ALTERNATIVE FUEL SYSTEMS

Prins

PEUGEOT CITROËN

Installation manual

PART 2/2

MANUFACTURER	PSA (Peugeot / Citroën)
ENGINE DISPLACEMENT	1600cc
NUMBER OF VALVES	16
ENGINE CODE / NUMBER - OUTPUT	EP6CDT/5FV/5F02 - 115kW
FIRING ORDER	1-3-4-2
VEHICLE CATEGORIES	M
TRANSMISSION	MT / AT
VERSION	AFC-2.1 DI-LPG
TYPE VSI INJECTOR	KN9 - 63cc
TYPE INJECTION MODULE	Gen2 Type 1
PETROL ECU MANUFACTURER / CODE	BOSCH MED 17.4.2
MODEL YEAR:	2009
SYSTEM APPROVAL NUMBER (R115)	E4-115R-000023 / VSI-LPG 34
LOCATION R115 SYSTEM STICKER	right side, centre door post
ENGINE SET NUMBER	358/121000/A
MANUAL NUMBER	076/1803000-1
DATE	2019-06-06

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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.
- 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 and alarm system.
- Do not place the main fuse into the fuse holder before having completed the installation of the VSI system.
- The VSI computer has to be activated by means of the diagnosis software.
- In the unlikely event the AFC fails, it will automatically switch over to petrol.
  Never disconnect the AFC connector, unless you have removed the main fuse.
- When installing the VSI 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 the 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 100mm of the exhaust or similar heat source, unless such components are adequately shielded against heat.
- Remove any internal burrs after having shortened the LPG pipe.
  (This guarantees the maximum flow through the pipe without pollution.)
- 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 an exterior filler into the body work).
- After having completed the installation, check the whole system for gas leakage; use a gas leak detection device. Also check for any 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’s 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.

Please fill in the warranty portal completely within 14 days after installation.

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 no. 099/99928)
- Exhaust gas analyser
- Multimeter
- Oscilloscope
- Prins diagnostic software
- Prins Diagnostic Tool
- Torque wrench (5-50Nm)
- Torque wrench (200-250Nm)
- Portable light
- Assortment drill bits Ø4 to 12 mm
- Assortment cutters (Ø20, 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

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

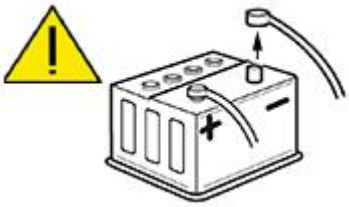
Tightening moments

		Nm	Spanner mm
M5 x 0,8		6.5	8
M6 x 1,0		11.3	10
M8 x 1,25		27.3	13
M10 x 1		52	15-16-17
M10 x 1,5		54	15-16-17

LPG manifold nipple		1	3.5 Allen
Reducer nut - bracket		10	13
Lock-off nut		15	16
Fuel line nut – lock-off		20	13
Fuel line tank – lock-off		20	16
Filling hose connections		50	22

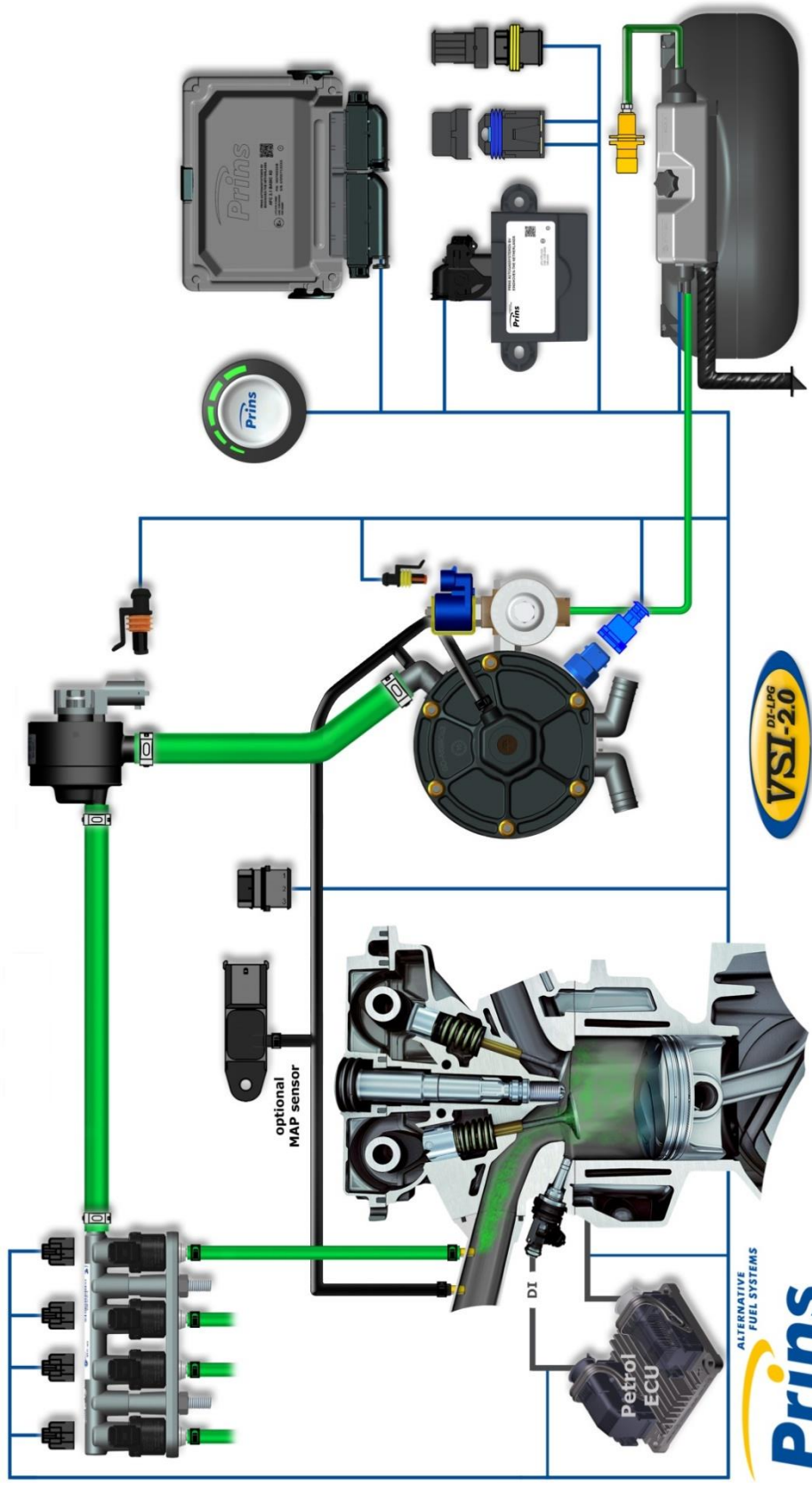
EXPLANATION OF SYMBOLS:

= IMPORTANT, CAUTION



= WEAR SAFETY GOGGLES

Basic System Overview



VSI approval numbers

Reducer VSI LPG Prins : E4-67R-010054
Lock-off valve OMB : E8-67R-014327
Lock-off valve Valtek : E4-67R-010041

Injector rail Prins : LPG E4-67R-010093
CNG E4-110R-000021

Filter unit T1 / T2 Prins : LPG E4-67R-010096
CNG E4-110R-000028
Filter unit Keihin: LPG E4-67R-010177
CNG E4-110R-000091

Injector Keihin KN9 : LPG E4-67R-010310
CNG E4-110R-000295

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

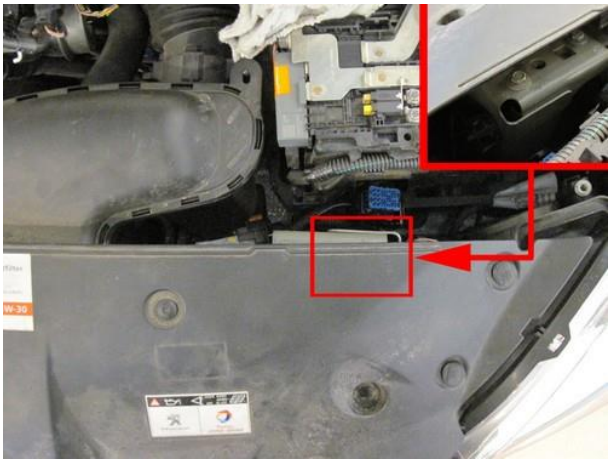
Tubithor : LPG E13-67R-010145
CNG E13-110R-000017
Rubia : LPG E4-67R-010068
CNG E4-110R-000003
WinLas : LPG E37-67R-010140
CNG E37-110R-000012
Thunderflex LPG E24-67R-010018
CNG E24-110R-000040

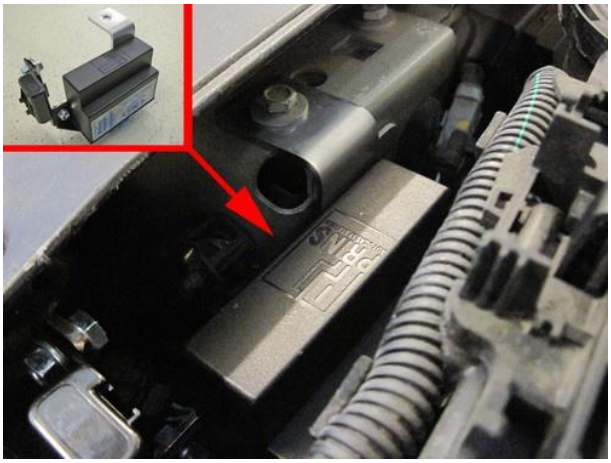
Installation Examples

(based on Peugeot 508)

