

ESI-10

Entry-level Sequential Injection



EN

PROGRAMMING MANUAL

Some information about the program

The **Emmegas Suite** is a program for the automatic recognition of the Emmegas conversion kit installed on the vehicle. In fact you just need an Emmegas Interface type USB 100 or USB 200 to allow the software to recognize the type of Emmegas Ecu installed on the vehicle.

How to connect it

- Turn on the PC
- Connect the Emmegas Interface type USB 100 or USB 200 to the computer and to the Emmegas ECU 07.
- Start the program and wait for the connection: the program will automatically recognize the Ecu installed on the vehicle highlighting it in green
- To start the program, click on the mentioned Ecu type.



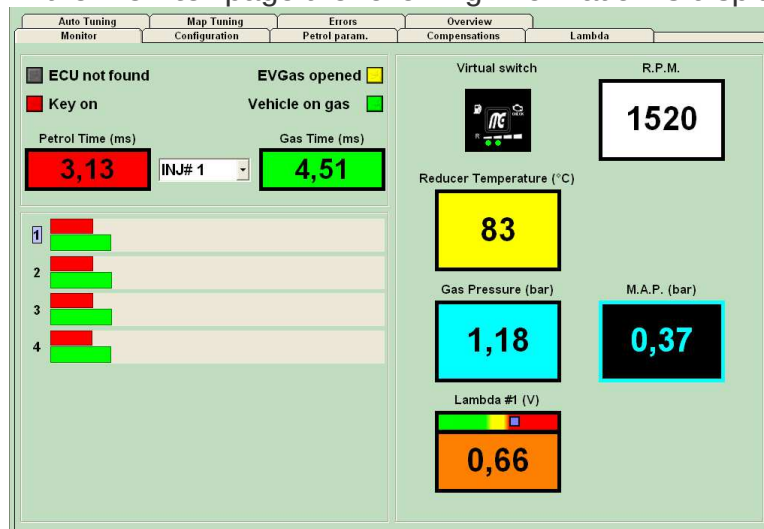
Please find herebelow the initial screen of the Suite Software displaying the automatic research mode. The possible programs are as follows:

- ECU-07 OBD EVO2
- ECU-07 OBD EVO1
- ECU-07
- ESI-10
- BIS-10

Please select the ESI 10 program.

MONITOR

In the **Monitor** page the following information is displayed:



► **ECU not found:** it says if the Ecu is connected or disconnected.

► **Key on:** it says the key signal is on or off.

► **EV gas opened:** it says if the Lock-off valve is open or closed.

► **Vehicle on gas:** it says if the car is running on gas or petrol.

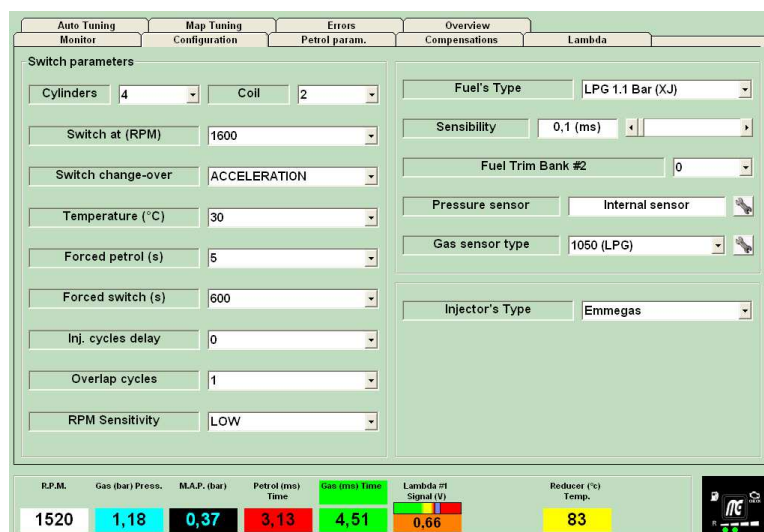
The lower part of the window on the left displays:

- the **petrol / lpg times** of the selected injector.
- **graphical representation** of the injectors (petrol / lpg)

The right side displays:

- **The “virtual”switch:** the user can change from gas to petrol and viceversa just clicking on it
- **R.P.M. :** it shows the number of revolutions of the engine
- **Reducer Temperature (°C):** it shows the temperature of the regulator .
- **Gas Pressure (bar):** it shows the injection pressure of the gas.
- **M.A.P. (bar):** it indicates the intake manifold pressure.

