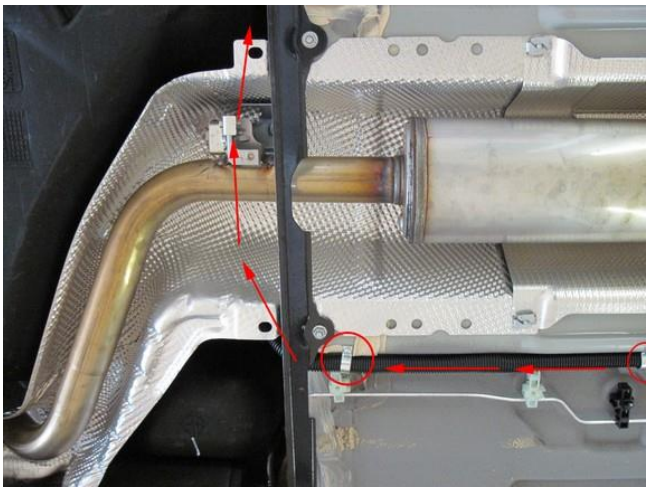
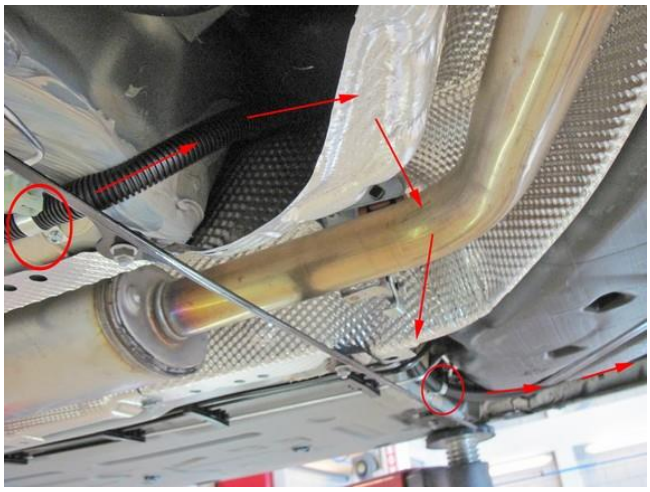
Overview fuel lines.

Supply hose – Return hose – Tank wiring

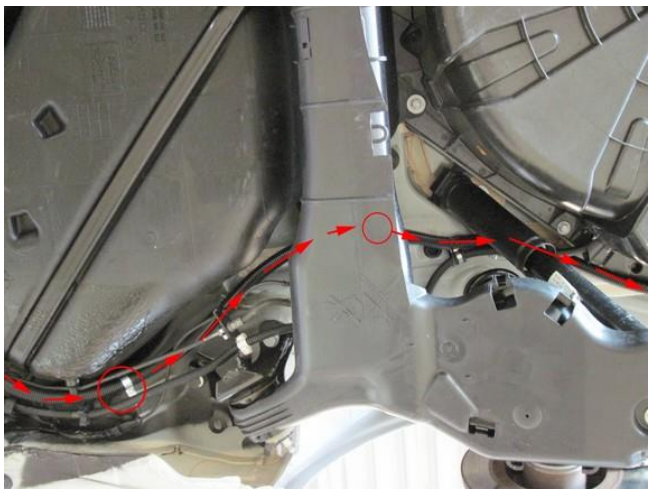
Protect the supply- and return hose together with tank-wiring using the Ø16 split tube.
Mount the “hose assembly “ with clamps, with a maximum distance of 40cm.

