



**INSTALLATION MANUAL**  
of the Sequential Injection System **LIN-ONE**  
2° Generation  
**Vers. 1.2**

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**CHAPTER 1 WORKING PRINCIPLE**

The **LIN-ONE** is an electronically controlled Gas Sequential Injection System. It can be installed in any petrol fuel injection vehicles with special emphasis to all last-generation catalytic fuel injection vehicles. The **LIN-ONE** system is a Multi-point sequential injection system, 100% "follower" and where no OBD emulation device is required. The **LIN-ONE** is available in the LPG and in the CNG versions.

Gas is injected through the injector rail directly into the manifold near the intake valves, thus achieving an optimised fuel mixture improving gas exhausts level. The gas injection timing is directly driven by the original petrol signal.

The **LIN-ONE** Gas Sequential Injection system is composed of the following items: an **Electronic Control Unit** named **MACH Pro**, a **Change Over Switch** model **QUICK-ON**, a **Gas Pressure Regulator**, an **Injectors Rail GAS** and finally a **Temperature and Pressure Gas Sensor**.



**Figure 1** – The Sequential Injection Kit LIN-ONE – 2<sup>nd</sup> Generation

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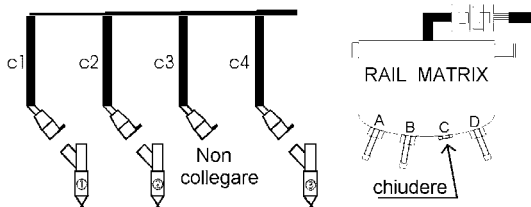


**CHAPTER 2 INJECTOR RAIL**

**Installation instructions:**

- The Rail is installed by connecting outlet "A" to engine cylinder Nr. "1", outlet "B" to cylinder Nr. "2", "C" to engine cylinder Nr. "3", outlet "D" to cylinder Nr. "4".
- Install the device in the engine compartment, far away from heat sources and possible infiltrations.
- Hoses connecting the rail to the manifold shall be as short as possible and must have the same length.

**For 6 cylinder:**



**Figure 2** – Connection scheme for 6 cylinders vehicles

The Rail is installed by connecting outlet "A" to engine cylinder Nr. "1", outlet "B" to cylinder Nr. "2", outlet "D" to cylinder Nr. "4".

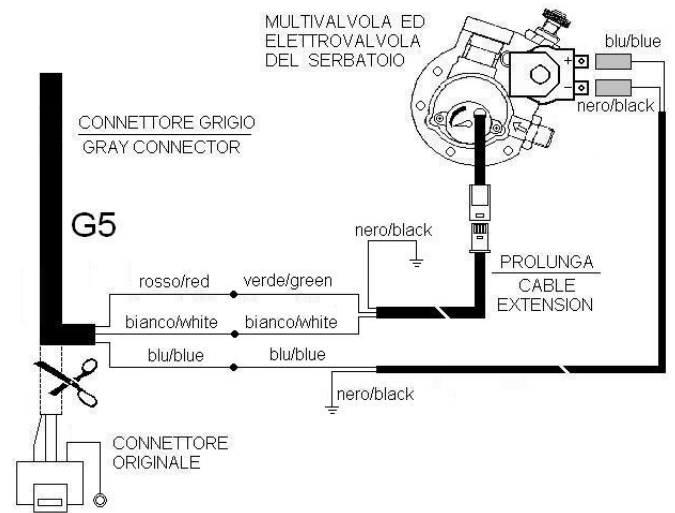
**N.B. : Connect the first Matrix to N2 cable. The first Matrix is regulated by the 1st group of cylinders ( N1 ); Connect the second Matrix to N5 cable: it is regulated by the 2<sup>nd</sup> group of cylinders (N4 / N6 )**

