M.T.M. Srl I Società Unipersonale
Via La Morra, 1 I 12062 Cherasco (Cn) I Italy
Tel. +39 0172 4860140 I Fax +39 0172 593113
info@brc.it I www.brc.it

Regulation R115 handbook
LPG Sequent system

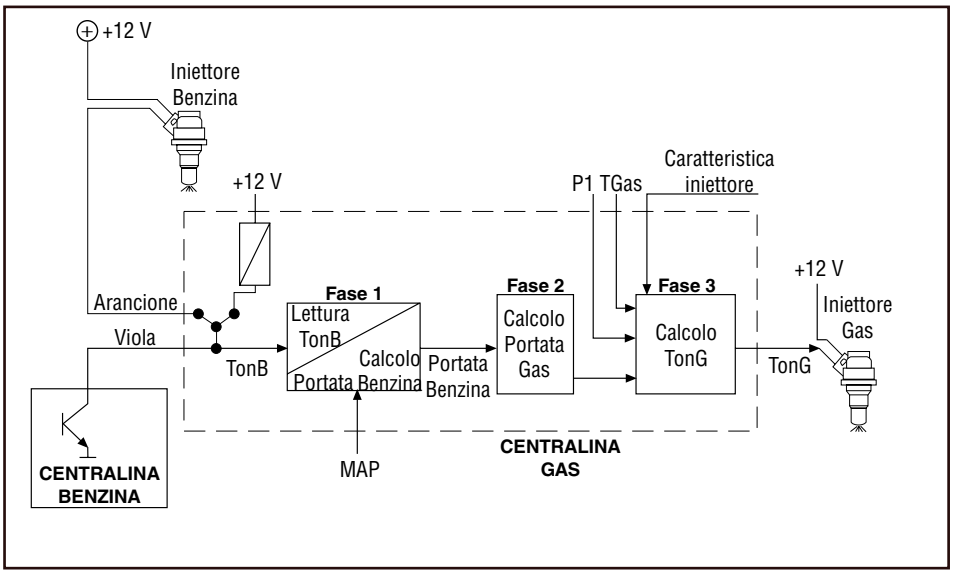
Inst_HNBK_Ver.018_00_OMVL

Dated 01.03.2018

INDEX

1. FUNCTIONING STRATEGIES

The DREAMon system is standard with the petrol system, meaning it ensures that during gas functioning it is still the petrol control unit to determine the amount of fuel to send to the engine. It can also be said that DREAMon is a “passive system” or “slave”, or that DREAMon works as “interpreter” between the petrol system and the gaseous fuel management. The DREAMon system functioning is based on the fact that the DREAMon control unit is connected to clamp or clamps of the petrol control unit piloting the injectors (fig. 1). In this way, it recognises the petrol injection time (Ti). (During gas functioning, the injectors signal will be recognised by the presence of injectors emulation integrated in the same system). Thanks to Ti and to engine revs signal, the DREAMon control unit calculates the petrol capacity that the original control unit intends to supply to the engine, converts it in gas capacity and realises it by opportunely piloting the gas injectors. This is a very important choice because to enable the petrol control unit to be constantly working and to itself pilot the gas dosing, allows to clearly and transparently realise functions such as stoichiometric control, enrichment in full load and cut-off in release according to the criteria envisioned by the manufacturing company, limiting of the maximum rotary speed, consistent management of petrol steam dispelling, correct communication with air conditioning system, etc.
All this without faulty error codes arising.
Everything remains unvaried with regard to the petrol system, therefore, the eventual appearance of an error message during petrol or gas functioning, is to be considered real and credible. Furthermore, if the vehicle has petrol functioning problems, they also occur in gas functioning. All this is necessary when wanting to also submit gas functioning to the strictest OBD anti-polluting Standards. The low impedance gas injectors are piloted in peak & hold mode, bearing in mind the gas physical parameters (temperature and absolute pressure) read by the control unit.



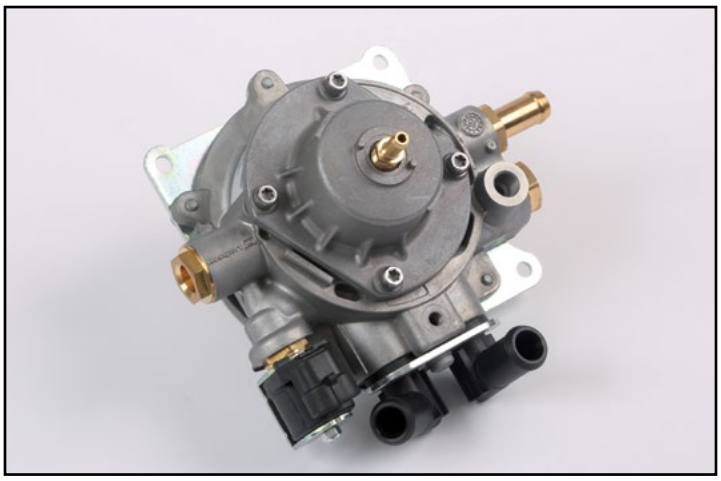
Pict. 1

2. DESCRIPTION OF LPG DREAM SYSTEM COMPONENTS FRONT SIDE

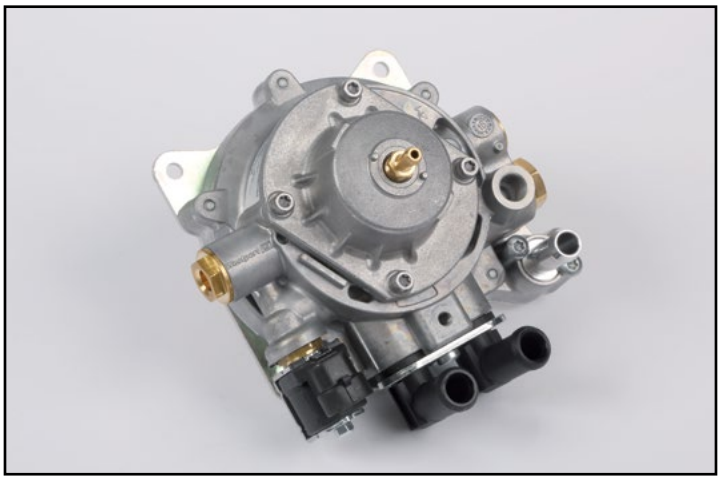
COMPONENTS DESCRIPTION	HOMOLOGATION
CPR LPG Reducer	E4*67R*010281*
Linx LPG Reducer	E4*67R*010281*
Palladio Reducer	E4*67R*010218*
Certools filter	E20*110R-000030*
Superlight Rail	E4*67R*010199*
Gemini Rail	E4*110R*010140*
PTS sensor (Pressure and temperature gas)	E13*67R01*0262*
Sensata sensor	E4*67R01*0179*
MAP sensor	E13*67R01*0036*
IN 03	E13*67R01*0223* E3*10R03*1140*
Dream ECU	E3*67R01*1002* E3*10R03*1131*
Changeover switch	E3*10R03*01137*

2.1 CPR LPG Reducer

The pressure regulator reduces gas pressure and, in case of the LPG, it also ensures that the liquid gas is completely vaporized. A solenoid valve shuts off the gas flow to the engine, when the engine is not operating. The new OMVL Compact series of pressure regulators implement many innovative solutions that improve performance in all driving conditions; technologies that are a step ahead toward higher performances, longer durability and improved safety. Not only performance for the drivers, but also solutions for the installers: simplified layout, thanks to reduced footprint that takes minimal precious space under the bonnet, frontal connections that are always close at hand in any situation and extended performance range that satisfies almost any application.



Pict. 1
CPR LPG Reducer



Pict. 2
Linx Reducer

2.2 LINX LPG Reducer

The LINX Lpg Reducer pressure regulator has been designed with a focus on the most compact size and the best long-term performance.The pressure regulator reduces gas pressure and, in case of the LPG, it also ensures that the liquid gas is completely vaporized. A solenoid valve shuts off the gas flow to the engine, when the engine is not operating. The LINX pressure regulators implement many innovative solutions

that improve performance in all driving conditions; technologies that are a step ahead toward higher performances, longer durability and improved safety. Not only performance for the drivers, but also solutions for the installers: simplified layout, thanks to reduced footprint that takes minimal precious space under the bonnet, frontal connections that are always close at hand in any situation and extended performance range that satisfies almost any application.

2.3 Palladio Reducer

- Nominal output pressure: 1,4 bar
- Maximum power output: 240 kW
- Integrated liquid phase filter: replaceable paper cartridge
- Integrated shut-off solenoid valve: 12 Vdc, 11,7 W
- Operating temperature range: -20 ÷ 120 °C
- Operating input pressure: 2,5 ÷ 270 bar
- Operating voltage range (solenoid): 8 ÷ 16 Vdc
- Weight: 2,0 Kg
- Homologations: 67R-01, 10R

2.4 Certools Filter

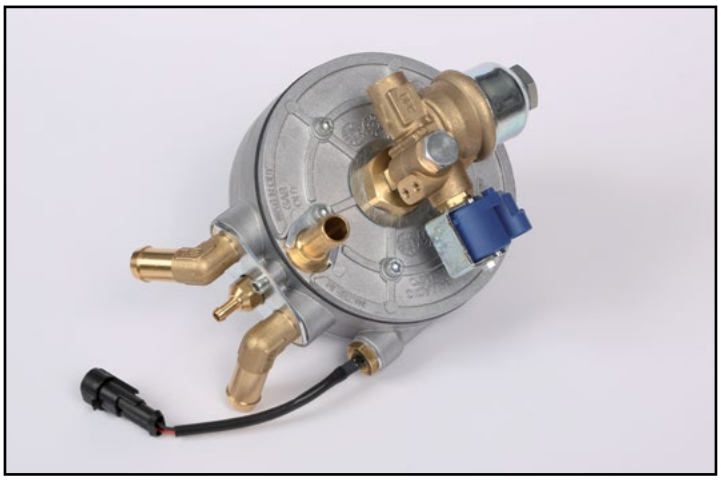
Certools filter is a very small cartridge filter but he has an inside cartridge with innovative filtering elements allowing to have a higher filtering power with regards to the previous ones (pict. 3).
We suggest replacing the inside cartridge each 20.000 km.

2.5 Super Light injection unit

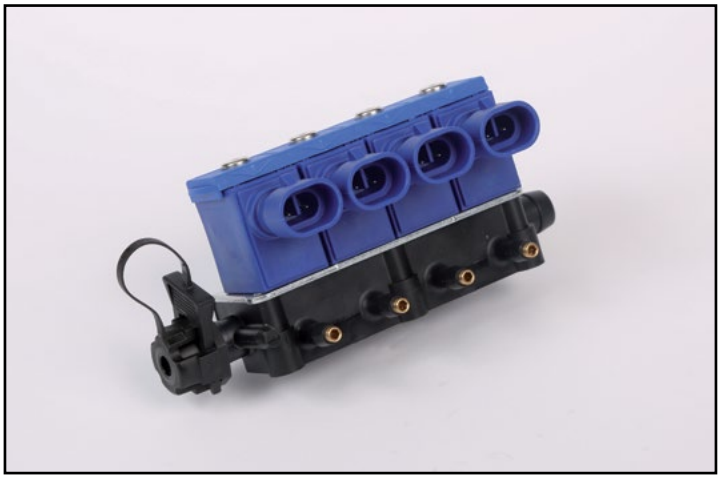
The injection unit ensures that the right quantity of gas is delivered into the intake manifold at the intake valves. The electronic injectors are opened in the right sequence and at the right time to suit the engine's ignition cycle.

2.6 Gemini injectors

- Normally closed, low resistance, peak & hold driving strategy injector
- 4 cylinder vertical layout for easy installation
- Side fuel feeding
- Gemini must be mounted well fastened on the engine, closed to the intake manifold.
- Solenoid valves must be near to the vertical position (it is allowed up to 80 degrees of tilt).
- Injection nozzles must be fastened as close as possible to the cylinders inlet valves and/or petrol injectors.
- Gas hoses from injection rail nozzle to manifold nozzles must have the same length and they must be as short as possible.



Pict. 3
Palladio
Reducer



Pict. 4
Super Light
injectors

Pict. 5
Gemini
injectors

2.7 Gas pressure and temperature sensor (PTS)

This sensor (pict. 7) has a compact body and is already integrated with the connector; it allows to measure gas pressure and temperature.
This sensor allows intervening more precisely to realize a faster gas carburetion correction if needed.

2.8 Manifold absolute pressure sensor (MAP)

This sensor (pict. 8) is light, small and easy-to-fix to the car body.
It has a compact body and is already integrated with the connector. It has a pressure sensor suitable for both aspirated and turbo-CNG engines, allowing an accurate setting on every kind of vehicle. Verified if is necessary the Map sensor on the electrical schemes from pag. 25 to 31.

2.9 ECU and Dream Family

ECU is the operating unit that controls the whole system. It's completely made by automotive components, being therefore suitable to face high temperatures inside the engine compartment, event though precautions must be taken to not assembly it near white-hot devices such as the exhaust manifold. It incorporates components of the latest conception with a data processing speed higher than most of the original petrol ECUs.
Memory where program and setting data are contained is not volatile, so, once programmed, Gas ECU can even be disconnected from the battery with no loss of data. It can be programmed many times without any problem, for instance it can be moved from a vehicle to another one and re-programmed. Some data acquisition channels have been planned in order to be connected to various signals, very different according to the kind of vehicle (e.g. TPS, MAP, and so on). Task of the ECU is collect and process full information and so check all different system functions.
So, Dream system is able to assure the best integration at electronic and communication level (through serial K-line and CAN BUS) keeping the same petrol control strategies and "translating" petrol ECU injection times into the corresponding gas ones, precisely and fast, adapting itself to gas pressure and temperature variations.
they satisfies OBD regulations thanks to an efficient diagnostic system on each sensor and actuator.
(Capable) able to face high temperatures and to protect its electronic components, both from external atmospheric agents, and from mechanical stresses it is subjected to, and from electromagnetic radiations irradiated by the engine electrical components or by other sources (transmitters, repeaters, mobile phones, and so on).
We wish to remember that ECU has been planned to withstand prolonged short-circuits, both towards ground and battery positive, on each of its inlet/outlet cables (naturally except for grounds and supplies). This allows not ruining ECU even in presence of the most common wiring errors (polarity inversion, wrong connection of one or more cables, etc…).
Wiring connection passes through a connector, which who change in base on the Dream system used and contains all the necessary signals for its different functions.