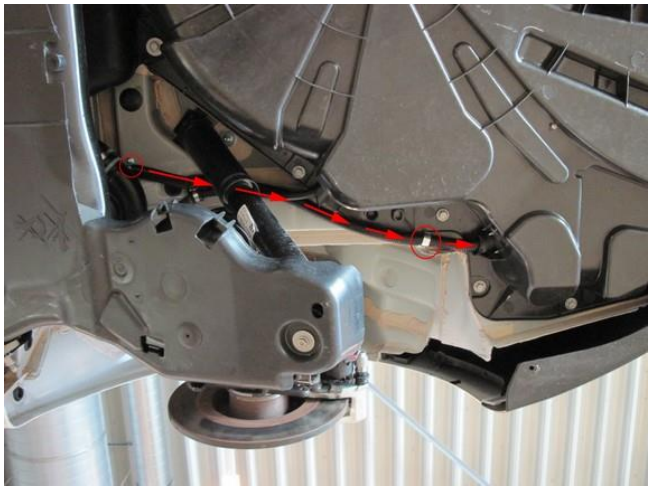


Hose / wiring routing to tank - 1

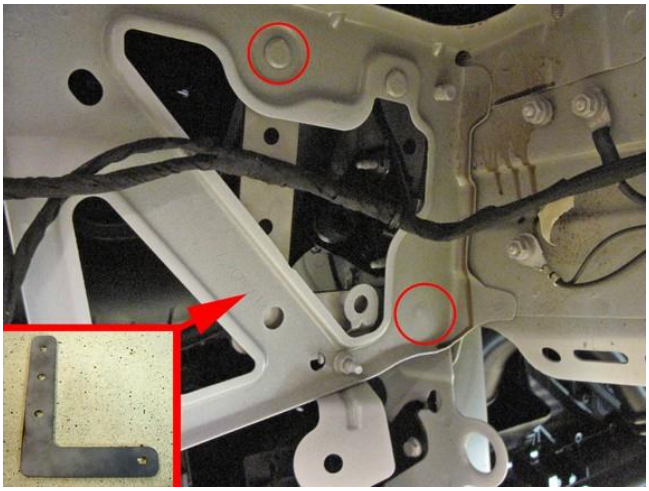







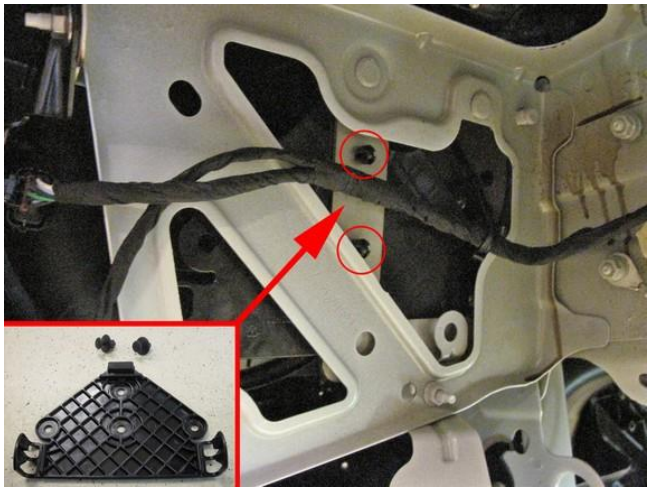
Hose / wiring routing to tank – 2





Mounting the AFC

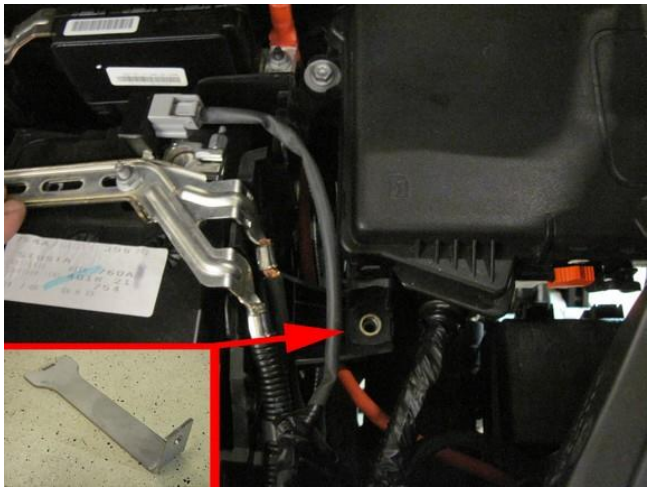




Mount bracket to original threaded rods. Mount plastic AFC-clip to bracket with quick clips.

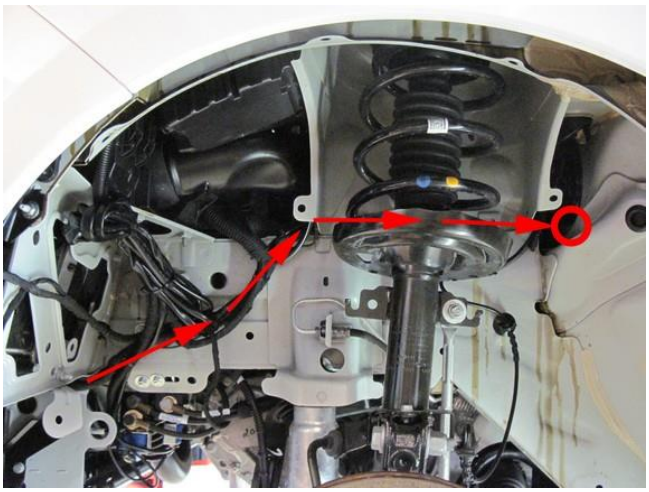
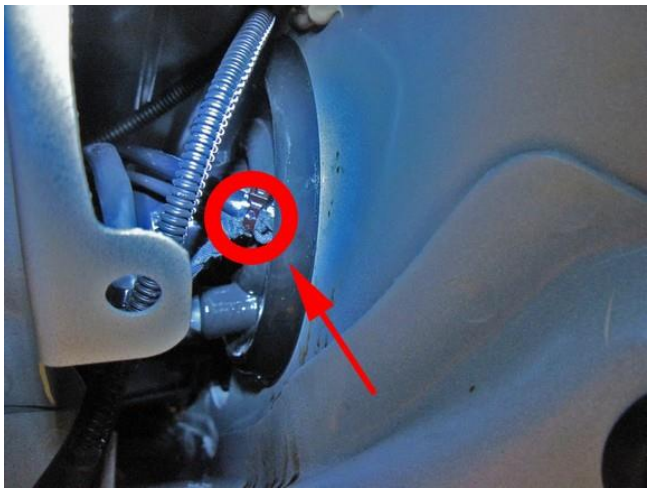
Mount the AFC.

Mounting the fuse/relay box / Wiring grommet

Mount the bracket to the original bolt.