CONFIGURATION



In the section **CONFIGURATION**, are listed the following parameters::

► **Cylinders:** it shows the number of cylinders of the engine:

[1→ 2→ 3→ 4]

► **Coils:** it shows the number of coils (to be used for the correct reading of the RPM):

[1→ 2→ 3→ 4→ 5→ 6→ 7→ 8]

► **Switch at (RPM):** It is the RPM value for the switch from petrol to gas.

► **Switch change-over:** it's the choice of the switching type from petrol to gas

► **Temperature (°C):** temperature to be reached in order to switch to gas.

► **Forced petrol (s):** forced time during which the vehicle keeps running on petrol before switching to gas.

► **Injectors delay (ms):** switching time to gas between one injector and the other.

► **Overlapping fuel (ms):** overlap time between petrol and gas when the vehicle switches.

► **RPM Sensibility:** intensity value of the RPM signal. It can be low or high.

► **Fuel type:** this is the choice of the fuel type:

- LPG 1.1 Bar (XJ)
- LPG 1.4 Bar (TDM)
- GNV 2.0 Bar

► **Sensibility:** this is a parameter used to reduce the extra injections , range from 0.1 ms to 2.4 ms

► **Fuel Trim Bank #2:** parameter used on 6, 8 cylinders vehicles with double bank in order to align bank 2 # to bank 1 #.

► **Pressure sensor:** to be used to select the type of pressure sensor (MAP) installed.

By selecting the picture  you can programm the following parameters:

- **Empty tank switch**, it is used to manage the automatic change to petrol when the empty tank signal is enabled .
- **Pressure (bar)**, pressure value where the tank is considered empty, range from 0.1 bar to 1.2 bar.
- **Delay (s)** period of time before switching over to petrol when pressure is under the above limit.

Pressure Sensor settings	
Empty tank switch	ENABLED
Pressure (bar)	0,5
Delay (s)	0,1

► **Gas sensor type:** to be used to select the gas sensor type. Select the picture  to activate the following parameters :

Gas sensor type	
1050 (LPG)	

Gas level setting	
3/4 - 4/4	1,3
2/4 - 3/4	2,33
1/4 - 2/4	3,7
R - 1/4	4,76
Default	Fast(V): 0

- **Gas level setting** : in this section it is possible to modify manually the reading of the levels of the gas sensor.
- **Default** : it restores the standard limits of the selected gas sensor
- **Slow / Fast** : it shows the sensor level value in Volts.
SLOW means that the value is slowed down; FAST means that the displayed value is in real time.

AUTO TUNING

Before proceeding to the auto tuning , it is necessary to set some configuration parameters. Go to page **Configuration** with the **engine switched off**, select:

- The number of cylinders.
- The number of coils.
- The type of level sensor
- The type of fuel (NGV or LPG).

Turn on the engine, let it at idle and check that the RPM value on the computer is the same as the one displayed on the revolution counter of the vehicle. If not, modify the number of coils until the RPM reading is correct.

Then, at the page **Monitor (with engine switched on)** check that all values are working correctly , that is to say injectors, temperatures, pressures, and sombda lamba (oxygen sensor) if connected. Then open the page **Errors and** check that there are no errors.

Moreover, please check as follows:

- The vehicle is stationary in a flat position, hand-brake engaged.
- Changing-gear in neutral position.
- The engine is running on petrol and RPM at idle
- The regulator temperature must be at least 60°C for LPG and 50°C for the CNG. On the contrary, wait until the correct temperature is reached.

Now, it is possible to go ahead with the auto tuning.

Then, select **Auto -Tuning** page and click on **START** button to begin the Auto Tuning process. The auto tuning starts automatically. Please leave the engine at idle and do not touch the accelerator pedal during the process.



At the bottom of the display you can visualize the **petrol injector timing (in red)** and the **gas injector timing (in green)**. On the right there is the correction value elaborated by the system.

At the end of the Auto Tune process, a message will appear according to the final result indicating:



- If the Auto Tune was completed successfully
- If the injectors size is correct .

Click on the button **“OK”** to go ahead or click on **“Cancel”** to repeat the Auto Tuning.

- Some applications are disabled during the auto tuning and the re-activated at the end of the setting.

At the end of the calibration, check that the regulator **pressure** (at idle) is between the following ranges:

Lpg : 1,1 ÷ 1,2 bar

Cng : 1,8 ÷ 1,9 bar

If it is not, adjust the regulator pressure by using the relevant adjustment screw that you can find on the cover of the regulator.

