

CPR LPG REDUCER K9014XX

INSTALLATION MANUAL

Rev	Date	Edited by	Reviewed by	Description
R00				
R01				
R02	May 10 th 2010	M. Buzzoni		



***The warranty will be declined by any unauthorized tampering by the manufacturer.
Any unauthorized tampering can not guarantee safety for product and consumer.***

The installation must be done by technical trained personnel

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1 GENERAL DESCRIPTION

The document defines the technical specification of CPR-LPG pressure reducer for Liquefied Petrol Gases.

1.1 Packaging and marking

The packaging of the unit during their delivery will protect against contact with any external foreign body. The packaging enables handling and storage without damage.

The box and its contents must be handled with care, avoiding contact with sharp edge.

Falls and shocks are prohibited and we recommend that you don't use a Unit which has been submitted to a fall or a shock.

The Serial part number and the manufacturing date (date code) appear on the body of the unit in a readable label.

1.2 Storage

The unit must be stored in its original packaging in a dry place and the temperature must not exceed -40°C to +50°C. The premises must be clean, in order to prevent foreign bodies from contaminating the unit.

2 CONDITION OF USE

2.1 Environment Specification

The unit shall be installed into the engine bay, but is not designed to be mounted on the engine.

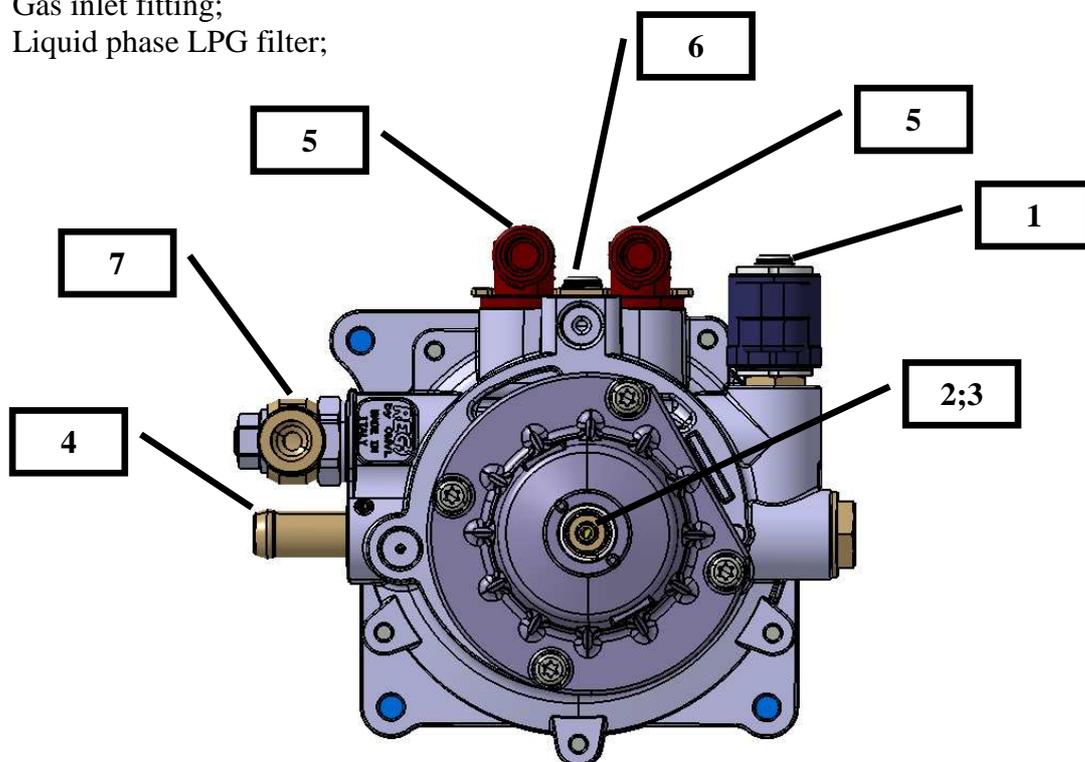
2.2 Compatible Media

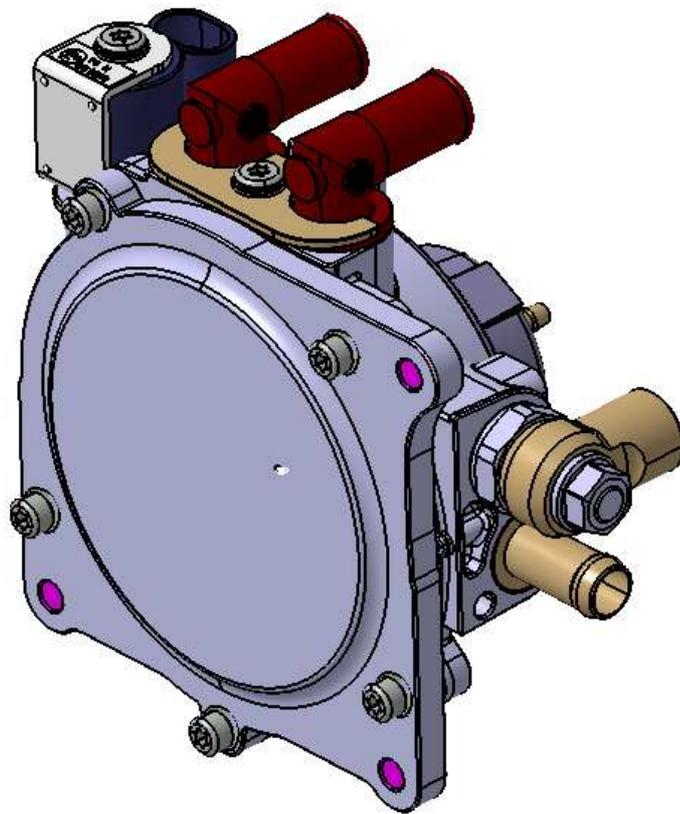