Switch

Reducer & AFC





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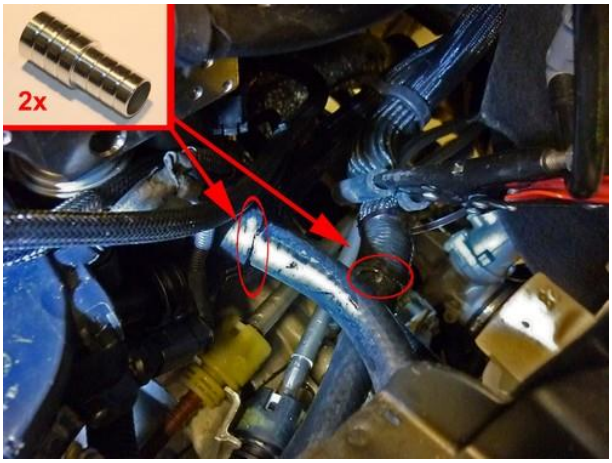
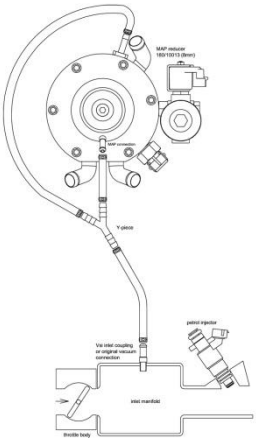


Coolant connections: Cut the original hose on the left side on the engine. Mount the 2 water couplings.

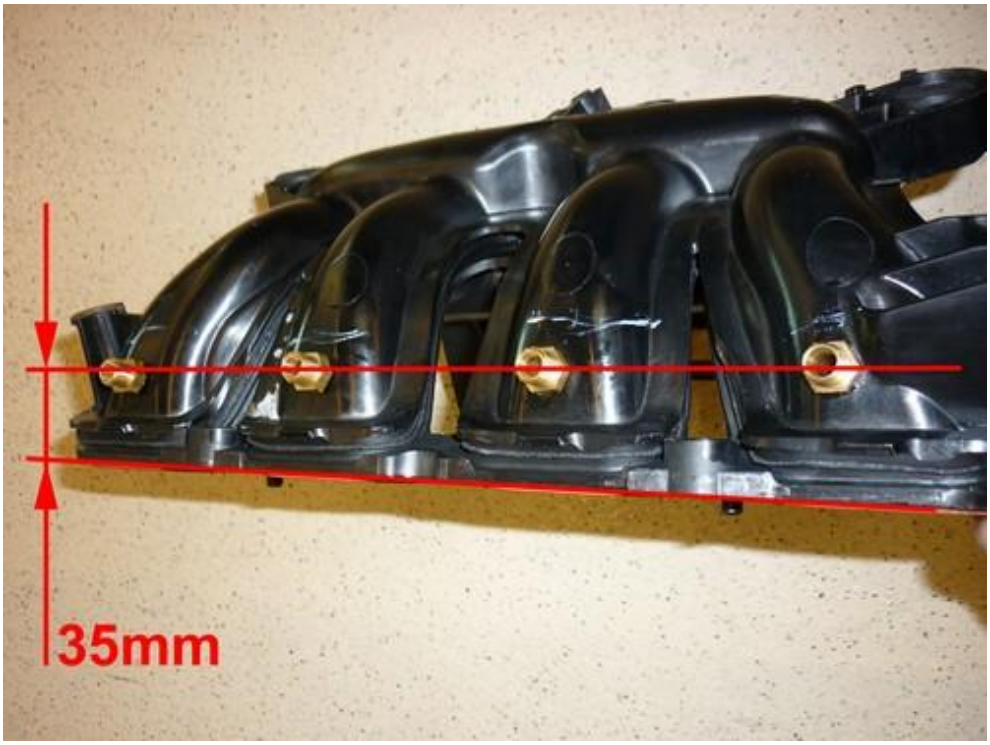
Overpressure / MAP connection



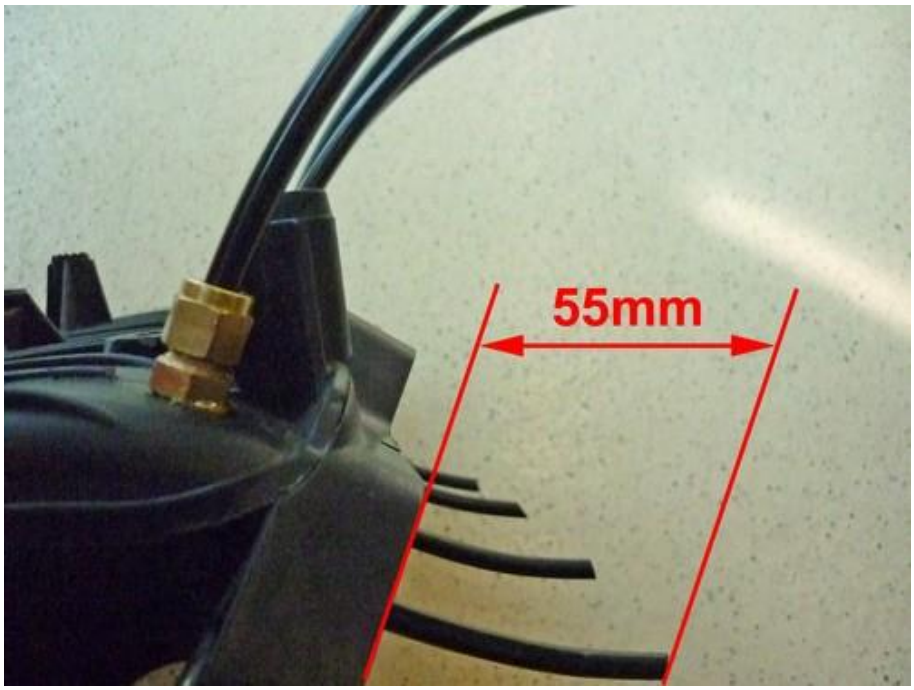
Drill a hole Ø5mm into the manifold and cut M6x1 thread into the hole.
Mount coupling with a locking compound.

