ALTERNATIVE FUEL SYSTEMS

Prins

Installation manual

PART 2/2

MANUFACTURER:	VAG
PISTON DISPLACEMENT:	1200cc
NUMBER OF VALVES:	16v
ENGINE CODE / NUMBER - OUTPUT:	CBZA – 63kW // CBZB – 77kW // CBZC – 66kW
FIRING ORDER:	1-3-4-2
TRANSMISSION TYPE	MT / AT
VEHICLE CATEGORIES M	M
TYPE VSI INJECTOR	KN9 – 43cc
TYPE INJECTION MODULE	Gen2 Type 2
VERSION (LPG)	AFC-2.1 DI - LPG
INJECTION SYSTEM:	Continental Simos 10.22A
MODEL YEAR:	2009 →
SYSTEM APPROVAL NUMBER (R115)	E4-R115-000031 / VSI-LPG 20
LOCATION R115 SYSTEM STICKER	right side, centre door post
SET NUMBER :	366/121002/A
MANUAL	076/2618600-1
DATE :	20-2-2019

TABLE OF CONTENTS

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 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 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 an 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 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.
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Required equipment / tools / materials for installing a complete system

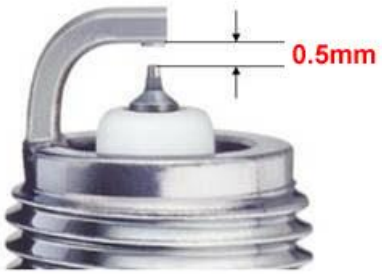
- Complete workshop toolbox (wrenches, screwdrivers, cutters, pliers, ratchet, sockets)
- Car lift
- Portable computer
- Vehicle fuel system scan tool or OBD scan tool Prins (part nr. 099/99928)
- Exhaust gas analyser
- Multimeter
- Oscilloscope
- Prins VSI diagnostic software
- Prins VSI serial interface
- Prins VSI break out box (part nr. 080/70090)
- Torque wrench (10Nm)
- Portable light
- Assortment drill bits 4 to 12 mm
- Assortment cutters (ø 20, 30, 50, 70 mm)
- Punching tool ø 70 mm
- Round file
- Portable drill or pneumatic drill
- Thread cutting device (male M6x1, M8x1, M10x1)
- Pipe-flaring tool (for 6 and 8 mm copper pipe)
- Air gun
- Vacuum cleaner
- Hot air gun
- Allan spanner for inlet couplings 3,5mm (part nr. 099//9970)
- Reducer adjustment tool (part nr. 099/9960)
- Molex extraction tool for VSI switch connector (part nr. 090/9929)
- 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 analyser)
- Check the condition of the ignition system (spark plugs, cables, coil)

Prins strongly advises to adjust the spark plug gap at 0.5mm (for this engine type)
Please be sure the spark plugs/coils are in good condition.

Good condition spark plugs/coils and the advised spark plug gap will prevent the engine from miss firing/shaking.