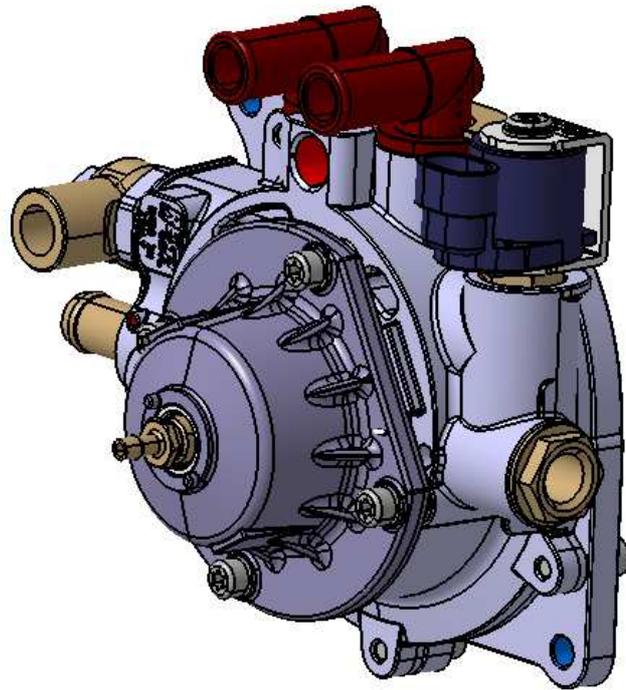
The Gas volume of the unit is designed to work only with LPG (variable mixture of Type A and B);
The Water Volume is designed to work with engine coolant fluid.

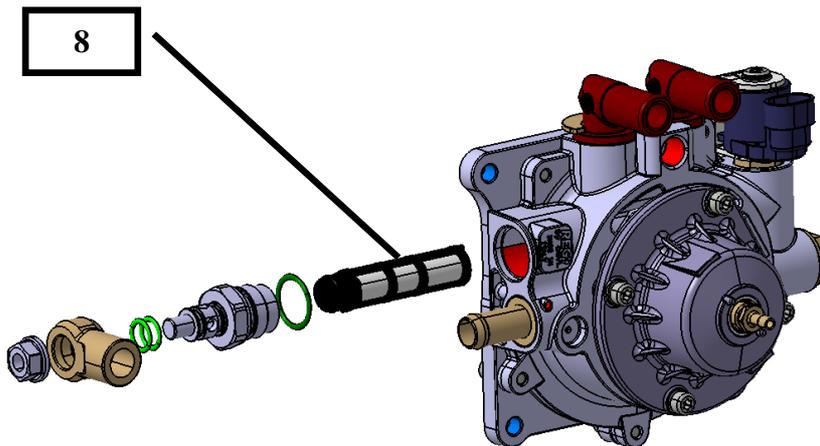
3 CPR-LPG OVERVIEW

It consists of:

- 1) Shut-off valve with electric connector
- 2) Hose connection to manifold
- 3) Pressure relief valve hose
- 4) Gas Outlet fitting
- 5) Inlet/Outlet Water fittings
- 6) Temperature sensor housing
- 7) Gas inlet fitting;
- 8) Liquid phase LPG filter;







Characteristic	Value	Unit
Product name	CPR-LPG	-
Dimensions	100 x 140 x 160	mm
Weight	1,190	kg
Homologations	ECE67R-01, ECE10R-02	-
Compatible Media		
Gas chamber:	Commercial LPG: variable mixture of Propane and Butane. Standard LPG type A and type B, as per ECE Standards	
Water jacket:	Engine coolant: variable mixture of water and ethylene glycol	
Pressure Inlet (Pin)		
Maximum working pressure	15	bar gage
Minimum working pressure	2,5	Bar gage
Pressure outlet(Pout)		
Operating pressure	1,2 +/- 5%	Bar gage
Adjustable	From 1.1 to 1.3	Bar gage
Pressure relief valve	2,75 +/- 20%	Bar gage
N° of stages	Single	-
Tolerance of pressure setting	+/-30	mbar
Burst Overpressure	67.5	bar
Gas Flow rate		
Pin 6 bar, Pout 1,2 +/- 10 %	12/18,6	Nm ³ /h air/ - kg/h LPG
Pin 15 bar, Pout 1,2 +/- 10 %	20/31	Nm ³ /h air - kg/h LPG
Max engine power	120	kW
Water jacket		
Heat exchange medium	Water with ethylene glicole	
Maximum working pressure	3	Bar gage
Flow rate	400	l/h @ delta p = 1 bar

