



***Romano Injection System***

***“ ANTONIO “***

**END USER MANUAL**

## INDEX

<b>1.PRODUCTS WARRANTY</b>	<b>3</b>
<b>2.TECHNICAL DATA</b>	<b>3</b>
<b>2.1 FUNCTIONING CHARACTERISTCS</b>	<b>3</b>
<b>2.2 ABOUT LPG</b>	<b>3</b>
<b>2.3 NORMAL CONDITIONS PERFORMANCES</b>	<b>4</b>
<b>2.4 EXTREME ENVIRONAMENTAL CONDITIONS</b>	<b>4</b>
<b>3.SAFETY INSTRUCTIONS</b>	<b>4</b>
<b>3.1 GENERAL</b>	<b>4</b>
<b>3.2 FUEL</b>	<b>4</b>
<b>3.3 WHEN REFUELLING</b>	<b>4</b>
<b>3.4 PARKING</b>	<b>4</b>
<b>3.5 USEFUL INFORMATIONS</b>	<b>5</b>
<b>3.6 RULES FOR EXTERNAL PAINT AND DRY ON LPG VEHICLES</b>	<b>5</b>
<b>4.COMPONENTS DESCRIPTION AND USE OF LPG SYSTEM</b>	<b>5</b>
<b>4.1 LPG filling valve</b>	<b>5</b>
<b>4.2 Tank</b>	<b>6</b>
<b>4.3 Multivalve</b>	<b>7</b>
<b>4.4 Reducer/vaporizer</b>	<b>7</b>
<b>4.5 Filter (optional)</b>	<b>7</b>
<b>4.6 Rail</b>	<b>7</b>
<b>4.7 Injectors</b>	<b>8</b>
<b>4.8 ECU</b>	<b>8</b>
<b>4.9 Pressure gauge</b>	<b>8</b>
<b>4.10 Switch</b>	<b>9</b>
<b>5.SET IN MOTION AND ADJUSTMENT OF LPG SYSTEM</b>	<b>16</b>
<b>6. MANTEINANCE</b>	<b>16</b>
<b>7. SCRAPPAGE OF THE SYSTEM</b>	<b>17</b>
<b>8. FORM FOR THE INSTALLER</b>	<b>18</b>
<b>9. MANTAINANCE COUPON</b>	<b>19</b>

## 1. PRODUCT WARRANTY

Romano S.r.l. products are warranted against faults on materials or manufacturing for 24 months starting from the fixing date. Every fault checked on components of Romano system should be communicated only to the workshop where the system was fixed within 2 months from the fault detection. The following documents have to be shown to the installer:

- ✓ copy of the receipt or invoice with the exact date of the installation of the system;
- ✓ original Warranty coupon indicating all items such as reducer, filters, rail, ECU, etc.;
- ✓ copy of this End User Manual indicating the scheduled maintenance checks.

**WARNING:** the Warranty is not granted in case of in-observance of the above mentioned issues. Moreover there is no warranty on materials subject to usury or for improper use or for any kind of usage different from the one indicated by Romano Srl.

Possible controversies derived from the interpretation and/or execution of this contract will be discussed c/o the Court of Napoli, Italy.

## 2. TECHNICAL DATA

### 2.1 FUNCTIONING CHARACTERISTICS

**ANTONIO** is the last generation of injection LPG systems which, interacting with petrol ECU, processes all functioning parameters of LPG system adjusting them to give better performances, consumptions, emissions and driving. It's also granted the compatibility with original OBD (On Board Diagnostic) of the vehicle.

### 2.2 ABOUT LPG

LPG (Liquid Petroleum Gas) together with Methane is an ecological fuel. Gases produced by LPG and Methane combustion have few pollutant emissions and gas carbon (CO<sub>2</sub>). Since it is gaseous when combusting, the production of particulates (PM<sub>10</sub> or PM<sub>2,5</sub>) is very small. LPG is a mix of hydrocarbon composed mostly by Butane and Propane and it doesn't contain lead nor benzene as petrol. LPG is a natural gas obtained during the process of crude oil extraction when the liquids are split from the gases, or produced during refinement of crude oil. To obtain LPG no energetic resources are needed. LPG is:

- ✓ GASEOUS AT AIR PRESSURE (pressurizing it , as inside the tanks, it is possible to make it partially liquid);
- ✓ ODOURLESS, but then a scent is added to let users understand when there is a gas leak.