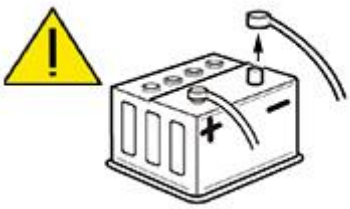


Tightening moments

	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

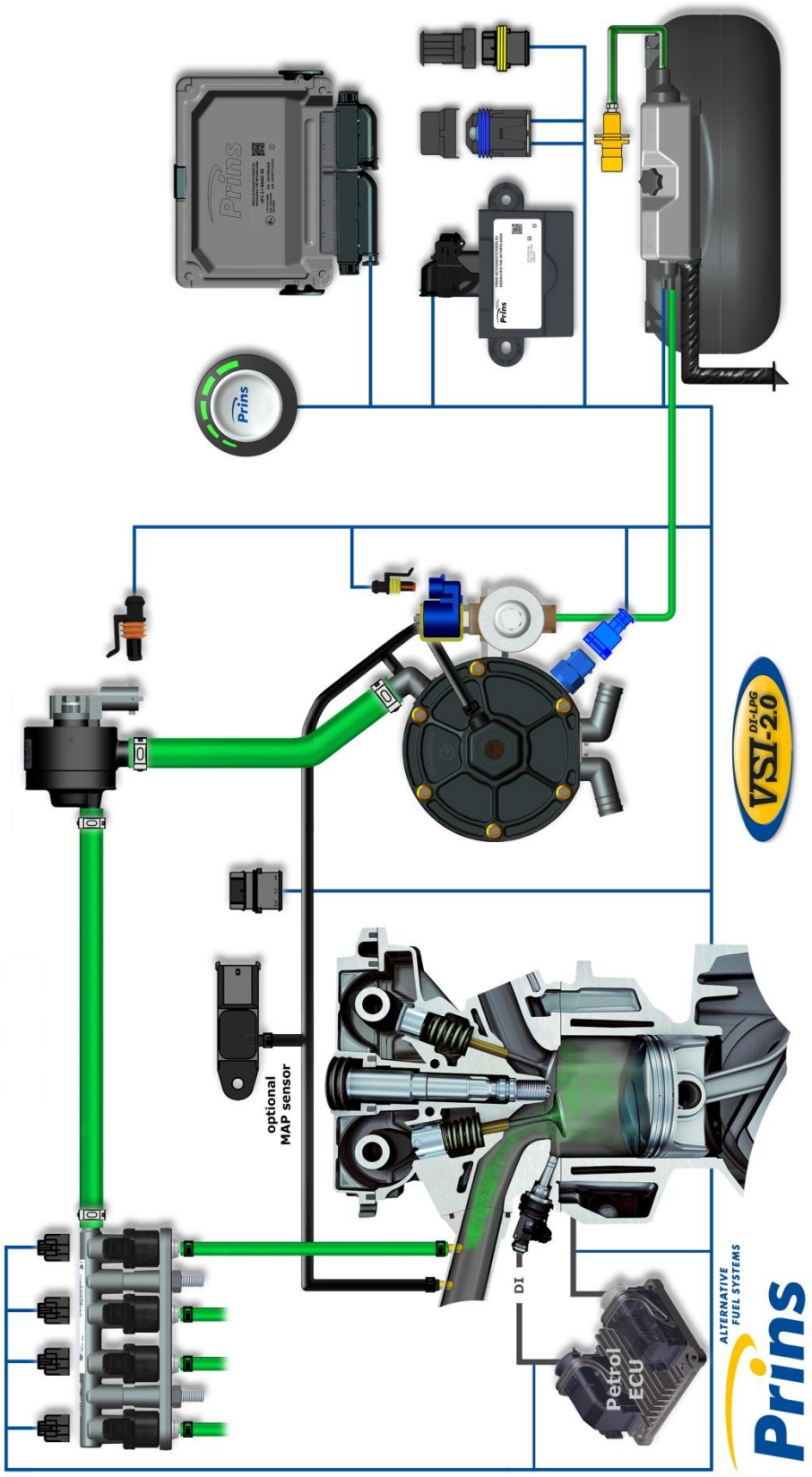
EXPLANATION OF SYMBOLS :