3.1 Optional Water temperature sensor

There are two types of water temperature sensor: with or without electric connector:

3.1.1 Temperature sensor with connector



3.1.2 Temperature Sensor without connector

Please note, this sensor wires should be soldered to the wire harness, there isn't any plug to handle;



Temperature sensor	
Sensor type:	4K7 NTC
Nominal resistance:	4K7 Ω \pm 5% @ 25°C
Working temperature range:	-55 \div 135 °C
Max power @ 25°C:	200 mW
Connector: (only OMVL 10565 sensor)	Counter connector: FCI Sicma2 2 ways, 211PL022S049 Counter terminal: FCI Sicma3 211CL2S1160

4 INSTALLATION

4.1 General information

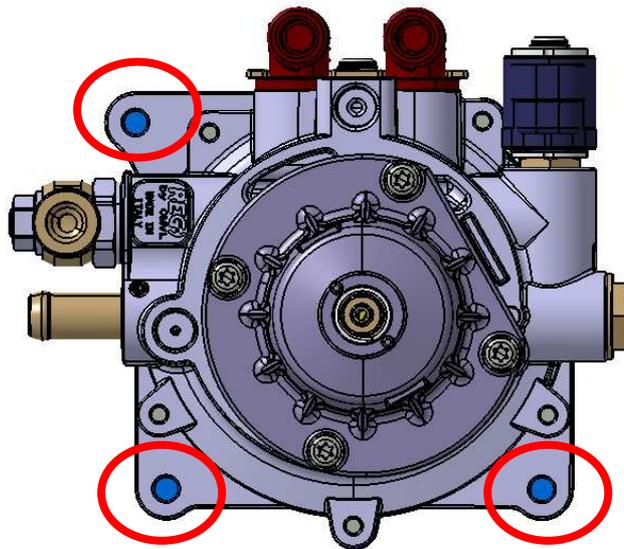
- Always place the reducer lower than the cooling water level of the expansion can;
- Place the reducer as close as possible to the injector rail;
- Don't install the reducer on the plate between the engine compartment and the driver cabin;
- The injector rail must be free from contact with the Bonnet and/or the chassis of the car;
- Always use a new fitting to catch the manifold vacuum, never use an existing one (like the brake assist hose);
- Never place the ECU unit on the engine, The vibration are too severe;
- For the manifold pressure sensor that comes with this kit, please read the "*Inj Control Unit Install Manual*" document;
- Avoid the installation of wire and pipe in high temperature, high vibration area;

4.2 Safety hints

- Disconnect the battery pole before to start the installation (or any electric maintenance);
- Before to switch to gas let the engine warm at idling until the electric fan starts once, after that drive the car few kilometer on gasoline and fill the cooling water expansion can;
- The wire harness connection should be soldered;
- Insulate the soldered connection with heath shrinking sheath, the insulation tape could suffer the heat of the engine and becomes fragile;
- Always remember to install the fuse box of the Wire harness in a comfortable position;
- Always remember to not use general purpose rubber pipe for LPG outlet and for water connection; only specific compounds allowed;

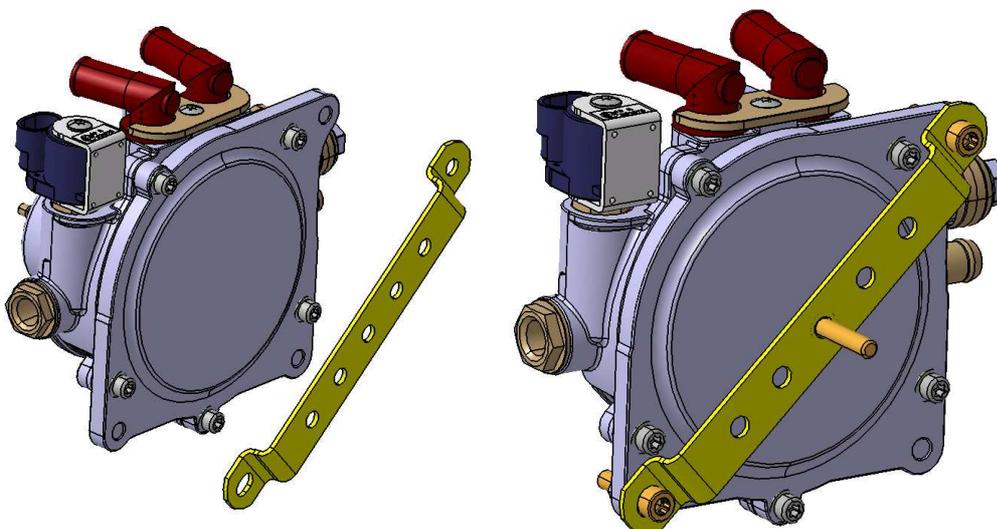
4.3 Placing the Reducer;

- Following the installation and the safety hints of the previous paragraph, find the proper place and install the Reducer, The injector Rail and the ECU in position;
- It takes few hours to connect everything together following this procedure;
- The main bosses of the reducer are shown in the picture below (in blue with red circle around it):