NOTE: for electrical connections, refer to chapter 10.

Pict. 6
Normal Injectors, Max and Supermax

Pict. 7
PTS Sensata sensor (on Rail)

Pict. 8
Map manifold pressure sensor

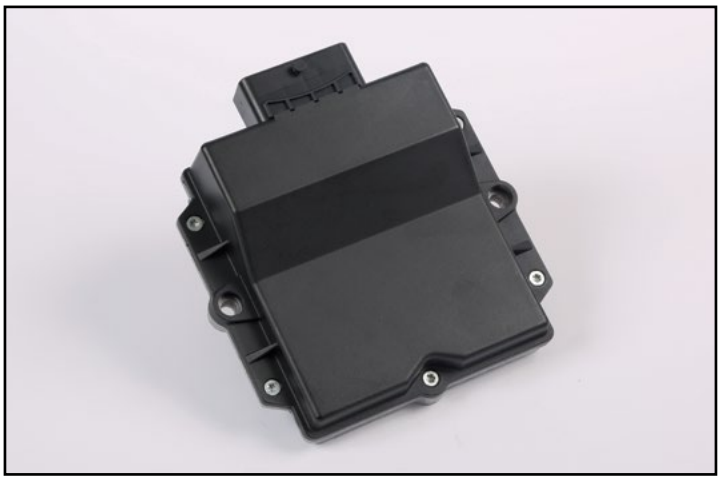
2.10 Dream S64 EVO ECU (fig9)

• Automotive microprocessor AEC-Q100, 16 bit 32 Mhz
• Operating Temperature range: -40 ÷ 105 °C
• Watertight 64 pin connection (IPX9K)
• Compliant to Automotive Standards for protection of I/O
• Operating voltage: 8 ÷ 16 V
• Maximum Voltage: 24 V <5 minutes
• Near-zero current draw in stand-by
• Sensors and actuators diagnostics compatible with EOBD
• Possible connection to the vehicle EOBD(KWP2000 K-line, ISO15765 CAN 2.0)
• Integrated solid-state relay (no relay on harness):
easier installation, higher protection against short circuits,
more accurate self-diagnostics, higher reliability
• Possible acquisition of different types of RPM signal, Negative Coil included
• Integrated petrol injectors cut and emulation
• Homologations: 67R-01, 110R-00 and 10R-04

NB: for electrical connections, refer to chapter 10.

2.11 Dream ECU S32 EVO ECU (fig10)

• Automotive microprocessor 16 bit 24 MHz
• Operating temperature range: -30 ÷ 90 °C
• Watertight through (IPX9K)
• Compliant to Automotive Standards for protection of I/O
• Operating voltage: 8 ÷ 16 V
• Maximum voltage: 24 V <5 minutes
• Current drawn in stand-by: <5 µA
• Sensors and actuators diagnosis compatible with EOBD
• Communication and programming with PC through propertary K-line
• KWP2000 protocol supported (OBD version)
• CAN 2.0 ISO15765 protocol supported (OBD version)
• EMC compliant
• Integrated solid-state relay (no relay on harness):



Pict. 9
Dream S64
EVO ECU
5,6,8 Cylinders

Pict. 10
Dream S32
EVO ECU
2,3,4 Cylinders

easier installation, higher protection against short
circuits, more accurate self-diagnostics, higher reliability
• Integrated petrol injectors cut and emulation
• Homologations: 67R-01, 110R-00 and 10R-04

2.12 Dream DI 2.0 ECU Gas (fig11)

•Automotive microprocessor 16 bit - 64 MHz
•Operating Temperature: -40 °C + 90 °C
•Watertight through immersion
•According to automotive norms for protections
and inlet/outlet signals
•Operating voltage: 8 V ÷ 16 V
•Sensors and actuators diagnosis compatible with EOBD
•Communication and reprogramming with PC through K-line
•It supports KWP2000 communication protocol
•It supports CAN 2.0 communication
•EMC compliant
• 2 ECU Versions: up to 6 injectors and up to 8 injectors
•Integrated injectors cut and emulation
•Approval: R67-01, R110 and R10

2.13 One-Touch Changeover Switch with level gauge and acoustic indicator (Buzzer)

It is a push-button changeover switch with acoustic indicator (Buzzer) and with a level indicator consisting of 4 green LEDs for gas level and possible errors indication, and of a bicolour LED (green-red) which indicates the gas or petrol mode.
Unlike the changeover switches provided until now, the One-Touch is a one-position changeover switch. Fuel change is recognised every time the push-button is pressed.
When you switch off the vehicle, ECU recognises and records the fuel state (gas or petrol), in order to re-propose the same state at the next switching on. Therefore, if during the switching off vehicle is in gas mode, the gas mode will be the one recorded at the switching on (idem for petrol mode).

2.14.A Petrol Mode

The red round LED turned on informs the user of this state; gas level information disappears, that's to say the four green level LEDs are turned off.

2.14.B Gas mode

In this state, vehicle starts in petrol mode (level LEDs are on) and it changes automatically over to gas when program changeover settings are reached. The round LED, by becoming first orange and then green (gas mode), informs the user that changeover has been done.

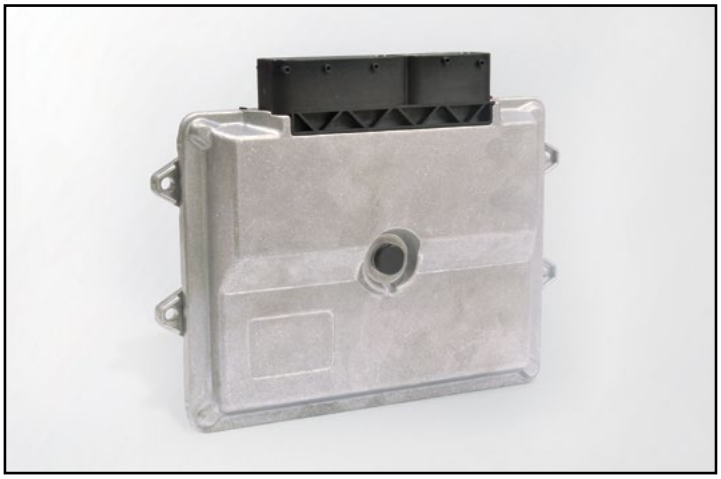
2.14.C Error indication (just with diagnostic enabled)

When communication fails, system informs user by turning on the two blinking green level LEDs in the middle, and by the round orange LED blinking too. In this situation the changeover switch doesn't work anymore, and the ECU records the fuel mode that you had before the error indication. If vehicle was in gas mode, the mode remains the same (idem for petrol mode).
If ECU recorded the gas mode, but meanwhile the fuel ends, passage to the petrol mode will happen automatically and without any acoustic indication.

2.14.D Fuel indication: LPG mode

Changeover switch also works as level gauge thanks to the four green LEDs.
In order to know how much gas there is in the tank (LPG) is enough to control how many LEDs are turned on. If four LEDs are turned on, tank is completely full (80% of tank total capacity), if three led – 3/4 of the tank, if two led – half tank, if one led – 1/4 of the tank.
Fuel reserve indication is given by the first LED blinking and it is purely indicative.
You can obtain correct indication with vehicle in plain and after few minutes since the starting, also if indication is immediately present.
We suggest using the partial speedometer in order to control vehicle autonomy.
If the four green LEDs are blinking at the same time, it means that it could be a gas exceeding quantity inside the tank or the cylinder. In this case, we suggest covering some kilometres until the blinking is over.
Just in gas mode the tank gas level is displayed on the four green LEDs.
Avoid that petrol tank be completely empty, so always keep petrol level at 1/4 or 1/2 of the tank and periodically refill it.
Some systems consider the possibility of activating a strategy that allows the vehicle to run on petrol for short periods, without any signal from the commutator. Check with the installer whether this strategy has been activated.

Pict. 11
Dream DI 2.0
ECU Gas



Pict. 12
Dream DI 2.0
ECU Gas
8 Cylinders

Pict. 13
One-touch
Changeover
Switch

2.15 Level sensor

Dream ECUs control gas level indication by means of a signal on the GREEN LEDs of the changeover switch. To do that, ECU is able to elaborate the signal coming from the resistive level sensor (pict. 12) placed on the LPG tank mul-

tivalve. LEDs lighting thresholds can be freely set up with the PC (see Software Handbook 3/3 Part Ic), to allow a precise indication.

2.16 Fuses

The LPG Dream systems are supplied with fuses at the correct amperage, fitted in the right harness.
We suggest not inverting their position or replacing them with fuses with different amperage.
Some systems consider the possibility of activating a strategy that allows the vehicle to run on petrol for short periods, without any signal from the commutator. Check with the installer whether this strategy has been activated. Check the correct amperages indicated on the general wiring diagrams from pag. 25 to 31.

2.17 Relay

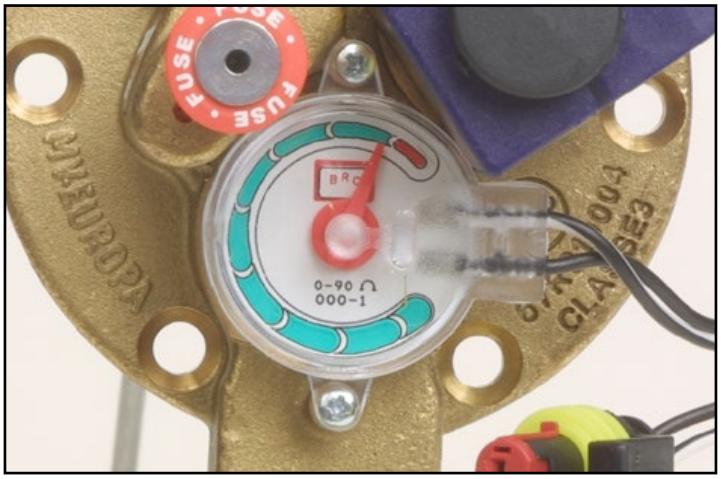
Dream system uses relay to interrupt battery positive coming from the actuators.

2.18 Diagnostic socket

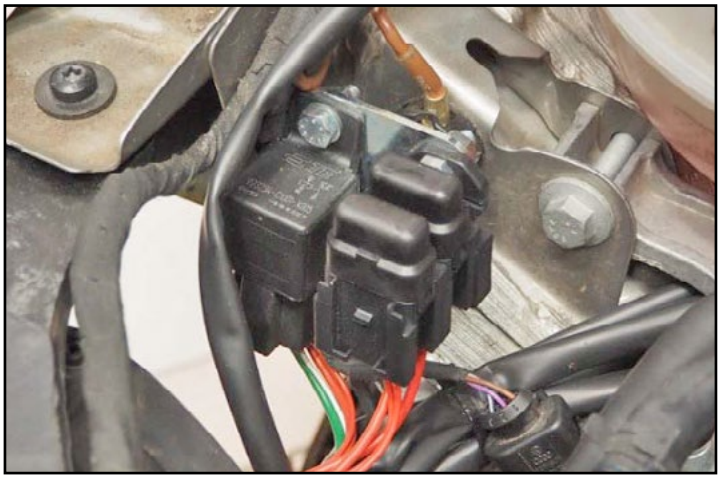
The PC connection to the Gas ECU is based on a diagnostic socket, directly coming out from the wiring. It is the 3-way connector diagnostic socket (female-holder on the harness), equipped with a protection cap.

2.19 Dream systems injectors emulation

Dream ECU carries out the whole cutting and emulation function of petrol injectors.
With the word “cutting”, we mean the function that, by interrupting electrical connection between petrol ECU and injectors, avoid that injectors could introduce petrol into the cylinders during gas mode.
Actually, in this phase engine gas supply must be carried out by the Dream system, and the contemporaneous petrol injection must be absolutely avoided because it should be dangerous for both engine and catalyst. Obviously, the petrol ECU diagnostic has especially been studied to detect possible interruption in actuators connection, especially for injectors.
This is the reason why it’s emulate” the load that was before represented by the petrol injectors, that’s to say to replace from an electrical point of view the petrol injectors disconnected with “fake” injectors that ECU cannot distinguish from the true ones.
This function happens directly inside the ECU without any external component in respective harness.



Pict. 14 Sensor of resistive level on Multivalve



Pict. 15 Fuses and Relay

Pict. 16 Diagnostic point

3. DESCRIPTION OF LPG DREAM SYSTEMS COMPONENTS REAR SIDE

COMPONENTS DESCRIPTION		HOMOLOGATION
Ring-shaped tank (Stako-Step)	Check the list of available tanks in the dedicated manual	E20*67R01*XXXX*
Multivalvola Europa		E13*67R01*0004*
B1 Refueeling point		E13*67R01*0020*

3.1 Refuelling point

LPG refuelling point has a big importance in the equipment.
Besides allowing the tank refuelling, it has to assure the complete absence of gas leakages during vehicle normal conditions.
So, refuelling point is a further security device, because the non-return valve inside it is ranged in row with the LPG tank multivalve.
Refuelling point (pict. 1) is made up of a brass main body, where supply gun is hooked and of a non-return valve carrying out all main functions. Copper pipe goes from the filler body to the multivalve.
A plastic closing cap, present or not in accordance with the refuelling point position, protects it from possible foreign bodies.
Refuelling point is normally fixed inside the petrol refuelling point compartment, or to the vehicle rear bumper.
Refuelling point assembly doesn't influence the working principle of LPG system in which it's installed (it doesn't need adjustments); however, it has to respect installation regulations in force in the country where it's installed.