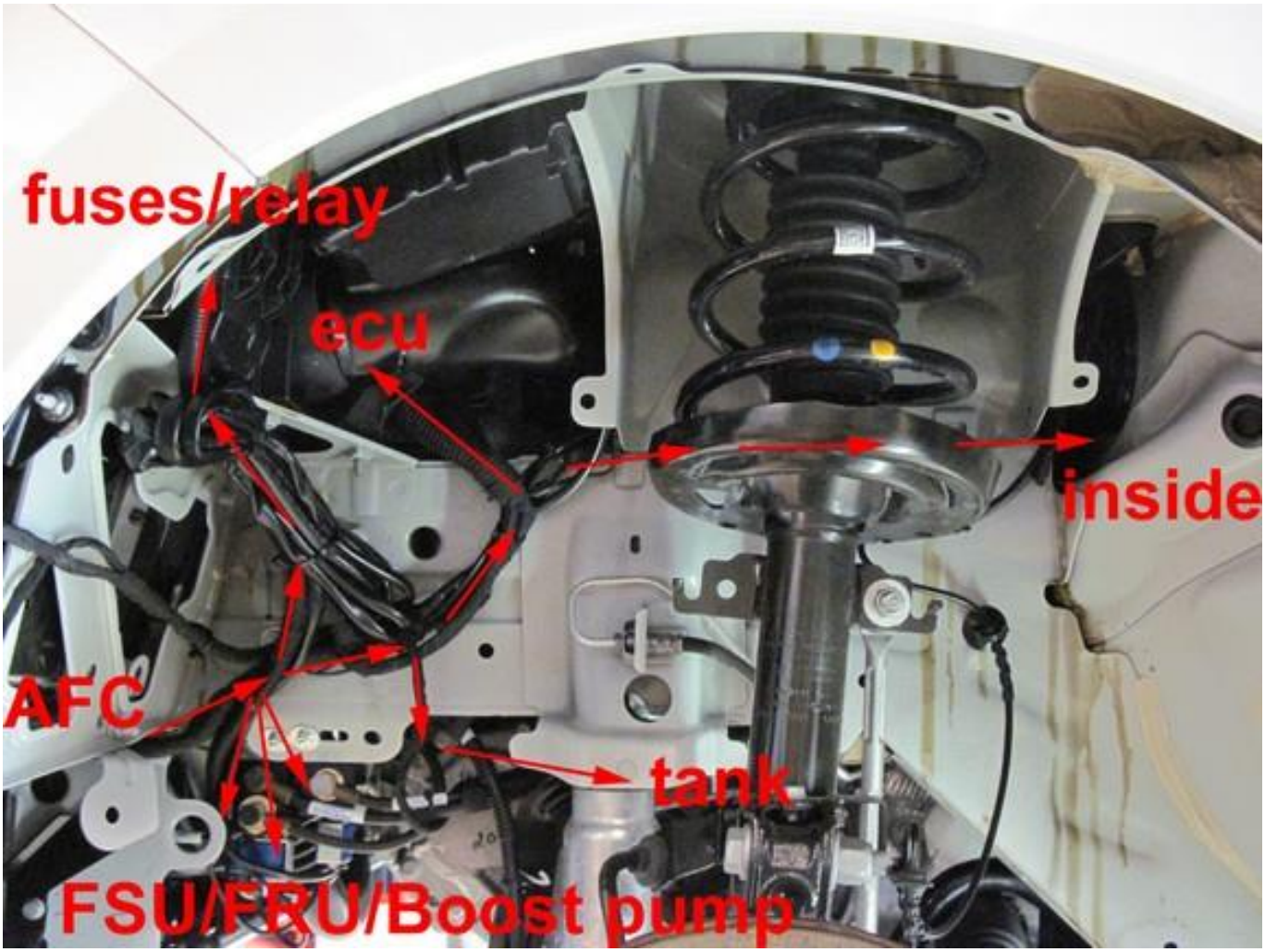

Mount the bracket to the original bolt. Mount the fuse/relay box.

Wiring routing to passenger room. Wiring grommet.

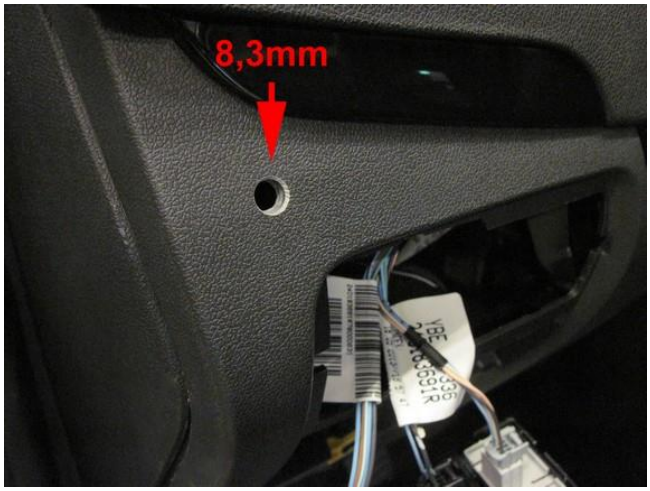
Before stabbing wiring to passenger room, connect wires for the fuel gauge reset module to the AFC wiring.