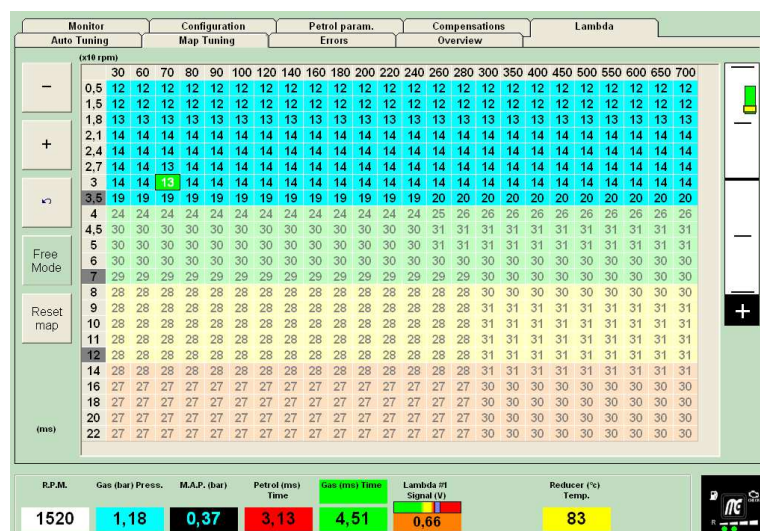
ATTENTION: for a better calibration of the vehicle, please consider that it is not enough to rely just on the auto tuning process. It is better to use also the “scan tool” device to ensure a good setting.

MAP TUNING

The map is divided into 4 horizontal bands:
To change the numbers on the map click on the desired area and press the button + to increase the number or press the button – to decrease it .

Moreover, you can click on the value you need to modify and then press “enter” if you want to replace the value by mode
Linear / Absolute / Percentage:

- **Linear** (+/- 100) : to add / subtract to the value indicated to the one selected on the map.
- **Percentage** (+/- 50): to add / subtract the percentage indicated to the value selected on the map.
- **Absolute** (+/- 127): it replaces directly the written value instead of the one in the box.

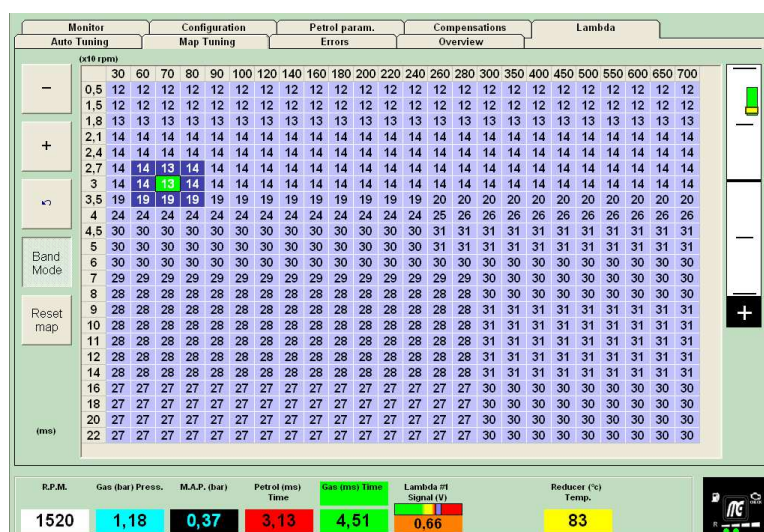


To modify the **sectors wideness** , select the values on the dark grey vertical bar and press the buttons + and – to decrease /increase the selected sector.

LATERAL BUTTONS

- The button with the arrow (UNDO) is used to clear the last modification
- The button “Free Mode” switches to free mode (see following page)
- The button “reset map” resets the map to default values
- The cursor is green when we are running on gas and red when we are running on petrol

FREE MODE



In the free mode screen you can select the desired area and you can modify it as previously described for sectors/map .

The button “**Band mode**” brings to the 4 bands mode previously described.

COMPENSATIONS

Reducer temperature compensation

°C	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
%	-10	-9	-8	-7	-6	-5	-4	-4	-3	-3	-2	-2	-1	0	0

Select a cell and press (-) or (+) keys to change values. Press shift to increase by 10 unit.

R.P.M. Gas (bar) Press. M.A.P. (bar) Petrol (ms) Time Gas (ms) Time Lambda ST Signal (V) Reducer (°C) Temp.

1520 1,18 0,37 3,13 4,51 0,66 83

The compensation tables are automatic corrections of the Ecu and consider the regulator and gas temperature.

In the first line you can read the temperature values of reference. In the second line (white) you find the correction values, expressed by percentages and referred to the temperatures above indicated.

