

ALTERNATIVE
FUEL SYSTEMS

Prins

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



Installation manual Dedicated PART 2/2

MANUFACTURER
TYPE
ENGINE DISPLACEMENT
NUMBER OF VALVES
ENGINE CODE / NUMBER
VEHICLE CATEGORIES
TRANSMISSION
VERSION
PETROL ECU MANUFACTURER / CODE
HIGH PRESSURE PETROL PUMP
HIGH PRESSURE PETROL INJECTOR
MODEL YEAR:
SYSTEM APPROVAL NUMBER (R115)
LOCATION SYSTEM STICKER
ENGINE SET NUMBER
MANUAL NUMBER
DATE

KIA
SORENTO
2400
16V
G4KJ
M
MT/AT
Direct LiquiMax-2.0
CONTINENTAL SIM2K
KEFICO
BOSCH
2013
E4-115R-000004 / DLM-LPG 01
right side, centre door post
349/070915/A
076/2800900
2014-02-25

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Version 2012-11-02 D



TABLE OF CONTENTS

General instructions	2
Required equipment / tools / materials for installing a complete system	3
Vehicle check.....	3
Tightening moments.....	4
Direct LiquiMax	5
Overview Direct LiquiMax	6
Direct LiquiMax parts / approval numbers	7
DLM component location overview.....	8
High pressure pump installation 1.....	9
High pressure pump installation 2.....	10
High pressure pump installation 3.....	11
High pressure pump return 2.....	12
Boost pump.....	13
Connection of the fuel hose to the boost pump.....	14
Fuel Supply and Fuel Return Unit.....	15
Mounting the Fuel Supply and Fuel Return Unit	16
Lpg / petrol fuel lines.....	17
Hose routing 1.....	18
Hose routing 2.....	19
Hose routing 3.....	20
Mounting the AFC	21
Wiring AFC / relay 1.....	22
Wiring AFC / relay location 2.....	23
Wiring routing.....	24
Mounting the fuel selection switch	25
Electrical connections 1.....	26
Electrical connections 2.....	27
Electrical connections 3.....	28
Electrical connections 4.....	32
Electrical connections 5.....	33
Checklist after installation.....	34
Prins safety sticker and type sticker 1.....	35
LPG tank.....	35
Prins safety sticker and type sticker 2.....	36

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 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)
- Socket 46mm
- Air gun
- Vacuum cleaner
- Safety goggles
- Hot air gun
- Soldering iron, soldering tin
- Wire-stripping pliers
- Adhesive tape
- Adhesive sealant
- Thread locking compound
- Anti-corrosion agent / black body coating
- Gas leak detection device or foam leak spray
- Shrink sleeves

Vehicle check

- Check the vehicle drivability on petrol
- Check the fuel system for error codes (scan tool)
- Check if the catalytic converter is in good condition (exhaust 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

EXPLANATION OF SYMBOLS :