Using a LPG vehicle, at same driven Km., there are less expenses on fuel.

## 2.3 NORMAL CONDITIONS PERFORMANCES

When running on LPG, vehicle performances can be a little bit lower than running on petrol (and they change from car to car).

## 2.4 EXTREME ENVIRONMENTAL CONDITIONS

The use of LPG vehicle is the same of the one indicated by car manufacturer, in fact the system switches to gas only when it gets the functioning conditions set on gas ECU (liquid cooling temperature, rev, etc.).

## 3. SAFETY INSTRUCTIONS

### 3.1 GENERAL

- ✓ Only **Romano AutoGas** entitled staff can operate on the system (it's forbidden to modify the position of single items, cut the pipes, modify wires, etc.).
- ✓ Comply with scheduled check indicated on **Maintenance** section;
- ✓ Romano Auto Gas declines every responsibility for possible damages directly or indirectly caused by persons, things or animals, consequent to the failure in observing the safety instructions here mentioned.

### 3.2 FUEL

Gaseous LPG is heavier than air so when it leaks, it falls on the lowest parts of the area. It is not poisonous but it's better not to inhale it for its anaesthetic effect. LPG inside the tank is at its liquid phase, but if it leaks from tank it quickly gets vaporized and it can damage epidermis causing burning skin. It's odourless and easily flammable.

### 3.3 DURING REFUELING

- ✓ Smoking is forbidden;
- ✓ It's forbidden use mobile phone;
- ✓ Keep far from fire.

### 3.4 PARKING

- ✓ Complying with DPR of 22/11/2002, It's possible to park LPG vehicles on upper levels or the first underground floor of garages except different communication by the parking staff who can, in any case, forbid the access to these vehicles.
- ✓ If the car is parked indoors and you smell LPG please:
  - air the room before igniting car
  - don't turn on lights and control panel

- do not smoke, don't use fire
  - don't use mobile phone or any other flammable item.
- ✓ If smell is persistent, close the tap (spinning it clockwise) located in the multivalve (see section Description of components) to stop gas leaking and, once aired out the room, go to the nearest Romano Autogas workshop running on petrol to check the car.

### **3.5 USEFUL INFORMATIONS**

- ✓ After refuelling the vehicle, sometimes you can smell LPG inside the car. If smell is persistent please switch your car on petrol and go to the nearest Romano Auto Gas centre;
- ✓ If smell comes from engine compartment: please switch the car to petrol and go to the nearest Romano Auto Gas centre;
- ✓ If smell persists even after switching on petrol, close the tap (spinning it clockwise) located in the multivalve (see section Description of components) to stop gas leaking and go to the nearest Romano Autogas workshop running on petrol to check the car.
- ✓ If you notice a gas leak go to the nearest Romano Autogas workshop to check the car.

### **3.6 RULES FOR EXTERNAL PAINT AND DRY ON LPG VEHICLES**

If you have to repair your LPG vehicle and you need to paint and dry it using special lamps, please follow these instructions:

- ✓ Verify that LPG tank filling level is lower than the 80% of its nominal capacity;
- ✓ Repair the car respecting the standard procedures for gasoline cars.

#### **NOTE**

Never expose LPG system components and, in particular the tank, to fire or to high temperatures heat sources (i.e. electric welding, etc..). Anyway each component never has to exceed the temperature of 90° C.

Once finished reparation wait until the car gets completely cold, then ignite running on LPG and verify that everything is ok.