Mounting the inlet manifold couplings

Remove the inlet manifold.
Drill **4** holes of **9** mm in the inlet manifold. Cut M10x1 thread in these holes.
Place the VSI couplings with a lock compound in the inlet manifold.
Watch out that the lock compound doesn't come inside the VSI couplings.
Install hoses and place the inlet manifold back on the engine.



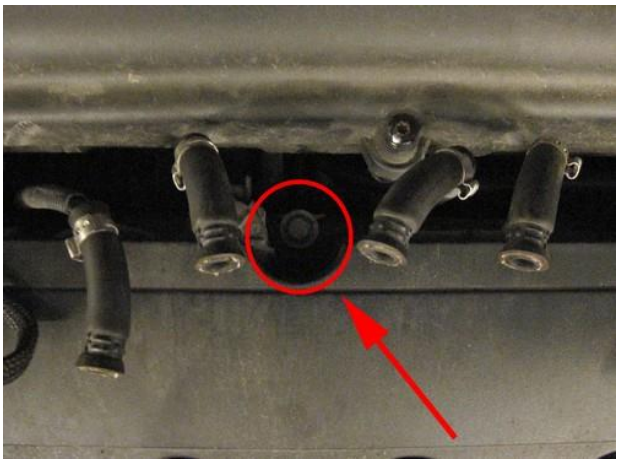
Mount the VSI couplings to the inlet manifold.



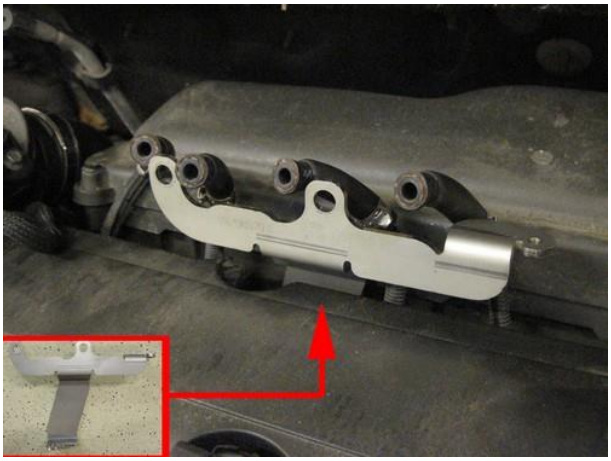
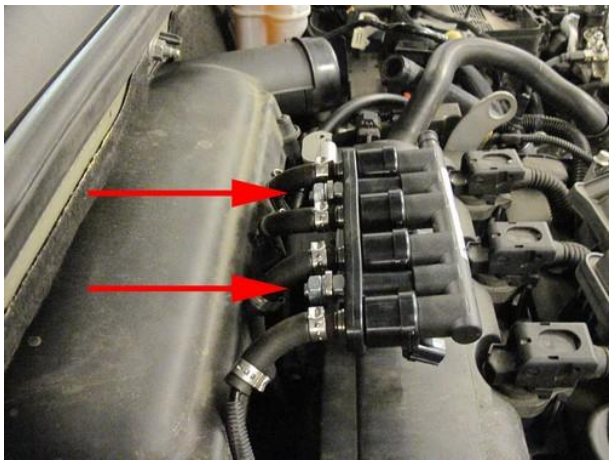
Mount the nylon hoses to the couplings.

Mounting the VSI injector rail

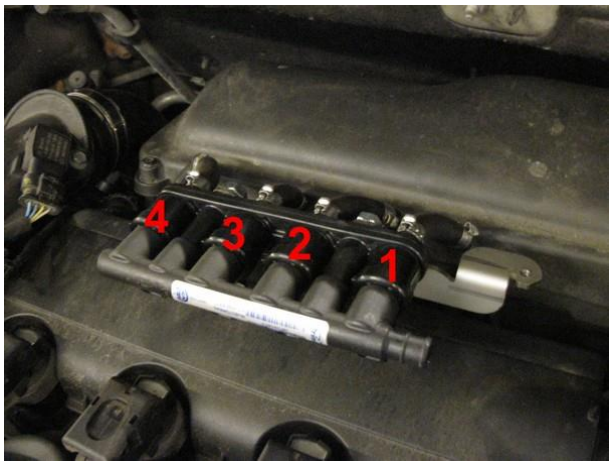
Mount the injection rail with the bracket.