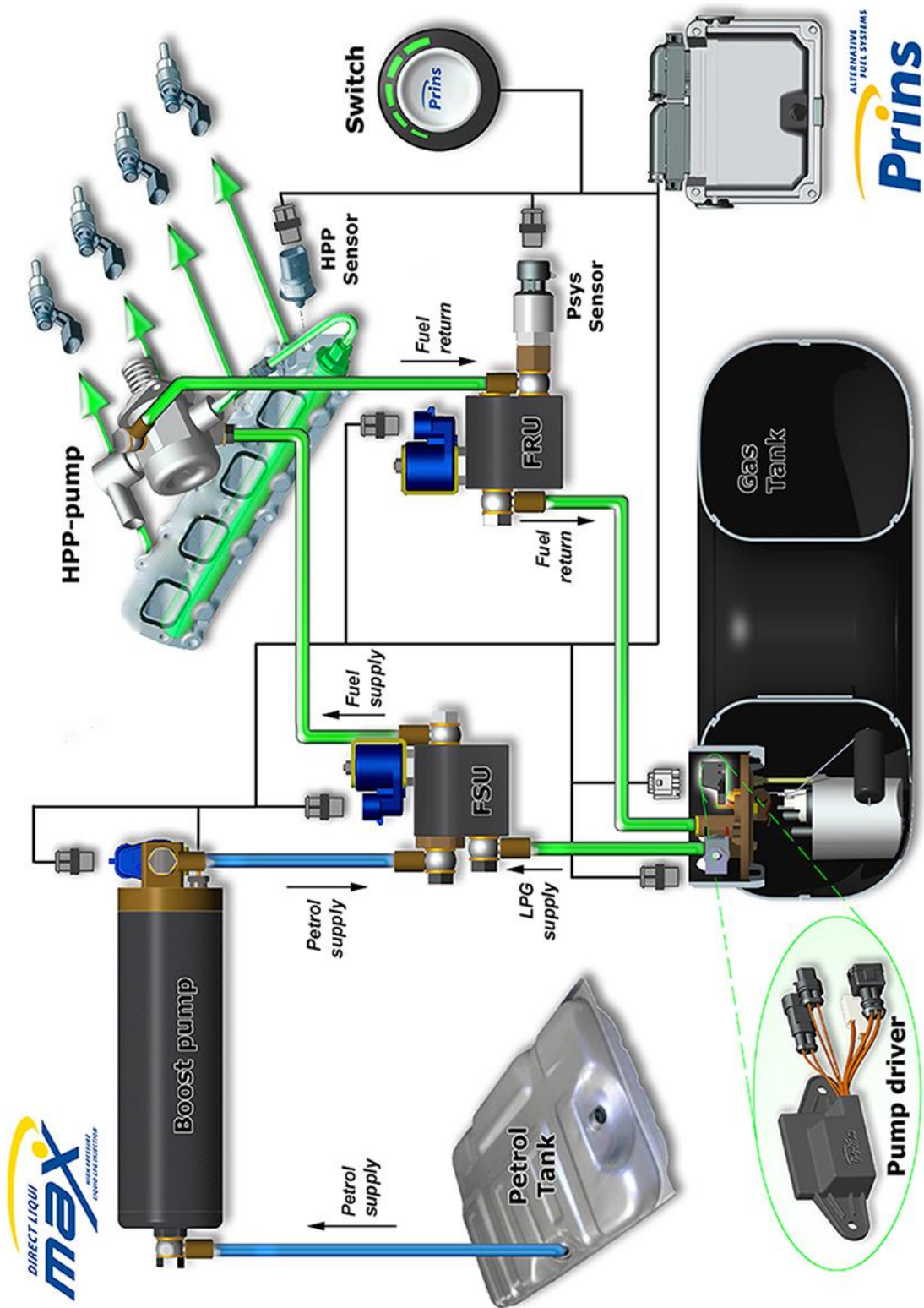
= IMPORTANT,
CAUTION



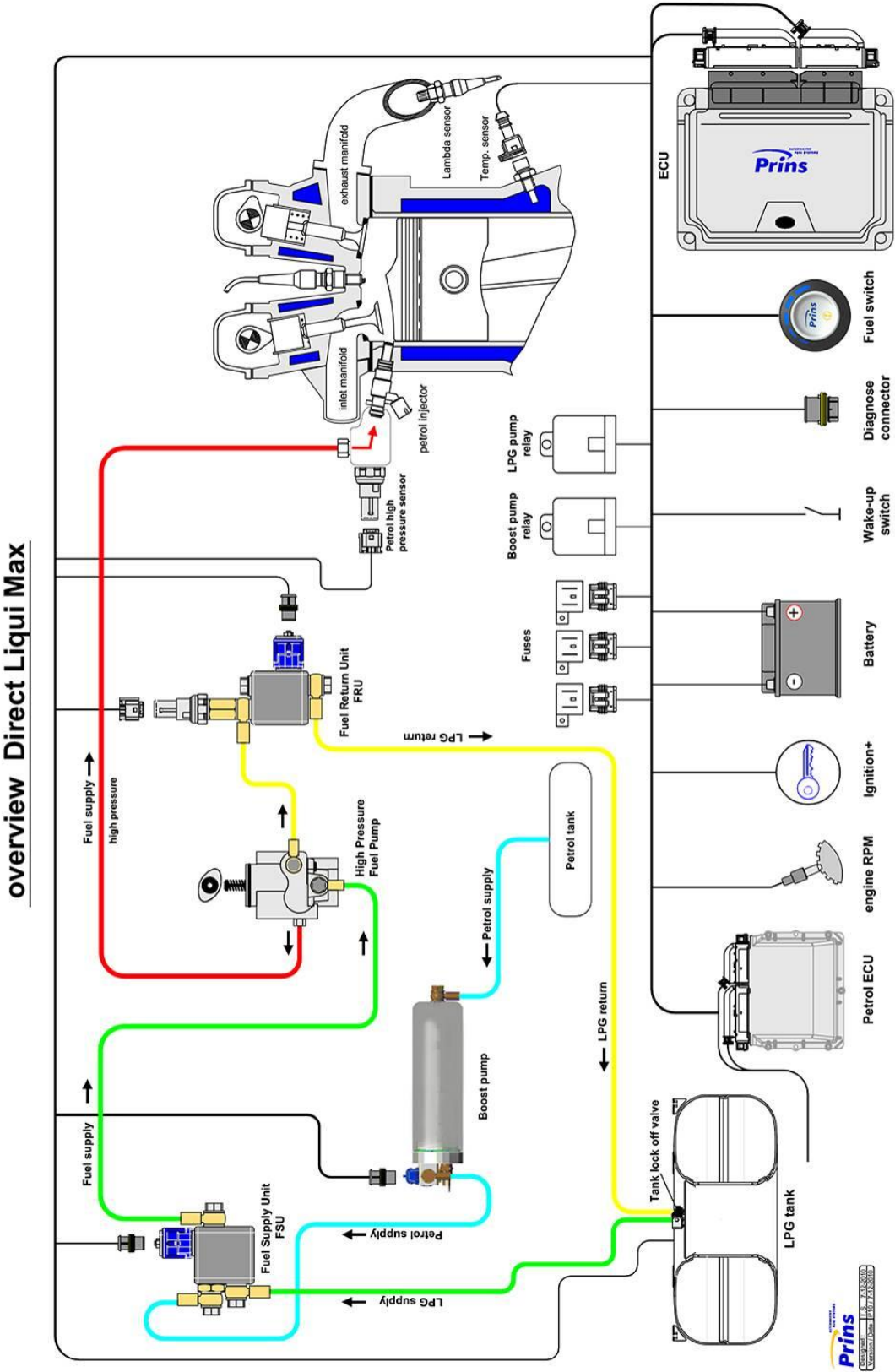
= WEAR SAFETY GOGGLES



Direct LiquiMax



Overview Direct LiquiMax



Direct LiquiMax parts / approval numbers

 1st generation  2nd generation	 1st generation  2nd generation
Fuel Supply Unit : E4-67R-010269	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
	 XD-3 LPG  XD-4 LPG
Prins ECU : E4-67R-010098 E4-10R-030507	Fuel lines series XD : E4-67R-010247 XD3 E4-67R-010247 XD4



DLM component location overview

FRU 	HPP pump 	AFC 	Petrol ECU 
FSU 			System relay 2x 
Boost pump 			System Fuses 

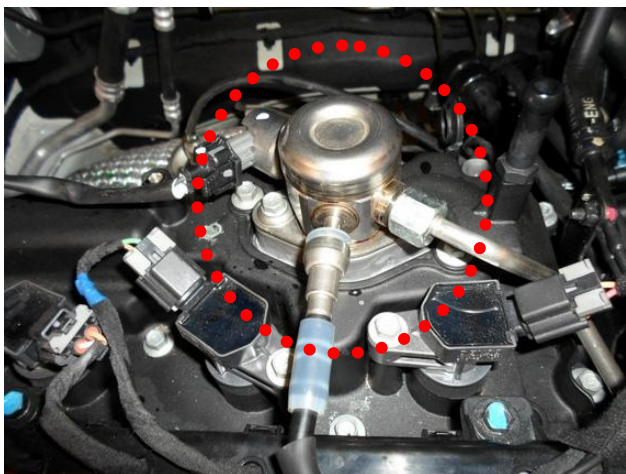
	R115 approval sticker : Right side centre door post
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High pressure pump installation 1



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



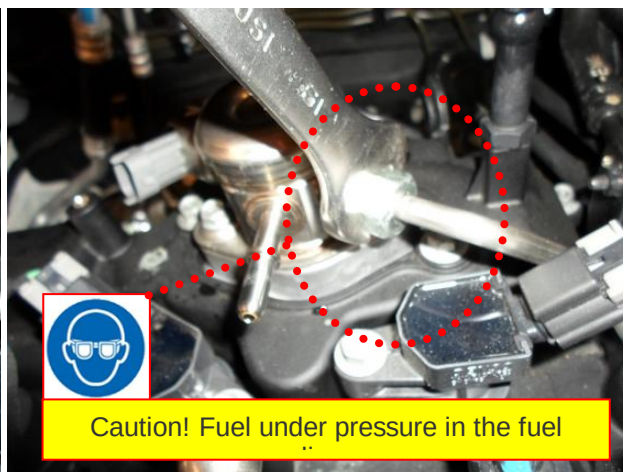
Caution! Fuel under pressure in the line.



Remove the petrol fuel line



Remove the electrical connector.



Loosen the nut of the high pressure pipe with spanner



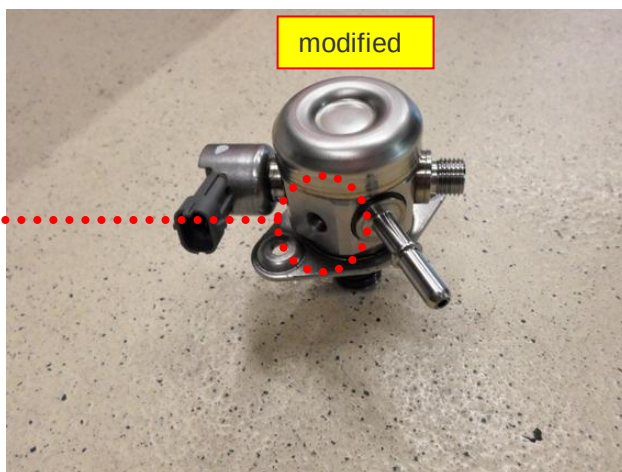
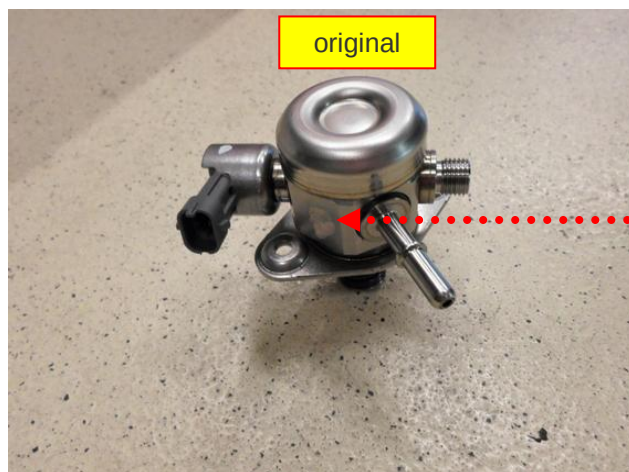
Remove the two mounting bolts from the high pressure pump and remove the high pump from the engine.



High pressure pump installation 2



Cover pump housing until the adapted high pressure pump is mounted.

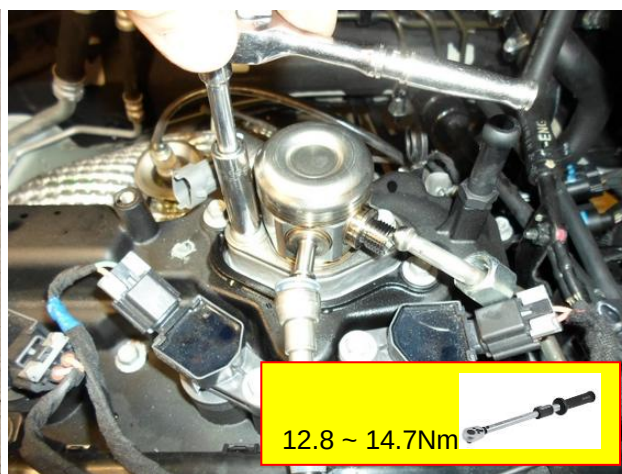


Modified high pressure pump.



High pressure pump installation 3

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



Install the adapted high pressure fuel pump.



Re-install the high pressure fuel pipe



High pressure fuel pump installation bolt:
12.8 ~ 14.7 N.m (1.3 ~ 1.5 kgf.m, 9.4 ~ 10.9 lb-ft)
High pressure fuel pipe installation nut:
26.5 ~ 32.4 N.m (2.7 ~ 3.3 kgf.m, 19.5 ~ 23.9 lb-ft)
High pressure fuel pipe function block installation bolt:
9.8 ~ 11.8 N.m (1.0 ~ 1.2 kgf.m, 7.2 ~ 8.7 lb-ft)



High pressure pump return 2

Mounting quick release



Quick release M10x1



Insert the locking, and check if it is locked



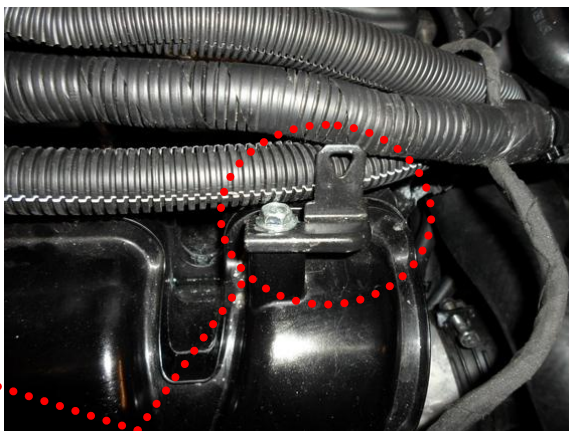
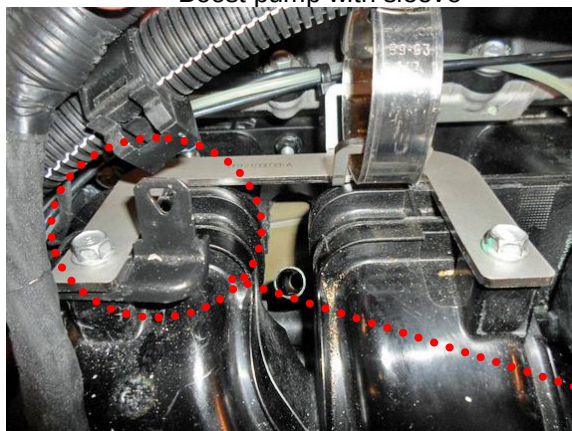
Boost pump



Fit the first directional valve with banjo bolt with quick release and filter with 2 bonded seals on the boost pump inlet.



