ALTERNATIVE FUEL SYSTEMS

Prins

Installation manual

PART 2/2

MANUFACTURER	VAG
ENGINE DISPLACEMENT	1800cc
NUMBER OF VALVES	16
ENGINE CODE / NUMBER	BZB
FIRING ORDER	1-3-4-2
VEHICLE CATEGORIES	M
TRANSMISSION	MT/AT
VERSION	AFC-2.1 DI-LPG
TYPE VSI INJECTOR	KN9 - 63cc
INJECTION MODULE	Gen2 type 1
PETROL ECU MANUFACTURER / CODE	Bosch MED 17.5
MODEL YEAR:	2007 - 2010
SYSTEM APPROVAL NUMBER (R115)	E4-115R-000020 / VSI-LPG 31
LOCATION R115 SYSTEM STICKER	right side, centre door post
ENGINE SET NUMBER	366/121023/A
MANUAL	076/2618300
DATE	2016-11-24

TABLE OF CONTENTS

General instructions 2
Required equipment / tools / materials for installing a complete system 3
Vehicle check 3
Tightening moments 4
Base diagram 4
VSI approval numbers 6
Overpressure / MAP connection 7
Water connections 8
Mounting the inlet manifold couplings 9
Mounting the VSI injector rail 10
Mounting the rail 11
Wiring Diagram 12
Electrical connections 13
Electrical connections 14
Electrical connections 15
Electrical connections 16
Electrical connections 17
Electrical connections 18
Checklist after installation 19

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

EXPLANATION OF SYMBOLS :

= IMPORTANT, CAUTION

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, 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 VSI computer fails, it will automatically switch over to petrol.
  Never disconnect the VSI computer 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 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.
- 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 a exterior filler into body work).
- After having completed the installation, check the whole system for gas leakage; use a gas leak detection device.
  Also check for leak of engine coolant, petrol and air.

  ATTENTION: please check, after activation of the AFC and switching the system to LPG,
  if DTC’s are stored in the Prins diagnostic software.
  If DTC’s are stored, please contact our After Sales department for a software update
  in relation to the CAN-BUS compatibility. aftersales@prinsautogas.com

- 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 gas 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.

Please fill in the warranty portal completely within 8 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 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

Vehicle check

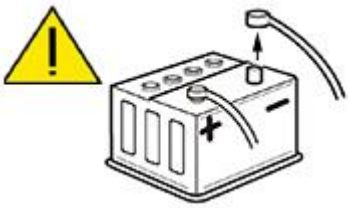
- Check the vehicle drivability on petrol
- Check the fuel system for error codes (scan tool)
- Check if the catalytic converter is in good condition (exhaust gas analyzer)
- Check the condition of the ignition system (spark plugs, cables, coil)

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

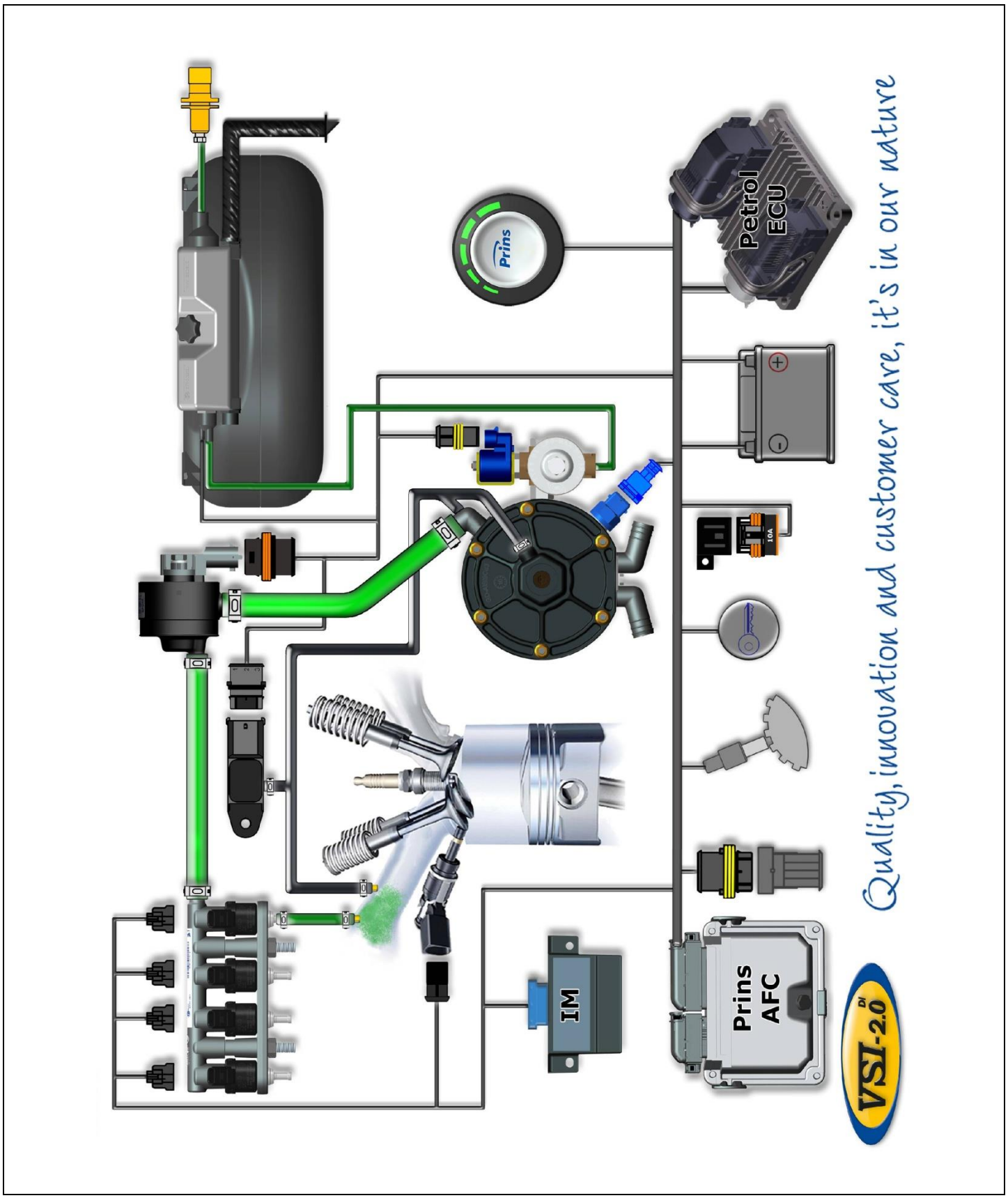
EXPLANATION OF SYMBOLS :