**CHAPTER 3 PRESSURE SENSOR**

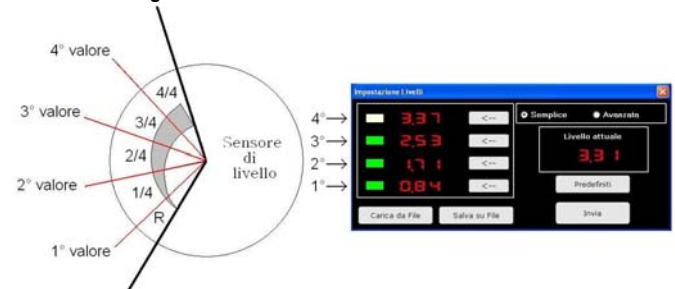
The Sequential Injection kit uses a gas pressure sensor that has to be connected to the injectors' rail, to the MAP and to the depressor intake that is on the cover of lo.gas reducer. Through this device you detect the following signals:

- The pressure value of the MAP (Manifold Absolute Pressure) to the manifold;
- The Gas pressure rail to the injector Rail.

**CHAPTER 4 LEVEL SENSOR AND SOLENOID VALVE**



**Figure 3** – Connection scheme of the level sensor



**Figure 4** – Setup of Level thresholds

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Go to window "General Setup" and click on "Set Switch Levels" to open the window with manual regulation of the levels threshold. We can select two types of data input:

- **SIMPLE**: hold the multivalve in the hand with the level sensor connected correctly. Move the float to the desired level and click on the arrow next to the level you wish to set. Doing this, we'll decide at what level the led lights up.
- **ADVANCED**: select the desired Volt value and again click on the arrow next to the level you wish to set. Doing this, we'll decide at what level the led lights up.
- Click on **SEND** to save the changes.

**CHAPTER 5 TUNING AND DIAGNOSTIC**

- a) The +12 Volts under key must be connected near the key block. Always check that the selected wire is not a timed wire. (Control that the 12 volts signal is ALWAYS constant even during engine cranking and check that there is no signal after turning off the engine. NOTE: in some vehicles the 12volts signal will be active for a longer limited time even after the engine is tuned off, if so use another 12volts under key wire). Make sure all connectors are in place, well insulated and well connected.

**N.B. : in some cars the signal remains on for a few seconds after you turn off the engine. In tis case, use a different 12 Volt Under Key Signal. Verify that all connections are well soldered and insulated.**

- b) Connect the Lambda to the related cable N3 through welding. Lambda is not necessary for the correct functioning of the system; yet, it can be useful to visualize it during the trimming process.
- c) Once the car is fully wired, connect the PC to the MACH III Pro using the connecting cable, to the G3 cable on the grey connector.
- d) Turn on the PC and launch Mach Pro. The connection is immediate and the **MONITOR** page will open up (Figure 4).
- e) Turn on the ignition key.

**NB: VERY IMPORTANT: during trimming check the case on the bottom left corner of the MONITOR page: this must indicate "PRESENT"**

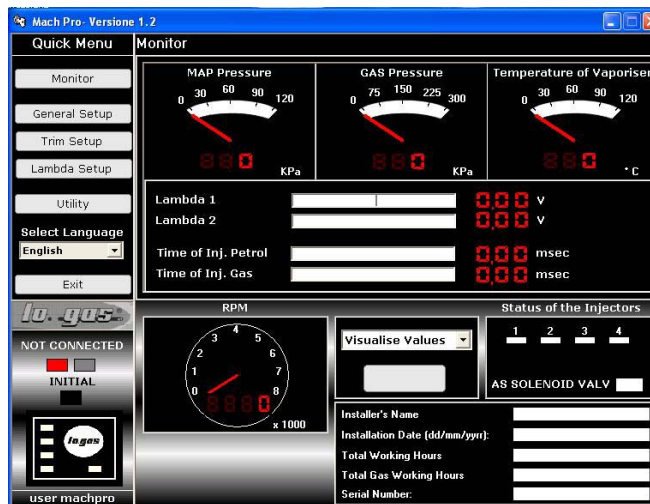


Figure 5 –"MONITOR" Window

- f) Check that all parameters are visualized and working properly; otherwise check cables and connectors.
- g) Select the preferred language on the "Select Language" menu on the left
- h) Go to the page "**General Setup**"