Pict. 1
Refuelling point

Pict. 2
LPG ring-shaped Tank

3.2 LPG ring-shaped tank

LPG tank is the biggest additional element of the equipment and it's normally installed in the vehicle rear side, using the spare wheel place.
Tanks too have to comply with prescription of European Regulation R 67-01. They're made for supporting an exercise pressure of 30 bar, bigger than the normal one which is of few bar, and must be equipped with an overpressure valve.
Special attention must be paid to NEVER fill up tank at 100% with liquid LPG.
Until a part of its capacity, even little, contains LPG in gaseous state, pressure inside the tank is equal to the vapour tension of that specific LPG mixture at that specific temperature, so, anyway, pressure values are low compared with tank resistance. If, instead, tank is completely full of liquid, pressure can reach very high levels. Liquid LPG, in fact, has a coefficient of cubic expansion very high, roughly 0.002 - 0.0025 °C-1, that's to say roughly 2000 times more than the steel one and, as almost all liquids, it cannot be compressed a lot. Therefore, an increase of temperature provokes a liquid LPG expansion, of course, developing in this way high pressures if in a closed place. So in this case, pressure doesn't depend so much on liquid LPG, as on tank resistance.
To avoid this situation, law obliges to never fill up tank with liquid LPG more than the 80% of its volume. Multivalve (described in paragraph 3.3), manages this limitation by means of a float and of a suitable block system.
The 80% filling limitation assures a big security level. In fact, to occupy all the tank volume with its expansion, it's necessary that LPG overheats more than 80° C above the refuelling temperature.
A so high temperature range is possible just in case of fire, but NOT during normal working conditions.
Finally, we have to consider that tank

complete filling is just a possibility of danger, but it doesn't mean that it's going to explode, because sheet metal still has all its stretching ability before breaking.

3.3. Multivalve

Multivalve for LPG irremovable tanks is a group of devices planned on the basis of Regulation 67 01. It must be directly installed on the tank without using connections and must be piloted so that it can automatically close gas flow when engine stops, even accidentally.
Multivalve has inside itself the following functions:
- valve for 80% filling limitation;
- non-return valve;
- level gauge;
- security valve for overpressure;
- remote control valve (solenoid valve) with excess flow valve.

Pict. 3
Multivalve

4. MECHANICAL INSTALLATION

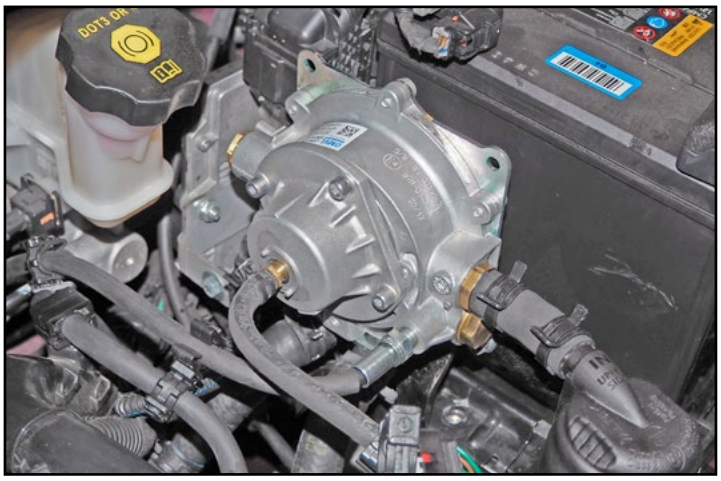
The following installation rules have to be considered as general.
Before installing the various components of Dream system, it is recommended to check the vehicle good working in petrol mode. Especially, it is necessary to carefully check the electronic ignition equipment, the air-filter, the catalyst and the Lambda Oxygen sensor.

4.1 LPG reducers

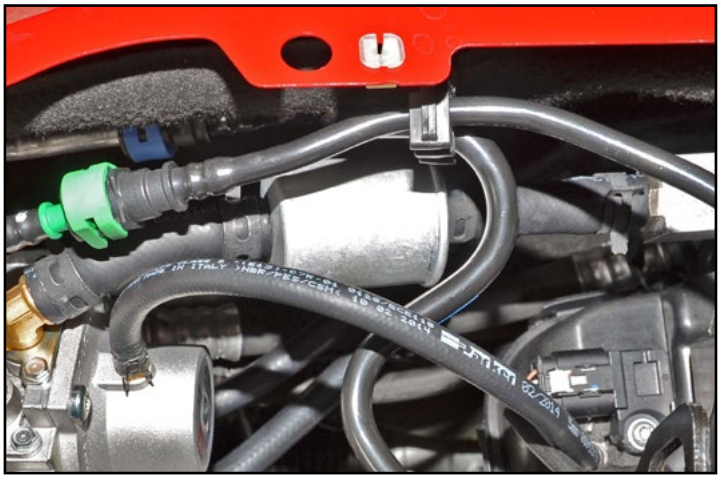
Reducer must be firmly fastened to the bodywork so that it is not subjected to vibrations during its working. With the engine under stress, the reducer must not hit any other device. It can be installed with any orientation; it's not important that diaphragm be parallel to the running direction.
Pipe that connects reducer to the rail should not be longer than 200-300 mm.
If present, Temperature sensor cable should not be too tight or twisted, and it should not make sudden folds at the outlet of the sensor.
Pipe going from the solenoid valve to the reducer mustn't go through too hot areas of the engine compartment.
As no adjustment is expected for reducer, it's not essential to assemble it in an easily accessible area. However, the installer should avoid too uneasy positions, in order to realize maintenance operations without too many difficulties. Please note that reducer has on the water side some pipe-holder fittings for pipes 17x23; pipes rather big, because LPG needs a good water flow to vaporize. Water connection must be realized in a row or in parallel compared with the passenger compartment heating circuit. During the functional inspection of the equipment installed, it's important to check that gas temperature doesn't reach low values especially after a long use in power.
Reducer is only available in pipe-holder fittings version, so use click clamps for tightening.

4.2 Certools filter

Filter can be fixed to the bodywork or to the engine with any kind of orientation.
Pipe that connects filter to the rail should not be longer than 200-300 mm.
We suggest to place filter in an easily accessible area in order to carry out scheduled replacement without any problem.
NOTE: During filter installation, being careful with respecting the way shown by the arrow printed on the sticker. It shows the gas flow right way, that's to say from the Genius reducer to the injectors rail.
Filter described is only available in the pipe-holder fittings version.
We suggest replacing filter cartridge every 20.000 km.



Pict. 1
Example of assembly CPR



Pict. 2
Example of installation Certools filter

4.3 Superlight injection rail

OMVL gas injectors are integrated into a single plastic rail: the single injectors inject the gas into the intake manifold thru the rubber injection hoses.

4.3.1 Fixing points

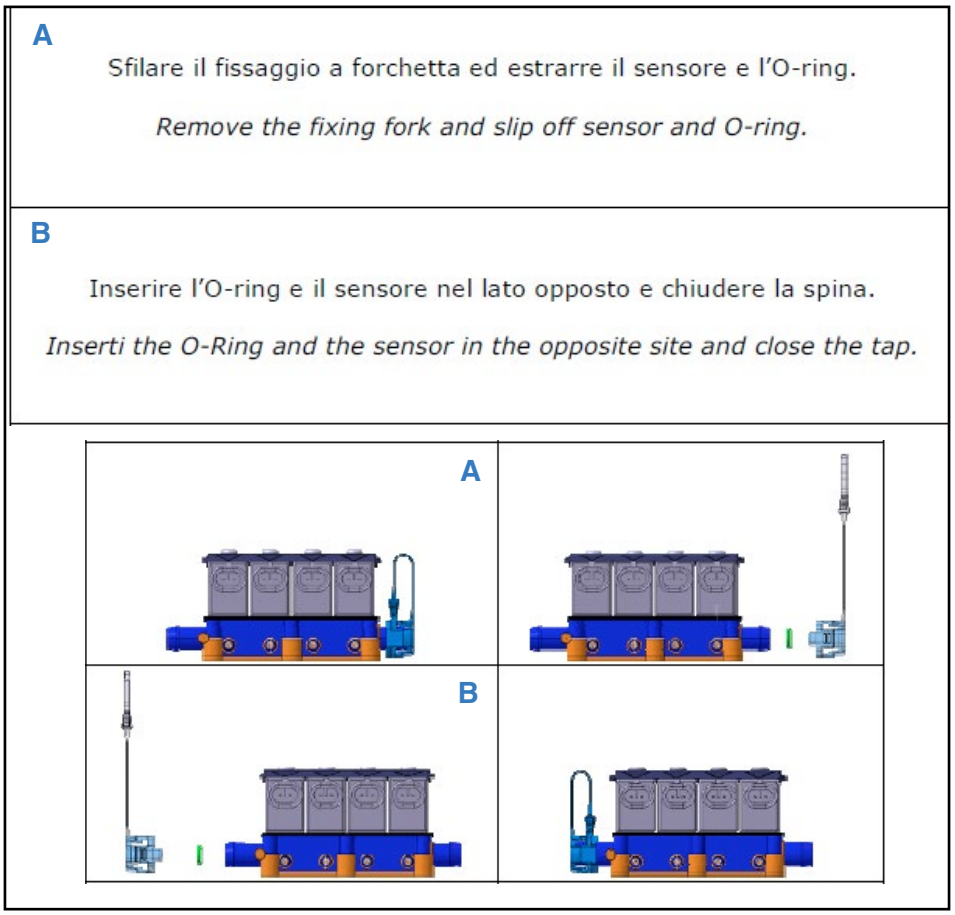
The steel plate fitted on the top of the plastic body has 2 threaded M6 holes on its side:
these holes are used to fix the injection rail to a bracket, usually fitting Silent Block
rubber dampers between the rail and the bracket.
The bracket for injection rail is usually fixed to the intake manifold; OMVL provides zinc plated steel brackets for general purpose.

4.3.2 Installation

To ensure an optimal modulation of the amount of gas injected into each cylinder, the rail must be installed very close to the intake manifold where the gas nozzles are installed and with the coil's axes in vertical position with a tolerance of ±15° along X and Y axes.

Note: The position of the injection unit must be such as to avoid sharp bends and folds of rubber
connecting pipe and their length must be exactly identical and not longer than 300 mm

The device must be firmly fixed by means of an appropriate stirrup, to any fixing screw placed on the engine or to a wall
of the motor space in horizontal position (with vertical solenoids axis) and protected from excessive heat and sprays of
water, but not too far from the manifold.
The device must be firmly fixed by means of an appropriate stirrup, to any fixing screw placed on the engine or to a wall
of the motor space in horizontal position (with vertical solenoids axis) and protected from excessive heat and sprays of
water, but not too far from the manifold.
If is necessary for a better installation, is allowed to turn the coils.
Is required to maintein the coils in the same position, so is recommended to turn one coil at time as shown in the picture.
Place the rail on a flat surface and with one hand blocking the plastic body, remove the plate by a lever on the side.



Pict. 3

Note: Do not force on the coils and tubes!

4.3.3 Temperature sensor inversion

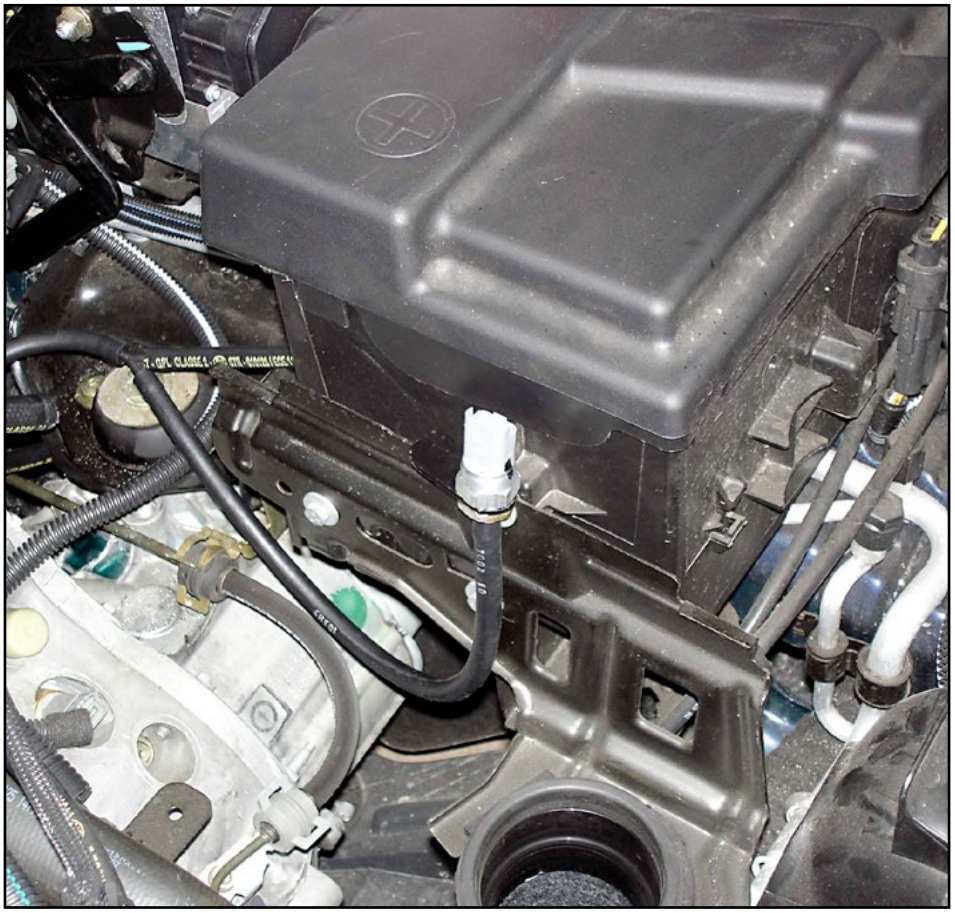
If is necessary is possible to place the temperature sensor in the other side of the injeciton rail. (pict.3)

4.4 Manifold Absolute Pressure Sensor (MAP) If present

Sensor has to be fixed to the vehicle bodywork (pict. 4) avoiding high heat irradiation areas. It is better than pipes are as short as possible and anyway no longer than 400 mm.