= IMPORTANT, CAUTION



= WEAR SAFETY GOGGLES

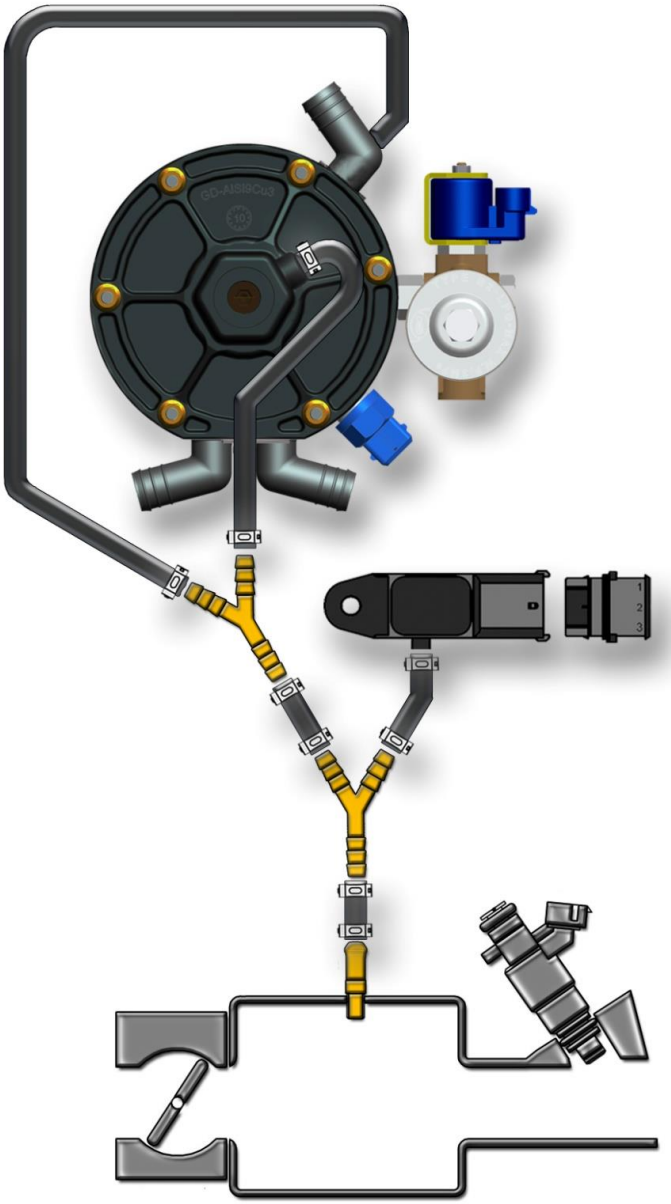
Base diagram



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 KN8 : LPG E4-67R-010092 CNG E4-110R-000020 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

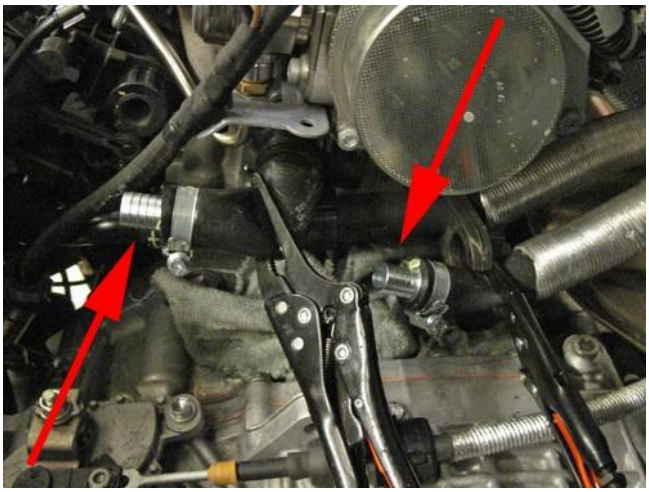
Overpressure / MAP connection

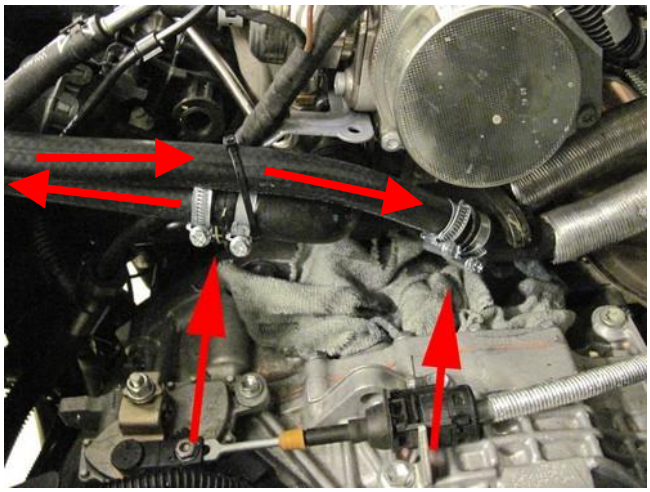


Remove the inlet manifold.
Drill 5mm in the inlet manifold.
Cut M6x1 thread
Place the VSI coupling with a lock compound in the inlet manifold.

Water connections

Cut water hose and turn 180°.