Wiring AFC

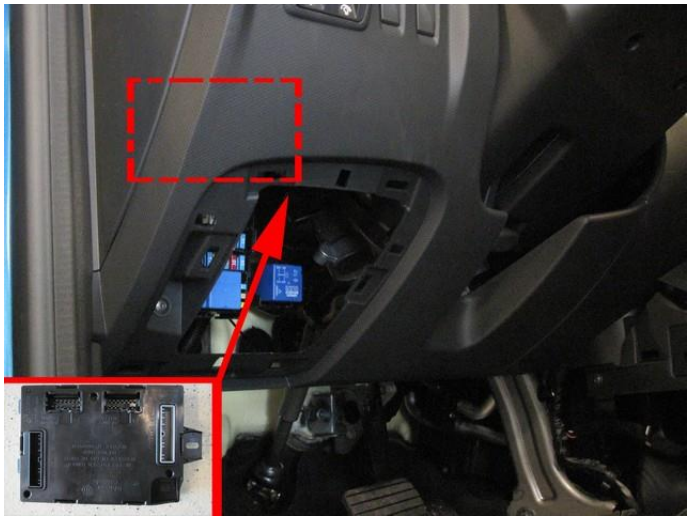


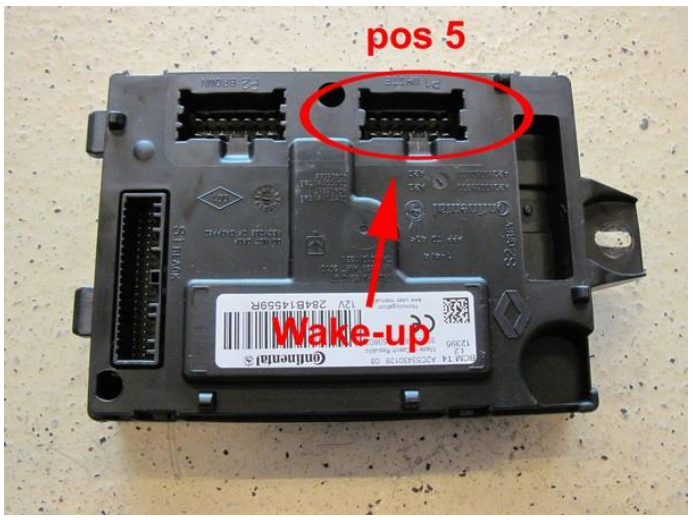
Mounting the CAN / Switch / BCM location

OBD connector for CAN wiring.



Drill hole 8,3mm for switch. Mount switch with supplied sticker.

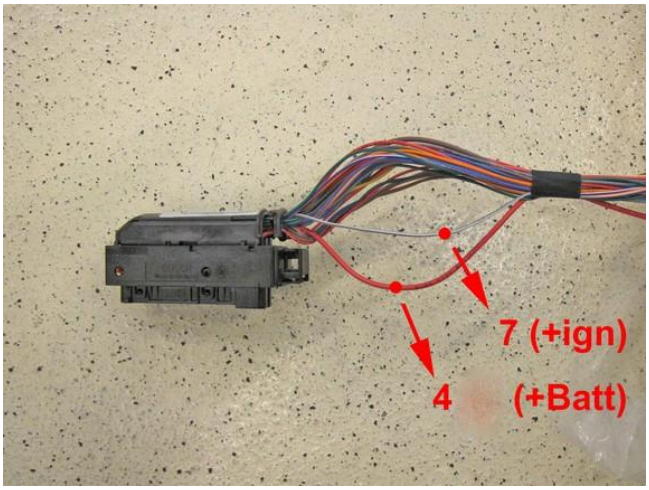


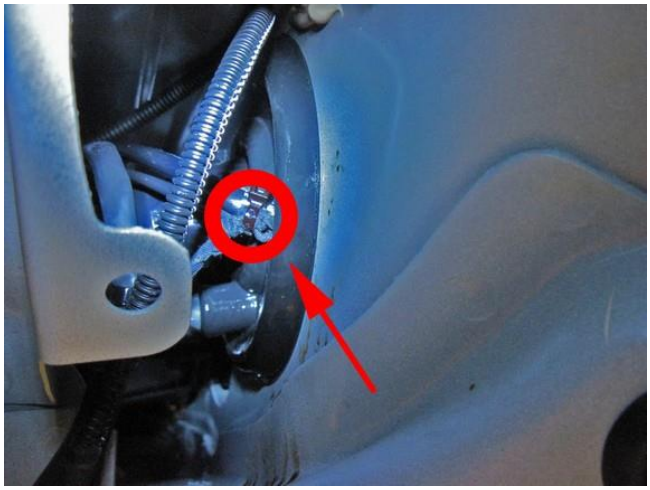


Body Control Module (for Wake-up connection).

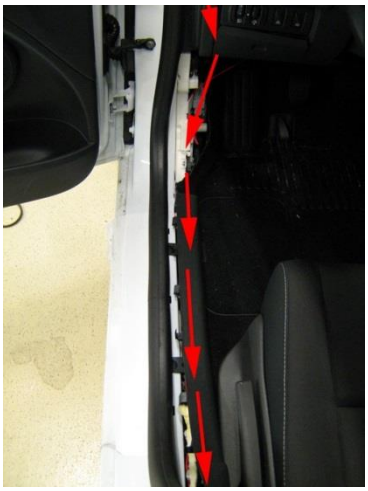
Connecting the fuel gauge reset module 1

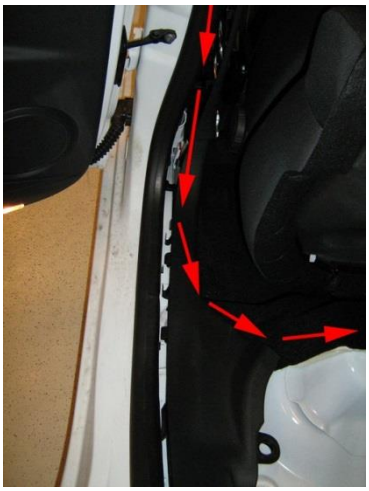
The fuel gauge reset module is mounted underneath the right back seat.