4.5 Pipes

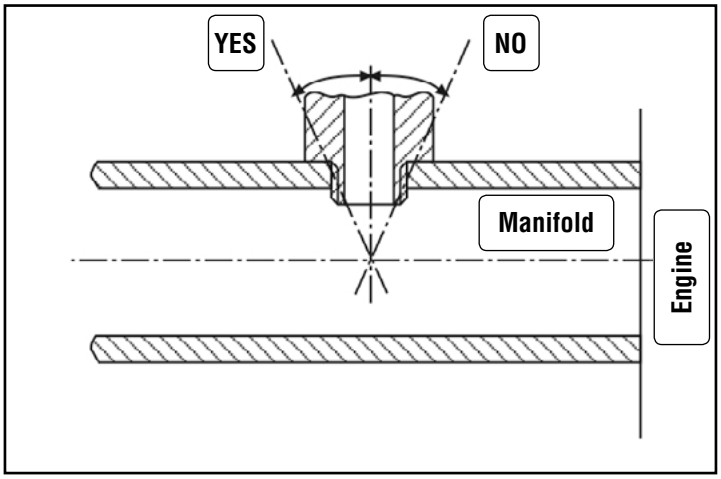
Pipes belonging to the Dream system are realised by OMVL. According to the Dream kit used, we provide pipes ø 10x17 or ø 12x19 mm with fittings on each end (pict. 5).
Before connecting pipes ø 10x17 or ø 12x19 mm, pipe-holders should be installed on each end as shown by picture


Pict. 4

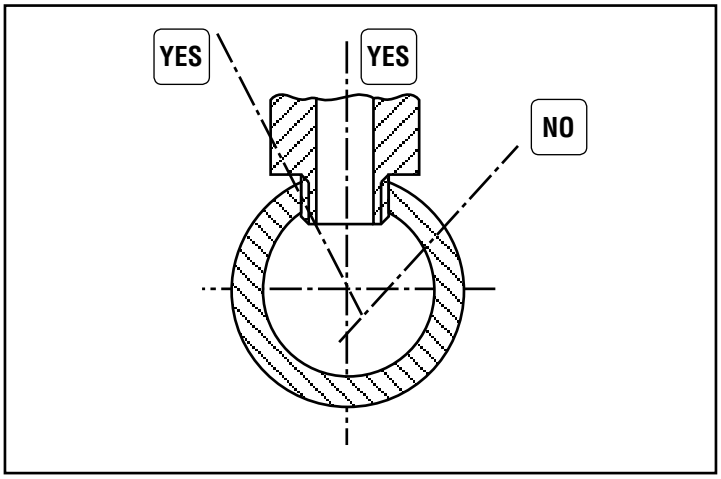
6.
For connecting injectors, we use pipe ø 5x10,5, that must be cut at the length desired to allow installing on it a pipe-holder with a fitting-nut. In such cases, installation will be as follows (pict. 6):
• Install pipe-holder fitting (1) on the suitable nut (2).
• Fit the click clamp (3) on the pipe (4).
• Fit deeply the pipe on the previously assembled pipe-holder.
• Tighten pipe on the pipe-holder with the click clamp using suitable pliers.
Be careful with not leaving any rubber residuals while cutting pipe or fitting pipe-holder, because they could obstruct the pipes or other components of the equipment, prejudicing its working.
Before installing pipe, it's better to blow it with compressed air, in order to expel any impurities or residuals. Verify that clamp assures tightness. We recommend not using pipes different from the supplied. The usual criteria related to the correct installation of pipes should always be respected, avoiding any relative movements during running in order to not creating frictions and wears, contacts against sharp corners or drive belts, and so on.
Once installed, pipes should not be too stretched, they should not make any folds or be positioned in such a way to have the tendency to make folds in the future.

4.6 Nozzles

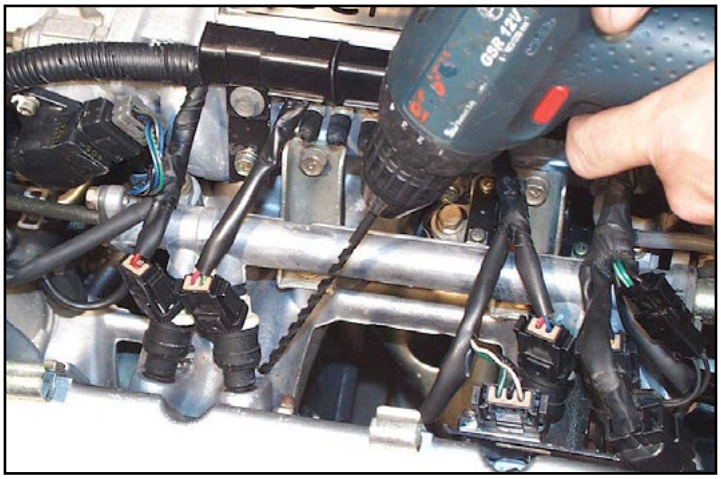
Nozzles installation is one of the most important operations of the whole installation.
We suggest to clearly indicating on the manifold all the points that will be drilled, before beginning.
Use specific tools included in the tool-case Injection Systems code 90AV99004048.
Drill should be quite near the cylinder head, but preserving the same distance on all manifold branches and the same nozzle orientation. Each nozzle has to be perpendicular to the intake-pipe axis, or at least, create an angle such to convey flow towards the engine and not towards the throttle-body.
On the plastic manifolds, find areas whose walls are as less thin as possi-

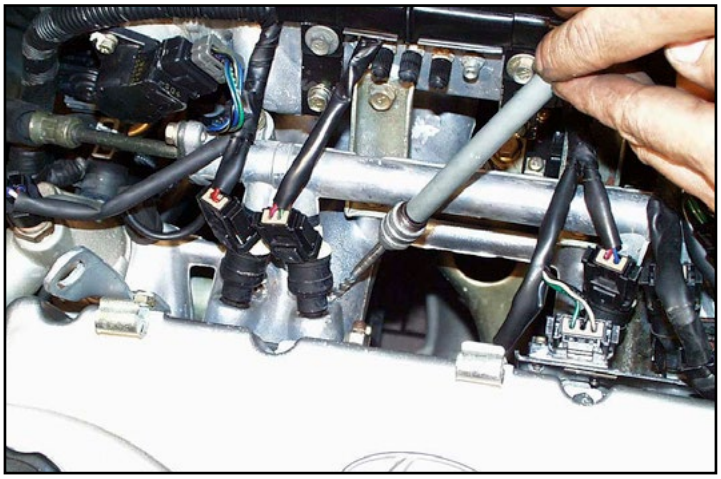


Pict. 5 Inclination puncture collector

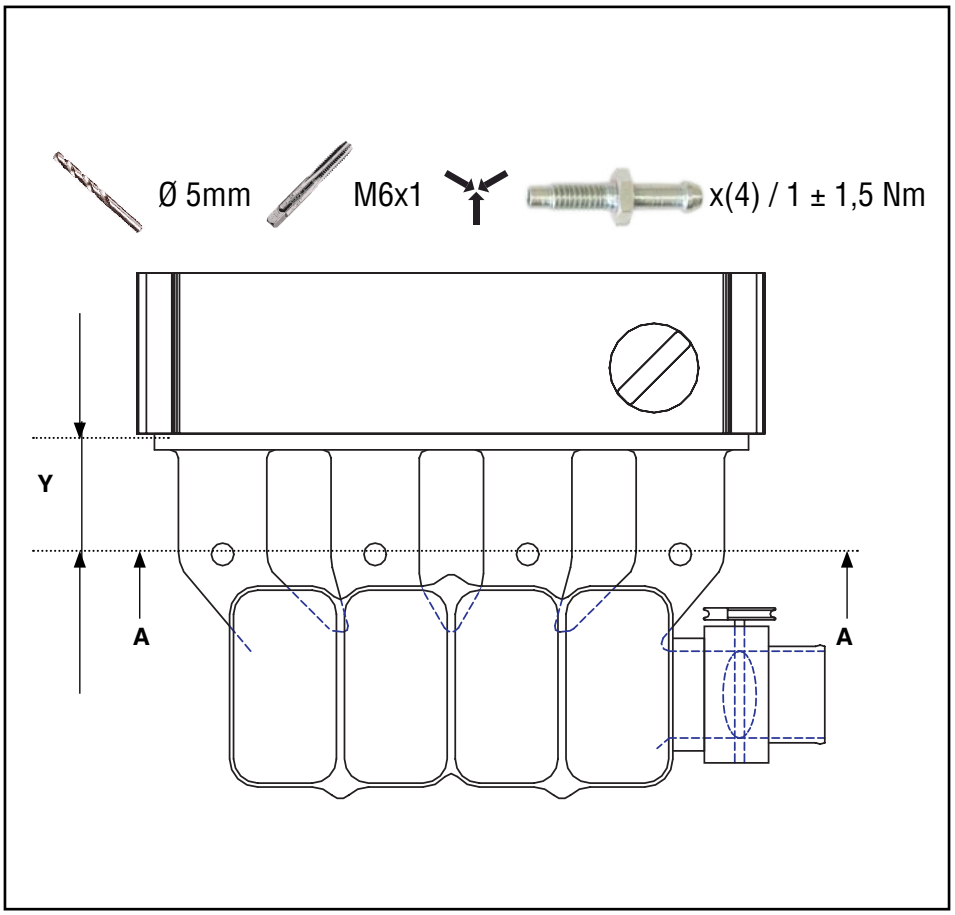


Pict. 6

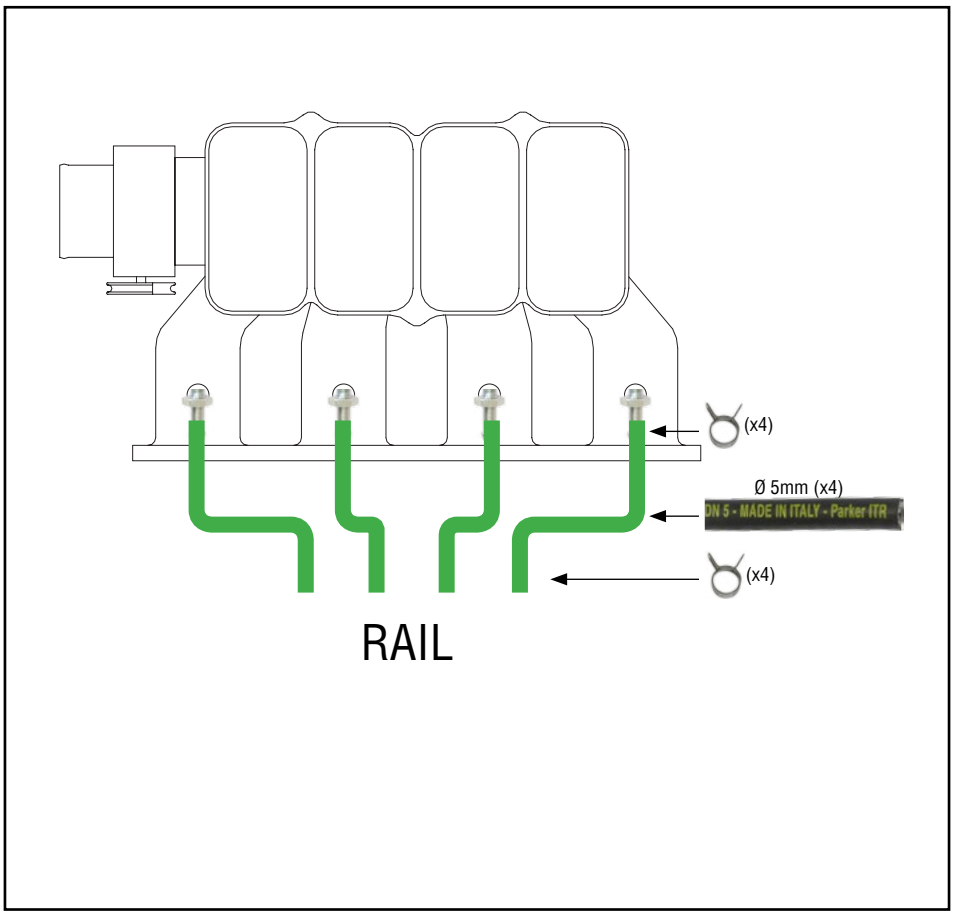

Pict. 7


Pict. 8

ble. After having marked properly the drilling points with a pencil, before starting to drill, verify with the drilling-machine equipped with a helical bit, that there are not overall dimensions such to avoid the correct drilling of all branches following the direction wanted. Make an engraving and now drill (pict. 7). Use a correctly sharpened 5 mm helical bit, and then make an M6 threading (pict. 8). While drilling and threading, take all necessary measures to prevent the chips from going into the manifold.
In particular, we suggest to frequently remove chips while drilling and grease the bit during the breaking last phase of the wall, in order to stick the chips to the bit. The last part of wall should be broken slowly so that the chips could be very thin: in this way, chips stick better to the bit and, if any of them falls inside, it would cause no damages. Even during the M6 threading, it is necessary to often grease, extract and clean the screw tap.
Using some sealing product, as Loctite 83-21, screw the nozzles on the manifold holes. Fit the nozzles correctly in order to avoid tightening them excessively and stripping them. Never change either the inside diameter of the nozzles or their outside shape. Fit the pipes with clamps on the nozzles.
NOTE: In presence of small diameter intake manifolds, it can be necessary to install some special nozzles, shorter than the standard ones.