= IMPORTANT, CAUTION



= WEAR SAFETY GOGGLES

Base diagram



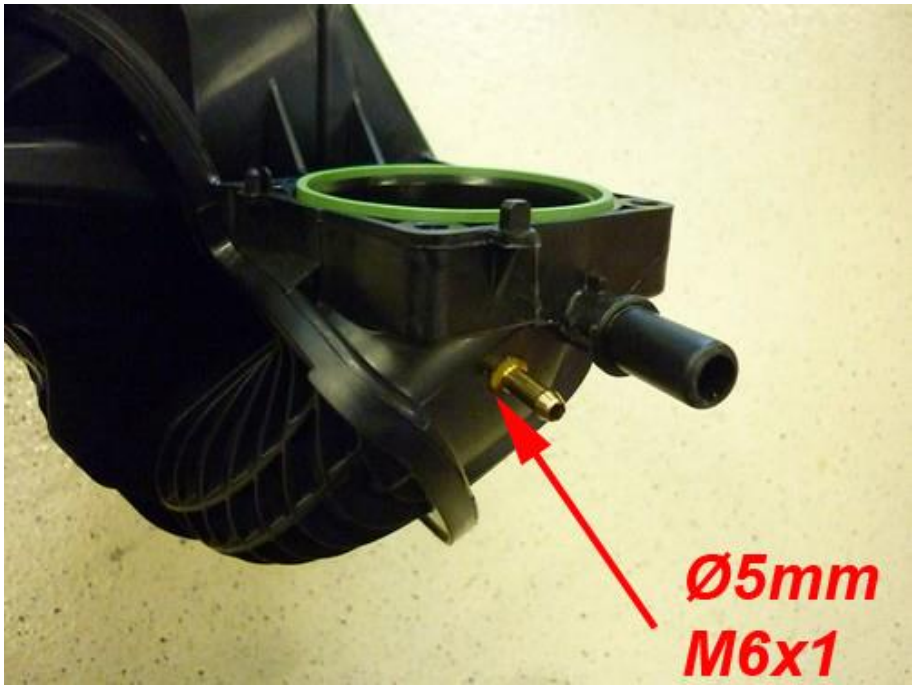
VSI approval numbers

	
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	Injector Keihin :LPG E4-67R-010092 CNG E4-110R-000020
	
Prins ECU : E4-67R-010098 E4-10R-030507	LPG hoses Tubithor : LPG E13-67R-010145 CNG E13-110R-000017 Rubia : LPG E4-67R-010068 CNG E4-110R-000003

Overpressure / MAP connection

Drill Ø5mm, cut M6 thread.

Overpressure / MAP connection



Drill hole Ø5mm and cut thread M6 for overpressure / MAP connection.
Mount overpressure coupling with a locking compound in the inlet manifold.

LPG hoses

4x Nylon hoses : **35cm** (cut on length later)

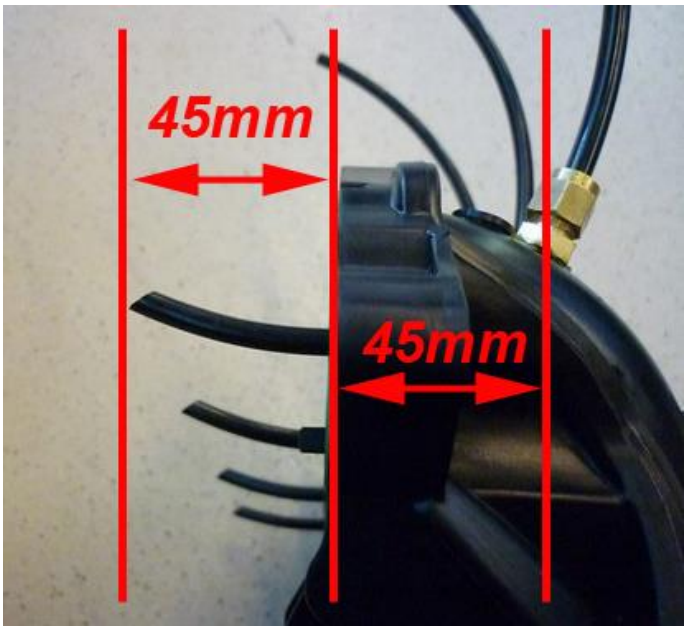
Connect Nylon to Injector:

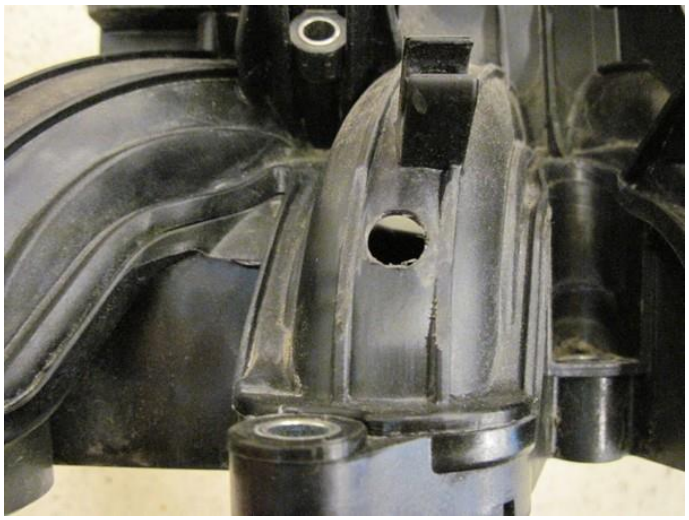
Length of hose,	ø	6 mm VSI injector 1	-> manifold coupling	=	± 4	cm
Length of hose,	ø	6 mm VSI injector 2	-> manifold coupling	=	± 4	cm
Length of hose,	ø	6 mm VSI injector 3	-> manifold coupling	=	± 4	cm
Length of hose,	ø	6 mm VSI injector 4	-> manifold coupling	=	± 4	cm

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

Mounting the inlet manifold couplings

Remove the inlet manifold.
Drill **4**x holes of **5**mm and drill up to **9**mm in the inlet manifold (instructions see picture).
Cut **M10x1** thread in these holes. Place the VSI couplings with a lock compound in the inlet manifold.
Mount the nylon hoses (**4x35cm**) before mounting the inlet manifold back on the engine (see picture).Cut nylon hoses on length later. Mount inlet manifold back to engine.

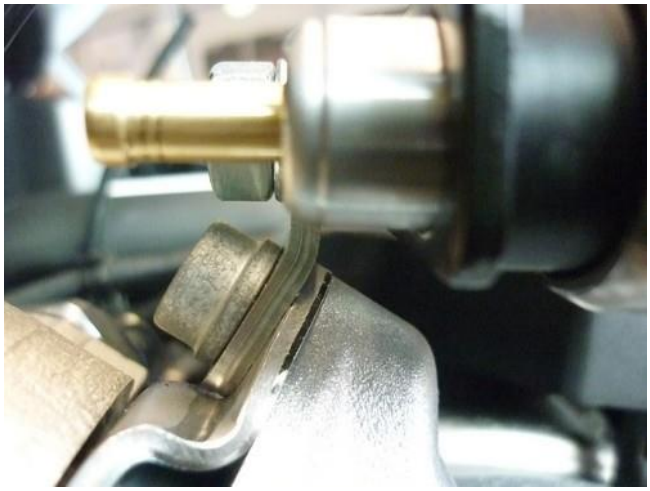




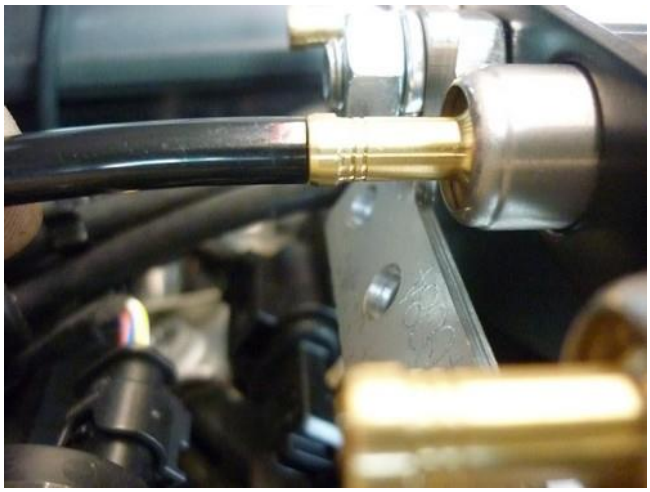
Remove plastic ribs if necessary..