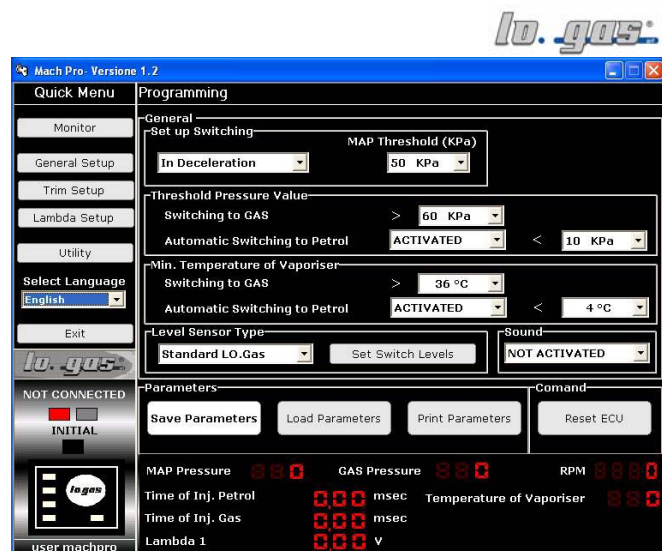


Figure 6 –GENERAL SETUP Window

- i) Select the switching mode (Timed, In Acceleration, In Deceleration ) and the switching threshold.
- j) Set the temperature required for switching.( NB : the system requires at least 30°C to work properly ).
- k) Select the level sensor type depending on what you have installed on the multivalve: various standard level sensors are available. "Standard LO.Gas" indicates the level sensor we recommend and normally use. You can set manually the threshold for each level indicated on the switch (see chapter 4).
- l) It's possible to activate "Automatic Switching to Petrol" (Pressure and/or Temperature) and the respective thresholds.
- m) MACH Pro is pre-set, meaning that it has default values. Still, it's possible to modify manually each single parameter in order to optimize vehicle's performance.
- n) Every time we modify a parameter the new data are automatically registered on the central unit.
- o) To hear a short BEEP when switching between Gas and Fuel, click on "**ACTIVATE**" in the Sound case.

- p) Click on the icon "**Trim Setup**" that is on the menu on the left of each page.

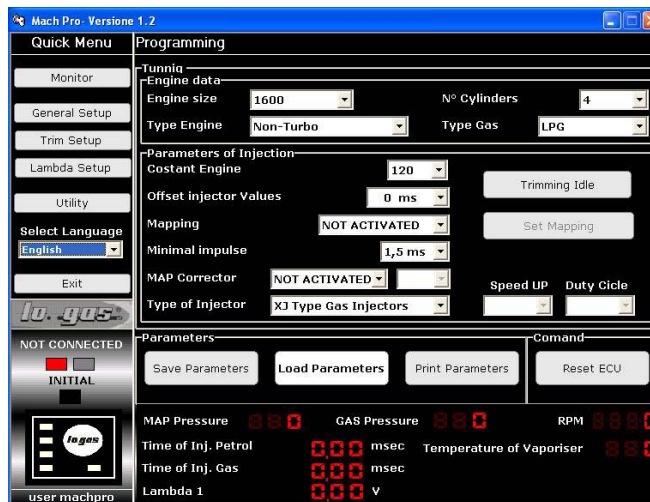


Figure 7a –TRIM SETUP Window



Figura 7b – Injectors type on TRIM SETUP Window

**ATTENTION: before you start the trimming procedure, make sure you've chosen the correct injector type.** By default the ECU is programmed to work with HD Type Gas Injectors; if we use different ones or substitute them, it's extremely important to change the setting on "Injector Type". In case of improper use, lo.gas can not be held responsible for breakage.



Figure 8 – Available Injectors Types

- q) On the “Trim Setup” window insert the data referred to the car ( Engine power, Number of Cylinders, Engine type, Gas type).
- r) Click on the “Trimming Idle” button and follow closely the instructions that appear on screen.
- s) Test carefully the car both at idle and on the road, in order to check that trimming is correct. If necessary, you can slightly adjust the two values of: Constant Engine, important to regulate the car’s behaviour on the road, and Offset Injector Value, to regulate idle.
- t) Let’s open now the page “Lambda Setup”.