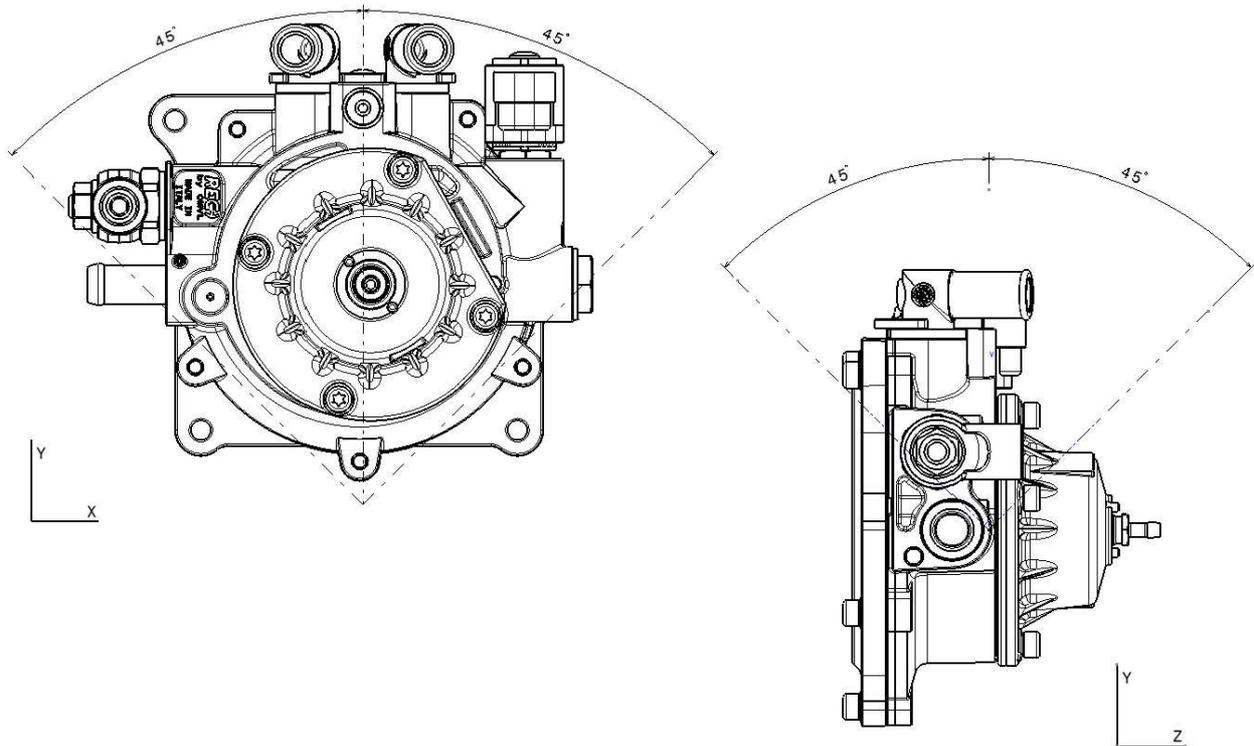
- Size of the bosses holes: 6.3mm un-threaded

With the reducer is shipped a metal bracket that could help its installation in case it is preferable to choose a barycentric fixing point.



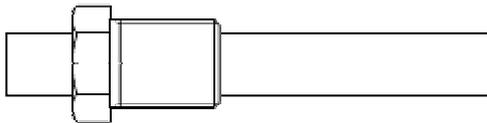
4.4 Recommended installation position

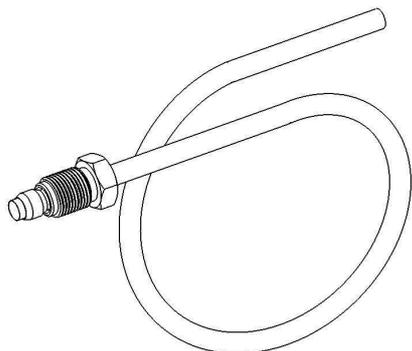
The reducer has a recommended orientation of installation. In the picture below is depicted the best position and its tolerances along the three main axis.



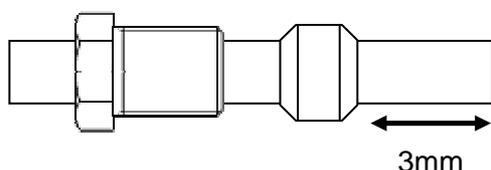
4.5 High pressure LPG hose connection

- Deburr the copper hose coming from the tank with a proper deburring tool;
- Clean the copper hose very well and make sure that there aren't any copper residuals in it (they will clog the liquid phase filter);
- Drop the threaded tightening fitting on the copper pipe