Mount bracket on original bolt from valve cover.

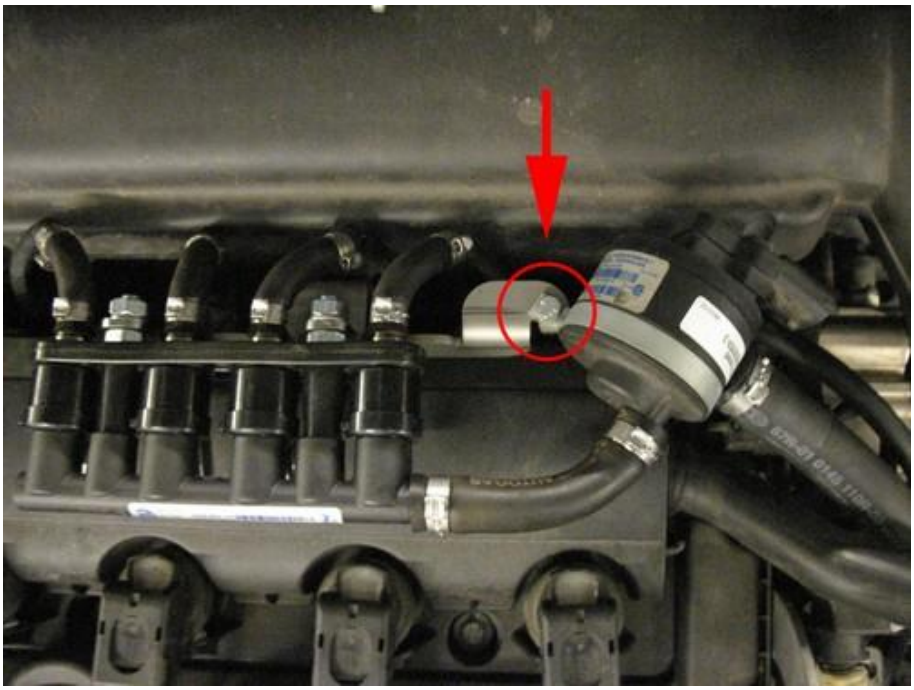
Mount rail to bracket.



Cut nylon hoses on right length and connect them to the rail with 6mm LPG hose.
Beware of the order of the injectors. Cylinder 1 is located on the gear box side.

Mounting the Prins filter unit

Filter replacement must be recorded in the service book supplied



Mount the filter with the supplied clamp & bolt to the injector rail bracket.