## **4. COMPONENTS DESCRIPTION AND USE OF LPG SYSTEM**

### **4.1 LPG filling valve:**

It's the device to refuel LPG at refuelling station; it's fitted with a non-return valve to prevent any gas leak

## 4.2 Tank

It contains LPG both at liquid and gaseous state. It can be used for 10 years, after this period has to be replaced. The maximum fuel limit is 80% of its nominal capacity to allow LPG to expand if the temperature inside the tank increases. When refuelling, as soon as the fuel level gets the maximum filling limit (80%), the fuel flow is automatically stopped by the multivalve positioned on the tank. If the tank is overfilled (more than 80%) please contact the Romano assistance center (every 6 months it is recommended to use all LPG in the tank and, at next refuelling, check that filling limit doesn't exceed the 80% of nominal capacity). Following you can find a table with the filling capacities (you can find this information related to the tank on your vehicle on registration document). The real capacity have an approximation of  $\pm 2$  liters.

### Cylindrical Tanks

Nominal [ l ]	<b>35</b>	<b>45</b>	<b>55</b>	<b>60</b>	<b>62</b>
Real Cap. [ l ]	28	36	44	48	49,6

Nominal [ l ]	<b>67</b>	<b>70</b>	<b>73</b>	<b>80</b>	<b>90</b>
Real Cap. [ l ]	53	56	58,4	64	72

### Toroidal Tanks

Nominal [ l ]	<b>35</b>	<b>43</b>	<b>47</b>	<b>58</b>	<b>64</b>
Real Cap. [ l ]	28	34,4	37,6	46,4	51,2

In Italy refuelling can be made only in refuelling stations by authorized staff (no self-service). In the countries where self service is allowed please follow local regulations.

During refuelling:

- ✓ Turn off the engine
- ✓ Turn off lights
- ✓ Don't smoke
- ✓ Don't use mobile phone
- ✓ Keep far from fire

The filling point is positioned close to the petrol filler. The distance covered with the same quantity of lpg is changeable because it depends not only on drive conditions and

maintenance of vehicle, but also on quality of lpg which can be different from a refuelling station to another.

**N.B. LPG tank should be replaced every 10 years and a new or updated test will be needed.**

WARNING: If the vehicle is not registered in Italy but in another country, LPG tank test procedures could be different and in any case should comply the local regulations.

### 4.3 Multivalve

It's a device fixed directly on the tank and is composed by:

- ✓ a **safety valve** which stops automatically LPG supply when it reaches the limit filling level i.e.80% of nominal value;
- ✓ an **overflow valve** which, in case of an accidental break of a pipe, stops LPG flow so that it remains inside the tank;
- ✓ an **overpressure valve (PRV)** which, if the pressure inside the tank increases, lets exceeding LPG go out the tank through a controlled flow to avoid tank explosion;
- ✓ an **electrovalve** which interrupts any LPG flow when the engine is off or when the vehicle is running on petrol;
- ✓ a **thermofuse (PRD)** which in case of fire, it fuses releasing controlled LPG flow to avoid tank explosion;
- ✓ an **manual valve** which stops gas leak from the tank. It has the same function of electrovalve but it is manual (in normal conditions it should be kept open);
- ✓ **LPG level gauge** which indicates the quantity of LPG in the tank and send this information by an electric wiring to the switch located in the driving cabin.

### 4.4 Reducer / Vaporizer

It's the device which vaporizes LPG and make its pressure compatible to engine functioning. On the reducer there is an electrovalve which stops LPG flow when engine is off or when vehicle is running on petrol.

### 4.5 Filter (optional)

It's the device which, positioned downstream of reducer, retains the impurities in the gas to preserve the functioning of injectors.

### 4.6 Rail

Rail is a rigid duct with one input and 2 or more outputs according to the number of electroinjectors to feed; its function is to lead gas flow coming from reducer to each injector.

#### **4.7 Injectors**

Are the devices which, controlled by LPG ECU, inject the right quantity of vaporized LPG upstream of aspiration valves of each cylinder.