Mount couplings with a locking compound. Mount nylon hoses before mounting the inlet manifold back on the engine

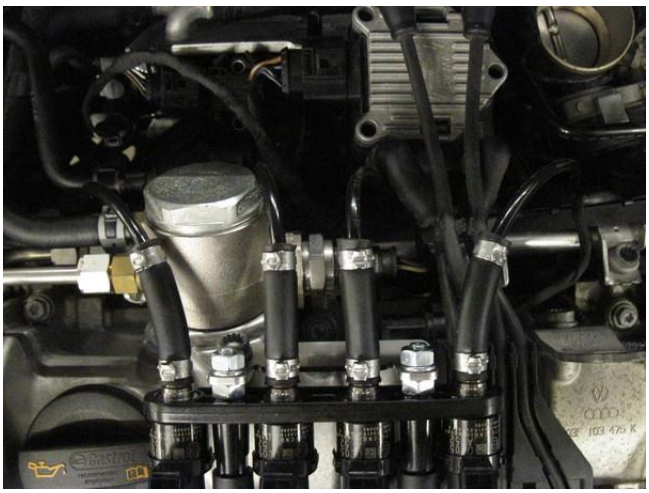
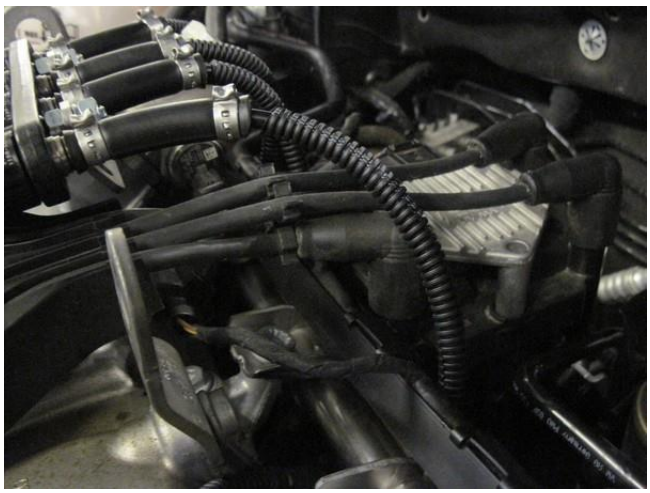
Mounting the VSI injector rail

Mount the injector rail with the bracket on the original bolt from the high pressure pump.

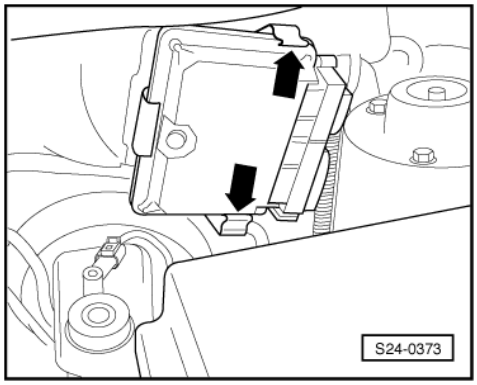


Cut nylon hoses on length (see picture).

Mount nylon hoses with 6mm hoses to rail. Mount protection around nylon hoses.

Petrol ECU



154-pin connector:

A - Engine control unit -J623-

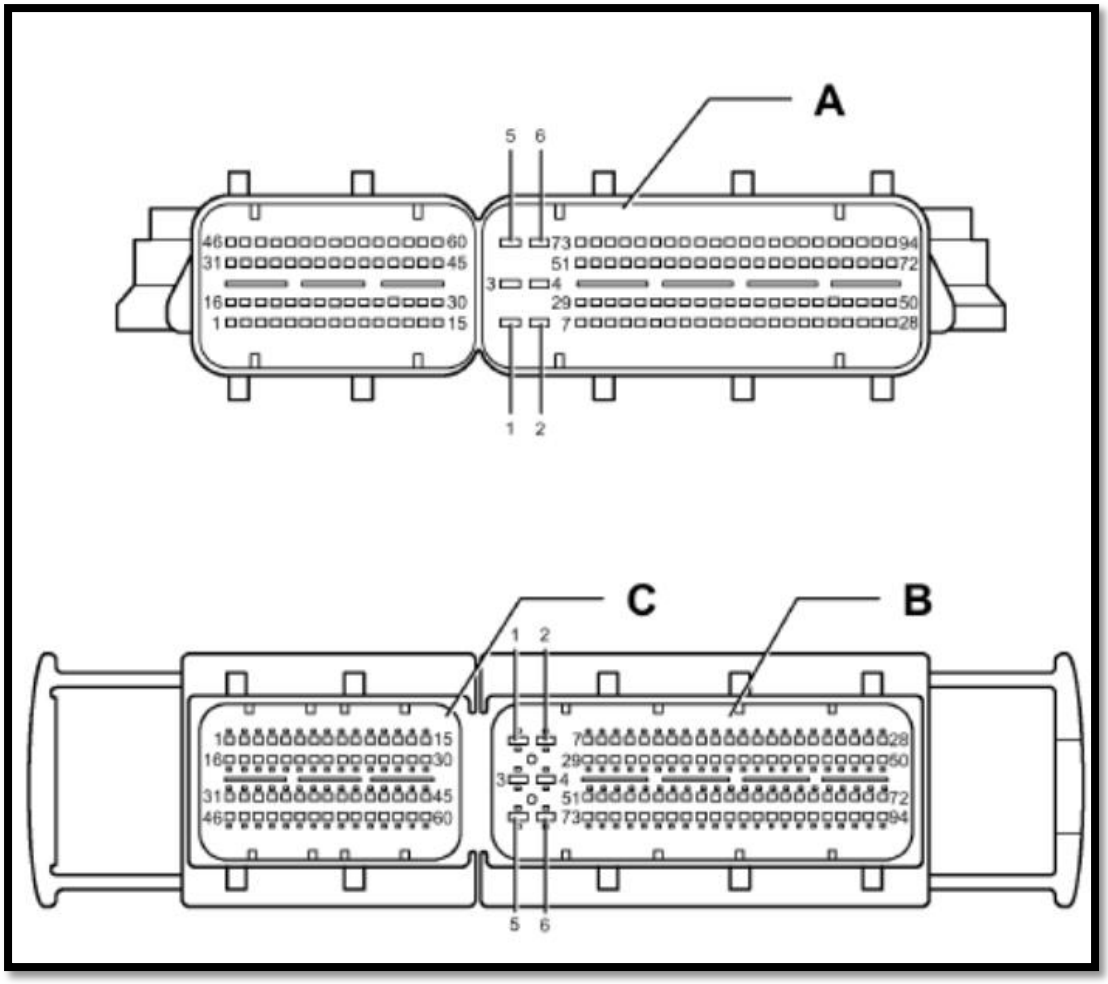
154-pin connector:

B - 94-pin connector -T94-

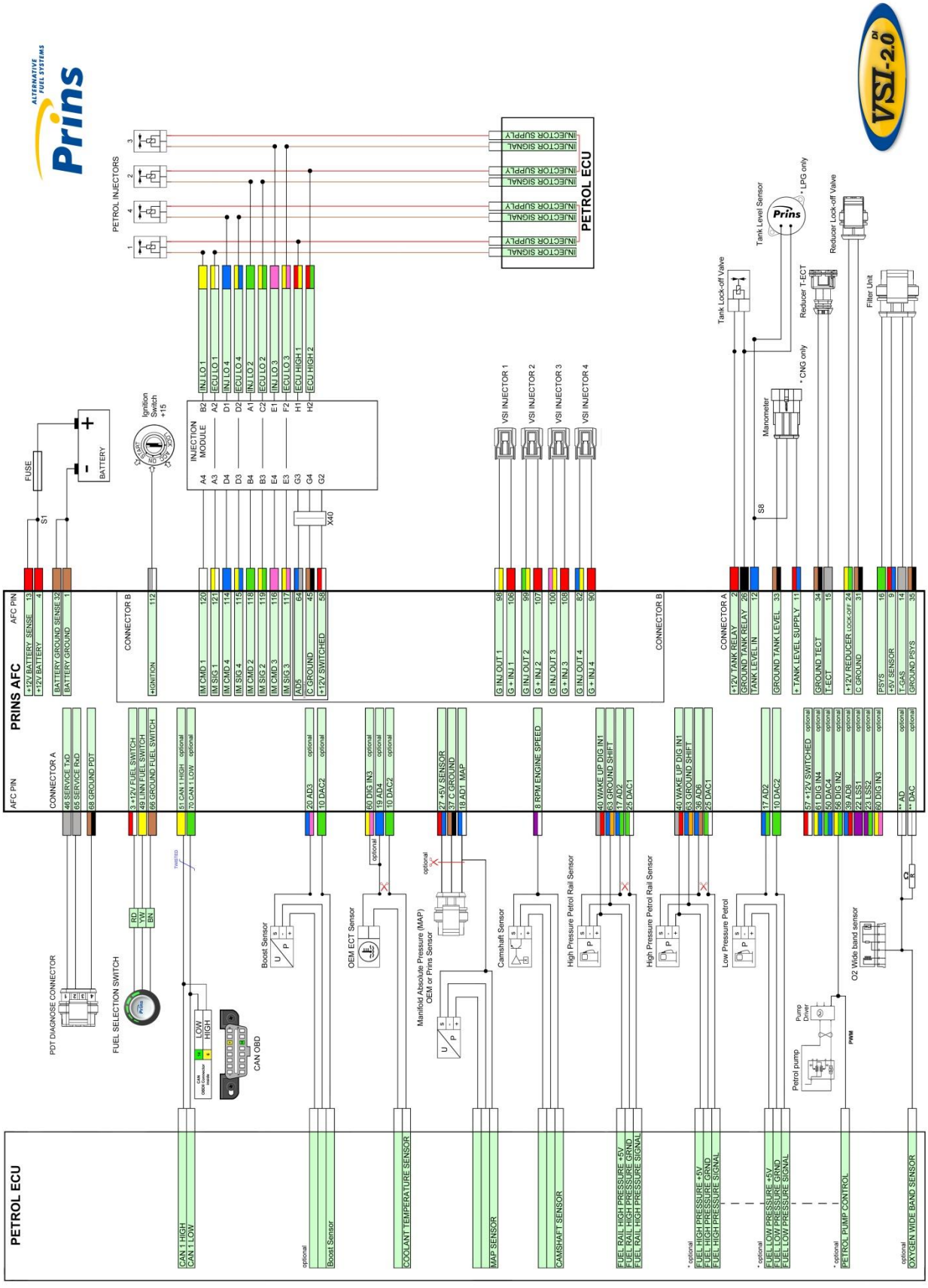
C - 60-pin connector -T60-

Note

Connector -T154- is comprised of a 94-pin connector -T94- and a 60-pin connector -T60- .



Basic Wiring Diagram



Electrical connections

10 DAC2	Green	***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 additional loose wires		

Electrical connections / VSI injector connectors

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 CBZA / CBZB / CBZC

Check and measure the wiring in case of changes in the cars wiring colours.
PIN OUTS are leading.