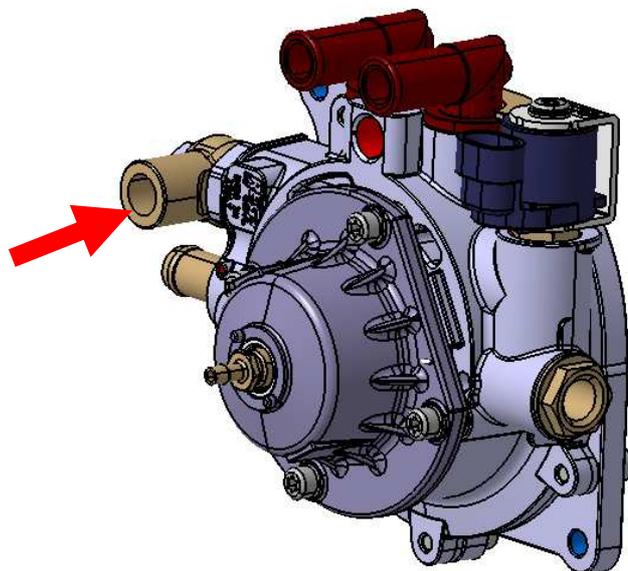




- Install the bicone on the copper pipe, it should fit without any seizure.



- Leave on the pipe a straight portion of min 3mm + the dimension of the bicone + the dimension of the fitting, it will help to fit properly the bicone in order to avoid gas leakage;
- Tighten the fitting in this position of the reducer at **12 Nm**:

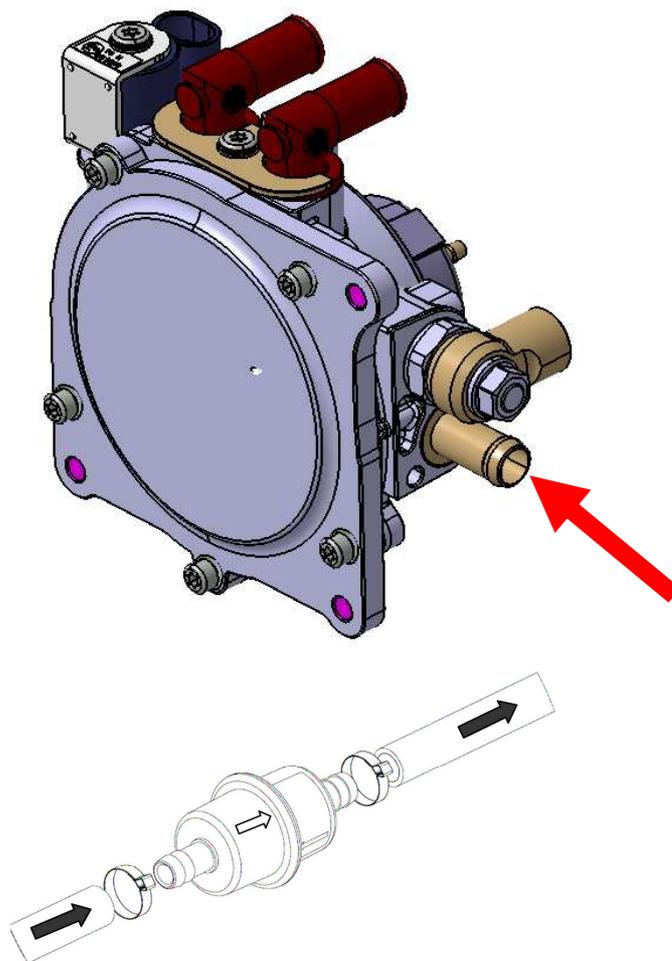


- If you don't have any proper tools to check the tightening torque, please don't overtighten. You will end up cutting the copper pipe.

4.6 Low pressure LPG hose connection

- Check the length of the tube between reducer -> filter and filter -> injection rail;

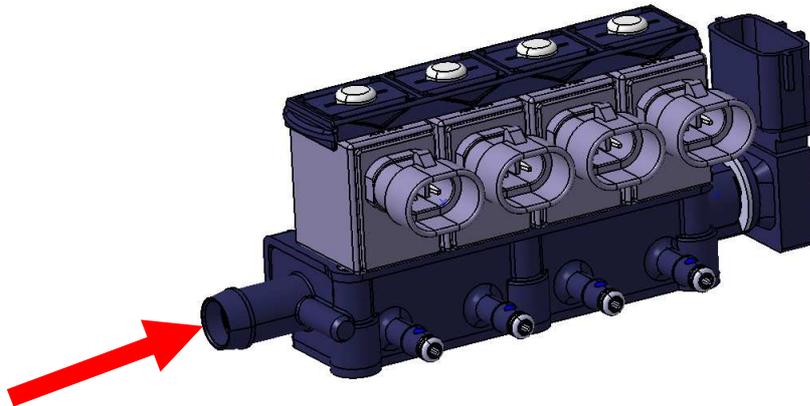
- Cut the rubber pipe of proper size: for this reducer you need a 12 mm internal size pipe.(19 mm external) The rubber must be specifically designed for LPG: here you can find some specification:
 - Max working pressure: 450Kpa;
 - Homologations: ECE67R-010128 Class 2, ECE110R-000008 Class 2;
- Fit the pipe both on the LPG outlet hose of the reducer and on the inlet hose of the gaseous filter, as shown below



12mm rubber hoses are tightened in place using stainless steel 12mm “Clic” clips.