Pict. 9



Pict. 10

4.7 LPG ECU

It can be fixed both inside the passenger and in the engine compartment.
Use the fixing holes on the aluminium body avoiding subjecting structure to excessive stresses (e.g.: do not fix the ECU on a convex surface, thinking you can tighten the bolts thoroughly, level so everything).
If available, always use the suitable fixing bracket.
Avoid too hot areas, or areas subjected to high thermal radiations.
Even though ECU is watertight, avoid installing it in areas subjected to continuous dripping in case of rain, so that the water doesn't penetrate and stagnate in the harness or sheaths.

No adjustment is programmed on the ECU; it is therefore not important it's easily accessible.
It's more important, instead, that cable going from the ECU with the computer connection is placed in a very accessible area and protected by the cap from possible water infiltration.

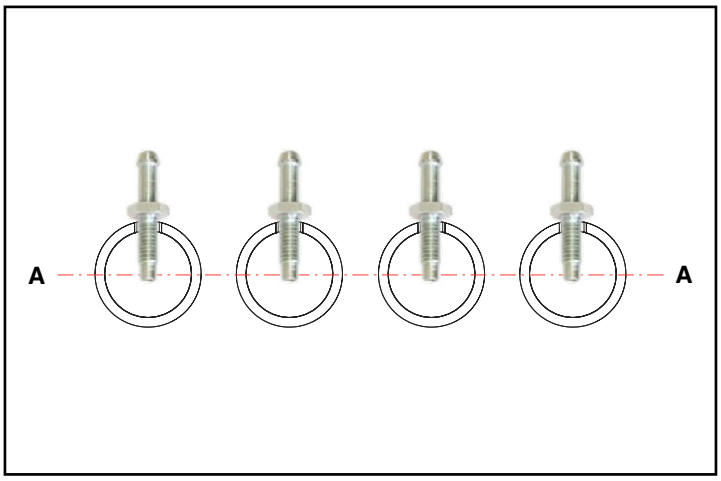
4.8 One-Touch Changeover Switch

One-Touch changeover switch is available in two versions, with or without the round frame. So, installation must be carried out as following:
- built-in fixing: making a 23 mm hole and introducing changeover switch without its frame (pict. 14).
- external fixing: making a 14 mm hole that allows the cable passage, and pasting changeover switch with its round frame (pict. 15).

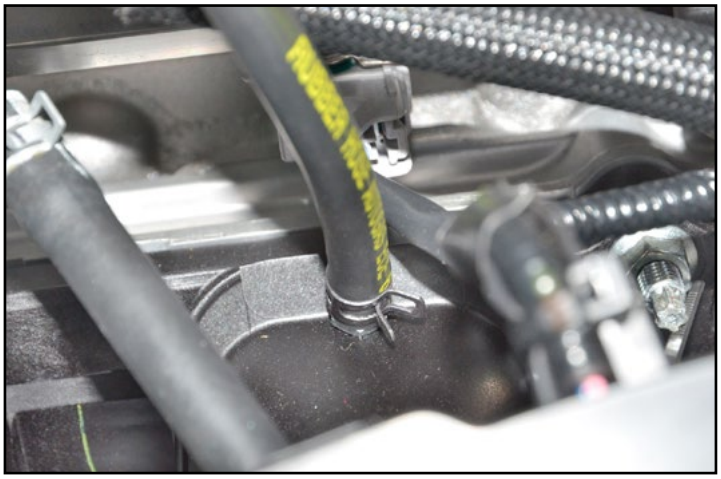
4.9 Family Dream systems harness

From a "mechanical" point of view, we suggest placing wiring very carefully and avoiding forcing on the connections (never pull on wires to let a connector passing through a hole or to disconnect it!!!). Avoid making too remarked folds, too strong clamping, sliding against moving parts, etc. Avoid that some pieces of cables are too stretched when the engine is under stress. Fix opportunely the pieces of cable near connectors, to prevent that, by dangling, they could wear them out in the future. Avoid any contact with sharp corners (burr the hole rims and install some wire-leads). Avoid placing Dream system cables too close to the spark plugs cables or to other parts subjected to high voltage.
Each connector is polarised, and this is the reason why you can install it without stress only in the right direction.

Warning: all not pre-cabled connections should be carried out through sweet brazing (soft soldering) and opportunely insulated. Be careful that soldering is not "cold" and without risk of detachment in the future. Any unused wiring cables should be

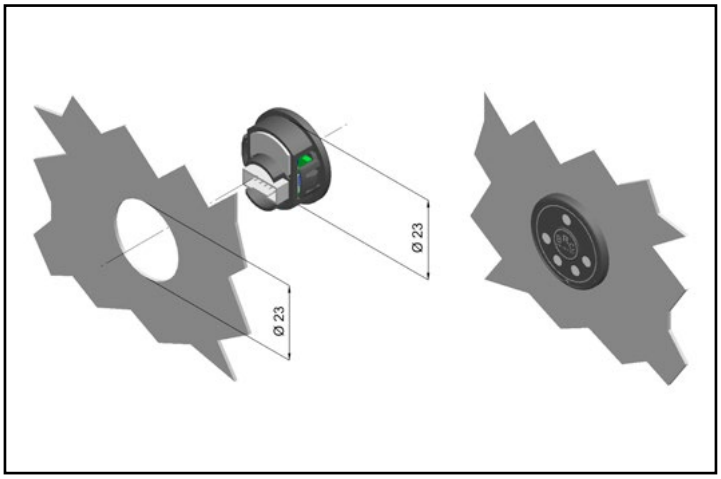


Pict. 11
Top view of nozzles



Pict. 12
Tube with nozzle on collector

Pict. 13
Assembly of the ECU in the engine compartment



Pict. 14
One-touch Changeover Switch

shortened and separately insulated. Never use welders that are connected to the battery of the same vehicle, or quick type welders.

Pict. 15
Changeover Switch with frame

5. RULES FOR A RIGHT INSTALLATION OF LPG DREAM SYSTEMS REAR SIDE

5.1 Ring-shaped tank assembly rules

Tank is provided with Multivalve already installed.
R67 01 regulation describes in its part II prescriptions to follow for assembling tanks; in Italy, further prescriptions are indicated in the Ministry's circular Prot. 1671-4102 del 21.05.2001.
Place tank in the luggage compartment strongly anchoring it to the car body with its suitable supports, with fixing clamps and tie rods.

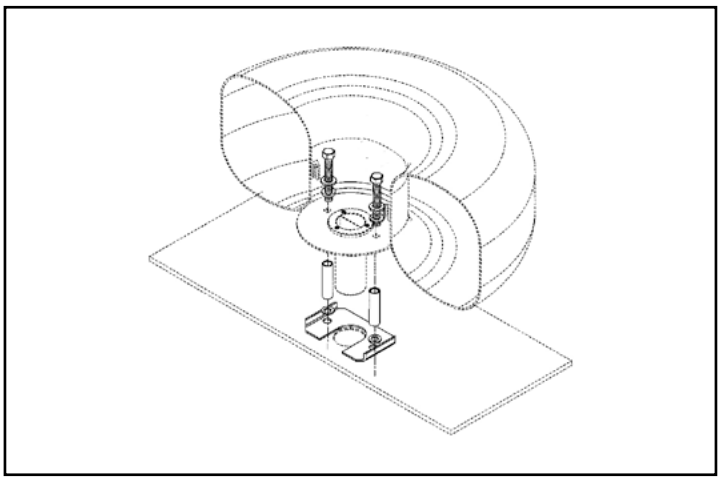
5.2 Prescriptions about LPG tanks fixing

A right installation should respect what provided for Enclosure 5 of ECE ONU R67 01.
If prescriptions indicated by enclosure 5 about screws, washers, plates and fixing clamps dimensions are not respected, you must make reference to calculation notes concerning LPG tank fixing provided by tanks builder.

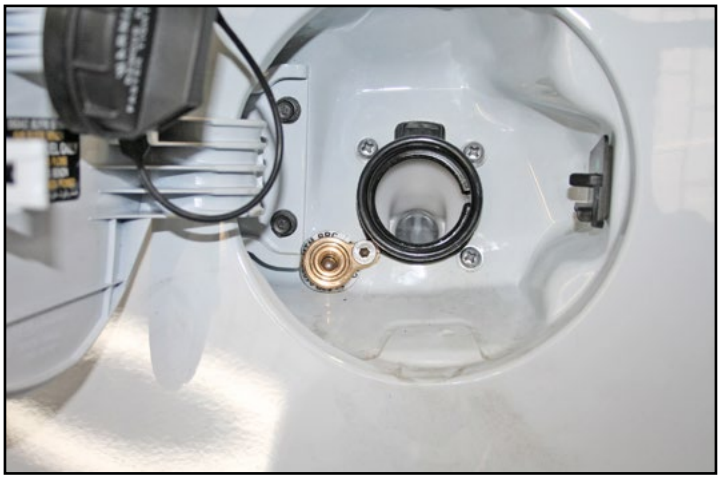
5.3 Refuelling point assembly rules

Fix refuelling point inside the petrol refuelling compartment, being careful to apply some anti-rust paint on the holes. Let perfectly adhere refuelling point to the bodywork, also using some silicone.

Pict. 1
Ring-shaped Tank



Pict. 2
Tanks fixing



Pict. 3
Refuelling point

6. CHECK PROCEDURES FOR A RIGHT INSTALLATION

In the engine compartment, verify that all tightness clamps have been inserted, that fittings are closed and that every component has been installed.
With the engine switched on, check that components and pipes in the engine compartment don't touch any moving mechanical part or any heat source.
Verify fittings tightening to avoid possible gas leakages and check that pipes don't create any narrowing.
Control liquids level, and being sure with the right reducer heating.
Check right changeover, and LEDs and level sensor working.
Control tank fixation.
Start vehicle up and refill it with 5 litres of LPG in the refuelling area.
Check the right working of refuelling point and Multivalve while refuelling.
It's absolutely necessary to verify that:
a: 80% filling limitation device works, testing that it really interrupts filling at roughly the 80% of the tank;
b: opening and closing of supply solenoid valve are clear and precise.
With the engine switched on, connect yourself to the PC and, by means of the suitable software, verify vehicle working parameters.

7. START UP PROCEDURES (RANGE-VALUE)

You'll find Start Up procedures and all information about diagnostic into the software handbook.

8. SOFTWARE INSTALLATION DREAM SYSTEMS

Follow the procedure indicated on the software manual Calibration Tool.

CHECK LIST

	GAS	PETROL
Components fixing		
Pipes narrowing		
Water clamps		
Fittings of high-pressure gas pipes		
Fittings of low-pressure gas pipes		
Gas leakages		
Liquids		
Components slidings		
Right 80% refuelling		
Reducer heating		
Changeover switch LED working		
Level sensor working		
Right changeover		
Check latest version SW with PC		
Parameters check with PC		
Petrol mode		

9. COMPONENTS MAINTENANCE SCHEDUL

The following rules for components maintenance have to be considered as general.

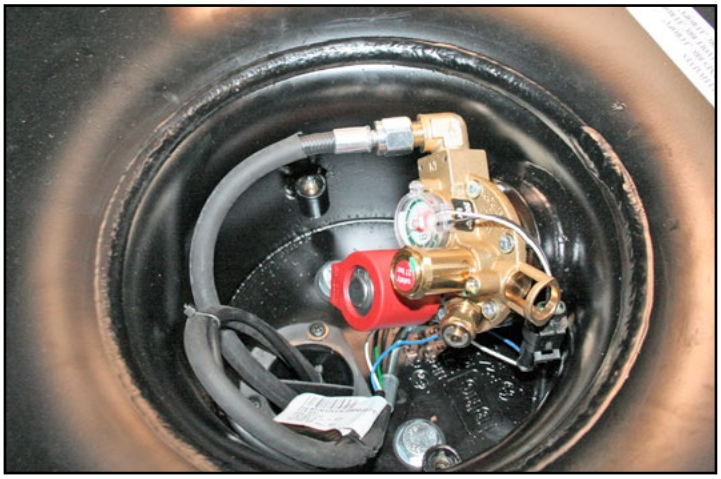
9.1 Preliminary operations

9.1.1 Securing the equipment

These operations are not necessary if you realize interventions on Gas ECU and on fuses.
Open the bonnet, lift the spare wheel cover, and remove the gas-tight housing cap on LPG tank by operating on the 2 screws.
Close tap on multivalve (pict. 1).

NOTE: while closing tap don't apply too much strength, to avoid damaging the inside rubber shutter.
Start vehicle up with changeover switch on automatic mode (pict. 2, Red LED off; changeover switch button has a red LED that reports vehicle working mode).
Bring vehicle to 3000 RPM; after the changeover to gas, wait for gas exhaustion in the pipes.
When gas is over, an intermittent sound informs that vehicle has automatically changed over to petrol. Push changeover button. Button should turn on and sound should stop.
Switch vehicle off.

NOTE: sometimes, during the automatic changeover from forced gas to petrol, vehicle could switch off. In these cases, change over to petrol (Red LED on) and turn dashboard off.