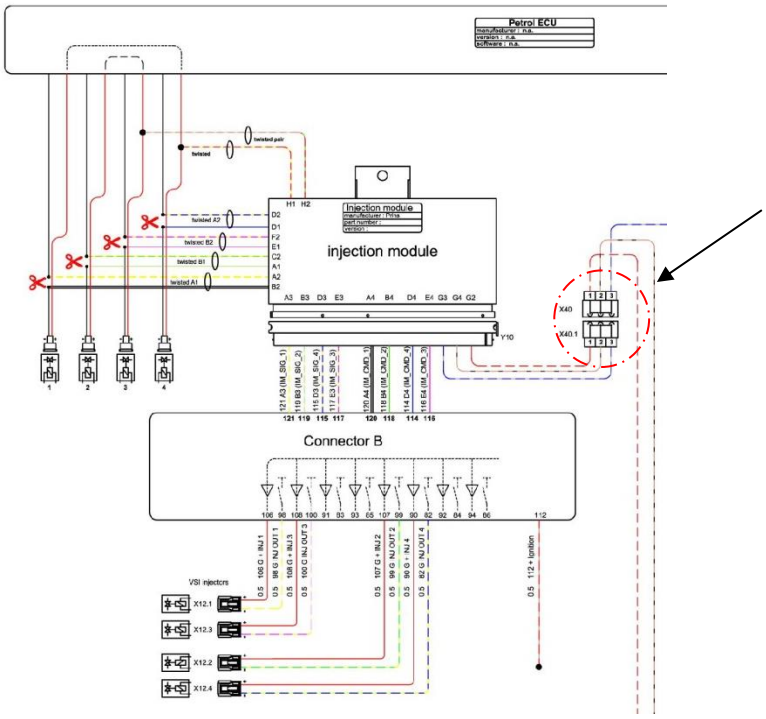
⚠ For measuring the petrol injectors :

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



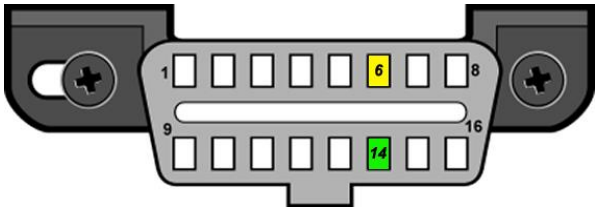
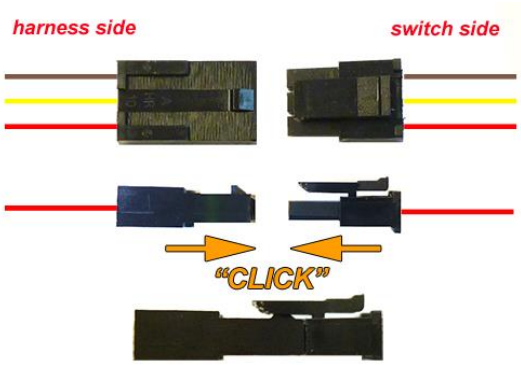
Electrical connections CBZA / CBZB / CBZC

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 (not used) Brown-black (not used) Blue-white	*For measuring the inlet manifold pressure (MAP).* ***Cut off connector and insulate both not used wires*** Wire colour : **White or Lila-black** Wire location : Petrol ECU, connector **T60**, pin **55**
17 AD2 25 DAC1	Blue-green Green-white	*High pressure petrol sensor signal interruption.* Sensor side. ECU side. Wire colour : **Yellow-Blue / Grey-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-white or Brown-blue** Wire location : Petrol ECU, connector **T60**, pin **13**
8 RPM engine speed	Purple-white	*For measuring the engine speed.(Cam Shaft)* Wire colour : **Yellow or Black** Wire location : Petrol ECU, connector **T60**, pin **53**
40 Wake-up	Grey-red	*High pressure petrol sensor 5Volt supply / car wake-up* Wire colour : **Red-blue** Wire location : Petrol ECU, connector **T60**, pin **29**
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 : **Black-yellow or Black-purple / Brown-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
		

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 → 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. Warm up the engine on petrol >80°C, check if the evaporator heats up.
   Check the engine signals, petrol injection time, RPM, ECT, lambda, MAP signal and petrol pressure signal.
   Idle the engine 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 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.

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.

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