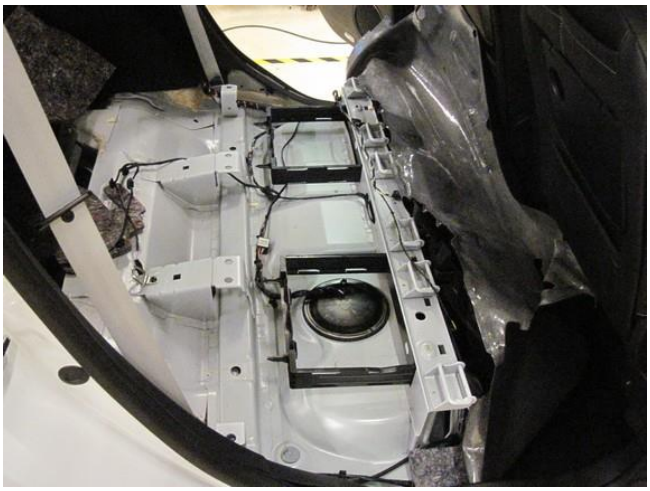




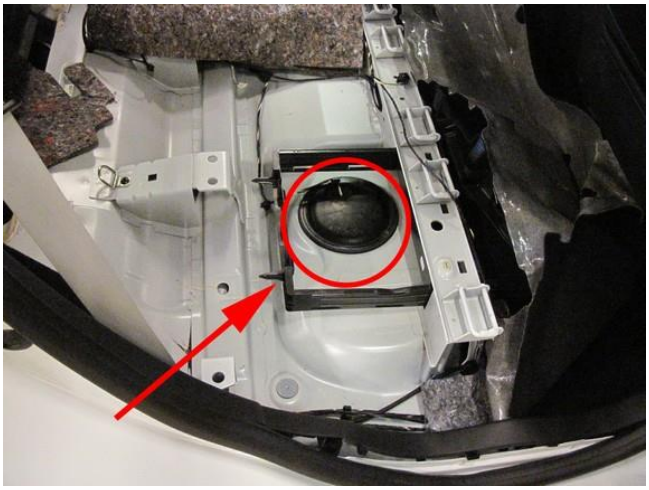
Connect extension wires to wire nr. 4 &7 at AFC connector.
Stab wiring with ***Switch / CAN / WAKE-UP*** through grommet.

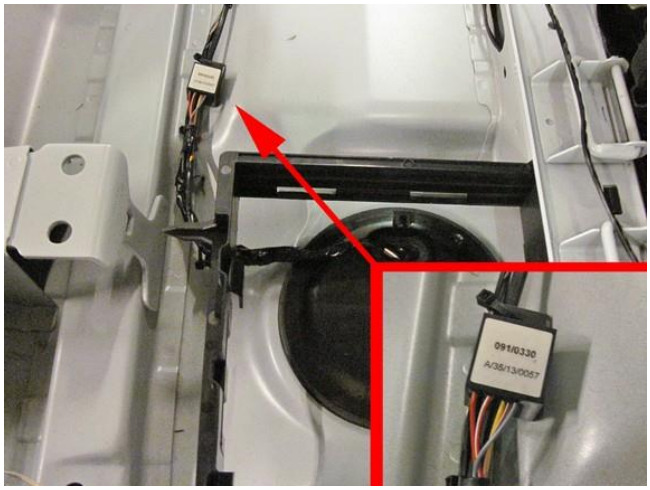






Wiring routing through car. Remove rear seats.