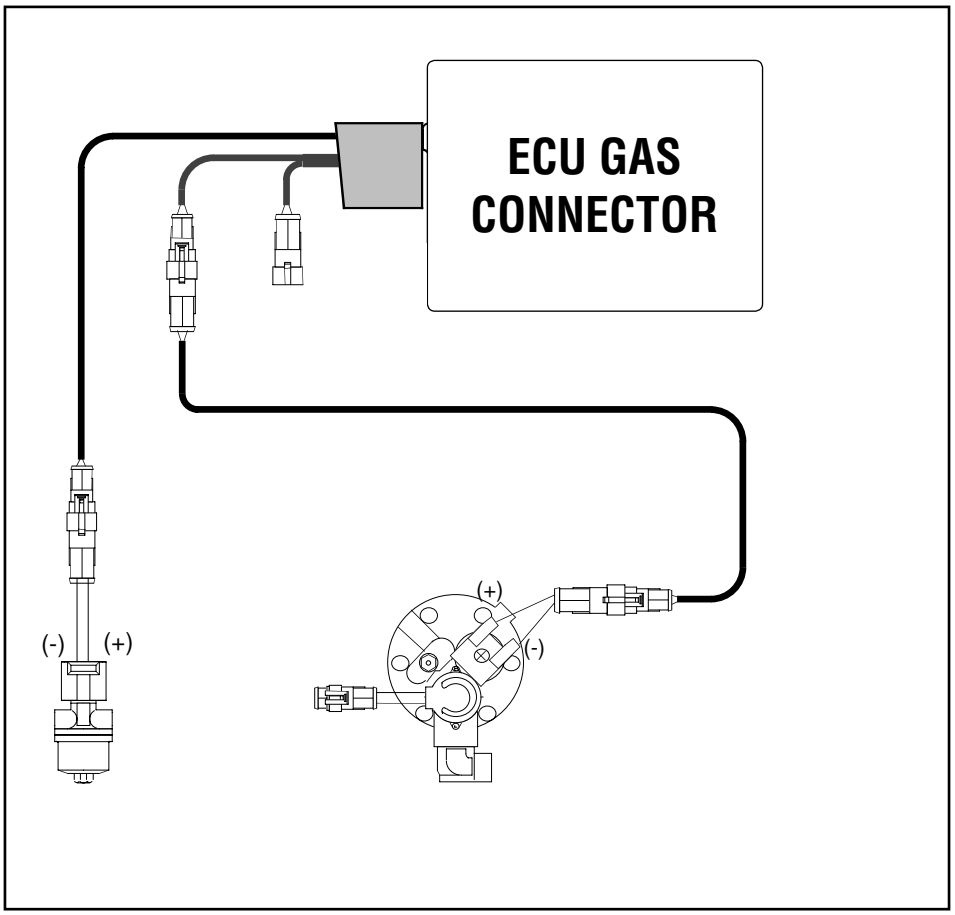
Pict. 1
Multivalve

Pict. 2
Changeover Switch

SCHEDULED MAINTENANCE INSPECTIONS	1000 km	20000 km	40000 km	60000 km	80000 km	100000 km	120000 km
Inspection of LPG system mechanical components	x	x	x	x	x	x	x
Inspection and replacement of LPG SV filter	-	-	x	-	x	-	x
Air filter cleaning	x	x	x	x	x	x	x
Check of spark plugs cables, spark plugs, ignition system	x	x	x	x	x	x	x
Inspection of connection clamping	x	x	x	x	x	x	x
Inspection of water-gas clamps tightening	x	x	x	x	x	x	x
Inspection of carburation with OMVL special instrument	x	x	x	x	x	x	x
Replacement of FJ1 filter cartridge		x	x	x	x	x	x
Inspection and adjustment of valves gap		x	x	x	x	x	x
Key: X= to curry out							

10. DREAM FAMILY WIRING CONNECTIONS

The following general installation rules have to be considered as indispensable for a good understanding of the system. Gas ECUs are connected to the electric equipment (supplies, grounds, signals, sensors, actuators, etc.) through a connector hwo change according to the system used containing all the signals necessaries for the various functions.
Most of the wiring cables ends on precabled connectors, therefore it becomes very easy to connect the system components to the ECU; furthermore, conductors are divided into many sheaths, in order to simplify the installation and the identification of the different cables.
All the connections of cables not ending on a connector should be carried out by a well-done and duly insulated soft soldering. Avoid any connections by simply twisting the wires or using other scarcely reliable systems. For the mechanical assembly and the wiring location, make reference to the chapter 5 of the present handbook.



Pict. 1 Solenoid connection front and rear

In the following paragraphs we'll analyse wiring connections of Dream systems.

10.1 Dream harness family

Refer to the general diagrams from page 25 to page 31 based on the wiring of the system that is being installed

10.1.1 Supply and battery ground

The red wires and the black wires must be connected to the car battery: the red wires to the positive and the black ones to the negative. It is important to connect the cables as they are, allowing that they reach separately the terminals of the battery, without joining wires of same colour in one only or joining them along the harness.
Grounds must be always connected to the battery negative and not to the car body, to the engine ground or to other grounds presents on the vehicle.

10.1.2 Diagnostic socket

The PC connection to the Gas ECU is based on a diagnostic socket, directly coming from the wiring "D". It is the 3-way connector diagnostic point (female-holder on the harness), equipped with a protection cap. Diagnostic socket is usually placed near the connector of the ECU.

10.1.3 WP Solenoid valves connections

Solenoid valves are connected to the harness through precabled connectors joined to the cables in sheats "D" and "E".
Front solenoid valve ought to be connected to the connector of sheath "E", while the rear one ("Europa 2" multivalve) ought to be connected to the connector of sheath "D" through suitable extension cable code 06LB50010062.
Sheath "D" also contains connector for connecting resistive sensor.
No solenoid valve terminal is permanently connected to the ground, but a cable comes from +12V battery (through fuse and relay), while Gas ECU controls the other one.
Do not directly connect solenoid valve terminals to the ground: this may cause a short-circuit and will burn fuses on harness and/or prejudice the equipment right working.
Separated piloting cables have been planned for front and back solenoid valve. This separation allows gas ECU understanding whether and, in case, which of the two solenoid valves is burnt or in short-circuit. It is therefore necessary to avoid connecting the two solenoid valves in parallel: this may prejudice the ECU diagnostic function (pict. 3).

10.1.4 Level sensor

The resistive level sensor is connected directly to the harness through the precabled 2-poles connector (sheath "D" in picture 3). There is no possibility of error, because the connector of the level sensor is the only one of this type. The connection between ECU and sensor can be made through the special extension cable (06LB50010062) ending on special connector of resistive sensor for Europa multivalve.

10.1.5 TH2O Sensor

When present ,it's connected to the harness through the suitable 4-way connector (male-holder on harness) on which 3 cables of sheath "Q" end (pict. 3).

10.1.6 Gas injectors

Gas injectors are connected to the wiring through the cables with pre-cabled connectors contained in the sheaths "N1", "N2", "N3", "N4" (pict. 3).
A Green cable and a White/Green one come to the connector. On the White/Green one a number from 1 to 4 is printed, indicating petrol injector correspondence.
It is very important to maintain correspondence between gas and petrol injectors.
Actually, gas injector to which connector N1 has to be connected, must correspond to the cylinder containing the petrol injector to which we will connect the plug of Injectors Connection Dream Harness (or the Orange and Violet wires of the Universal Injector Connection Dream Harness) marked with P1 and so on. If corrispondence fails, you could note a performance worsening, such as: worse driving conditions, higher unsteadiness of lambda control, less "clean" petrol/gas changeover, etc.
Remember that number distinguishing gas injectors connectors is printed on wiring cables arriving to the connector itself.

10.1.7 Lambda Oxygen Sensor signal If necessary

In sheath "H" there is the Yellow cable to be connected, if necessary, to the Lambda Oxygen sensor signal wire, placed before the catalyst. You don't have to cut this cable but rather only strip it, weld it with gas harness cable and insulate it.
Yellow cable connection allows a quicker self-adapting of the gas ECU and is therefore very useful if the self-mapping phase needs a further map refinement.

10.1.8 Gas pressure and temperature sensor

Gas pressure and temperature sensor is directly situated on the rail. It's connected to the harness through suitable 4-way connector (male-holder on harness) where the 4 cables of sheath "M" end.

10.1.9 MAP Absolute Pressure sensor

MAP pressure sensor is connected to the harness through suitable pre-cabled connector, at cables contained in sheath "O".

10.1.10 Connection of EOBD diagnostic socket

Through cables of sheath "G" you can take signals from EOBD diagnostic socket to obtain a better integration of the system with petrol injection strategies.
White cable or Yellow and Yellow/Black cables should be connected to EOBD diagnostic socket one by one, and not the three ones at the same time (pict. 3).

10.1.11 10-pole connector, petrol injectors harness connection

Sheath "F" ending with a 10-poles connector, makes possible petrol injectors cutting. Now, it's enough to connect one of the specific injectors cutting wirings according to the kind of connector present on the vehicle (Bosch or Sumitomo).
List of harness codes with connector Bosch not supplied into the kit but sold apart:
• code 06LB50010102W RIGHT Dream Connection Harness 4 Petrol Injectors,
• code 06LB50010103W LEFT Dream Connection Harness 4 Petrol Injectors,
• code 06LB50010105W RIGHT Dream Connection Harness 2 Petrol Injectors,
• code 06LB50010106W LEFT Dream Connection Harness 2 Petrol Injectors,
• code 06LB50010101 Universal Dream Connection Harness 4 Petrol Injectors,
• code 06LB50010104 Universal Dream Connection Harness 2 Petrol Injectors,
to choose according to the petrol injectors polarity.
List of harness codes with connector Sumitomo not supplied into the kit but sold apart:
• code 06LB50010113 RIGHT Dream Connection Harness 4 Petrol Injectors Sumitomo
• code 06LB50010114 LEFT Dream Connection Harness 4 Petrol Injectors-Sumitomo
• code 06LB50010115 RIGHT Dream Connection Harness 2 Petrol Injectors Sumitomo
• code 06LB50010116 LEFT Dream Connection Harness 2 Petrol Injectors Sumitomo to choose according to the petrol injectors polarity.
Connection is very easy, and philosophy of injectors cutting is the same followed by OMVL during all these years. To select the right wiring you only have to follow the instructions inside the single packages.
During gas mode, it's important to keep the same injection sequence you had during the petrol mode. Therefore, it's necessary to interrupt petrol injectors signals in the same order you will follow to connect gas injectors.
To do this, you can pair a consecutive number to each cylinder, for instance from 1 to 4 in case of a 4-cylinder engine (note that this order only help to carry out the Dream installation so that it could be different from the one assigned by the car manufacturer). Generally, in case of engine positioned in a transversal way, you will indicate as number 1 the cylinder placed on the timing belt side (see picture 4).
Petrol injector sprinkling in the cylinder n. 1 will be stopped with the group 1 of the Dream Petrol Injectors Connection Harness (or with the Orange and Purple wires identified with n. 1 of the Dream Universal Petrol Injectors Connection Harness) and so on.
The numbers identifying both gas and petrol injectors connections are printed directly on the wiring connection cables.

10.1.11.A Injectors polarity

In order to choose the right injectors cutting wiring (Right or Left) or to precisely know which is the negative wire (in case you preferred to use a Universal harness), it's important to know the

injector polarity, that's to say where positive wire is placed to safely intervene on the Negative one.
Therefore, referring to picture 4 it is necessary to:

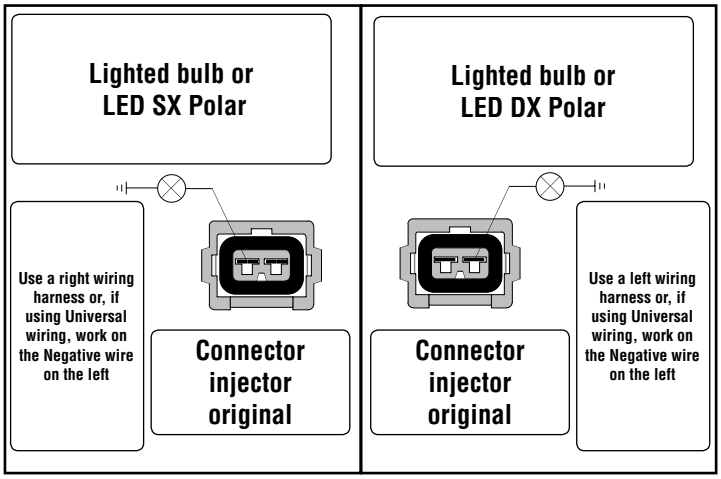
• Disconnect all injectors connectors and, if necessary, all other connectors eventually installed upstream (only after contacting OMVL technical Assistance Service).
• Switch the dashboard on
• Detect which pin of each female connector just disconnected has a +12 V voltage (use the POLAR device code 06LB00001093 or a pilot-light). [Check all of them!!]
• If watching the connector as indicated in picture 4 (pay attention to the reference teeth orientation) the +12V cable is on the right, you have to use a RIGHT Wiring. If instead you are installing a Universal wiring you will have to cut the negative cable (on the left).
• If supply is on the left, use a LEFT Wiring. If instead you are installing a Universal wiring you will have to cut the negative wire (on the right).

10.1.12 Fuses and Relay

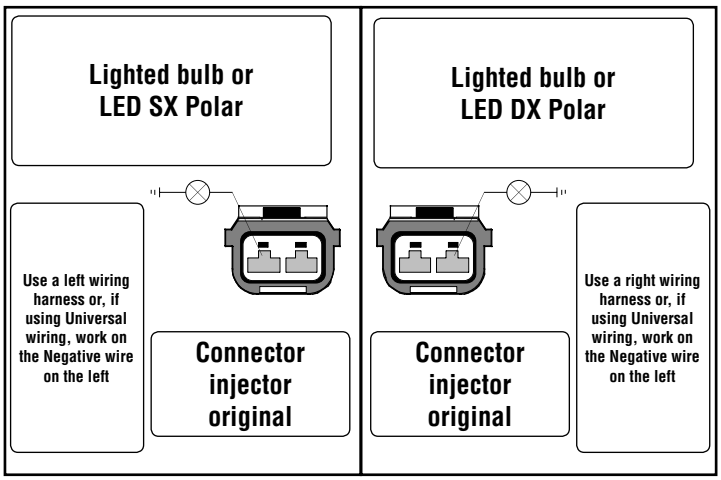
At the outlet of the sheath "L" (see picture 3) there are the two 15A and 5A fuses of the LPG equipment. The harness is supplied with the two fuses at the correct amperage, fitted in the right seat. We suggest not inverting their position. The 5A fuse ought to be inserted in the fuse-holder with the smaller section cables, while the 15A fuse in the one with the larger section cables. Remember that for 5, 6 and 8 cylinder version 15A fuse is replaced with a 25A one.
The system uses relay to interrupt the battery positive arriving to the actuators.