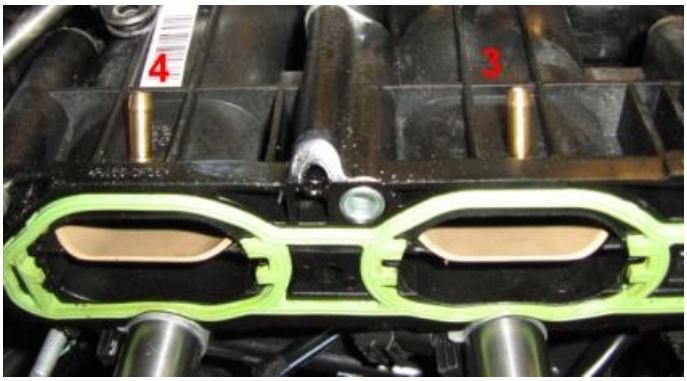




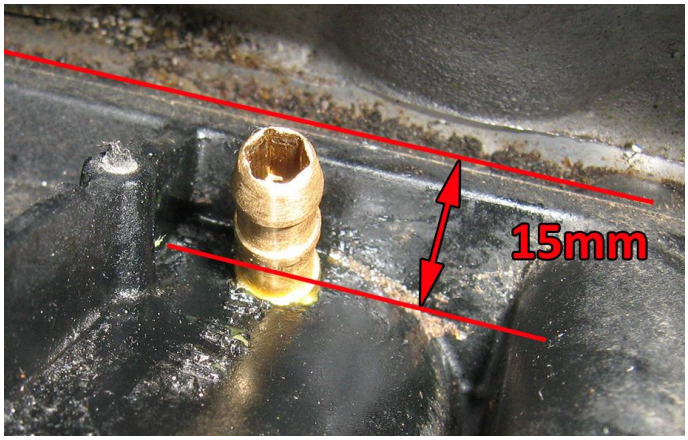
Mount 2x 16x20mm water couplers and mount water hoses.

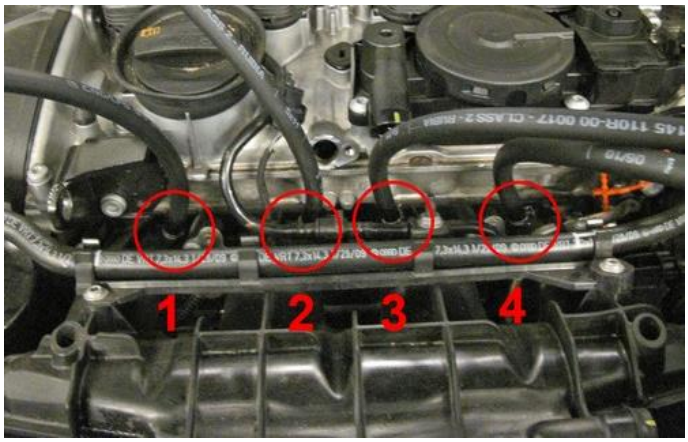
Mounting the inlet manifold couplings

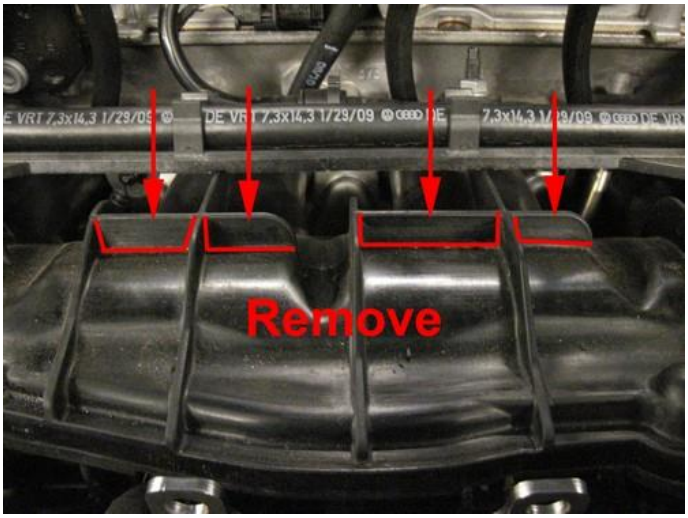
Remove the inlet manifold.
Drill **4** holes of **5**mm in the inlet manifold. Cut **M6** thread in these holes.
Place the VSI couplings with a lock compound in the inlet manifold.
Watch out that the lock compound doesn't come inside the VSI couplings
and place the inlet manifold back on the engine.

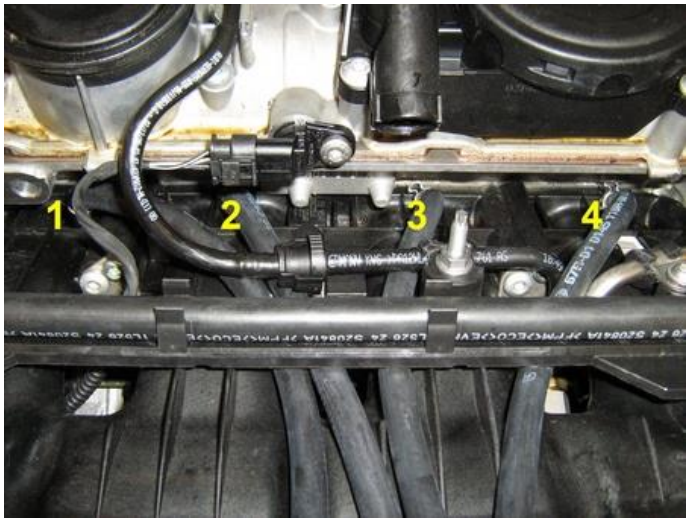


Injector couplings



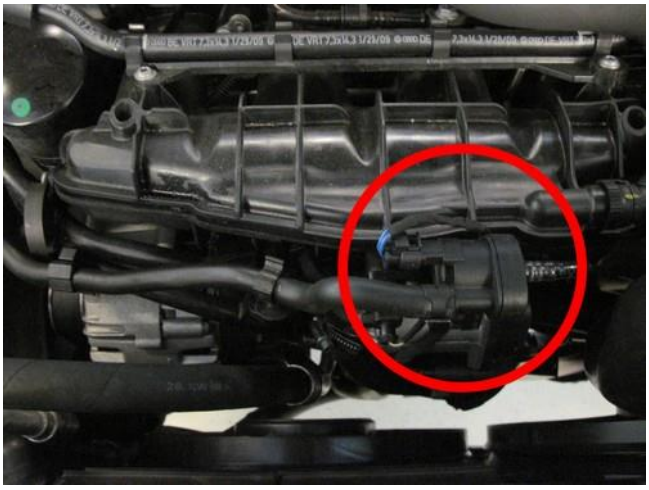
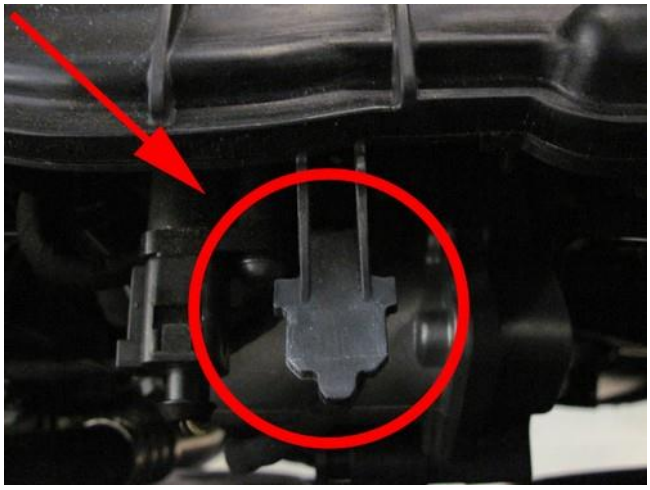