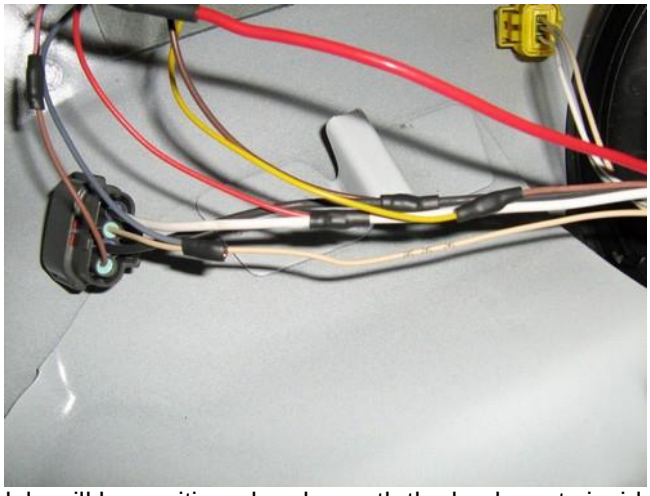




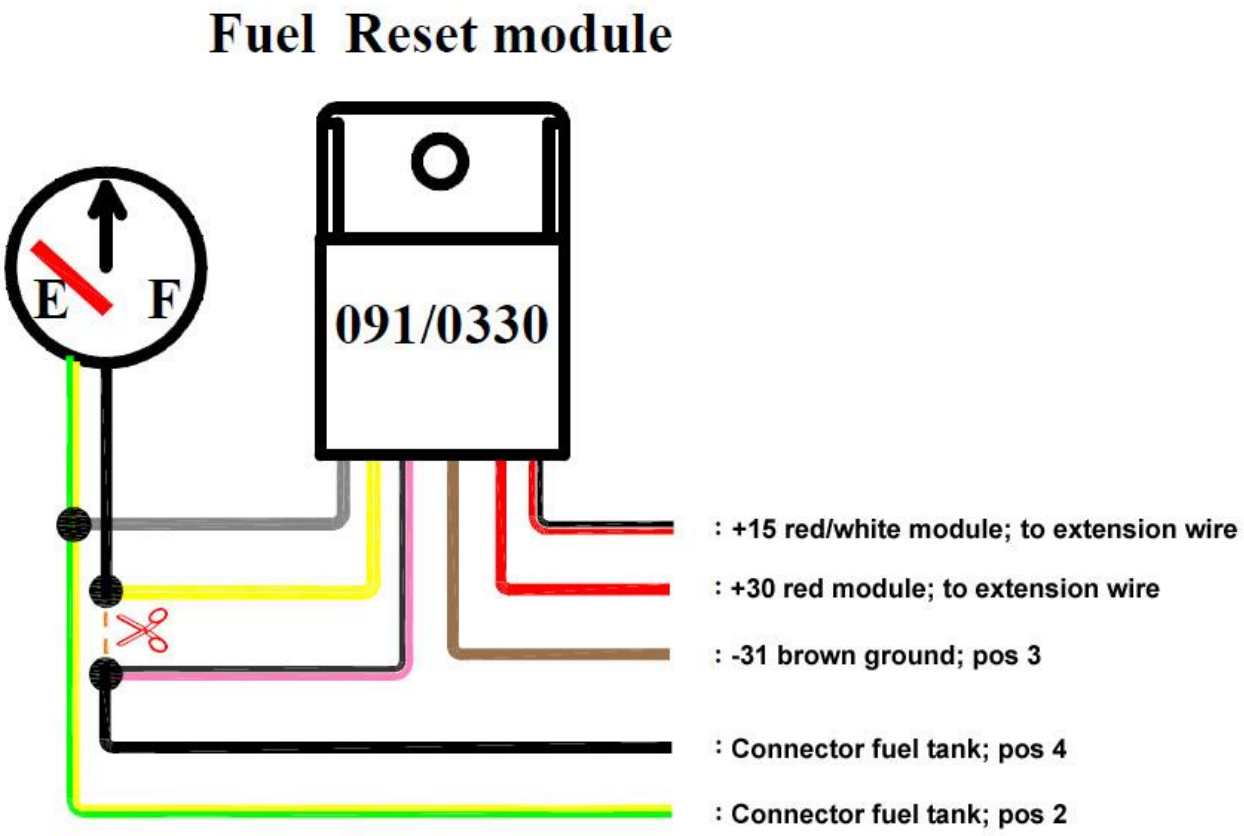
Connection of the fuel tank / fuel gauge.

Fuel gauge reset module.

Connecting the fuel gauge reset module 2

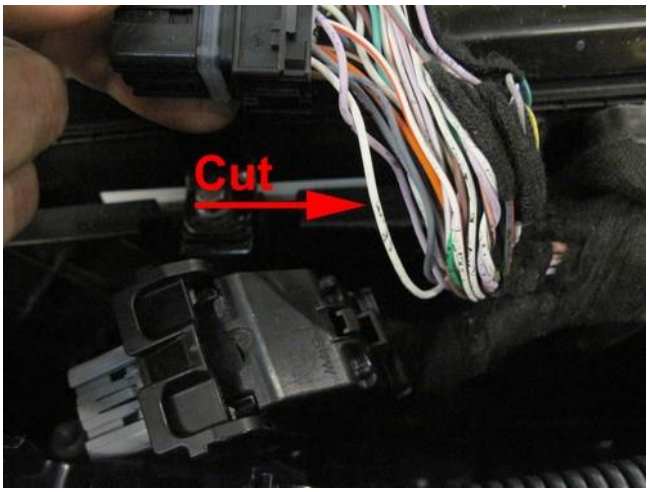


The reset module will be positioned underneath the back seats inside the vehicle.

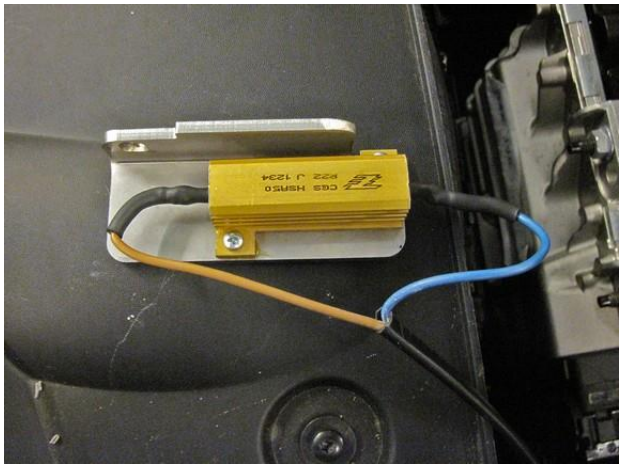


Position 1: White-green / Position 2: Green-white / Position 3: Black-green / Position 4: Ivory
Connect wires to the wiring of the fuel tank and mount back covers and back seat.

Actuator resistance



Cut wire from big black ecu connector, Q4, white and connect extension wires.
Mount resistor on bracket with 2x M3 screws and spring washers.

