



LPG REDUCER

Use and Maintenance Instructions

MM 809110#01

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1. Introduction

- The scope of this manual is to:
 - 1 Facilitate the Use and Maintenance of the LPG reducer;
- The information here detailed don't substitute standards and/or regulations, valid where the Installation is performed at that time.

2. Safety conditions

- The **R90/E LPG reducer**, if not installed in the right way, can give wrong working or damaging to the vehicle and/or to the people.
- Also engine emissions and performances may be influenced by a wrong installation.
- This manual is a guide for Qualified Technician in the automotive field. The reducer, must be installed only by suitably instructed and qualified people, in agreement with the instructions of this manual.
- **OMVL** declines every responsibility directly or indirectly due and/or caused by a wrong interpretation or execution of any part of this manual.
- This manual must be deeply studied and understood before converting the vehicle.
- To prevent gas leakages, that can cause fire or explosion, don't smoke, avoid sparks, free flame and operations with electrical devices, near engine vane and during re-fuel.
- The user of the vehicle and any other person unauthorized, have not to do any type of regulation and/or modification of the installed system. Every operation on the system is allowed only on authorized workshops and by suitably instructed technicians. A wrong Use Maintenance of the system will jeopardize the vehicle safety.

Mechanical components installation procedure

R90/E pressure reducer installation

Technical Features

- Type:
- Pressure reduction system:
- Heating system:
- Activation device:
- Maximum flow rate:

Double stage By spring/membrane By engine cooling liquid (Water) Solenoide valve 28Kg/hr



Water inlet

Gas outlet

3.1.1. R 90/E reducer advantages

- It's the only one on the market with "Self Controlled pneumatic Pilot" (patented). This
 device has the scope to keep a constant pressure in the chamber where the engine is
 fed, at every gas flow rate with every rpm values.
- The only one that can be successfully used at every cylinders volume, from 0,5 to 6,0 lt.
- **Double gas outlet** to make easier the installation and connections (the outlet not used is closed by a special cap in equipment).
- **Safety valve** to avoid reducer fails and eventual damages to people and things, in case of overpressure inside reducer chamber.
- **Supplementary idle device**, studied to avoid sudden engine switch off in case of strong braking or fast bend.

3.1.2. Reducer installation instructions

- Reducer must be installed, in the engine vane, in vertical position, as much protected as possible to avoid damaging in case of car crash. It must be firmly fixed to the vehicle body (the bracket in equipment is a good support), to allow a good "grounding" of the component.
- Reducer angle on the vertical axis, must not exceed ±10°, as shown in fig. beside.



- Pressure reducer must be fixed, closed to engine cooling liquid pipes and closed to the mixer.
- Install the reducer far from exhaust manifold, to avoid gas uncontrolled overheating at reducer outlet.
- Fix the reducer at a lower level than the top of the cooling circuit into the heater. If this is not

possible, carefully vent from air the engine cooling circuit before sealing it again. Air bubbles in the circuit can reduce efficiency in heat exchange between the two fluids.

- Don't fix the reducer to the engine. High heat and vibration could seriously damage it.
- Pipes connecting reducer to the engine cooling circuit, have to be a bit longer than the minimum

required length. This to avoid pipes obstruction during engine running and to permit an easy

reducer disassembly from its bracket, in case of small repairs, without disconnecting the pipes.

• Protect the venting hole on the steel cover from air flow coming from the engine cooling fan. A

strong air flow on low pressure membrane, can cause wrong engine operation due to incorrect

gas flow rate.

3.1.3. Reducer working principles

LPG flows from the tank to the reducer through a inlet nipple(1)

1°Reduction stage. The *High Pressure Valve (3)*, is controlled by *High Pressure Membrane (4)*.

This regulates gas flow in the double *Chamber of heating and expansion (5)*, where pressure is reduced till 60kPa. From here gas flows to the 2° reduction stage.

2°Reduction stage. It is constituted by a *Chamber (6)*, in communication with the mixer, placed upstream the throttle valve. The *Membrane Unit (7)*, through the *Valve (8)* actuated by the *Membrane (14)*, feel the suction generated by engine pistons. The *Valve (10)*, controlled by the just mentioned unit, regulates gas flow from 1° stage Chambers (5) to 2° stage Chamber (6), where pressure is further reduced till atmospheric (0±20 Pa). From here, gas flows into intake manifold where it mixer with air coming from engine air filter, before flowing inside cylinders ignition chambers.





Engine cooling liquid chamber

Shut off valve. A *solenoid valve (9),* controlled by gas/petrol switcher, cuts gas flow from 1° to 2° stage, at the same time the engine is switched of f. This happens both in case of intentional and casual switching off (in case of damaging, accident, fuel completely consumed, etc. **Heating system:** LPG expansion due to pressure reduction, has the effect of a temperature reduction. To avoid icing inside the reducer, and to get the best efficiency from the fuel, the chambers where gas is expanding, are heated up by *engine cooling liquid (13).* **Carburetion adjustment screws.** Beside reducer there are 2 adjusting screws. The hexagonal M10 screw is the *Offset adjusting screw (12)* and allow to modify the delivered gas quantity. The hexagonal M8 screw is the *Idle adjusting screw (11)* and it's usually closed. It must be unscrewed only in the case the engine is switching off, in case of strong braking or fast bend.







4.2 Substitution of High pressure Shutter

4.2 2°Stage membrane substitution

Remove the 2stage cover screwing out the four screws
Gently rise the membrane extracting carefully the connected spring from its cover side, avoiding to stretch it.
Remove the brass cone, clean it., from Change the membrane and srew the cone with a torque of 0,6[Nm]
Verify the status of 2stage internal camber

Position the new membrane connecting the membrane hole with the relevant body ferrule
Insert the membrane spring in its cover side
Fix the 2°stage cover, screwing the four screw following a cross scheme 1-2, 3-4, with a torque of 5[Nm]

4.4 Low pressure membrane substitution





4.5 Substitution of low pressure leaf-spring