Boost pump with sleeve



Original harness attachment points.

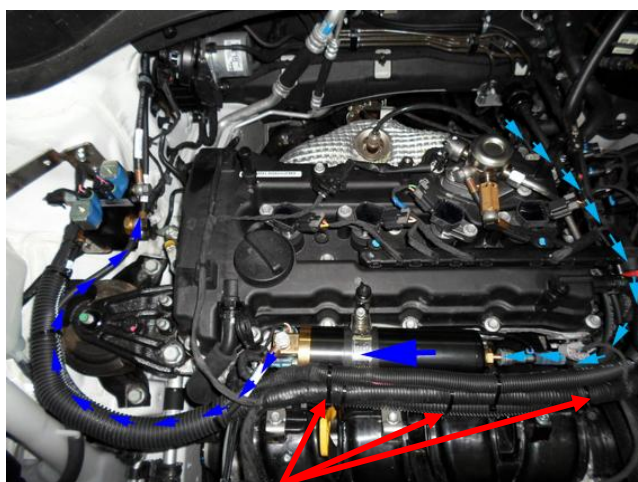
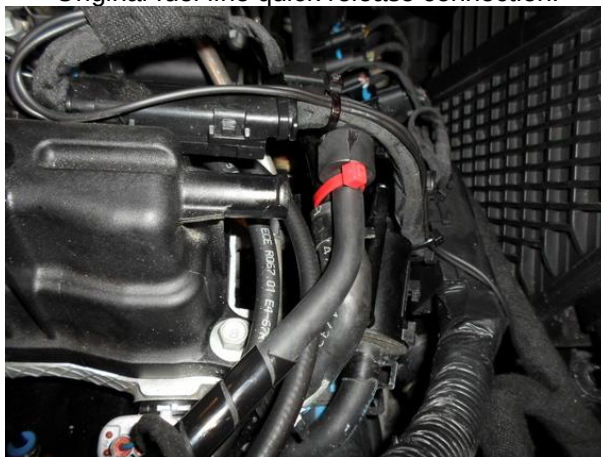
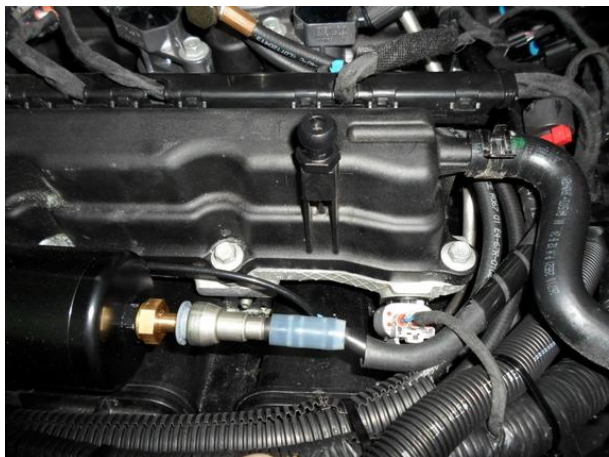


Connection of the fuel hose to the boost pump.

Connect the fuel hoses to the boost pump.



Original fuel line quick release connection.

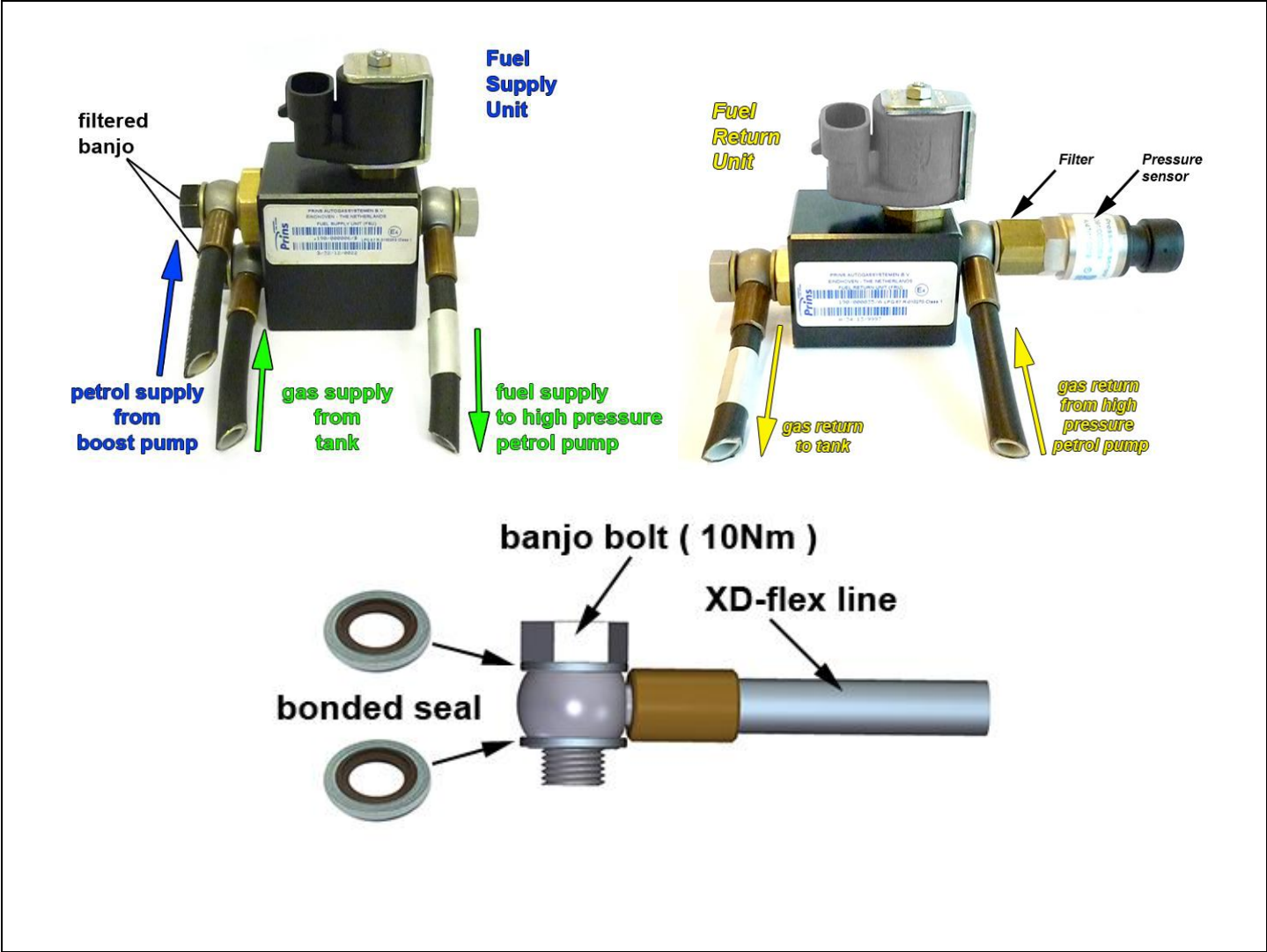


Original harness attachment points.

Remove the plastic clips, and use this plastic clip to hold the fuel lines of the LPG system in place with cable straps.



Fuel Supply and Fuel Return Unit



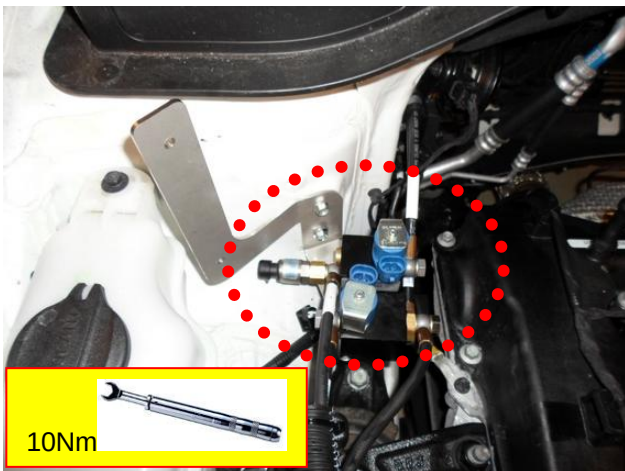
Mounting the Fuel Supply and Fuel Return Unit



Mounting point for the FSU and FRU backing



Two original threaded holes M6



Connect the fuel lines to the FSU, FRU
and
and valve protector banjo quick release 3mm.
connection.