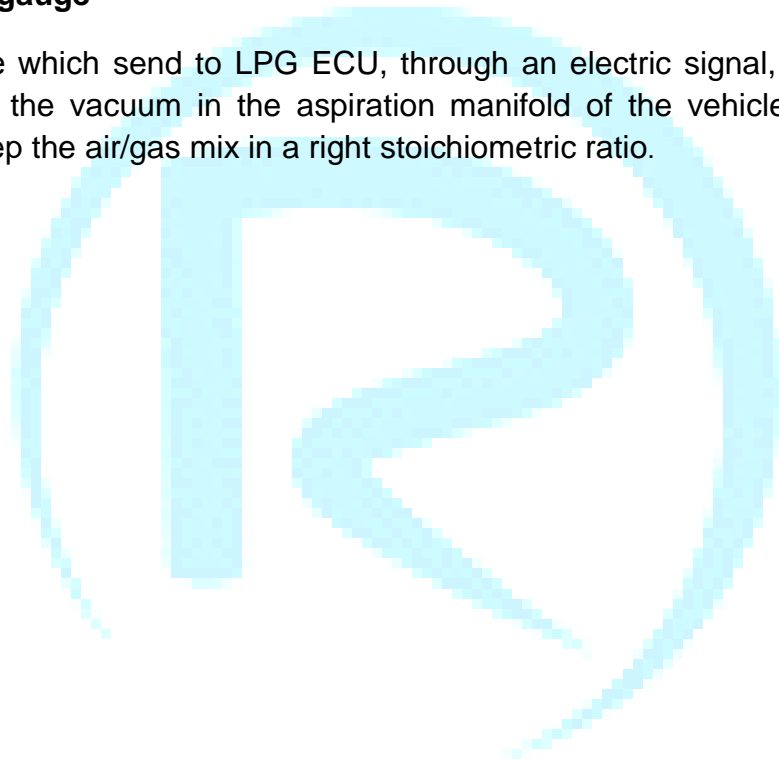
#### **4.8 Ecu**

It's the device that controls the entire LPG system mostly it:

- ✓ Keeps the gas/air mix in a stoichiometric Ratio to offer low consumptions, better performances and low pollutants emissions of the vehicle
- ✓ Controls that all LPG system devices are working properly and, in case of problems with LPG system , advising the user through the switch.

#### **4.9 Pressure gauge**

It's the device which send to LPG ECU, through an electric signal, the value of LPG pressure and the vacuum in the aspiration manifold of the vehicle. These data are needed to keep the air/gas mix in a right stoichiometric ratio.