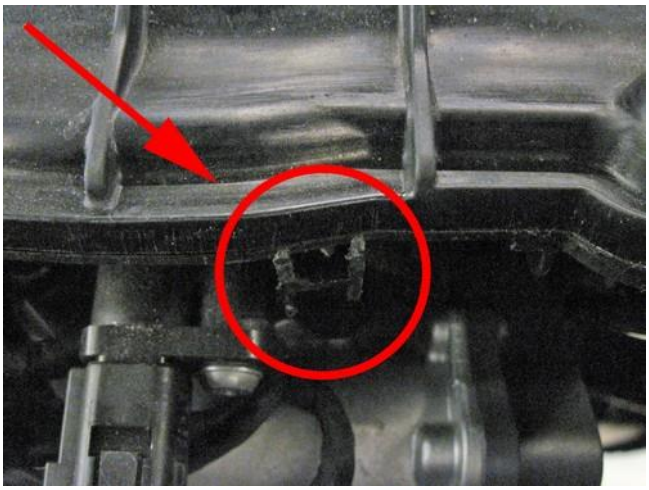
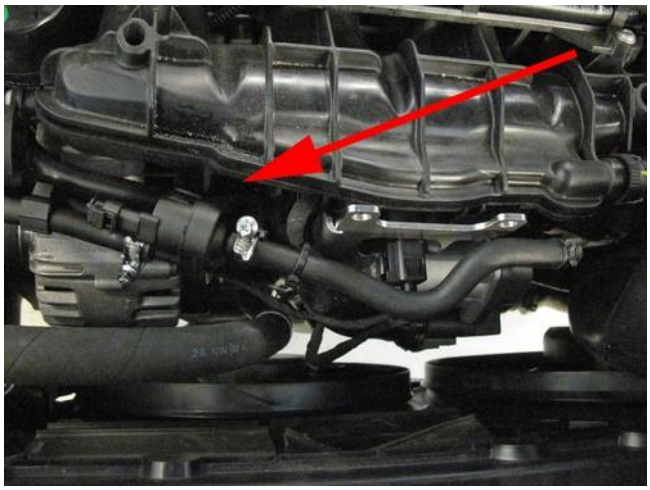


Injector couplings with hoses.

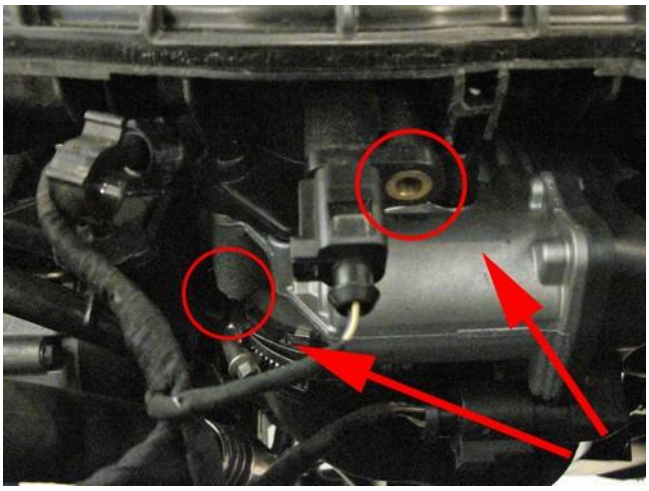
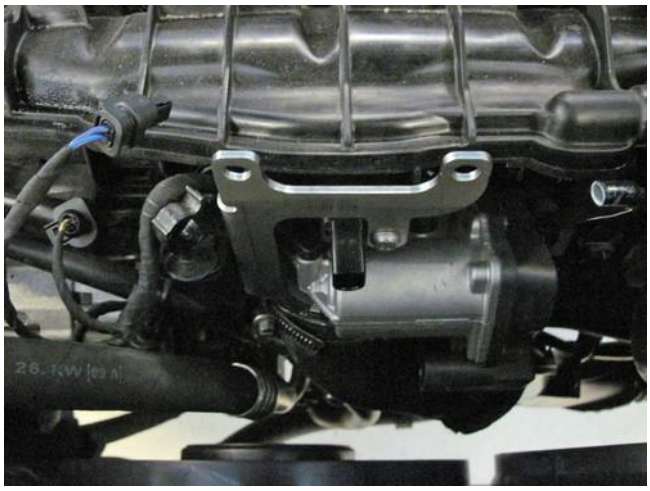
Mounting the VSI injector rail

Remove canister valve from support. Cut away support.