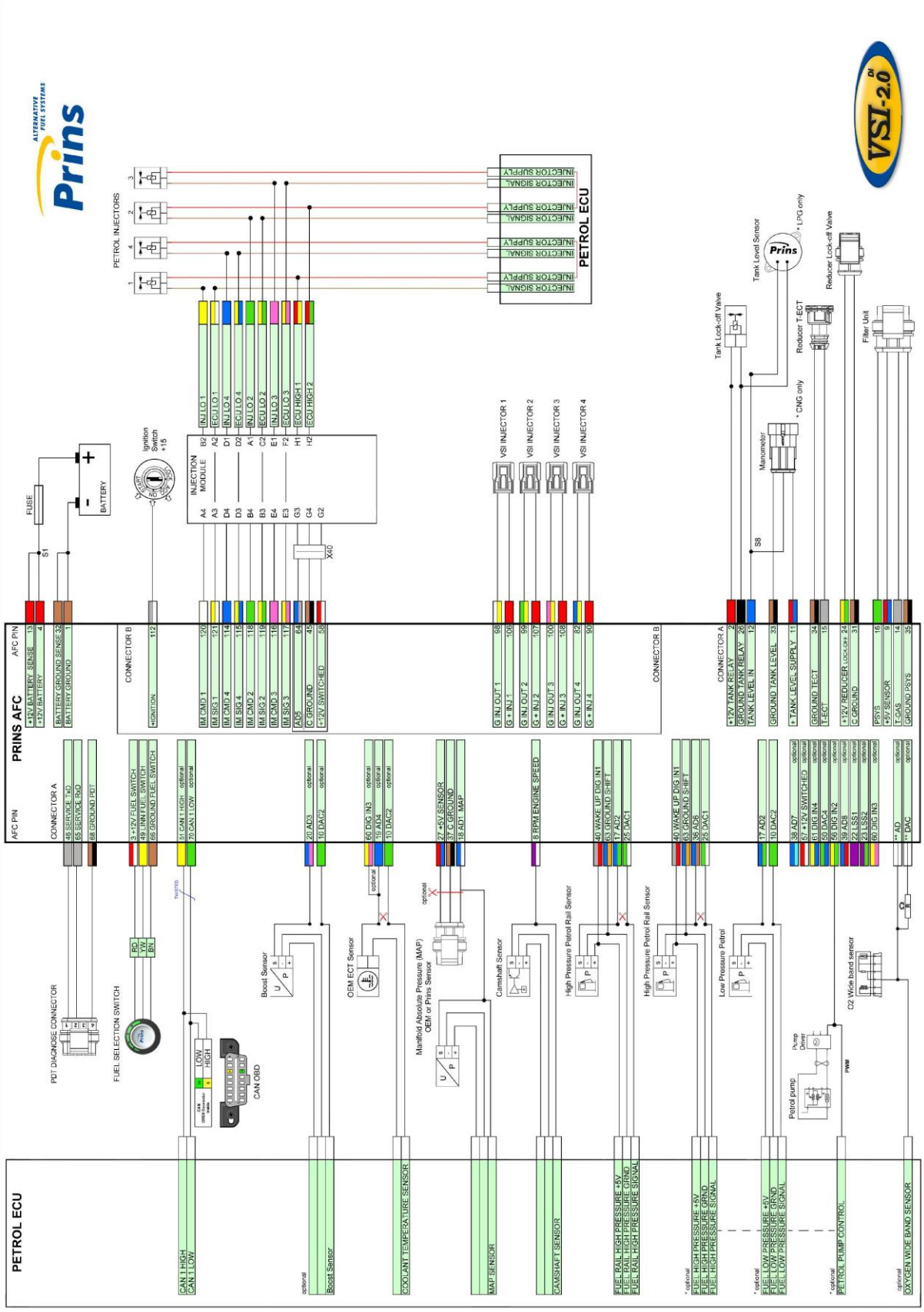
LPG hoses

Hose (Ø..mm)	*From component*	*To component*	*Hose length (cm)*
11	Prins filter unit	VSI injector rail	9
6	VSI injector 1	Nylon hose cyl. 1	6
6	VSI injector 2	Nylon hose cyl. 2	6
6	VSI injector 3	Nylon hose cyl .3	6
6	VSI injector 4	Nylon hose cyl..4	6
6	Nylon hoses through inlet couplings (cut on length later)		

General info.
Cut the LPG hoses on length.
Cut the nylon hoses on length, make sure that the inlet of the nylon hose faces the injector outlet.

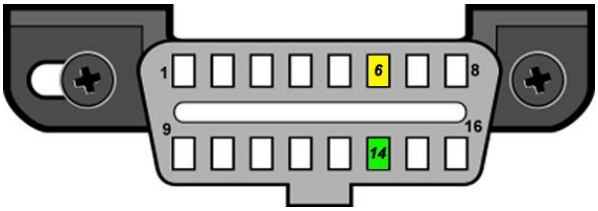
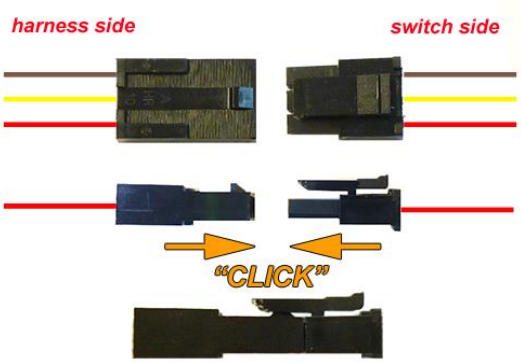
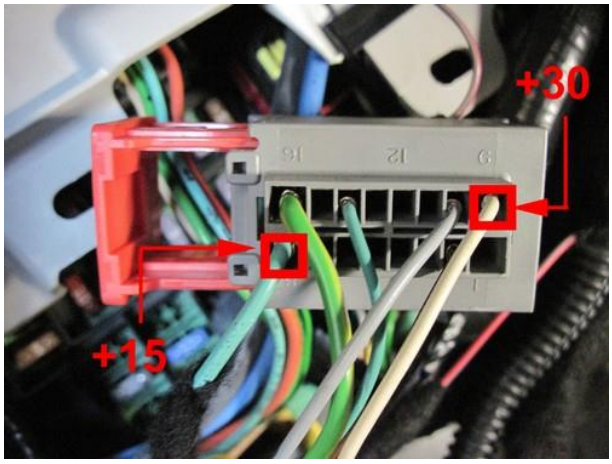
Please observe that there is no damage or fouling to the hoses.

Basic Wiring Diagram



Electrical connections – Driver room 1

Driver room

51 CAN1 High 70 CAN1 Low	Yellow Green	Connect to EOBD diagnose connector Pin : 6 Pin : 14
		
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
		
112 + Ignition	Red - grey	*Make a connection to ignition + / contact +.* Do not place the fuse in the holder before having completed the installation of the LPG system. *(Based on Peugeot 508)* Wire colour : **Green** Wire location : BCM, grey **16p** connector, pin **8**
		

Electrical connections – Driver room 2

Driver room

Mount the **second CAN module** to the big AFC connector / main wiring loom. 53 CAN2 High - Yellow-black 72 CAN2 Low - Green-black		*Petrol level gauge reset via OBD* Mount the **second CAN module** to the big AFC connector / main wiring loom. 
53 CAN2 High 72 CAN2 Low	Yellow-black Green-black	*Connect to EOBD diagnose connector (petrol gauge reset).* Pin : 3 Pin : 8