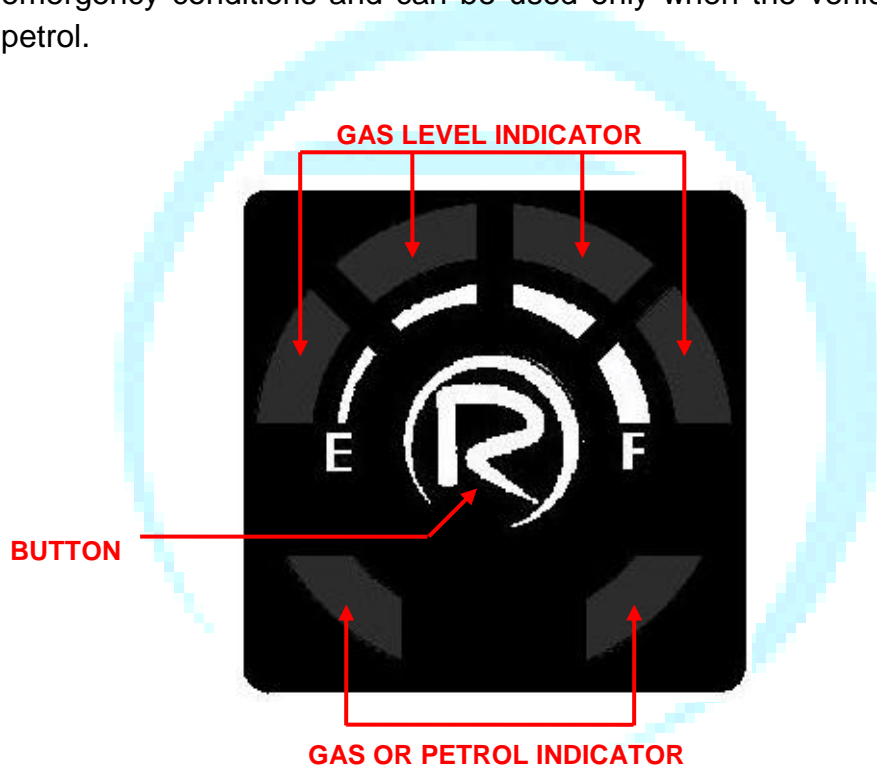




#### 4.10 Switch

It's the device which, positioned inside the driver cabin in a comfortable position for driver, allows the end user to communicate with the system. By the switch, the end user can:

- ✓ Switch vehicle fuel from petrol to LPG and vice versa by clicking the little button in the middle of the switch;
- ✓ Understand the type of fuel (LPG or petrol);
- ✓ View the quantity of gas in the tank;
- ✓ Be warned, by light and acoustic signal, when the level of LPG in the tank is not enough;
- ✓ Be Warned, by light and acoustic signal, that there is a malfunctioning of LPG system (diagnosis);
- ✓ Start the vehicle directly on LPG fuel. This procedure is allowed only in emergency conditions and can be used only when the vehicle cannot start on petrol.



Following you have the possible conditions of switch



**A. 2 lower orange led lights ON permanent state**

Switch is indicating that vehicle is running on petrol. To switch to LPG fuel you have to click the button in the middle of the switch by the logo.



**B. 2 lower orange led lights FLASHING and the blue led lights indicating LPG level ON**

Switch is indicating that vehicle is running on petrol but it is waiting for ECU to get the conditions set during calibration to switch to LPG.



**C. 2 lower blue led lights ON with 1 blue led light indicating LPG level ON – permanent state**

Switch is indicating that vehicle is running on LPG and that LPG level in the tank is 1/4



**D. 2 lower blue led lights ON –permanent state with 2 blue led lights indicating LPG level ON – permanent state**

Switch is indicating that vehicle is running on LPG and LPG level in the tank is 2/4.



**E. 2 lower blue led lights ON – permanent state with 3 blue led lights indicating LPG level ON – permanent state**

Switch is indicating that vehicle is running on LPG and that LPG level in the tank is 3/4



**F. 2 lower blue led lights ON- permanent state with 4 blue led lights indicating LPG level ON- permanent state**

Switch is indicating that vehicle is running on LPG and that LPG level in the tank is 4/4 (full).



**G. 2 lower blue led lights ON-permanent state with 1 orange led light indicating LPG level ON- permanent state**

Switch is indicating that vehicle is running on LPG and the LPG level in the tank is low. It is recommendable to refuel the vehicle.



**H. All blue led lights flashing with an acoustic signal (beep)**

Switch is indicating that LPG level in the tank is not enough and that ECU will automatically switch fuel from LPG to petrol to avoid damages to the catalyst.



**I. 2 lower blue led lights flashing with acoustic signal (beep)**

Switch is indicating an important malfunctioning of one of the components of LPG system so it will switch automatically to petrol to avoid any further damage. It is recommendable to go to the nearest Romano authorized workshop to check the system.



**J. 2 lower blue led lights flashing with all led lights indicating LPG level ON- permanent state**

Switch is indicating a small malfunctioning of one of the components of LPG system but vehicle will continue running on LPG. It is recommendable to go to the nearest Romano authorized workshop to check the vehicle.



### **K. LPG start (emergency procedure)**

To start the vehicle running directly on LPG you should follow this procedure:

- 1) When panel is still off, click the little button on the switch
- 2) By clicking the button, start the panel
- 3) If lower led lights are ON start the engine, otherwise, if led lights are OFF it won't be possible to start the vehicle directly on LPG.