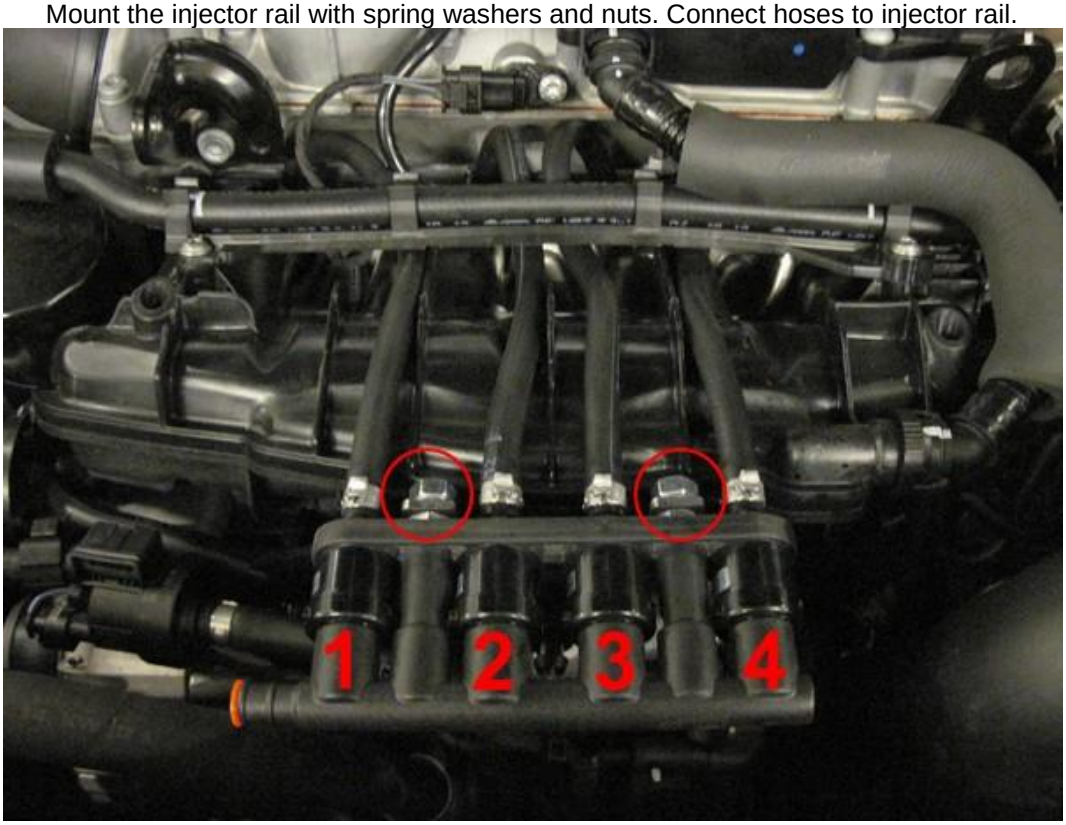
Cut original canister valve hose and reposition canister valve. Mount original hose to the other side.

Mount injector rail bracket on 2 original torx bolts from inlet manifold.

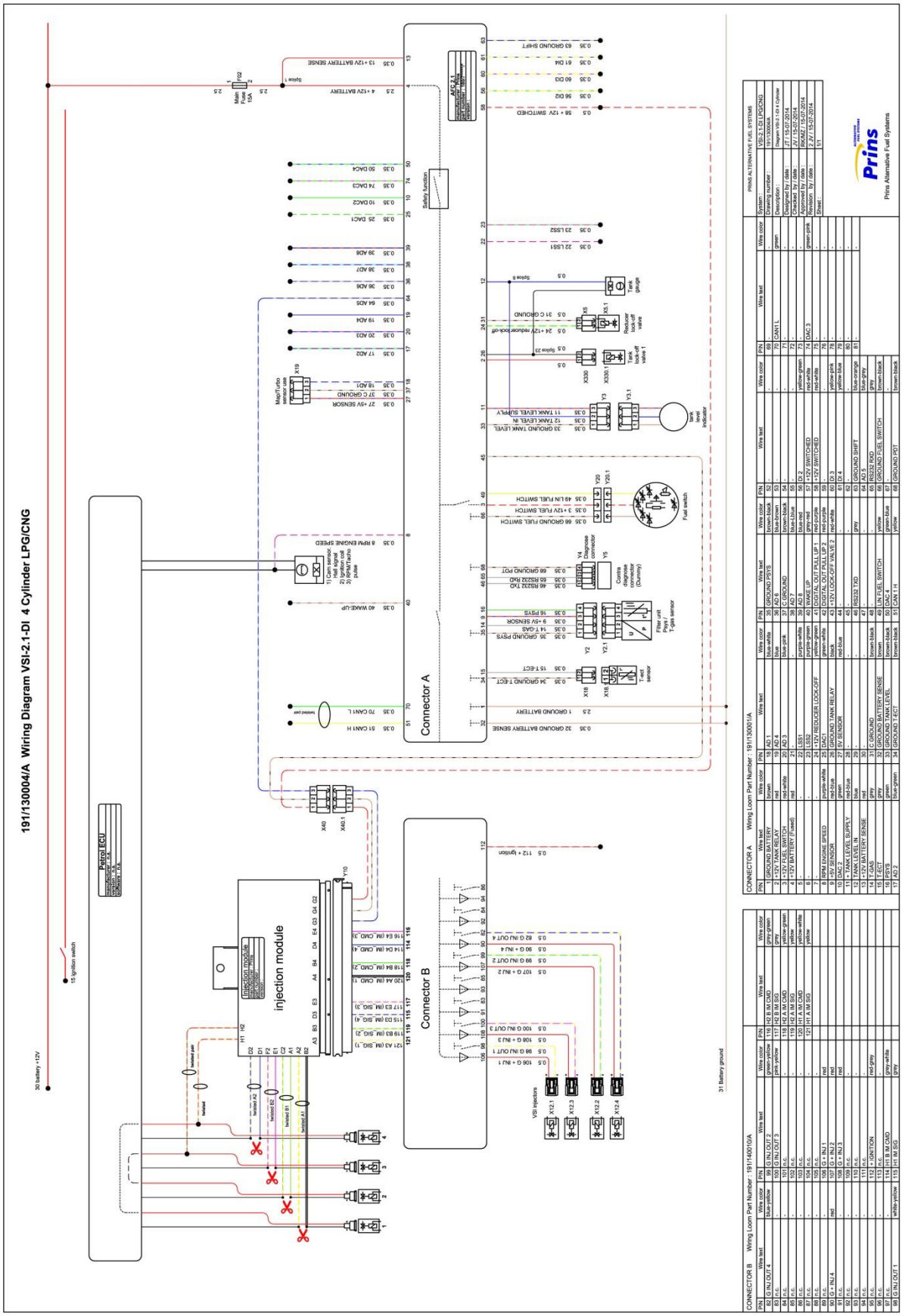
Mounting the rail

Mount the injector rail with spring washers and nuts. Connect hoses to injector rail.