Figure 9 – page “LAMBDA SETUP”

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- u) Select the Lambda type. In case we don't know it, just select “**Lambda Setup**” and follow the instructions: the system will recognize automatically the Lambda type.
- v) At idle, the **MAP value must be approximately between 30KPa and 37 KPa**.
- w) The reducer’s temperature is **very important**, because it’s the reference value for vehicle switching from Fuel to Gas.
- x) When using the PC interface, you can switch from Gas to Fuel by double clicking on the button at the bottom left hand corner: switching to Gas will be immediate. When you use the switch inside the car, switching to gas is not immediate but retarded.
- y) When you reach the reducer’s temperature that is set for switching to Gas, a short Beep indicates that the gas circuit is now under pressure.
- z) It’s possible to activate a “MAP corrector”. This increases or decreases the amount of gas in the cylinders depending on the MAP pressure. The corrector works in a different way for LPG or CNG:
  - GPL : with higher MAP pressure, injection timing is higher also; with lower MAP pressure, injection timing is lower also;
  - CNG: with higher MAP pressure, injection timing is lower; with lower MAP pressure injection timing, injection timing is higher.
These variations depend on the selected value. Minimum value is 1, maximum 16: these have an effect in % on the performance.

## CHAPTER 6 TRIMMING

N.B. : Before starting automatic trimming, check that engine temperature is at least 65°C.

Once the mechanical installation is complete, connect the PC with MACH Pro Software installed to the ECU and follow these instructions:

1. Open Mach Pro software on the PC.
2. Turn on the engine.
3. Check that all parameters are correctly visualized.
4. Click on the switch to run on fuel only (not on gas).
5. Open page “Setup Trimming”.
6. Insert data of the specific engine in the box “ Engine Data “.
7. Select injector type and its minimal impulse .
8. Click on “ Trimming Idle”.
9. Follow closely the instructions appearing on the screen.
10. Trimming is complete when the Trimming window closes automatically and the car switches to gas.

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## 11. The Automatic Trimming Procedure tries to find the correct values for CONSTANT ENGINE and OFFSET INJECTOR VALUE. These two values are necessary to determine gas injection timing.

- It’s possible to select manually these two parameters (CONSTANT ENGINE and OFFSET INJECTOR VALUES) . They can be manually modified also, if necessary: just modify slightly in one direction or the other the two values found with the Automatic Procedure.

- **OFFSET INJECTOR VALUES** is the most important parameter for trimming idle;

12. **CONSTANT ENGINES** is the most important parameter for trimming car in driving conditions.

13. At the end of this procedure, please verify the vehicle’s behaviour on the road.

## CHAPTER 7 SWITCH AND LEVEL SENSOR



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## CHAPTER 8 TROUBLE SHOOTING

### 1. THE PC DOESN'T CONNECT

- a. Check the connection between the PC and the MACH Pro

### 2. THE ENGINE DIES AFTER CHANGE OVER OR DURING IDLE.

- a. Check if pressure of gas is present on rail. If present, check the rail connector.
- b. Check if the negative wire has been correctly connected.
- c. Check if the solenoid valve on the reducer and on the tank multivalve are activated.
- d. Increase the engine K on the page “**Setup Taratura**”.

### 3. THE LAMBDA SIGNAL INDICATES A RICH OR POOR MIXTURE.

- a. The Lambda does not work properly. Check LAMBDA.
- b. Check the reducer’s pressure.

### 4 CHANGEOVER FROM GAS TO PETROL.

- a. Make sure there is a good temperature setting (in case of cold weather) and that pressure signal is present
- b. Check if there is Gas in the Tank.
- c. Check if the pressure on the system is present and stable.
- d. Check the water level in the radiator or for gas locks inside the reducer.
- e. Check if the reducer’s temperature is high enough (equal or higher than the temperature pre-set for changeover)

### 5. THE VEHICLE HAS A HIGH FUEL CONSUMPTION.

- a. Check for leaks on the pressure sensor.
- c. Check the nozzle sizes.
- d. Check the reducer pressure.

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