10.2 RPM Signal

Is engine rotation speed signal (RPM) by directly connect with RPM counter or crankshaft signal.
Connect so Grey cable of sheath "G" to the original equipment cable. You don't have to cut this cable but rather only strip it.



Pict. 3
Bosch type connector



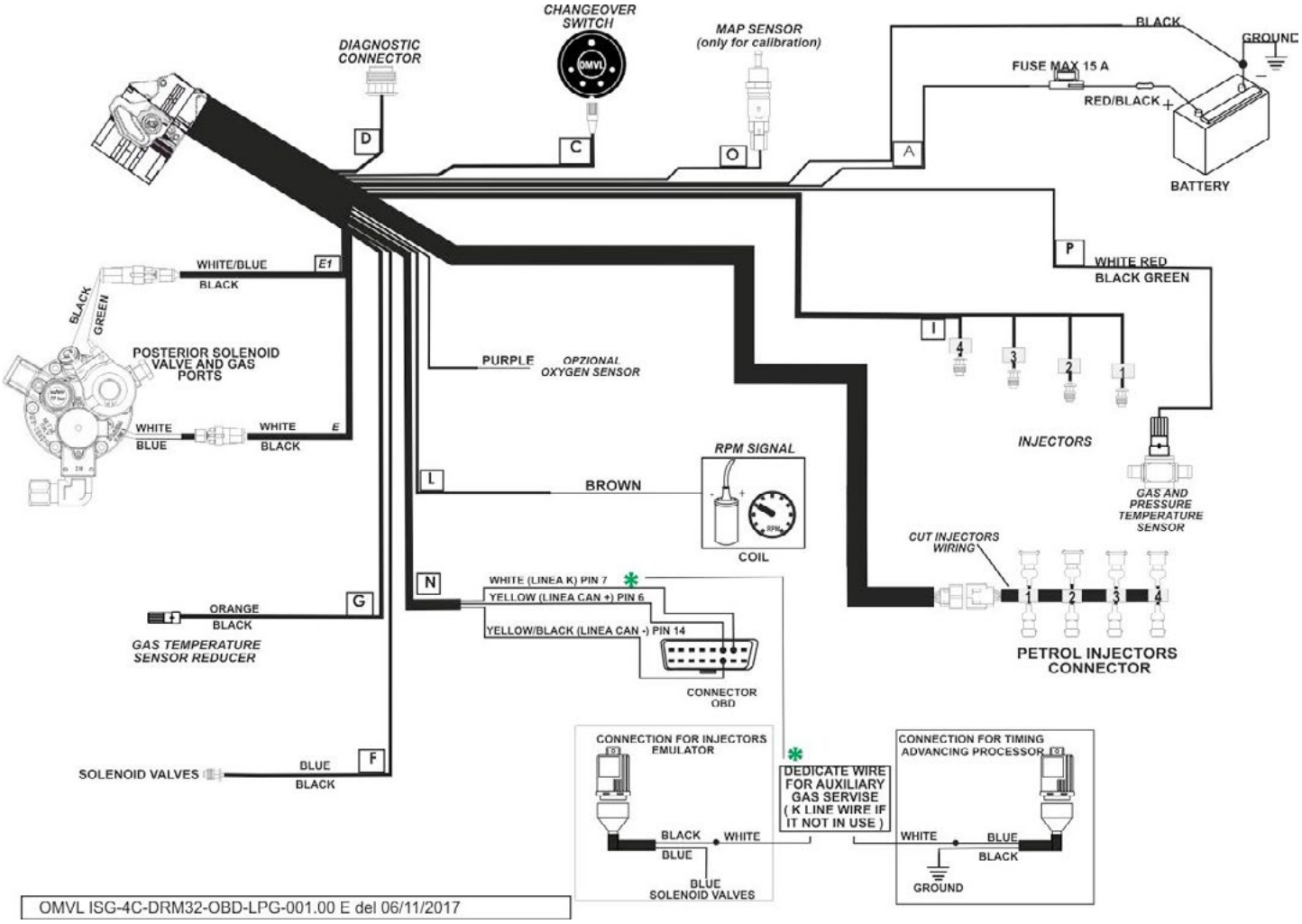
Pict. 4
Sumitomo type connector

10.2.1 Positive with key contact

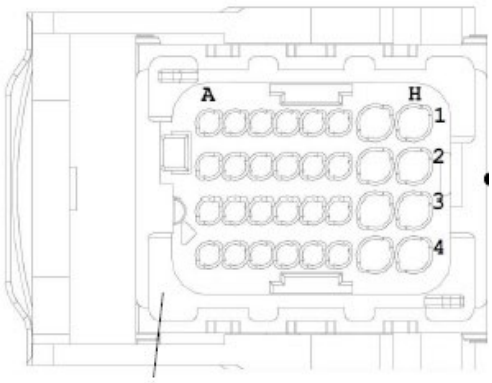
The Brown wire has to be connected to the under key positive signal of the original equipment.
You don't have to cut this cable but rather only strip it, weld it with Dream 24.11 harness cable and insulate it.
We want to remind you that it's very important to connect our +12V with key contact (brown cables) on a safe and clean supply, with no voltage peaks that could cause temporary problems or, in worst case, a serious damage to ECU.
Safe connections:
We suggest to take this signal from a good +12V with key contact or at most from petrol injectors positive.

11. MAIN WIRING AND PINOUT

- DREAM ON

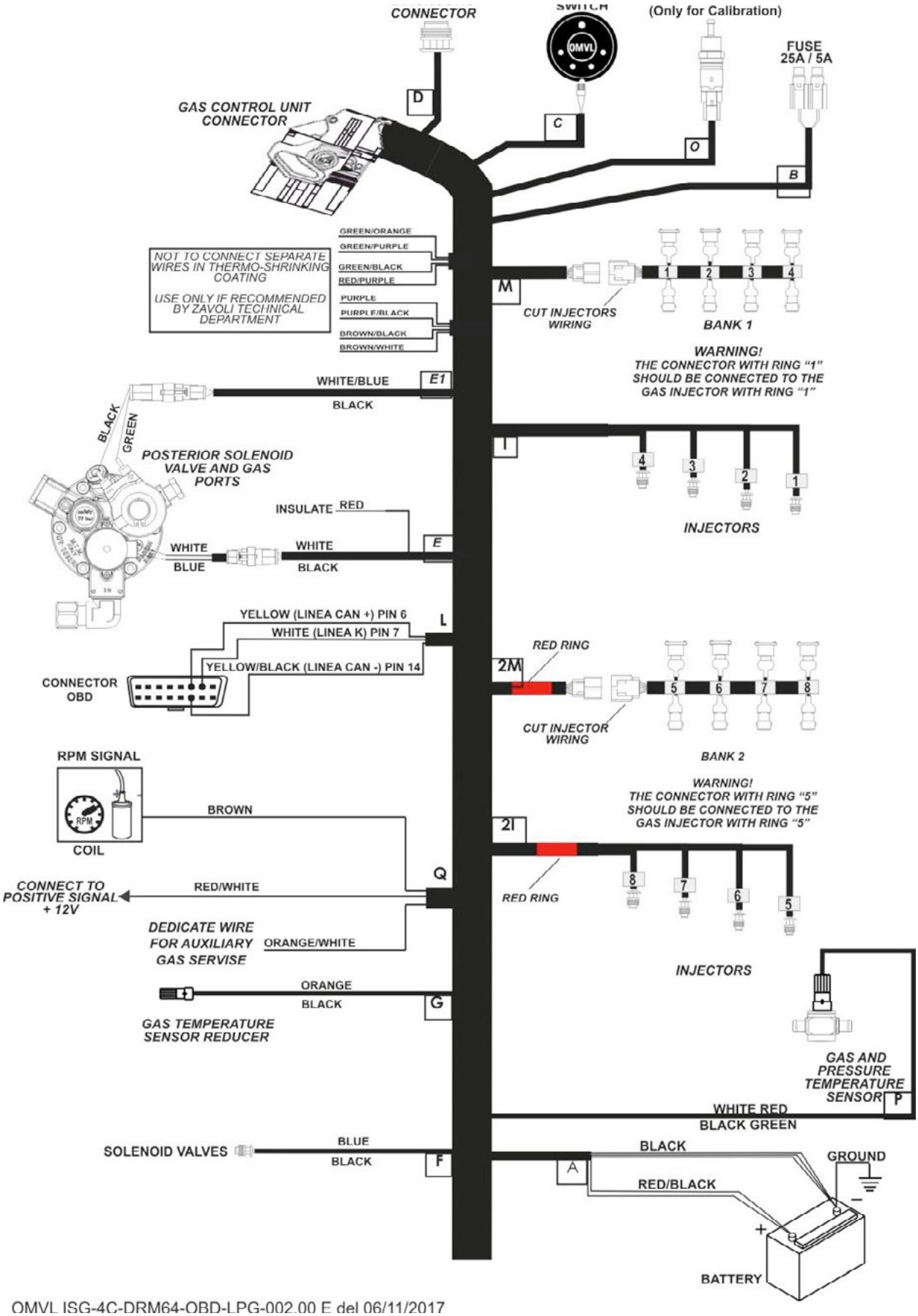


Pin Out



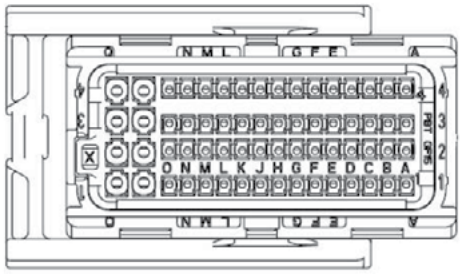
PIN	DESCRIPTION	COLOUR	SIGNAL
1A	Petrol Injector Cyl. 3 Side Injector	GREEN	→
1B	Petrol Injector Cyl. 3 Side Petrol Ecu	GREEN/BLACK	←
1C	Petrol Injector Cyl. 4 Side Injector	YELLOW	→
1D	Petrol Injector Cyl. 4 Side Petrol Ecu	YELLOW/BLACK	←
1E	Connection Obd Linea K	WHITE	↔
1F	Rpm	BROWN	←
1G	Power Supply Battery	RED/BLACK	→
1H	Positive Solenoid Valve	BLUE	→
1H	Positive Gas Injector	RED/GREEN	→
2A	Petrol Injector Cyl. 2 Side Petrol Ecu	RED/BLACK	←
2B	Signal Map Sensor	WHITE	←
2C	Signal Temperature Gas Sensor	WHITE	←
2D	Signal Pressure Gas Sensor	GREEN	←
2E	Changeover Switch and Socket Diagnostic	GREEN	→
2F	Positive Signal + 12V	WHITE/RED	←
2G	Power Supply Battery	RED/BLACK	→
2H	Positive Posterior Solenoid Valve	WHITE/BLUE	→
2H	Positive Gas Injector	RED/GREEN	→

PIN	DESCRIPTION	COLOUR	SIGNAL
3A	Petrol Injector Cyl. 2 Side Injector	RED	→
3B	Signal Temperature Water Sensor	ORANGE	←
3C	Signal Sonda Lambda	PURPLE	←
3D	Connection Obd Can Bus	YELLOW/BLACK	↔
3E	Connection Obd Can Bus	YELLOW	↔
3F	Positive 5V Level Sensor	RED	→
3G	Ground	BLACK	←
3H	Positive 12V Socket Diagnostic	RED	→
4A	Petrol Injector Cyl. 1 Side Petrol Ecu	BLUE/BLACK	←
4B	Petrol Injector Cyl. 1 Side Injector	BLUE	→
4C	Negative Injector Gas 1	YELLOW	→
4D	Negative Injector Gas 2	ORANGE	→
4E	Negative Injector Gas 3	RED	→
4F	Negative Injector Gas 4	BROWN	→
4G	Ground	BLACK	→
4G	Negative Solenoid Valve	BLACK	→
4H	Negative Posterior Solenoid Valve	BLACK	→



OMVL ISG-4C-DRM64-OBD-LPG-002.00 E del 06/11/2017

Pin Out



PIN	DESCRIPTION	COLOUR	SIGNAL
1A	Power Supply Battery	RED	→
1B	Changeover Switch	GREEN	→
1C	Signal Temperature Water Sensor	ORANGE	←
1D	Connection Obd Can Bus	YELLOW	↔
1E	Signal Sonda Lambda 2	PURPLE/BLACK	←
1F	Signal Petrol Pressure IN	GREEN/ORANGE	←
1G	\\	\\	\\
1H	Ground	BLACK	←
1J	Rpm	BROWN/GREY	←
1K	Rpm	BROWN	←
1L	\\	\\	\\
1M	Rpm	BROWN/WHITE	←
1N	Connection Obd Linea K	WHITE	↔
1O	Signal Petrol Pump PWM	RED/PURPLE	←
1P	Power Supply Battery	RED	→
1Q	Power Supply Battery	RED	→