Ø5	VSI injector 1	Inlet manifold coupling cyl.1	± 25 cm
Ø5	VSI injector 2	Inlet manifold coupling cyl.2	± 25 cm
Ø5	VSI injector 3	Inlet manifold coupling cyl.3	± 25 cm
Ø5	VSI injector 4	Inlet manifold coupling cyl.4	± 25 cm

Wiring Diagram



CONNECTOR A Wiring Loom Part Number : 191/130001/A

PIN	Wire text	Wire color	PIN	Wire text	Wire color	PIN	Wire text	Wire color	PIN	Wire text	Wire color	PIN	Wire text	Wire color
1	GROUND BATTERY	brown	18	AD 1	blue-white	35	GROUND PSYS	brown-black	52		-	69	-	-
2	+12V FUEL SWITCH	red	36	AD 4	blue	36	5V GROUND	blue-brown	53		-	70	CAN1 L	green
3	+12V IGNITION	red-white	37	AD 5	blue-pink	37	GROUND	brown-white	54		-	71	-	-
4	+12V BATTERY (Fused)	red	21	-	-	38	AD 7	blue-blue	55		-	72	-	-
5	-	-	22	LSS1	purple-white	39	AD 8	blue-red	56	D0 2	yellow-green	73	-	-
6	-	-	23	LSS2	yellow-green	40	START SIG	grey-pink	57	+12V SWITCHED	red-white	74	DAC 3	green-pink
7	-	-	24	+12V REDUCER LOCK-OFF	yellow-white	41	DIGITAL OUT PULL UP 1	red-purple	58	+12V SWITCHED	red-white	75	-	-
8	RPM ENGINE SPEED	purple-white	25	DAC1	red-purple	42	DIGITAL OUT PULL UP 2	red-purple	59	-	-	76	-	-
9	+5V SENSOR	red-blue	26	GROUND TANK RELAY	green-white	43	+12V LOCK-OFF VALVE 2	red-white	60	D0 3	yellow-pink	77	-	-
10	+5V SENSOR	red-blue	27	5V SENSOR	black	44	-	-	61	D0 4	yellow-blue	78	-	-
11	TANK LEVEL SUPPLY	red-blue	28	-	red-blue	45	-	-	62	-	-	79	-	-
12	TANK LEVEL IN	blue	29	-	-	46	RS232 TXD	grey	63	GROUND SHIFT	blue-orange	80	-	-
13	+12V BATTERY SENSE	red	30	GROUND	red	47	-	-	64	AD 9	blue-grey	81	-	-
14	+12V IGNITION	red-grey	31	GROUND	grey	48	RS232 RXD	grey	65	GROUND TPS	green-blue			
15	T-ECT	grey	32	GROUND BATTERY SENSE	brown-black	49	LIN FUEL SWITCH	yellow	66	GROUND FUEL SWITCH	green-black			
16	PSYS	green	33	GROUND TANK LEVEL	brown-black	50	DAC 4	green-blue	67	-	-			
17	AD 2	blue-green	34	GROUND T-ECT	brown-black	51	CAN 1 H	yellow	68	GROUND PDT	brown-black			

CONNECTOR B Wiring Loom Part Number : 191/140010/A

PIN	Wire text	Wire color	PIN	Wire text	Wire color	PIN	Wire text	Wire color
92	G INJ OUT 4	blue-yellow	99	G INJ OUT 2	green-yellow	116	H2 B M CMD	grey-green
93	n.c.	-	100	G INJ OUT 3	pink-yellow	117	H2 B M SIG	grey
94	n.c.	-	101	n.c.	-	118	H2 A M CMD	pink-green
95	n.c.	-	102	n.c.	-	119	H2 A M SIG	yellow
96	n.c.	-	103	n.c.	-	120	H1 A M CMD	yellow-white
97	n.c.	-	104	n.c.	-	121	H1 A M SIG	yellow
98	n.c.	-	105	n.c.	-			
89	n.c.	-	106	G + INJ 1	red			
90	G + INJ 4	red	107	G + INJ 2	red			
91	n.c.	-	108	G + INJ 3	red			
83	n.c.	-	110	n.c.	-			
84	n.c.	-	111	n.c.	-			
85	n.c.	-	112	+ IGNITION	red-grey			
86	n.c.	-	113	n.c.	-			
87	n.c.	-	114	H1 B M CMD	grey-white			
88	G INJ OUT 1	white-yellow	115	H1 B M SIG	grey			

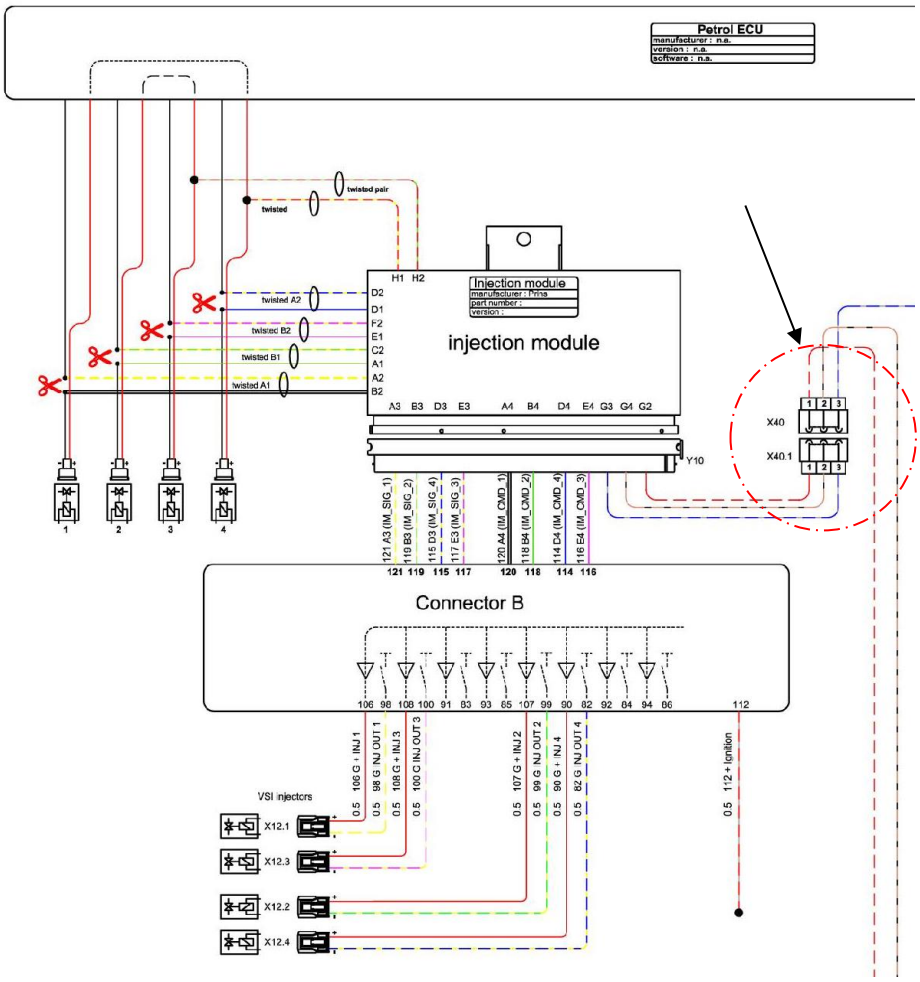
PRINS ALTERNATIVE FUEL SYSTEMS

System:	VSI-2.1-DI LPG/CNG
Drawing number :	191/130004/A
Description :	Diagram VSI-2.1-DI 4 Cylinder LPG/CNG
Designed by / date :	JV / 15-07-2014
Checked by / date :	JV / 15-07-2014
Approved by / date :	RKMZ / 15-07-2014
Revision by / date :	2 JV / 15-07-2014
Sheet:	1/1