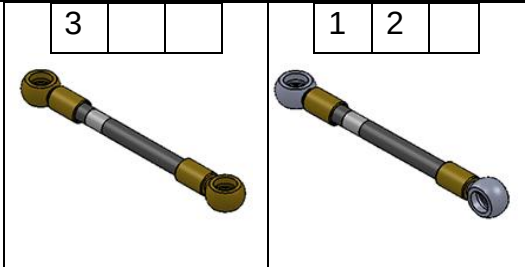
Connect the wires to the pressure sensor, FSU, FRU

→ Banjo quick release nipple Valve protector

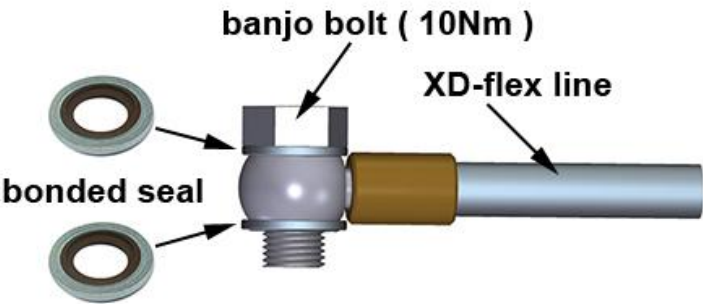


Lpg / petrol fuel lines

	Hose	from	to	Length (cm)
1	XD-3	Petrol boost pump	Fuel supply unit	55
2	XD-3	Fuel supply unit	High pressure petrol pump	110
3	XD-3	High pressure petrol pump	Fuel return unit	115
4	3mm line	Valve Care pump	Quick release nipple	21



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



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



181/300009/A



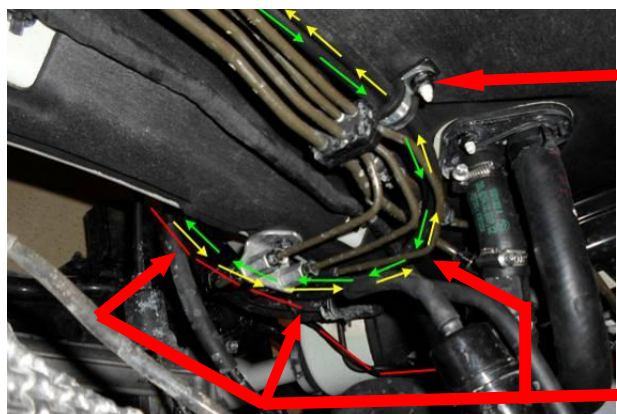
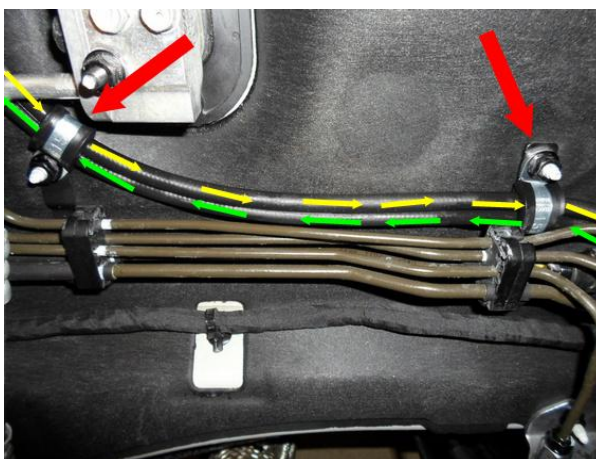
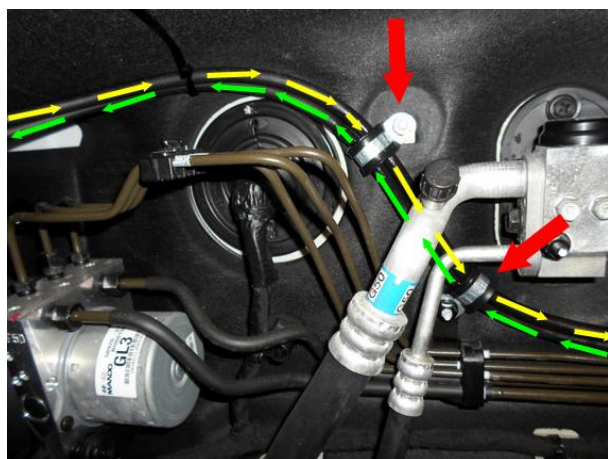
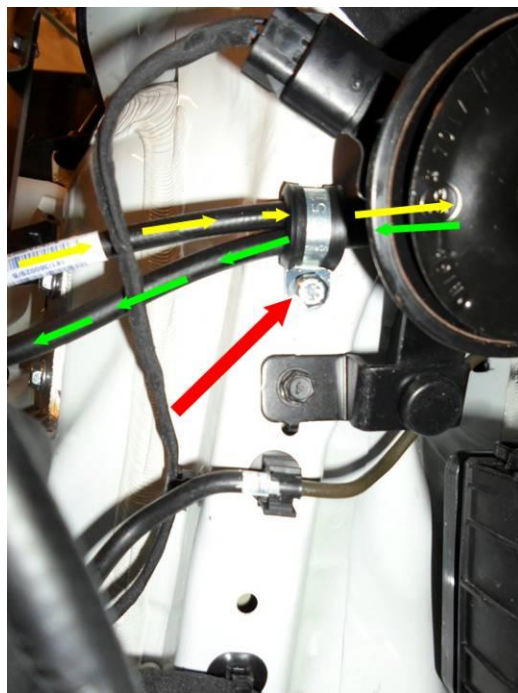
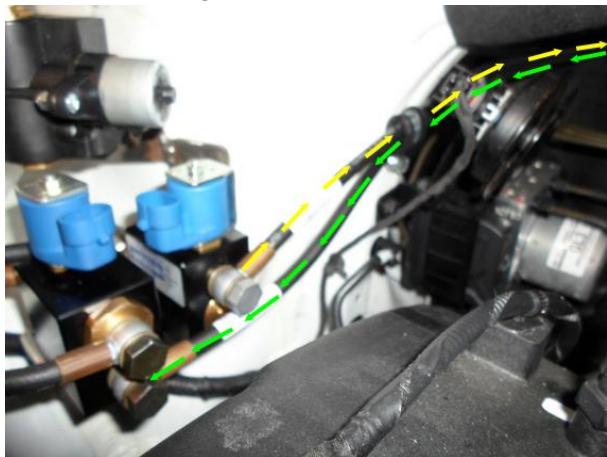
Hose routing 1



Mounting fuel line
with:

- P-clip Ø15mm
- M6 nut
- M6 Bolt x20

Fitting material fuel lines

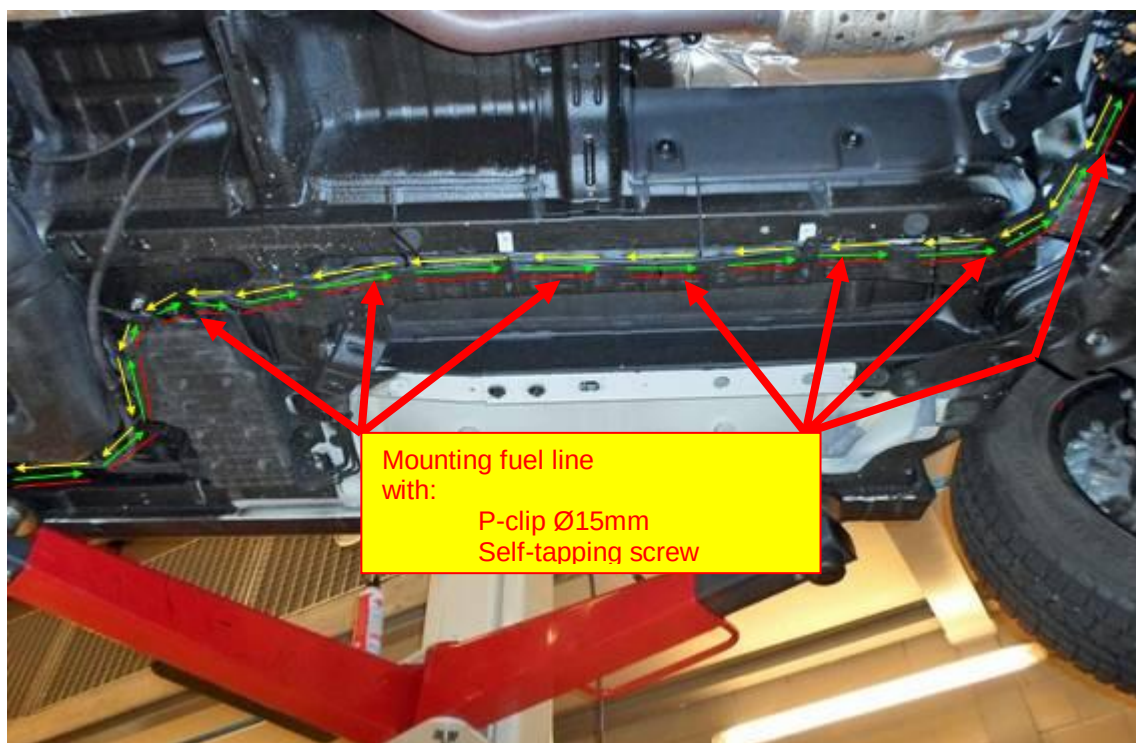


Mounting fuel line
with:

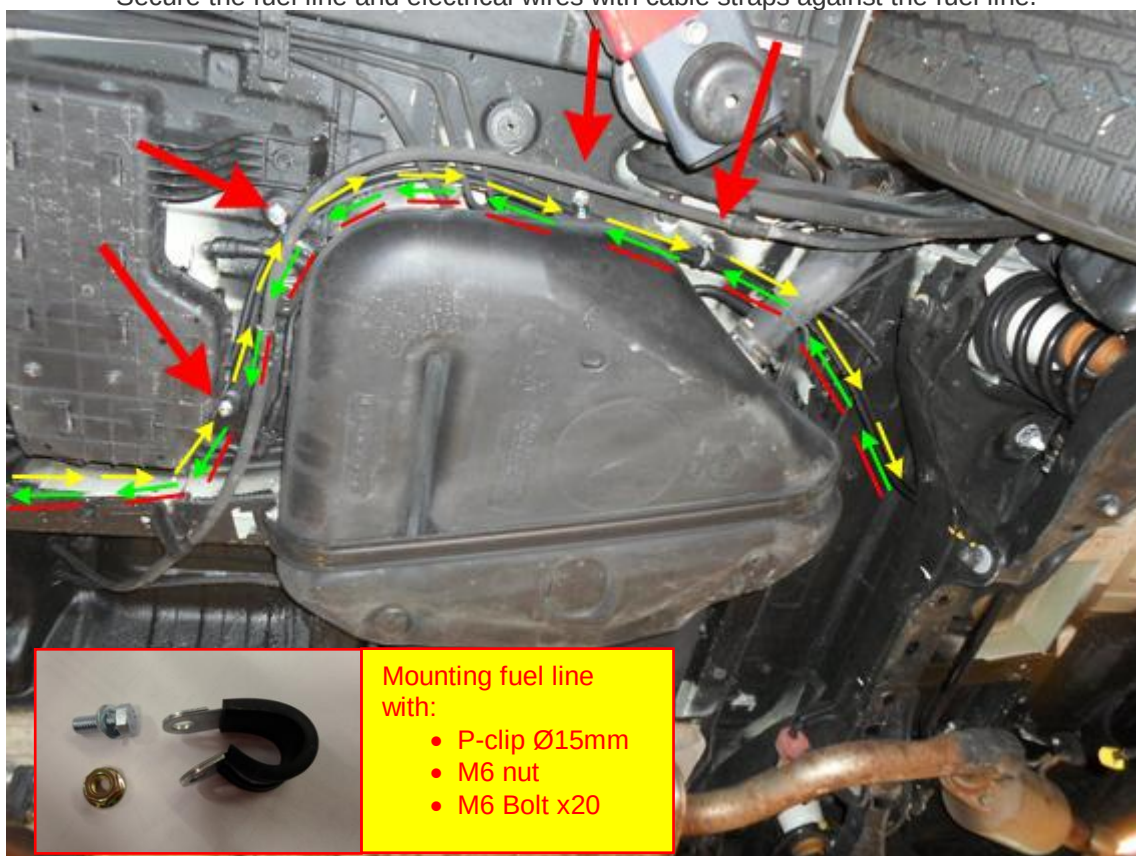
- P-clip Ø15mm
- M6 nut
- M6 Bolt x20



Hose routing 2



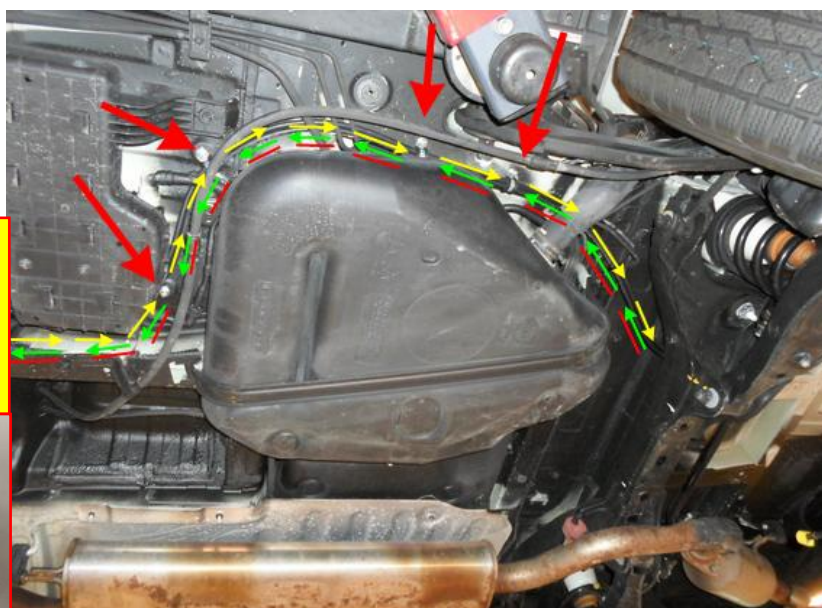
Secure the fuel line and electrical wires with cable straps against the fuel line.



Fitting material fuel lines



Hose routing 3



Fitting material fuel lines.



Mounting fuel line
with:

- P-clip Ø35mm
Self-tapping
screw



Mounting the AFC



Mount the AFC bracket.



Mark the holes and drill two holes Ø8mm.



Double-sided adhesive tape.

Lock with two push pin rivets.



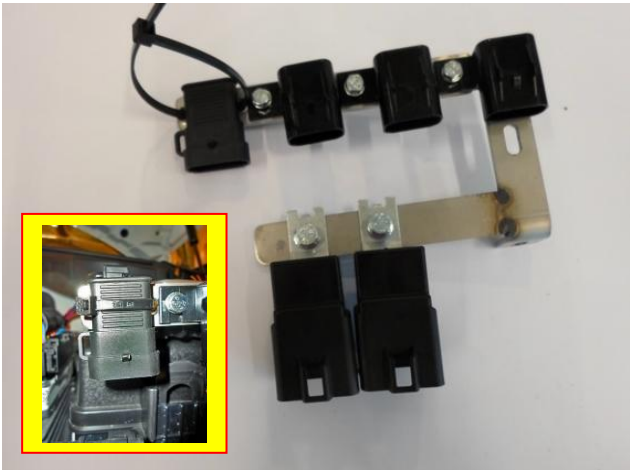
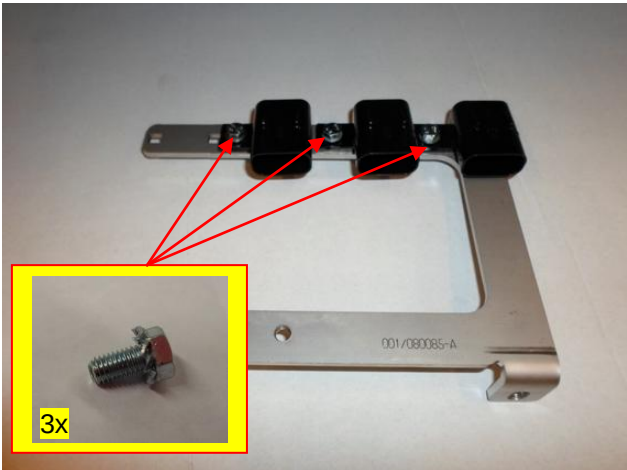
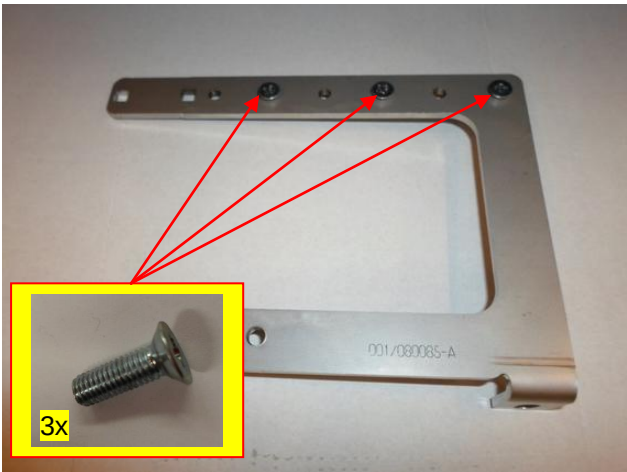
Seal the push pin rivets with silicone sealant.