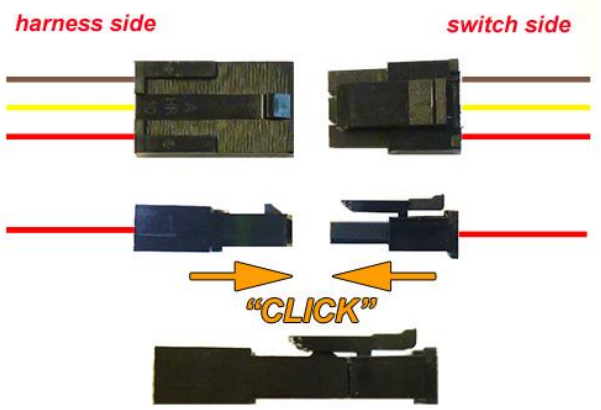
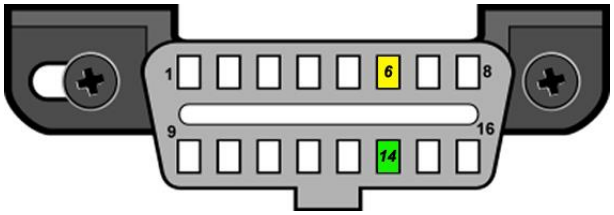
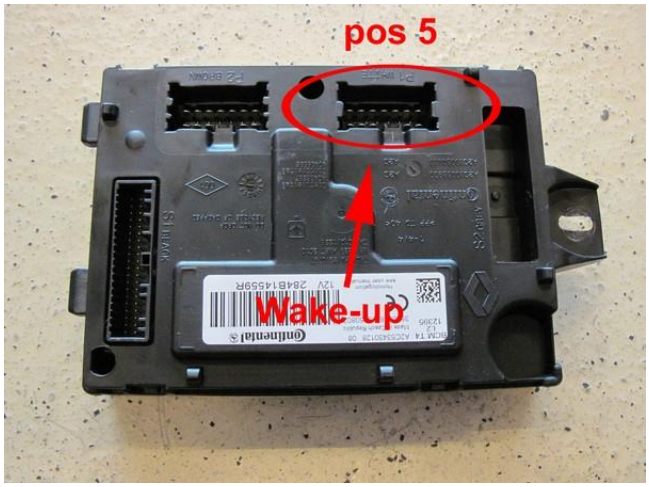


Solder extension cables to resistor (also use shrink sleeves) and mount bracket to original battery mounting.

Electrical connections

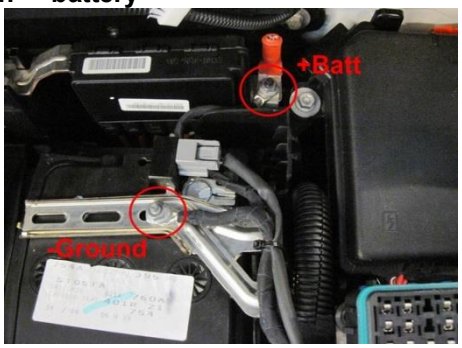
Check and measure the wiring in case of changes in the cars wiring colours.
Insulate not used wires.

Driver room (*Inside!*)

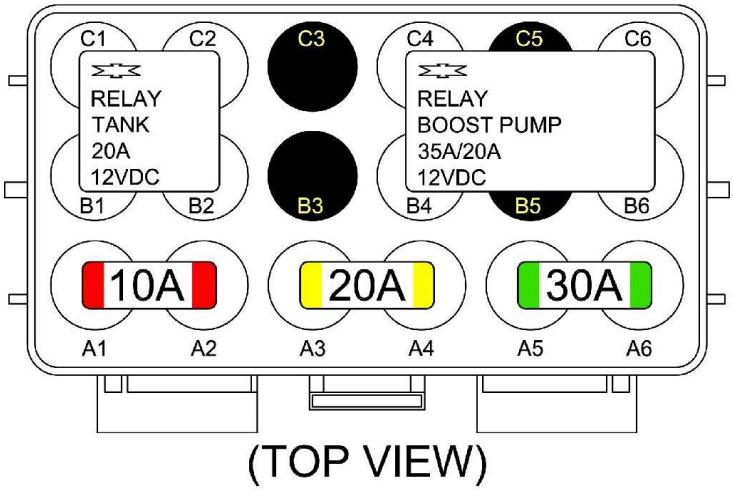
Wire number / code	**Wire colour**	**Connection**
3-pole micro connector 66 Ground fuel switch 3 +12V fuel switch 49 LIN fuel switch	Brown-black Red-white Yellow	Connect the 3-pole connector to the Prins fuel selection switch.
Inside!		
51 CAN-High	Yellow	EOBD connector pin 6
70 CAN-Low	Green	EOBD connector pin 14
Inside!		
40 Wake-up ***Inside!***	Grey-red	Wire colour : **purple-light blue** (wire colours may change) Wire location : **P1** (control ECU below dashboard, see picture) **pos 5.** 

Electrical connections

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

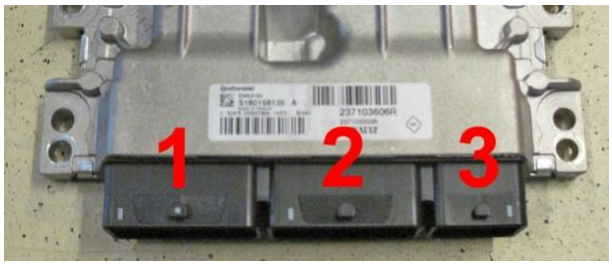
1-32 MAIN GND ecu MAIN GROUND SENSE	Brown	Connect to the '–' of the battery (-31) ; use a ring terminal. Wire colour : **Black** Wire location : **On '-' battery** 

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. Wire colour : **Red** Wire location : **On '+' battery just above the battery**



(TOP VIEW)

Petrol ECU pinning



If you have to count from A to Q on the connectors, remember: there is no letter " i " on the connector.