Electrical connections

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

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 : Wire location : **Battery –** (ground)
4 +12V Battery	Red	Do not place the fuse in the holder before having completed the installation of the LPG system. Wire colour : Wire location : **Battery +** (plus)
98 98 G INJ OUT **1** 106 106 G + INJ 1	**White-yellow** red	Connector VSI-injector to cylinder **1**. Timing belt 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**.



Electrical connections

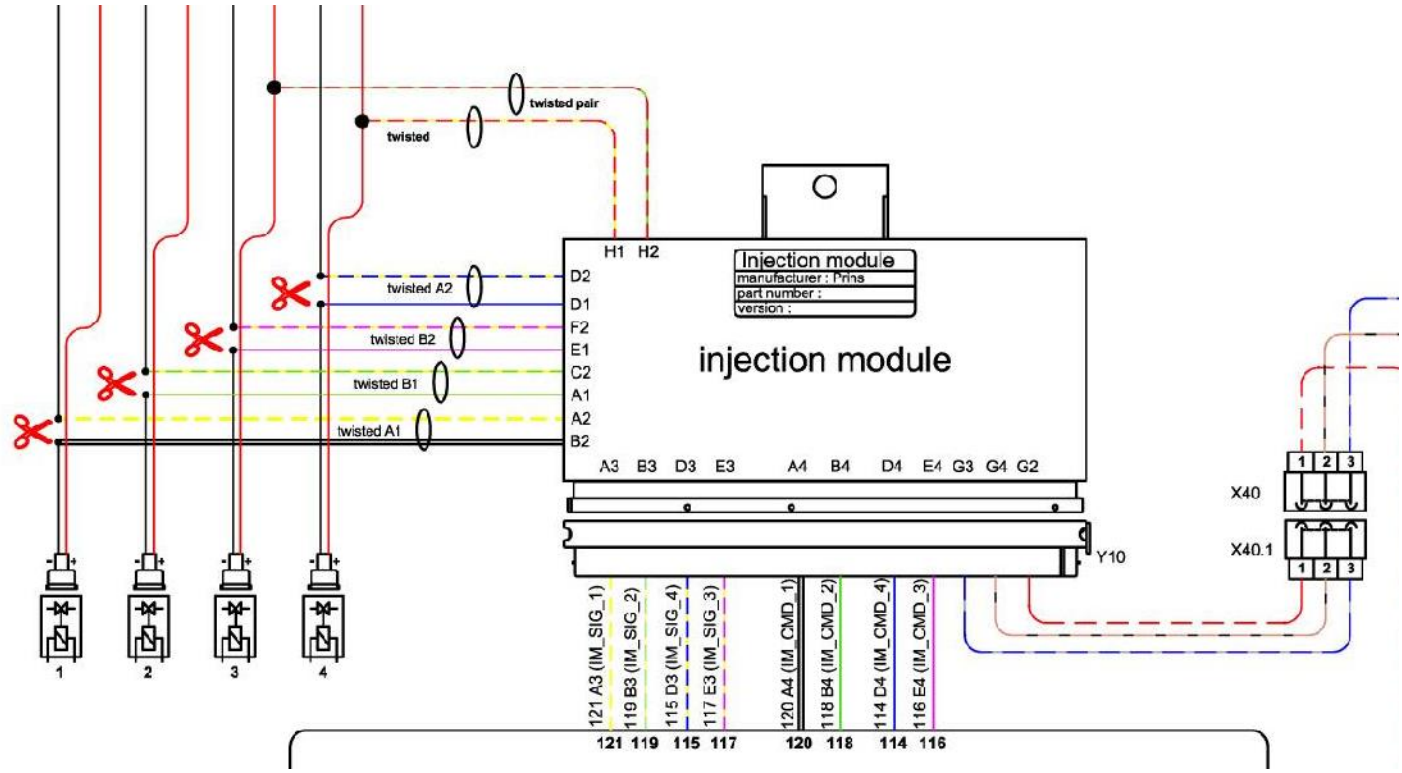
Check and measure the wiring in case of changes in the cars wiring colours.
Pin outs are leading !

⚠ 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.

VSI measure wire nr. :	Full coloured / Bicoloured Module position	Interrupt petrol injector wire
VSI wire inj/ecu-lo-1 Petrol injector cyl. 1	white / white-yellow B2 / A2	Colour : **Red - black** Location : petrol ECU, connector **T60**, pin **33**
VSI wire inj/ecu-lo-2 Petrol injector cyl. 2	green / green-yellow A1 / C2	Colour : **Red - white** Location : petrol ECU, connector **T60**, pin **49**
VSI wire inj/ecu-lo-3 Petrol injector cyl. 3	pink / pink-yellow E1 / F2	Colour : **Red - purple** Location : petrol ECU, connector **T60**, pin **34**
VSI wire inj/ecu-lo-4 Petrol injector cyl. 4	blue / blue-yellow D1 / D2	Colour : **Red - grey** Location : petrol ECU, connector **T60**, pin **48**
Module wire pos. H1 ECU HIGH A (cil. 1-4)	red-yellow H1	Colour : **Brown - black** Location : petrol ECU, connector **T60**, pin **31**
Module wire pos. H2 ECU HIGH B (cil. 2-3)	red-green H2	Colour : **Brown - purple** Location : petrol ECU, connector **T60**, pin **32**



Electrical connections

Check and measure the wiring in case of changes in the cars wiring colours.
Pin outs are leading !