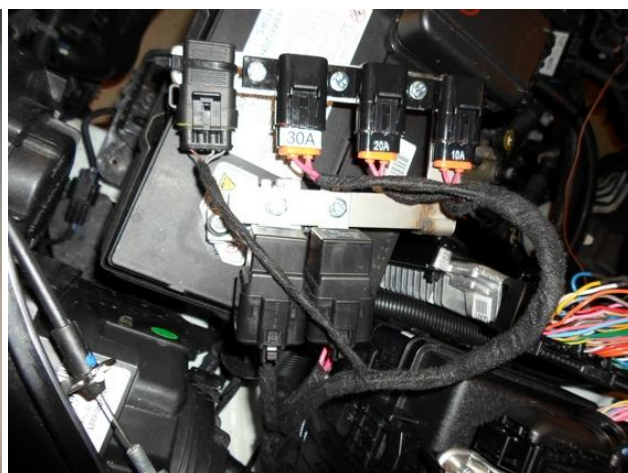
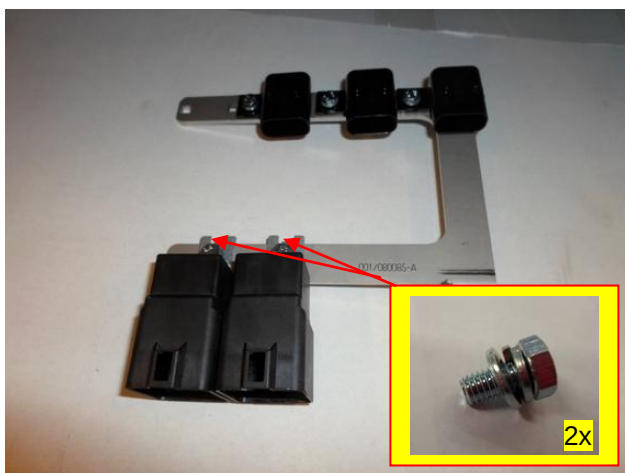
Wiring AFC / relay 1



001/080085/A



Wiring AFC / relay location 2



Mount the relays, fuses and diagnostic connector



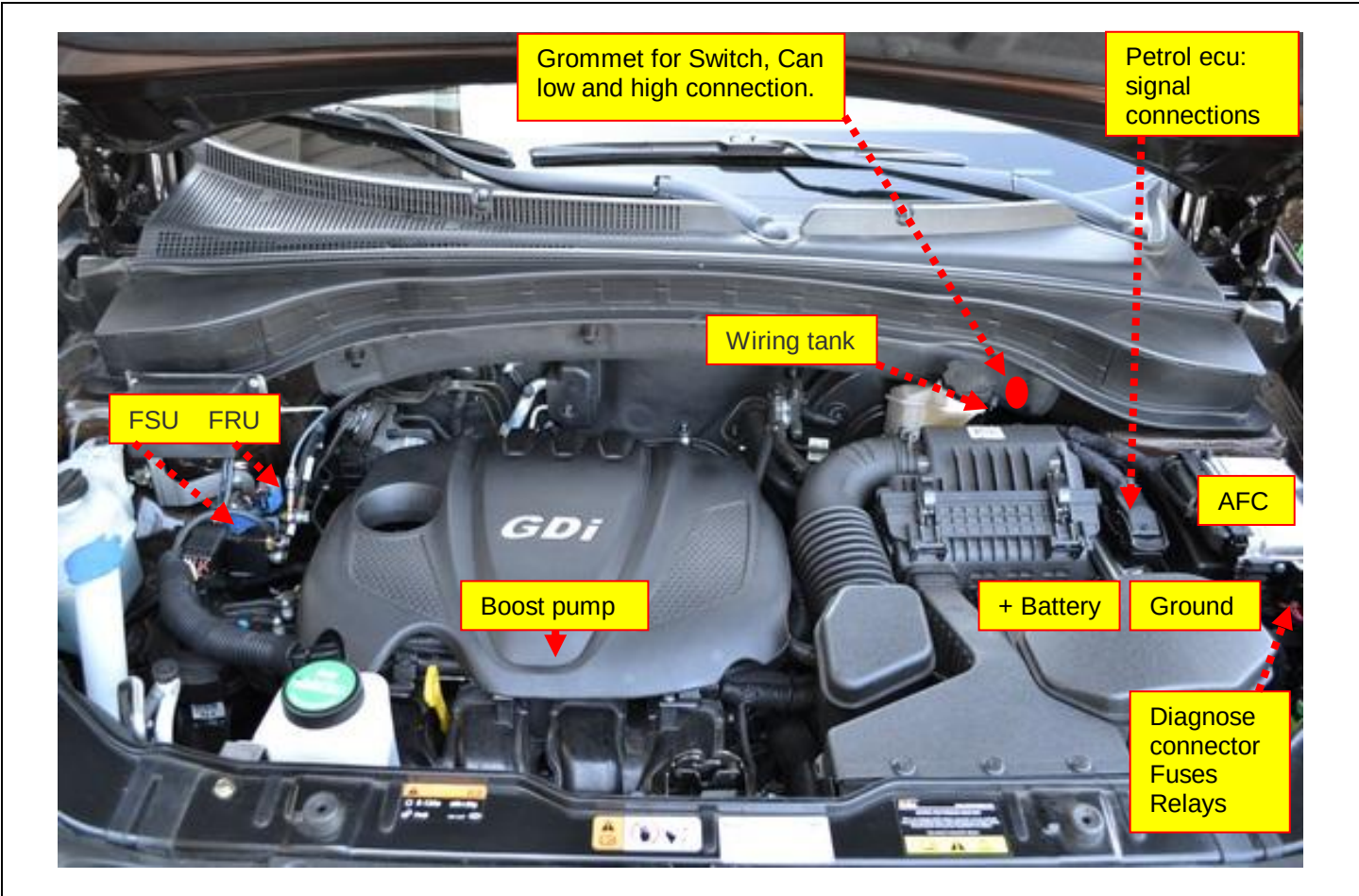
Mount the bracket under the fuse box.
Use original M6 nut.



Secure the wiring against the bracket with a cable strap



Wiring connections



 Mount the switch.

Mounting the fuel selection switch



Drill a hole Ø8.2mm for the switch

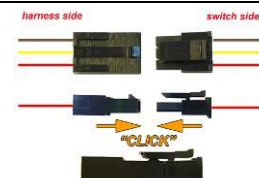


Electrical connections 1

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	Brown	Connect the 3-pole connector to the Prins fuel selection switch.
3 +12V fuel switch	Red	
49 LIN fuel switch	Yellow	



Engine room

Check and measure the wiring in case of changes in the cars wiring colours.

Wire number / code	Wire colour	Connection
1-32 MAIN GND ecu MAIN GROUND SENSE MAIN GND pump driver MAIN GND boost pump	Brown	Connect to the '-' of the battery (-31) ; use a ring terminal. Wire colour : black Wire location :Left site battery original ground Ground cable eye M6
4 – 13 – 44 +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 fuse in the holder before having completed the installation of the lpg system. Wire location :Battery
51 CAN-High	Blue-yellow	CAN-High signal Wire colour : White Wire location : Petrol ecu pin 77 connector C300B
70 CAN-Low	Blue	CAN-Low signal Wire colour : Red Wire location : Petrol ecu pin 60 connector C300B



105	104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
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Connector [C300-A]

91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
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Connector [C300-B]



Electrical connections 2

Check and measure the wiring in case of changes in the cars wiring colours.

Engine room

Wire number / code	Wire colour	Connection
18 Analog 1 25 Simulation 1	Blue-red Green-grey	High pressure petrol sensor signal interruption Sensor side. ECU side. Wire colour : Brown Wire location : Petrol ecu pin 39 connector C300A
19 Analog 4	Blue-white	High pressure petrol sensor ground Wire colour : Black Wire location : Petrol ecu pin 60 connector C300A <u>29 red connect in the wiring harness with blue/white(19)</u>
121 Digital input 3	Grey-red	High pressure petrol 5 volt sensor power Wire colour : Blue Wire location : Petrol ecu pin 12 connector C300A
17 Ad2 (MAP)	Blue-black	MAP sensor. Wire colour : Blue-light Brown Wire location : Petrol ecu pin 82 connector C300A
8 RPM	Purple-white	For measuring the engine speed signal. Wire colour : Blue Wire location : Petrol ecu pin 29 connector C300B
15 T-ect	Grey	For measuring the engine coolant temperature. Wire colour : White-Black Wire location : Petrol ecu pin 63 connector C300A
7 +12V IGNITION	Grey - white	Make a connection to ignition + / contact + (+15). Wire colour : Green-black Wire location : Petrol ecu pin 41 connector C300B

105	104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85
84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22
21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