- Same procedure between the filter and the injectors rail;
- The connection of the injector rail is shown in the picture below



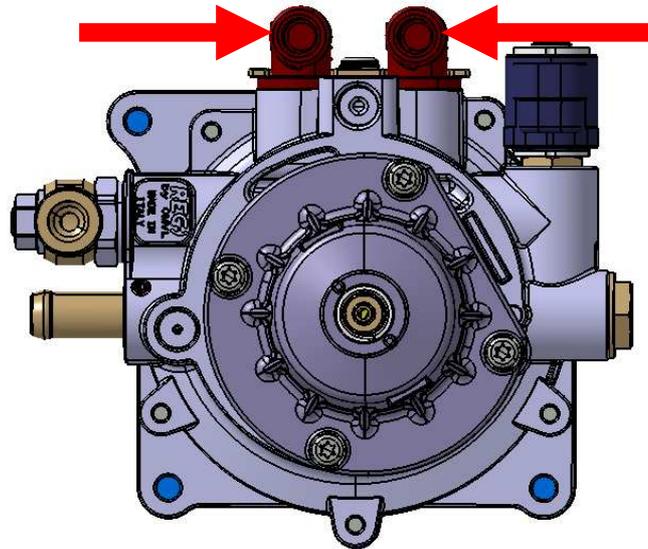
- The circlip are the same of the previous point;

4.7 Water hose connections

15mm flexible rubber pipes are used to connect the pressure regulator to the coolant circuit.

- Materials:
 - Smooth core substrate of synthetic black rubber;
 - Internal reinforcement layer of high resistance polyester fibres;
 - External layer of synthetic black rubber, resistant to ageing, heat, abrasion, ozone and other weather agents.
- Internal diameter: 15mm
- External diameter: 23mm
- Weight: 0,35Kg/m
- Max working pressure: 1000KPa
- Max working temperature: 120°C

- In the picture below the water connection of the reducer are highlighted:



- Water pipes are fixed in place using stainless steel clips, 16mm. Engine coolant leakages are prevented by tightening these clips.



16mm stainless steel clip with screw

4.8 Electric Connections

The CPR-LPG reducer has two electrical connections:

- 1)The Shut-Off valve plug;
- 2)The Temperature Sensor plug;

In several applications the Temperature Sensor is not provided with the reducer.

The shut off valve has an Amp/Tyco SuperSeal 1.5mm 282080-1 connector;
The Temperature sensor has an FCI Sicma2 2 ways, 211PL022S049.

4.9 Resume of Connections

Type	Connection	Hose	Torque
Gas:			
Inlet	M12x1 steel locking nut D6 steel sleeve (bi-cone)	ECE110R approved copper pipe D6.0mm external diameter D4.0mm internal diameter	12Nm
	M12x1 steel locking nut D8 steel sleeve (bi-cone)	D8.0mm external diameter D6.0mm internal diameter	
Outlet	12,5mm sharp edge barb brass hose fitting 8x19mm "Clic185" steel clip	ECE67R approved rubber hose D19mm external diameter D12mm internal diameter 4.5bar working pressure	
Water:			
Inlet and outlet	16mm plastic hose fittings 9x27mm steel clip with screw	Rubber hose D23mm external diameter D15mm internal diameter	
Vacuum (MAP):			
Inlet	4,5mm sharp edge brass hose fitting 5x9.5mm "Clic095" steel clip	Rubber hose D10mm external diameter D4mm internal diameter 4.5bar working pressure	
Electric:			
Shut-off valve	Amp/Tyco SuperSeal 1.5mm 282080-1		
Temperature sensor (optional)	FCI Sicma2 2 ways, 211PL022S049		