Insulate not used wires

10	DAC2	Green - white	Insulate
19	AD4	Blue	Insulate
20	AD3	Blue - pink	Insulate
36	AD6	Blue - brown	Insulate
38	AD7	Blue – light blue	Insulate
39	AD8	Bleu - red	Insulate
50	DAC4	Green - blue	Insulate
56	DI2	Yellow – green	Insulate
60	DI3	Yellow - pink	Insulate
61	DI4	Yellow - blue	Insulate
74	DAC3	Green – pink	Insulate
Insulate not used additional wires			

Electrical connections

Check and measure the wiring in case of changes in the cars wiring colours.
Pin outs are leading !

27 +5V Sensor 37 C ground 18 AD1	Red - blue Brown - black Blue - white	*For measuring the inlet manifold pressure (MAP).* Connect the 3-pole connector to the Prins MAP sensor.
17 AD2 25 DAC1	Blue – green Green - white	*High pressure petrol sensor signal interruption.* Sensor side. ECU side. Wire colour : **Blue** Wire location : Petrol ECU, connector **T60**, pin **40**
63 Ground shift	Blue – orange	*Make a connection to ground high pressure petrol sensor.* Wire colour : **Brown** Wire location : Petrol ECU, connector **T60**, pin **13**
8 RPM engine speed	Purple - white	*For measuring the engine speed.* Wire colour : **Green** Wire location : Petrol ECU, connector **T60**, pin **53**
40 Wake-up	Grey-red	*High pressure petrol sensor 5Volt supply / car wake-up* Wire colour : R**ed - blue** Wire location : Petrol ECU, connector **T60**, pin **29**

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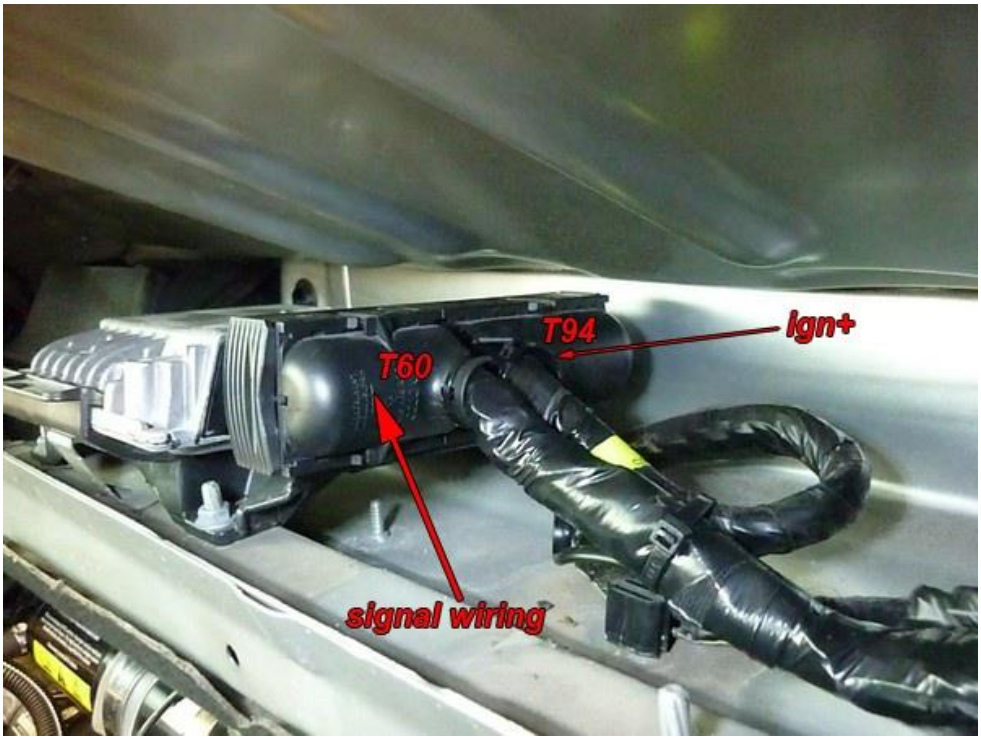
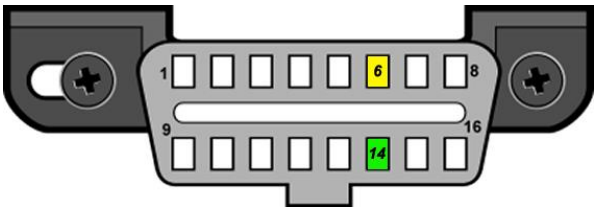
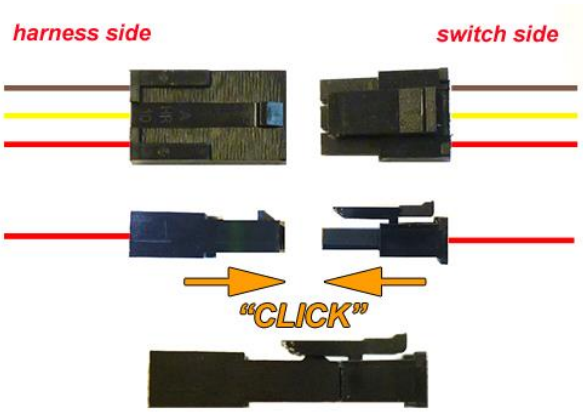
112 + Ignition	Red - grey	*Make a connection to ignition + / contact +.* Do not place the fuse in the holder before having completed the installation of the LPG system. Wire colour : **Blue - black** Wire location : Petrol ECU, connector **T94**, pin **87**



Electrical connections

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
		

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 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 VSI computer with the diagnostic software. When the VSI computer has not been activated, the switch will keep blinking. To activate the VSI computer, select function activate ECM in the diagnostic software.

3. Check whether the program in the VSI computer matches with the car (dedicated engine set):
   Refer the car description in the diagnostic software (Basic → Indentification) 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 64 - 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 evaporator heats up.
   Check the engine signals, petrol injection time, RPM, ECT, lambda, MAP signal, petrol pressure signal.
   Let the engine run idle on LPG.
   Adjust the evaporator pressure. Refer to Basic → System in the diagnostic software for the idle level value set.
   Adjust the evaporator 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 evaporator to adjust the pressure.
   An error code will be generated whenever the pressure variation is to high.

7. Use the diagnosis 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.

ATTENTION: please check, after activation of the AFC and switching the system to LPG, if DTC's are stored in the Prins diagnostic software.
If DTC's are stored, please contact our After Sales department for a software update in relation to the CAN-BUS compatibility. aftersales@prinsautogas.com

ALTERNATIVE FUEL SYSTEMS
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