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
32 Ground sense 1 Ground battery	Brown Brown	Connect to the '–' of the battery; use a ring terminal or solder: Wire colour : **Black** Wire location : **- (ground) battery**
4 +12V Battery	Red	Do not place the fuse in the holder before having completed the installation of the LPG system. Wire colour : **Red** Wire location : **+ Battery**
98 98 G INJ OUT **1** 106 106 G + INJ 1	**White - yellow** red	Connector VSI-injector to cylinder **1**. ***Gear box side!!***
99 99 G INJ OUT **2** 107 107 G + INJ 2	**Green - yellow** red	Connector VSI-injector to cylinder **2**.
100 100 G INJ OUT **3** 108 108 G + INJ 3	**Pink - yellow** red	Connector VSI-injector to cylinder **3**.
82 82 G INJ OUT **4** 90 90 G + INJ 4	**Blue - yellow** red	Connector VSI-injector to cylinder **4**.
22 LSS1	Purple	*Make a connection to the High Pressure Pump Actuator* Wire colour : **White** Wire location : Petrol ECU, brown connector **53p**, pin **45** ***Extend the LSS1 wire with an insulated / not used wire.***
27 +5V Sensor 37 C ground 18 AD1	Red – blue (not used) Brown - black (not used) Blue - white	*For measuring the inlet manifold pressure (MAP).* Wire colour : **Yellow** Wire location : Petrol ECU, brown **53p** connector, pin **21**
17 AD2 25 DAC1	Blue – green Green - white	*High pressure petrol sensor signal interruption.* Sensor side. ECU side. Wire colour : **Yellow** Wire location : Petrol ECU, grey connector **32p**, pin **A3**
63 Ground shift	Blue – orange	*Make a connection to boost pressure sensor.* Wire colour : **White** Wire location : Petrol ECU, brown connector **53p**, pin **13**
8 RPM engine speed	Purple - white	*For measuring the engine speed.* Wire colour : **Yellow** Wire location : Petrol ECU, grey connector **32p**, pin **A2**
38 AD7 10 DAC2	Blue – light blue Green	*Boost sensor signal interruption.* Sensor side. ECU side. Wire colour : **Light blue** Wire location : Petrol ECU, grey connector **32p**, pin **B4**
20 AD3	Blue – pink	*Make a connection to first lambda sonde.* Wire colour : **Yellow** Wire location : Petrol ECU, brown connector **53p**, pin **22**
40 Wake-up	Grey – red	*Make a connection +5V boost sensor.* Wire colour : **Blue** Wire location : Petrol ECU, brown connector **53p**, pin **38**

Insulate not used wires

19 AD4	Blue	Insulate
56 DI2	Yellow – green	Insulate
Insulate additional not used wires		

Electrical connections

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

⚠ For measuring the petrol injectors :

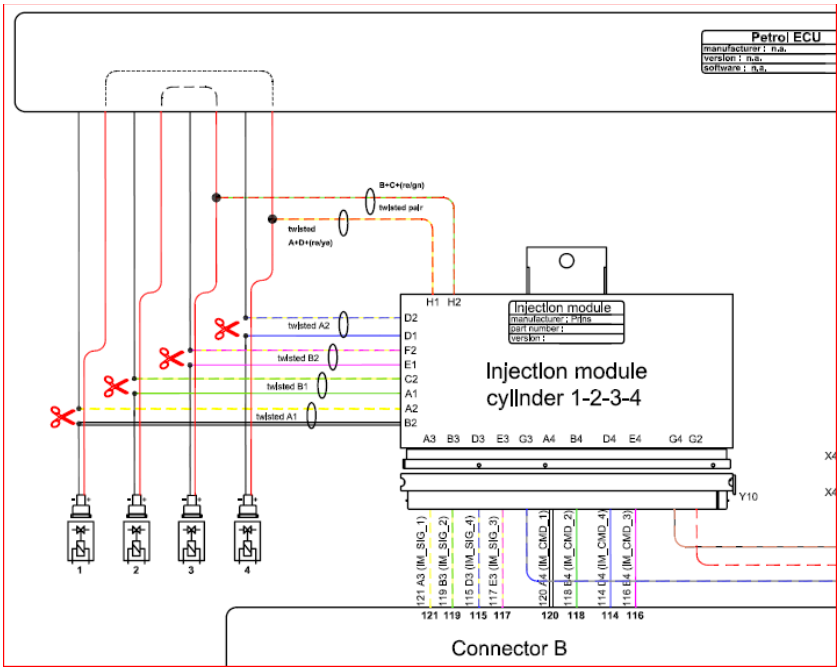
Interrupt each petrol injector control wire (injector min)
Each VSI wire has a petrol injector / cylinder number printed on the wire, connect this wire to the corresponding petrol injector / cylinder.

Connect the **bicoloured** VSI measuring wire to the **ecu side**, (wire code: ecu-lo).
Connect the **corresponding full coloured** VSI wire to the **petrol injector side** (wire code: inj-lo).
See diagrams: Installation manual general part 1 / 2.

Attention:
Each bicoloured measuring wire corresponds to a specific LPG injector and petrol injector / cylinder number. Do not interchange the wires. Cylinder 1 is located at the gear box side!!