	A1	B1	C1	D1	E1	F1	G1	H1	J1	K1	L1	M1	N1	O1
				3AJP X		3LP X					3LQ X		3BY X	
	A2	B2	C2	D2	E2	F2	G2	H2	J2	K2	L2	M2	N2	O2
		3AJQ	3LN X								3AJR X			3BU X
	A3	B3	C3	D3	E3	F3	G3	H3	J3	K3	L3	M3	N3	O3
				3BX X	3GK X		3GH X				3EN X	3CF X	3CG X	3CE X
	A4	B4	C4	D4	E4	F4	G4	H4	J4	K4	L4	M4	N4	O4
		3TA X	3UCB X						3AJB X	3AJC X				

P1	Q1
3L X	3CR X
P2	**Q2**
3LC X	3CU X
P3	**Q3**
3LB X	3CT X
P4	**Q4**
3LA X	3CS X

Connector 1 (grey)

	A1	B1	C1	D1	E1	F1	G1	H1	J1	K1	L1	M1	N1	O1
		3S NC				2MQ X		3BGA X	3LX X	3ALW X	3ALV X		3MN X	
	A2	B2	C2	D2	E2	F2	G2	H2	J2	K2	L2	M2	N2	O2
		3AA		3SV X	3SX X			3SY X	3JJ X	3MD X	TBI X		3DD X	3BL X
	A3	B3	C3	D3	E3	F3	G3	H3	J3	K3	L3	M3	N3	O3
	3BG X	3AC X			3SW X	3LY X			3LZ X				3ALG X	
	A4	B4	C4	D4	E4	F4	G4	H4	J4	K4	L4	M4	N4	O4
						3GL X	3C X	3MP X		3JK X	3AT X	3BB X	3VL X	3K X

P1	Q1
3FB1 X	3FB2 X
P2	**Q2**
3SZ X	
P3	**Q3**
3GF X	3ZP X
P4	**Q4**
3GG X	3HI X

Connector 2 (black)

A	B	C	D	E	F	G	H	
			AP15 JA		3WT X	3FB X	NH NO	1
3FX X			86G X		3LU X	3LR X	3LS X	2
3SN X		3PD X	86M X		3LW X	NH NO	3LT X	3
3SM X	HK X	86D X		5A X	3LV X	NH NO	NH NO	4

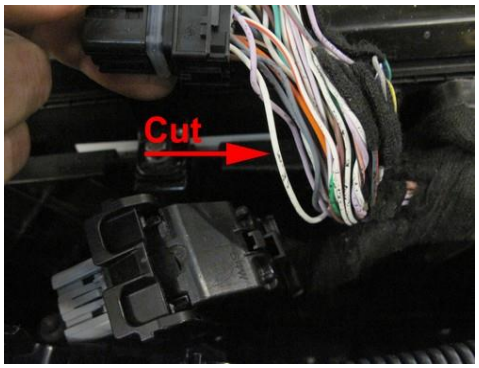
Connector 3 (black)

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*
36 & 25		*High pressure petrol sensor signal interruption* Wire colour : **white-black** Wire location : **Connector 2 petrol ECU → F3**
36 AD 6	Blue-brown	Sensor side
25 DAC 1	Green-white	Petrol ecu side

63 Ground Shift	Blue-orange	*High pressure petrol sensor ground* Wire colour : **purple** Wire location : **Connector 2 petrol ECU → J3**
60 DI3	Yellow-pink	*High pressure petrol sensor 5Volt supply* Wire colour : **tan** Wire location : **Connector 2 petrol ECU → J1**
8 RPM engine speed	Purple-white	*For measuring the engine speed signal.* Wire colour : **pink-black** Wire location : **Connector 2 petrol ECU → D2**
15 T-ect	Grey	*For measuring the engine coolant temperature.* Wire colour : **green-red** Wire location : **Connector 2 petrol ECU → G4**
18 AD 1	Blue-white	*For measuring the inlet manifold pressure from the MAP sensor* Wire colour : **green-black** Wire location : **Connector 1 petrol ECU → B2**
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 : **white-yellow** Wire location : **Connector 3 petrol ECU → D1**

2-core wire from actuator resistor **See page 28**		Wire colour : **White** Wire location : **Connector 2 petrol ECU** → interrupt wire **Q4** and connect the 2 resistor wires. Both ways possible. 

Electrical connections

Insulate not used wires.

Wire number / code	*Wire colour*	
10 DAC 2	Green	insulate
17 AD 2	Blue-green	insulate
19 AD 4	Blue	insulate
20 AD 3	Blue-pink	insulate
21 AD 9	Blue-purple	insulate
22 LSS 1	Purple-white	insulate
23 LSS 2	Purple-green	insulate
42 Digital out pull up 2	Red-purple	insulate
56 DI 2	Yellow-green	insulate
58 +12V switched	Red-white	insulate
60 DI 3	Yellow-grey	insulate
61 DI4	Yelow-blue	insulate
74 DAC 3	Green-pink	insulate

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 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.