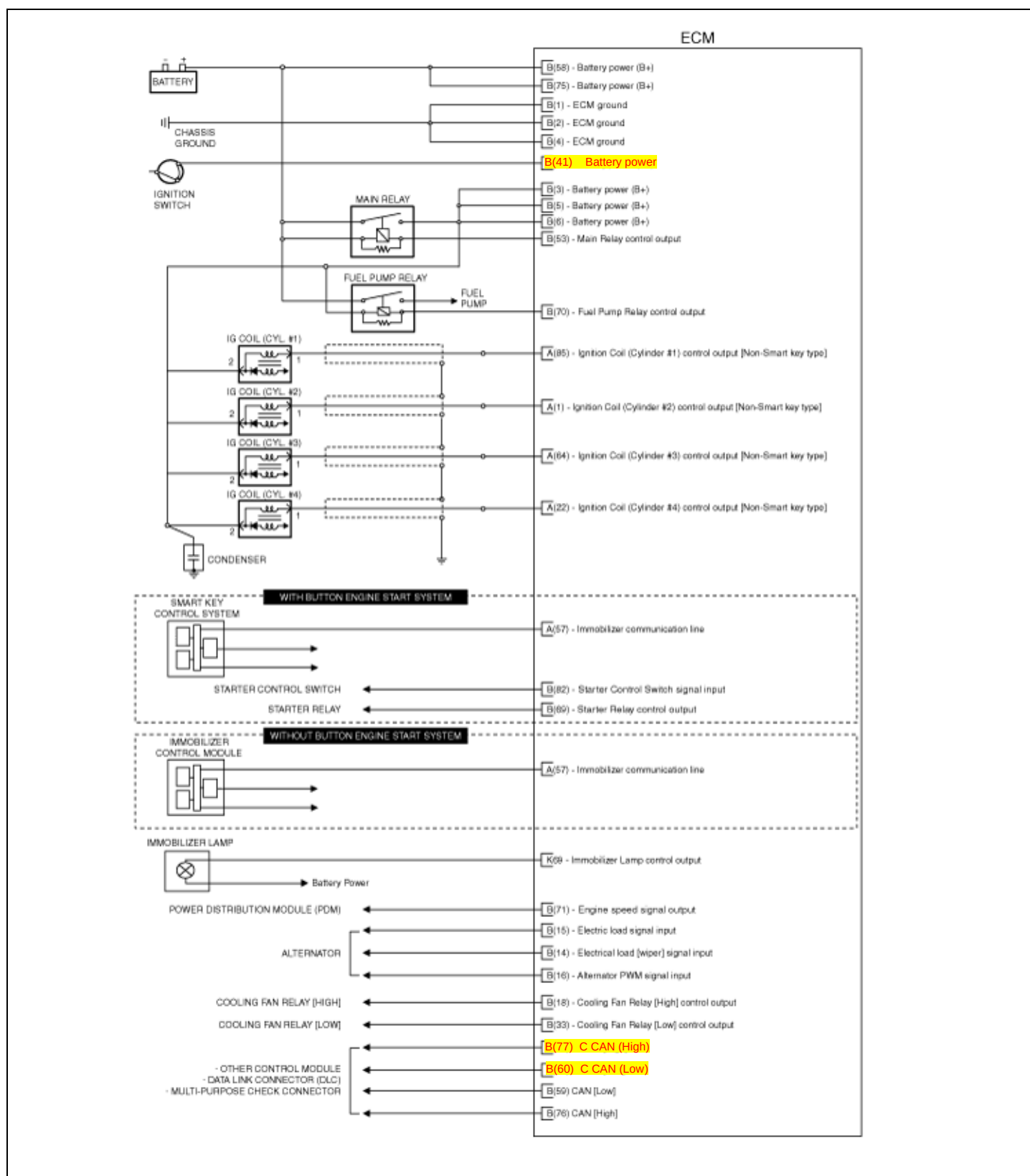
Connector [C300-A]