This procedure in any case is not recommendable because it is not granted the temperature value to have the right LPG vaporization.

## 5. SET IN MOTION AND ADJUSTMENT OF LPG SYSTEM

This system doesn't need testing period, but car has to be checked after a period as per our recommendation on section **Maintenance**. If the car is new please follow the instructions of manufacturer even if you use it on gas

## 6. MAINTENANCE

It is very important to follow the Maintenance schedule as shown in the table to get the best performances of system components and to access ROMANO WARRANTY in case of product fault.

	KM ( MONTHS )						
	3.000 ( 12 )	20.000 ( 24 )	50.000 ( 36 )	80.000 ( 48 )	110.000 ( 60 )	140.000 ( 72 )	170.000 ( 84 )
Reducer pressure and gas junctions check	•	•	•	•	•	•	•
Functioning and system parameters check (by selfdiagnosis plug)	•	•	•	•	•	•	•
LPG tank fixing stirrups tightening torque check	•		•		•		•
General conditions visual check: LPG/water hoses and connections	•	•	•	•	•	•	•
LPG injectors check		•		•		•	
LPG reducer check		•		•		•	

Please ask Maintenance coupons to the workshop where the vehicle was converted to LPG or to Romano Autogas authorized dealer, making sure that the control is reported on the maintenance coupons at the end of the manual.



## **7. SCRAPPAGE OF THE PRODUCT**

To scrappage the product please contact a ROMANO AUTOGAS authorized workshop.



## 8. FORM FOR THE INSTALLER

<b>VEHICLE</b>		
<b>ENGINE CODE</b>		
<b>CAR POWER/KW</b>		
<b>VEHICLE PLATE</b>		
<b>DATE OF INSTALLATION</b>		
<b>KM ON VEHICLE ODOMETER</b>		
<b>COMPONENTS LIST</b>		
<b>TANK</b>	<b>BRAND</b>	
	<b>MODEL</b>	
	<b>YEAR OF PRODUCTION</b>	
<b>MULTIVALVE</b>	<b>BRAND</b>	
	<b>MODEL</b>	
	<b>YEAR OF PRODUCTION</b>	
<b>REDUCER</b>	<b>BRAND</b>	
	<b>MODEL</b>	
	<b>YEAR OF PRODUCTION</b>	
<b>INJECTORS</b>	<b>BRAND</b>	
	<b>MODEL</b>	
	<b>YEAR OF PRODUCTION</b>	
<b>ECU</b>	<b>BRAND</b>	
	<b>MODEL</b>	
	<b>YEAR OF PRODUCTION</b>	
<b>PRESSURE GAUGE</b>	<b>BRAND</b>	
	<b>MODEL</b>	
	<b>YEAR OF PRODUCTION</b>	
<b>DELIVERY VEHICLE</b>		
<b>Gas pressure value</b>		
<b>Result of leakage test (YES/NO)</b>		

Date

Stamp and signature

## 9. MAINTENANCE

<b>CHECK AT ABOUT 3.000 KM</b>	
Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG tank fixing stirrups tightening torque check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

<b>CHECK AT ABOUT 20.000 KM</b>	
Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG reducer check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

## CHECK AT ABOUT 50.000 KM

Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG tank fixing stirrups tightening torque check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

## CHECK AT ABOUT 80.000 KM

Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG reducer check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

## CHECK AT ABOUT 110.000 KM

Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG tank fixing stirrups tightening torque check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

## CHECK AT ABOUT 140.000 KM

Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG reducer check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

## CHECK AT ABOUT 170.000 KM

Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG tank fixing stirrups tightening torque check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

## CHECK AT ABOUT 200.000 KM

Real KM	
Reducer pressure and gas junctions check	
Functioning and system parameters check	
LPG reducer check	
General conditions visual check: LPG/water hoses and connections	
Other	
<b>DATE</b>	<b>STAMP AND SIGNATURE INSTALLER</b>

**WORKSHOP STAMP**