5 MAINTENANCE

5.1 Maintenance List

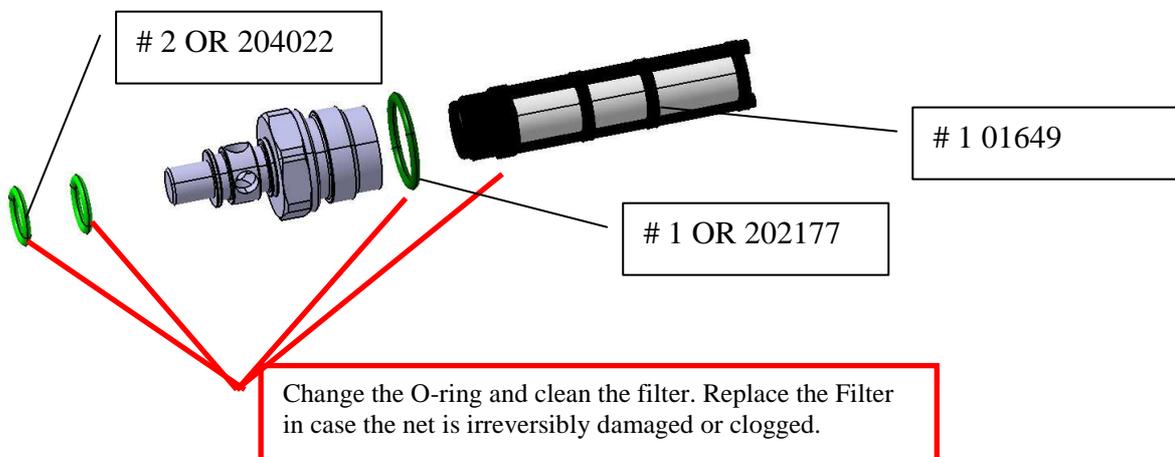
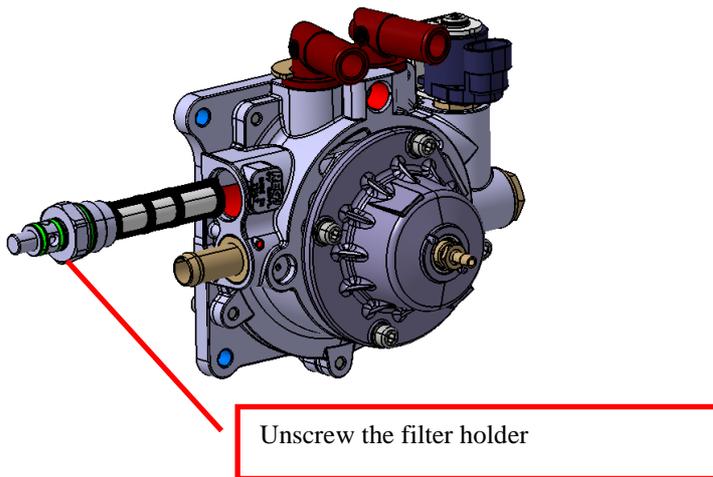
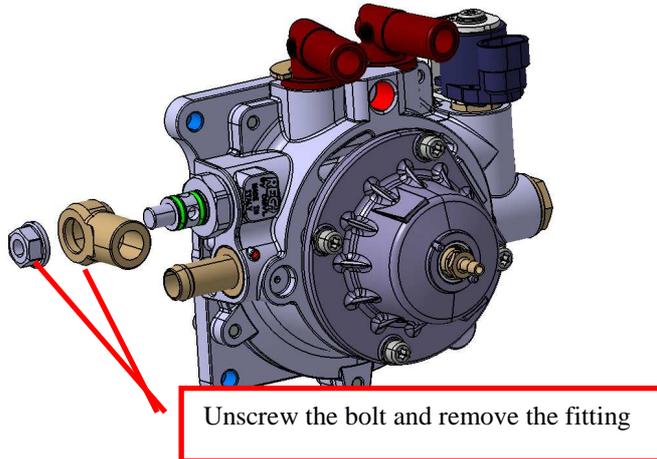
This Table resumes the main operations in order to keep the reducer at its best functional performance.

	20000 km	40000 km	60000 km	80000 km	100000 km	>
LPG Liquid Filter (Regulator)	X	X	X	X	X	Repeat pattern 0-100000 km
LPG gaseous filter	X	X	X	X	X	Repeat pattern 0-100000 km
Regulator membrane				X		Repeat pattern 0-100000 km
High pressure shutter				X		Repeat pattern 0-100000 km

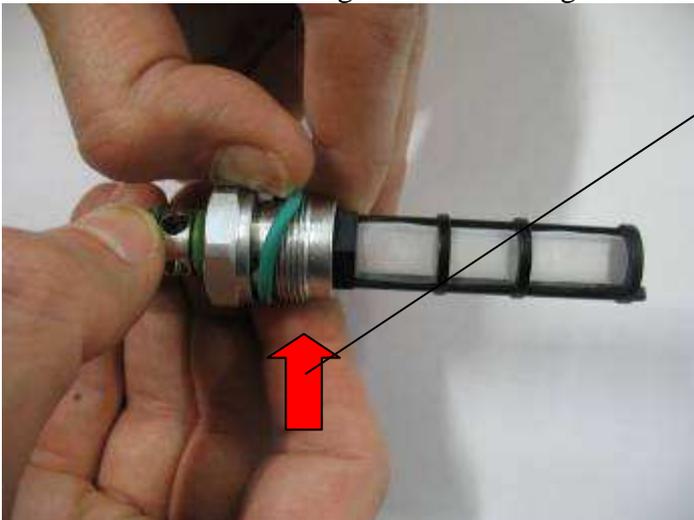
5.2 Replacing the LPG liquid filter in the reducer

The LPG liquid phase filter acts as a protection in case particles of dust or dirty fuel enter inside the reducer.

To remove and clean the filter follow these instructions:



How to remove the O-Ring from the O-Ring Seat:



Press the O-ring toward the seat and remove from the opposite side



Press the O-ring toward the seat and remove from the opposite side

IMPORTANT: DON'T SCRATCH THE FILTER HOLDER WITH SHARP TOOLS (SCREWDRIVER, NAILS ETC.)

Before to put the filter back in place check the filter housing and clean the area.

To assemble back the filter follow the instruction in the opposite order.