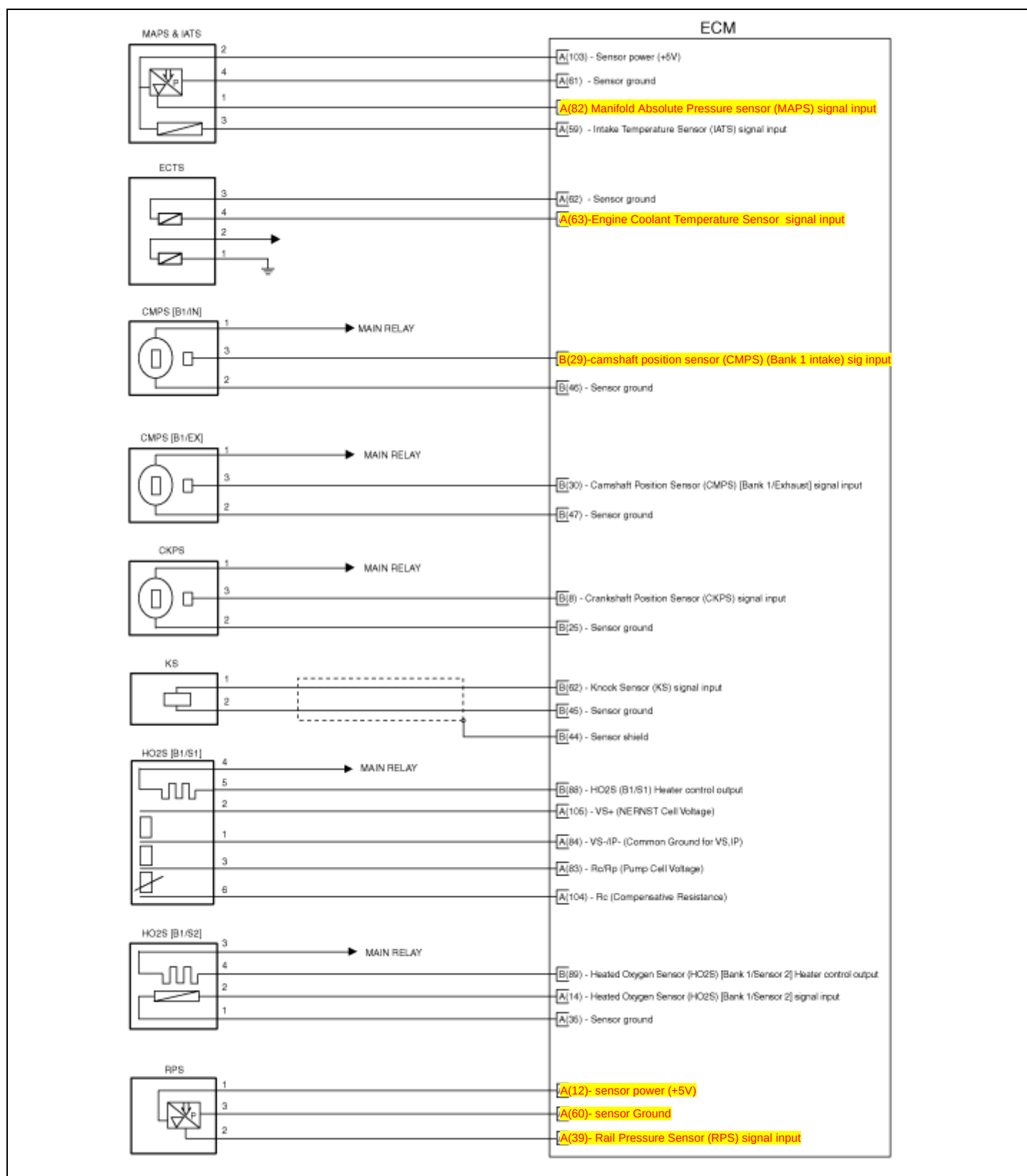
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49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
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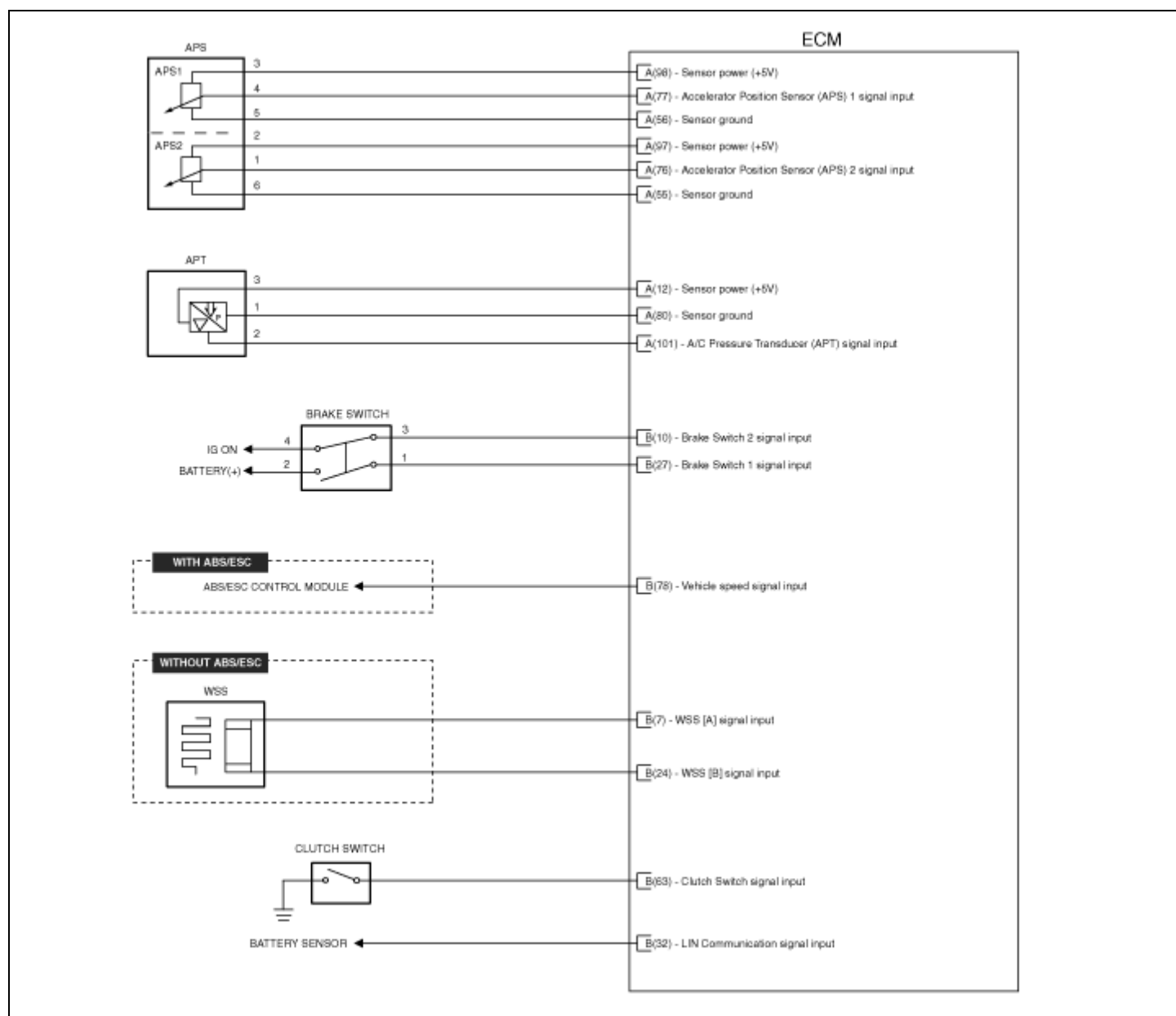
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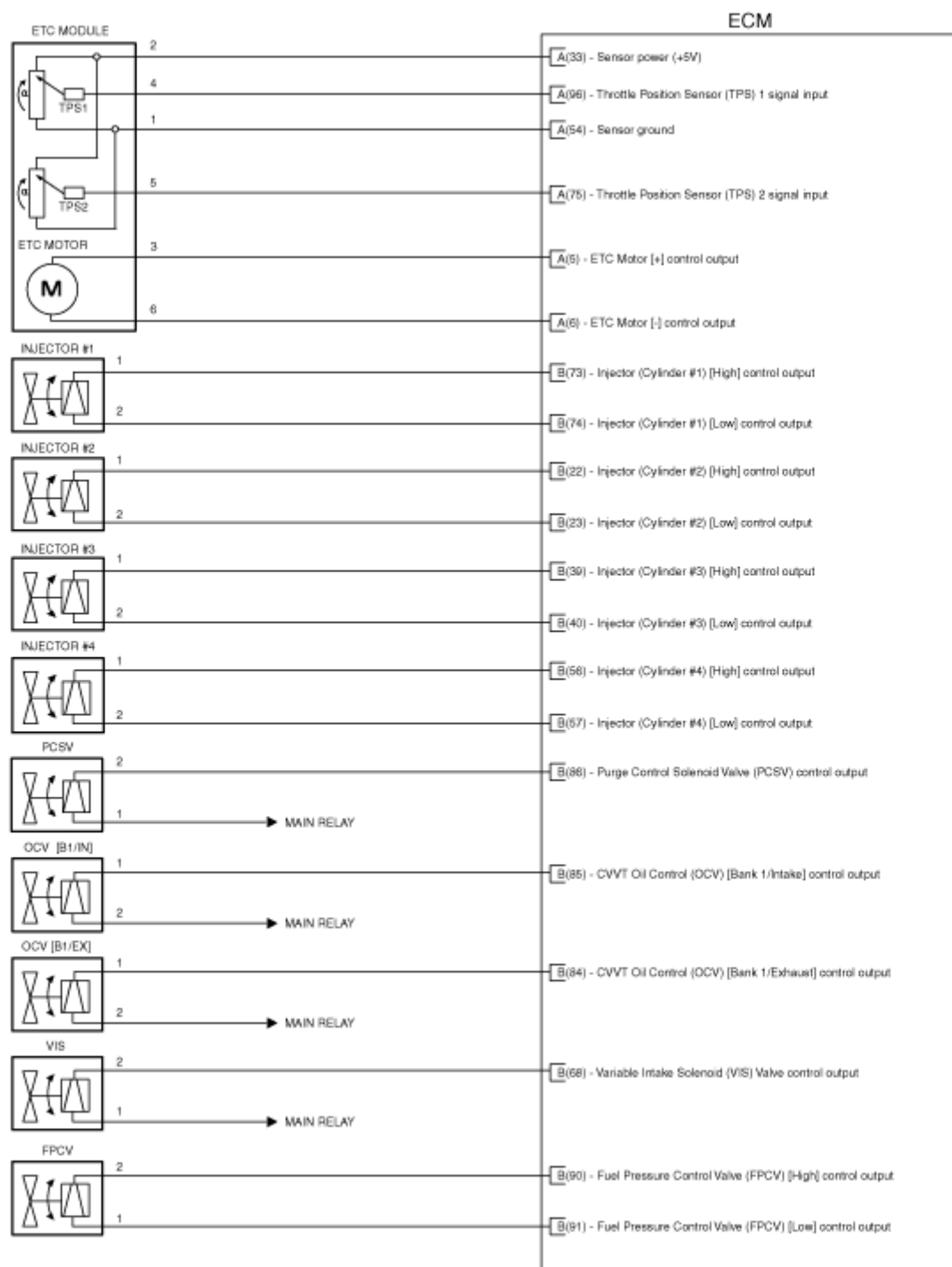


Electrical connections 3









Electrical connections 4

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
<i>3-pole connector</i>		Connect the 3-pole connector to the P-sys sensor positioned into the Fuel Return Unit.
35 C Ground pin A	Brown	Sensor wire pin A
9 +5V sensor pin B	Red	Sensor wire pin B
16 P-sys pin C	Green	Sensor wire pin C
14 T-LPG	Grey	Not used, insulate.
<i>2-pole connector Boost Pump</i>	Red	Connect the 2-pole connector to the lock-off valve of the Boost Pump.
106 + Lock-off Boost Pump	White-yellow	
98 Ground lock-off		
<i>2-pole connector FSU</i>	Red	Connect the 2-pole connector to the lock-off valve of the Fuel Supply Unit
108 + Lock-off FSU	Pink-yellow	
100 Ground lock off		
<i>2-pole connector FRU</i>	Red	Connect the 2-pole connector to the lock-off valve of the Fuel Return Unit
90 + Lock-off FRU	Blue-yellow	
82 Ground lock off		
<i>4-pole diagnose connector</i>	Grey	Diagnose connector for service / diagnosis
46 Service TxD	Grey	Connector pin 1
65 Service RxD	Brown	Connector pin 2
68 C ground		Connector pin 4
<i>Boost pump relay</i>	Red	Pin 86 of the boost pump relay
107 + relay boost pump	Green-yellow	Pin 85 of the boost pump relay
99 GND relay boost pump	Red	Pin 30 of the boost pump relay
+12V fused BATT	Red	Pin 87 of the boost pump relay
+12V Boost pump		
<i>Wiring tank pump driver relay</i>	Red	Pin 86 of the driver relay
2 + driver relay	Green-yellow	Pin 85 of the driver relay
26 Ground driver relay	Red 2.5mm2	Pin 30 of the driver relay
+12V BATT fused	Red 2.5mm2	Pin 87 of the driver relay
+12V driver		



Electrical connections 5

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

Trunk in the Lpg tank housing

Wire number / code	Wire colour	Connection
3-pole tank level connector 40 Ground tank gauge 12 Tank level in 11 + tank level supply	Brown Blue Red	Connect the 3-pole connector to the tank level sensor.
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 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 22 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.



Prins safety sticker and type sticker 1



safety sticker



safety sticker



safety sticker left door

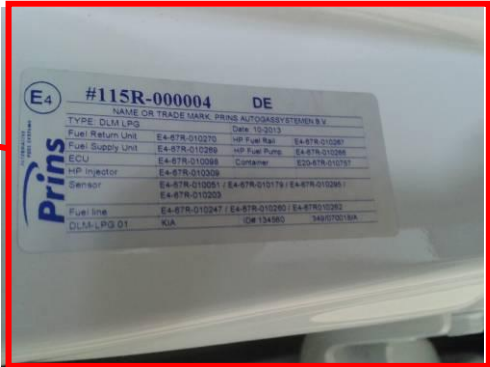


LPG tank



Prins safety sticker and type sticker 2

R-115 sticker



R-67 sticker