PIN	DESCRIPTION	COLOUR	SIGNAL
2A	Positive 12V Socket Diagnostic	RED	→
2B	Socket Diagnostic	GREEN	→
2C	Signal Map Sensor	WHITE	←
2D	Connection Obd Can Bus	YELLOW/BLACK	↔
2E	\\	\\	\\
2F	Signal Petrol Pressure OUT	GREEN/PURPLE	←
2G	Signal Temperature Gas Sensor	WHITE	←
2H	Signal Pressure Gas Sensor	GREEN	←
2J	Positive Sensor 5V	RED	→
2K	\\	\\	\\
2L	Power External Services 12V	WHITE/ORANGE	→
2M	\\	\\	\\
2N	Signal Sonda Lambda 1	PURPLE	←
2O	Power External Relè 12V	GREEN/BLACK	→
2P	Positive Gas Injector	RED/GREEN	→
2Q	Positive Gas Injector	RED/GREEN	→

Pin Out

PIN	DESCRIPTION	COLOUR	SIGNAL
3A	Petrol Injector Cyl. 1 Side Petrol Ecu	BLUE/BLACK	←
3B	Petrol Injector Cyl. 3 Side Injector	GREEN	→
3C	Petrol Injector Cyl. 3 Side Petrol Ecu	GREEN/BLACK	←
3D	Petrol Injector Cyl. 4 Side Injector	YELLOW	→
3E	Petrol Injector Cyl. 4 Side Petrol Ecu	YELLOW/BLACK	←
3F	Petrol Injector Cyl. 7 Side Petrol Ecu	GREEN/BLACK	←
3G	Petrol Injector Cyl. 7 Side Injector	GREEN	→
3H	Petrol Injector Cyl. 8 Side Petrol Ecu	YELLOW/BLACK	←
3J	Petrol Injector Cyl. 4 Side Injector	YELLOW	→
3K	Positive Signal + 12V	WHITE/RED	←
3L	Negative Injector Gas 4	BROWN	→
3M	Negative Injector Gas 3	RED	→
3N	Negative Injector Gas 2	ORANGE	→
3O	Negative Injector Gas 1	YELLOW	→
3P	Positive Posterior Solenoid Valve	WHITE/BLUE	→
	Positive Gas Injector	RED/GREEN	→
	Positive Solenoid Valve	BLUE	→
3Q	Ground	BLACK	←

PIN	DESCRIPTION	COLOUR	SIGNAL
4A	Petrol Injector Cyl. 1 Side Injector	BLUE	→
4B	Petrol Injector Cyl. 2 Side Petrol Ecu	RED/BLACK	←
4C	Petrol Injector Cyl. 2 Side Injector	RED	→
4D	Petrol Injector Cyl. 5 Side Petrol Ecu	BLUE/BLACK	←
4E	Petrol Injector Cyl. 5 Side Injector	BLUE	→
4F	Petrol Injector Cyl. 2 Side Petrol Ecu	RED/BLACK	←
4G	Petrol Injector Cyl. 6 Side Injector	RED	→
4H	Negative Posterior Solenoid Valve	BLACK	→
4J	Negative Solenoid Valve	BLACK	←
4K	Positive Signal + 12V	WHITE/RED	←
4L	Negative Injector Gas 8	BROWN	→
4M	Negative Injector Gas 7	RED	→
4N	Negative Injector Gas 6	ORANGE	→
4O	Negative Injector Gas 5	YELLOW	→
4P	Ground	BLACK	←
4Q	Ground	BLACK	←

PINOUT ECU UNTIL 4 CILINDERS:

- DREAM DI 2.0

PIN N°	WIRE	DESCRIPTION
1	ORANGE	Water temperature sensor
2	RED	Pressure e temperature gas sensor
3	GREEN	Pressure e temperature gas sensor
4		
5	PURPLE	Signal sonda lambda 1
6	PURPLE/BLACK	Signal sonda lambda 2
7	WHITE	Signal pressure rail IN sensor
8	WHITE/GREEN	Relè pin 35
9	GREEN	Diagnostic interface
10	YELLOW	Obd CAN +
11	BROWN	Signal RPM
12	RED	Fusible 5 am
13	WHITE	Obd K-LINE
14	BLACK	Solenoid valve
15	YELLOW	Injector gas 1
16	ORANGE	Injector gas 2
17	RED	Injector gas 3
18	BROWN	Injector gas 4
19	BLACK	Ground battery
20	GREEN	Relè pin 87
21		
22		
23		
24		
25	RED	Injector petrol 2 IN
26		
27		
28	GREEN	Injector petrol 3 IN

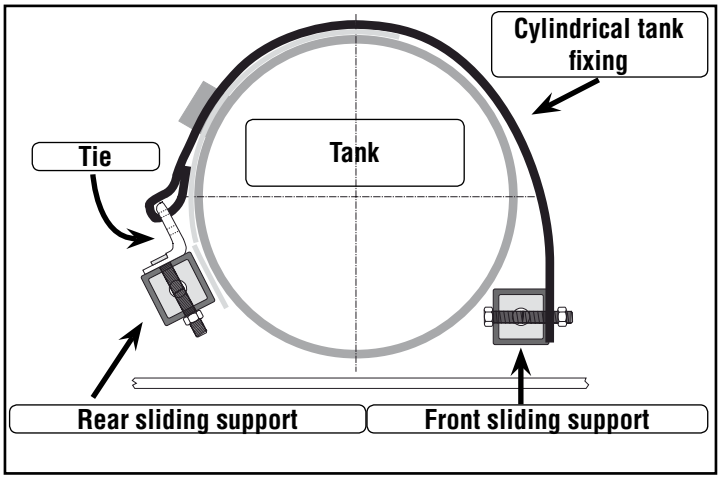
PIN N°	WIRE	DESCRIPTION
29	WHITE	Map sensor
30	WHITE	Pressure e temperature gas sensor
31		
32		
33	GREY	Signal emulation sonda lambda 1
34	GREY/BLACK	Signal emulation sonda lambda 2
35	WHITE/BLACK	Signal emulation pressure rail OUT sensor
36	WHITE/PURPLE	Signal pedal position
37		
38	YELLOW/BLACK	Obd CAN -
39	BLACK	Ground battery
40	WHITE/GREEN	Signal positive petrol pump
41	WHITE/RED	+12v key on
42	BLACK	Signal posterior solenoid valve
43	BLUE/BLACK	Injector petrol 1 OUT
44	BLUE	Injector petrol 1 IN
45	WHITE/BLUE	Positive injector petrol 1
46		
47	BLACK	Ground battery
48		
49	YELLOW/BLACK	Positive injector petrol 4
50		
51	YELLOW/BLACK	Injector petrol 4 OUT
52	YELLOW	Injector petrol 4 IN
53	RED/BLACK	Injector petrol 2 OUT
54	WHITE/RED	Positive injector petrol 2
55	WHITE/GREEN	Positive injector petrol 3
56	GREEN/BLACK	Injector petrol 3 OUT

12. DESCRIPTION OF ALTERNATIVE COMPONENTS OF LPG DREAM SYSTEM REAR SIDE

12.1 Cylindrical tank

Traditional shape is the cylindrical one with convex bottoms: market offers tanks of different sizes in order to give the best compromise between autonomy and overall dimensions for every kind of vehicles and user's requirements.

Pict. 1
Cylindrical tank



Pict. 2
Cylindrical tank fixing

12.2 Refuelling point on bumper

It can be fixed directly to the vehicle by means of screws, of an iron bracket or of suitable ABS covers allowing a perfect and almost invisible adherence of the refuelling point to the bumper.

Pict. 3
Refuellinf point on bumper

13. BRAND OF HOMOLOGATION

At the end of the retrofit kit installation, it is necessary to permanently apply on the vehicle a plate that shows legibly and indelibly the homologation data of the kit and its main components. The plate must be applied in compliance with the installation specifications shown in the installation sheet of the individual vehicle.

E3 # 115R - 000000

OMVL™

TYPE: LPG/CNG	Date:.....

- VAPORIZER/REGUALTOR.....
- GAZ FUELLING SYSTEM.....
- SAFETY DEVICE.....
- CONTAINER.....
- .....
- .....
- .....

GLOSSARY OF TERMS AND ACRONYMS USED IN THE HANDBOOK

TERM OR ACRONYM	SIGNIFICATO
Absolute pressure	Pressure measured with reference (value=0) to the perfect vacuum.
Bottom Feed	Literally Supplied from the bottom. Compare with “top Feed”. Particular type of injector, in which path fuel only involves the injector low part.
CAN Bus	Communication system between ECUs and devices installed on a vehicle.
Catalyst	Device installed on the exhaust pipe in order to reduce the polluting emissions.
3-way catalyst	Catalyst that reduces the HC, CO and NOx values.
Changeover switch	It is the device situated in the passenger compartment which allows driver choosing the wished fuel type (gas or petrol). See also paragraph 4.9.
Connector	Device which connects wirings parts with other wiring parts or with electric devices.
Crankshaft (sensor)	Sensor installed near a gearwheel supportive with the drive shaft; it produces an electric signal that represents the drive shaft position.
Cut-Off	Particular engine working condition where injectors don’t supply fuel to the cylinders, so that they intake pure air. Normally, you are in cut-off during a tip-out, with possible vehicle deceleration (engine brake), starting from rpm not too low.
Diagnostic	Identification process of cause or nature of a problem, a failure, or of a particular condition/situation to detect and indicate as bad working.
Differential pressure	Pressure difference between two zones, for instance between the intake manifold and the atmospheric pressure.
Duty Cycle	In a rectangular wave-shape is the proportion between the high level duration and the wave-shape period. In formulas, if Ton is the high level duration and Toff is the low level duration, then Tp = Ton + Toff is the period and DC = Ton / Tp = Ton / (Ton+Toff) is the Duty Cycle.
Electro-injector	See Injector.
EOBD	See “OBD”. European On Board Diagnostics. European implementation of OBD systems, regulated from institutions as ISO.
ECU	In this context, it’s the Electronic Control Unit of the engine or of the gas carburetion.
Flow	Physical measure that defines the fluid quantity passing through a specific section in a time unit. Mass flow defines, for instance, how many grams of a fluid pass through a specific section in a second.
Ground	Reference electric potential (relative tension amounting to zero Volt). It is also the mass of wires and electric conductor connected to this potential. Ground potential is on the negative pole of the vehicle battery, so that it’s called battery ground too.
Harness	In this handbook, it is the whole of wires coming from the ECU connector and going to all the other system wiring points.
Injector	Device that supplies accurate measured quantities of fuel in pressure, injecting them in the intake manifold.
K line	Communication line of engine ECU towards the external diagnostic instrument.
Lambda Oxygen Sensor	Sensor measuring the oxygen concentration in the exhaust gas. Thanks to this sensor ECU determines if air/fuel mix is too rich or too poor in fuel, allowing the system closed loop working.
LED	Light Emitting Diode. Semiconductor electronic devices that can glow if crossed by electric current.
LPG	Liquefied Petroleum Gas. It is a fuel coming from petroleum distillation, essentially made up of Butane and Propane in variable proportions. You can find it in gaseous state at ambient temperature and pressure, whereas it is liquid inside the tank.
MAP (Manifold Absolute Pressure)	Absolute pressure of the engine intake manifold (see Absolute pressure). It indicates the relative sensor too.
Map	See Mapping
Mapping/Map	It is the mass of data that defines fuel quantity to dose in accordance with the engine working conditions.
Multivalve	Device situated on the tank that performs different functions, controlling tank filling, fuel level, security protection, and so on.
Magnetic circuit	Path where magnetic flow conveys, usually made of iron or other iron-magnetic material. It is part of an electromagnetic device (solenoid valve, injector, electric engine, and so on).
OBD (On Board Diagnostics)	See also “Diagnostic”. Monitoring system of all or some inlet and ECU signal control. If it finds one or more signals out of the predefined threshold, it informs of the system/systems bad working and records it.
OR (O Ring)	Gasket made up of a rubber ring.
PC	Personal Computer
Peak & Hold (piloting)	Literal. See also “Piloting”. Particular injectors piloting that supplies to the coil early a bigger current in the opening phase, so that it can reduce the injector opening time (peak); then current decrease at a lower value, enough to maintain the injector open (hold).
Piloting	In this handbook, it indicates action and way with which electric actuators are controlled by the ECU or by other electric device, through power electric signals.
Positive battery	The pole with the higher electric potential of the vehicle battery. Normally it has a voltage between 8 and 16V compared to the ground.
Positive under key	Tension or electric knot situated upstream the switch activated by the vehicle ignition key. Normally it has a low potential; it reaches the battery positive potential when you turn the key off.
Rail	It is the element on which injectors are installed; thanks to it, gas at the required pressure can be opportunely supplied at every injector inlet.
Relative pressure	Pressure measured with reference (value=0) to the atmospheric pressure.
Relay	Electro-mechanical device that can open or close one or more electric contacts after appropriate electric piloting.

RPM (Revolutions per minute)	Acronym for Revolutions Per Minute. It usually indicates drive shaft rotation speed.
Self-diagnostic	See Diagnostic.
Sensor	Device measuring a physical quantity value as temperature, pressure, speed, and converting it in electric signal useful to the ECU or to another electric device.
Dreamial injection	Injection management system of a modern vehicle with fuel electronic injection; here the injection phase of each cylinder starts and ends according to independent times for everyone of them. The engine ECU verifies these times and correlates them with the cylinder phase and position.
Solenoid valve	Electro-mechanical device that stops a fluid flow. In this handbook, this device stops gas flow when it's not supplied, otherwise it lets the gas flow.
Throttle Valve	Valve that regulates the air flow intaken from the engine. Normally is controlled by the accelerator pedal but nowadays it is controlled directly from the petrol ECU more and more.
Top Feed	Literally Supplied from the top. See "Bottom Feed". Particular type of injector, in which path fuel passes through the whole injector length in an axial way, arriving from the top and being injected in the low part of the device.
TPS (Throttle Position Sensor)	Throttle Valve Position Sensor. It supplies an electric signal that shows the throttle valve opening (see "Throttle Valve").