Tightening Torque:

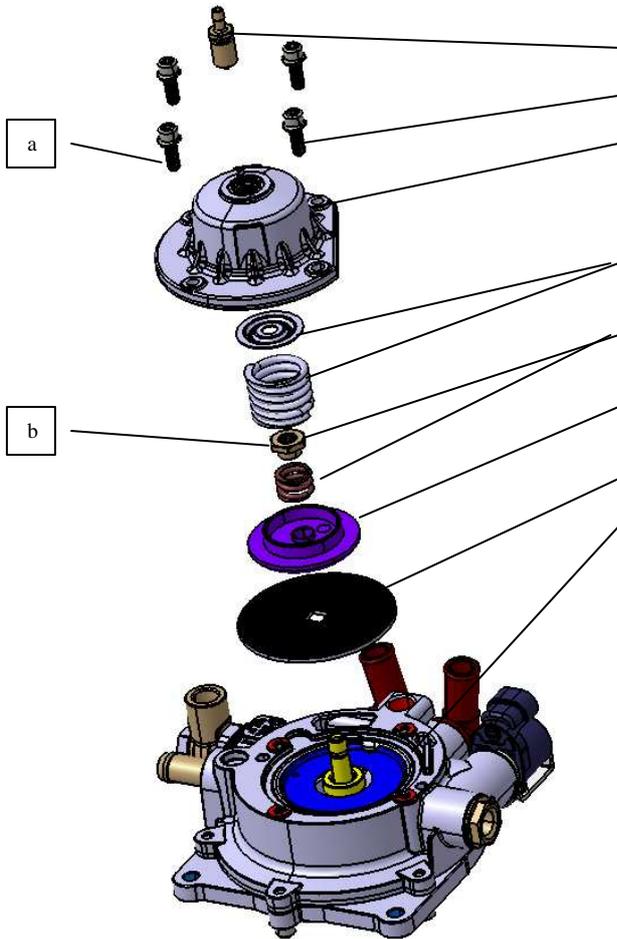
a)Filter Holder: 35 Nm.

b)Bolt: 15 Nm

IMPORTANT NOTICE: Check the tightness of the High pressure inlet after the maintenance.

5.3 Replacing the regulator membrane

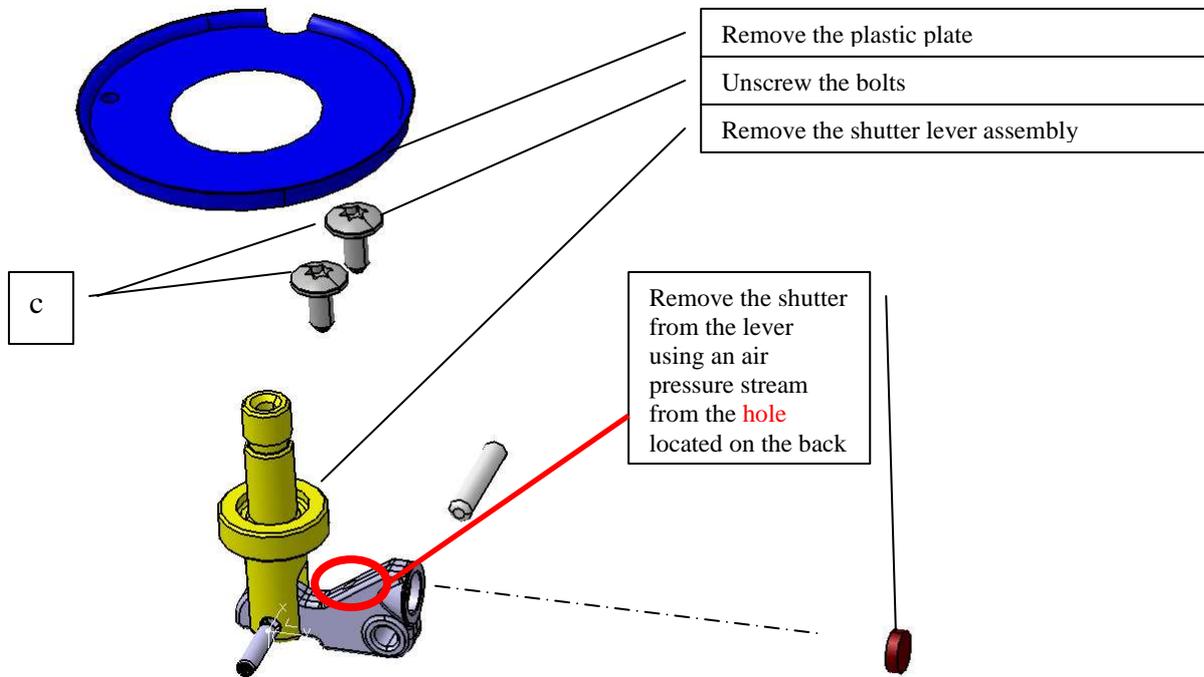
Remove the reducer from the car engine bay before to start this maintenance.



Remove the spring adjusting screw
Unscrew the four cover bolts
Remove the Spring cover with care. Warning: the spring under the cover is compressed.
Remove the plate and the spring
Unscrew the bolt and remove the spring
Remove the plastic plate
Remove the rubber membrane
Clean the rubber membrane seat and remove rubber residual
Change the membrane and assemble back in position the parts. Prescribed tightening torques: a) 5 Nm b) 3.5 Nm

5.4 Replacing the High Pressure shutter

Refer to the procedure of paragraph 5.3 and remove these additional parts



To change the shutter simply press the new one in position on the lever.
Reassemble back as explained in paragraph 5.3. The tightening torque in position c) should be 3 Nm