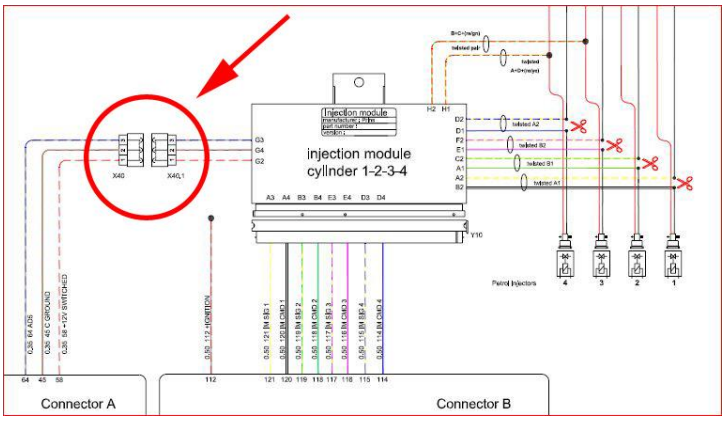
Connect to 32p GREY connector on petrol ECU.

VSI measure wire nr. :	Full coloured / Bicoloured Module position	Interrupt petrol injector wire
VSI wire inj / ecu **1** *Petrol injector cyl. 1*	white / white-yellow B2 / A2	Colour : **White** Location : **E4**
VSI wire inj / ecu **2** *Petrol injector cyl. 2*	green / green-yellow A1 / C2	Colour : **White** Location : **C4**
VSI wire inj / ecu **3** *Petrol injector cyl. 3*	pink / pink-yellow E1 / F2	Colour : **White** Location : **F4**
VSI wire inj / ecu **4** *Petrol injector cyl. 4*	blue / blue-yellow D1 / D2	Colour : **White** Location : **D4**
Module wire pos. H1 ECU HIGH A (cil. 1-4)	red-yellow H1	Colour : **Orange** Location : **F1**
Module wire pos. H2 ECU HIGH B (cil. 2-3)	red-green H2	Colour : **Orange** Location : **C1**



Electrical connections

Connectors in wiring loom

2-pole blue connector 15 T-ECT 34 Ground T-ECT	 Grey Brown - black	*For measuring the engine coolant temperature (Tect).* Connect the connector to the reducer temperature sensor.
4-pole connector 35 Ground Psys 14 T-Gas 9 +5 Volt sensor 16 Psys	 Brown - black Grey Red - blue green	*For measuring gas pressure and gas temperature*. Connect the connector to the filter unit sensor.
2-pole connector 24 +12V reducer lock-off 31 C Ground	 Yellow - green Brown - black	Connect the connector to the reducer lock-off valve.
4-pole connector 46 Service TxD 65 Service RxD 68 Ground PDT	 Grey Grey Brown - black	Diagnose connector.
Tank wiring loom 2 +12V Tank relay 12 Tank level IN 26 Ground tank relay	 red blue black	 Connect to the tank lock-off. Connect the tank level gauge. Connect to the tank lock-off.
Wiring loom link 45 C ground 58 +12V switched 64 AD5	 Brown – black Red – white Blue - grey	Connection from AFC connector A to connector B
		

Optional:

3-pole connector 11 + manometer 12 tank level in 33 ground manometer	 red blue brown	***Cut off connector and insulate wires***

Checklist after installation

1. Connect the Prins Diagnostic Tool and run the VSI diagnostic program.
   Install the VSI fuse, turn the ignition key in the accessory position.
   When working on the car, beware of moving and rotating parts in the engine compartment.

2. When commissioning the LPG system, you must activate the AFC with the diagnostic software.
   When the AFC has not been activated, the switch will keep blinking.
   To activate the AFC, select function *activate ECM* in the diagnostic software.

3. Check whether the program in the AFC matches with the car (dedicated engine set):
   Refer the car description in the diagnostic software (Basic → Identification) and compare these with the set number.

4. The system will switch over to LPG as soon as the temperature of the coolant becomes higher than parameter 70 - Switch over ECT.

5. Check all components and connections for any gas leakage (use a LPG leak detector device or a fluid detection like soap). Caution for moving and rotating parts in the engine compartment!

6. Let the engine run warm on petrol >80°C.
   Check if the reducer heats up.
   Check the engine signals, petrol injection time, RPM, ECT, lambda, MAP signal and petrol pressure signal.
   Let the engine run idle on LPG.
   Adjust the reducer pressure.
   Refer to *Basic → System* in the diagnostic software for the idle level value set.
   Adjust the reducer pressure in such a way that the pressure measured (P-sys) equals the idle level value.
   Turn the socket-head screw at the front of the reducer to adjust the pressure.
   An error code will be generated whenever the pressure variation is too high.

7. Use the diagnostic software to check again all input and output signals.

8. Check the system for error codes and solve these, if required.
   Check the petrol ECM for EOBD error codes.
   Place the protection connector on the VSI communication connector.

9. Take a test drive and check the drivability on LPG and petrol.

ALTERNATIVE FUEL SYSTEMS
Prins