You can change the correction values clicking on them (they will become yellow) and pushing the + or – button on your keyboard, in order to increase/decrease the value of a unit.

Besides you can enable or disable the compensation table by clicking on the flag “enabled”.

LAMBDA

Sensor type

DISABLED
DISABLED
0.1
0.5 Direct
0.5 Inverted
0.8, 1.6
UEGO

R.P.M. Gas (bar) Press. M.A.P. (bar) Petrol (ms) Time Gas (ms) Time Reducer (°C) Temp.

0 0,00 0,00 0,00 0

You can select the following parameter:

Sensor Type :it allows you to select the type of lambda sensor on the vehicle and also its functioning when the vehicle is running on gas or petrol.

ERRORS

Monitor Auto Tuning		Configuration Map Tuning	Petrol param. Errors	Compensations Overview	Lambda
#	Device name	Present	Stored		
Err 00	Gas injector #1	---	---		
Err 01	Gas injector #2	---	---		
Err 02	Gas injector #3	---	---		
Err 03	Gas injector #4	---	---		
Err 04	Gas injector #5	---	---		
Err 05	Gas injector #6	---	---		
Err 06	Gas injector #7	---	---		
Err 07	Gas injector #8	---	---		
Err 08	Gas pressure	---	---		
Err 09	MAP pressure	---	---		
Err 10	Reducer temperature	---	---		
Err 11	Gas injector temperature	---	---		
Err 15	Supply voltage	---	---		
Err 17	EVGas #1	---	---		
Err 18	EVGas #2	---	---		
Err 20	Petrol injector error	---	---		

☐ Enable acoustic signal

Gas Pressure (bar): 1,09

Errors :it contains a list of all errors and it is specified if they are present (occured during the current session) or memorized (occured at least in a past session)

Erase errors: it cancels the errors table

Gas pressure (Bar): It shows the gas pressure even during the operation on petrol.

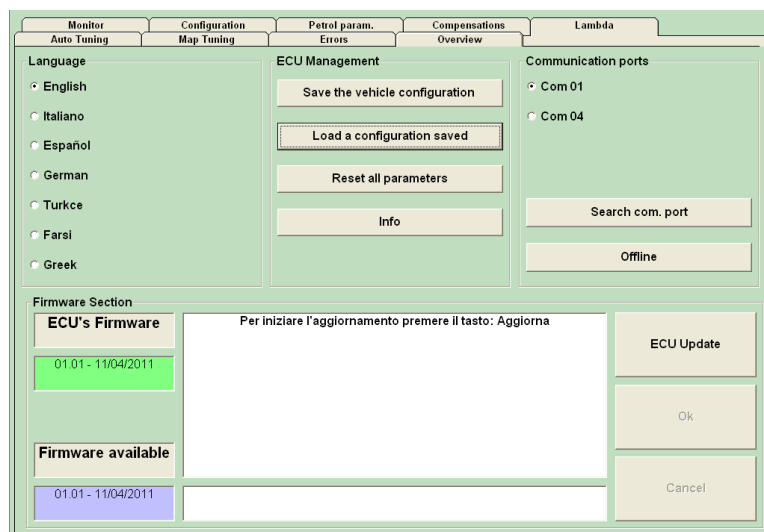
Monitor Auto Tuning		Configuration Map Tuning	Petrol param. Errors	Compensations Overview	Lambda
Signal name	Value				
Gas inj time					
Petrol inj time					
Time between 2 injections Petrol					
Correction time					
Rpm period					
Absolut collector pressure					
Collector - Reducer pressure					
Lambda sensor voltage					
Lambda 2 sensor voltage					
Level gas visualized on switching					
Level gas read					
Reducer temperature					
Injectors gas temperature					
Hardware temperature					
battery voltage					
Current Absorbed					
buzzer switch status					
Lead petrol status					

☐ Enable acoustic signal

Gas Pressure (bar): 1,09

Show Freeze Frame: by clicking on Freeze Frame, a new screen is displayed which indicates the frozen condition of the vehicle when the error occurred.

OVERVIEW



In the section Overview you can find the following features:

Language : you can select the desired language.

-ECU Management : you can proceed with the following options:

- **Save the vehicle configuration**: it lets you save the present configuration. .
- **Load a configuration saved**: you can upload on the Ecu a configuration previously saved
- **Reset all parameters**, all values will be reset to the default ones

In **Firmware Section** you can find the following functions:

-ECU's firmware: it shows the version and the date of the Ecu's firmware;

-Firmware available: it shows the version and the date of the firmware available for the Ecu updating.

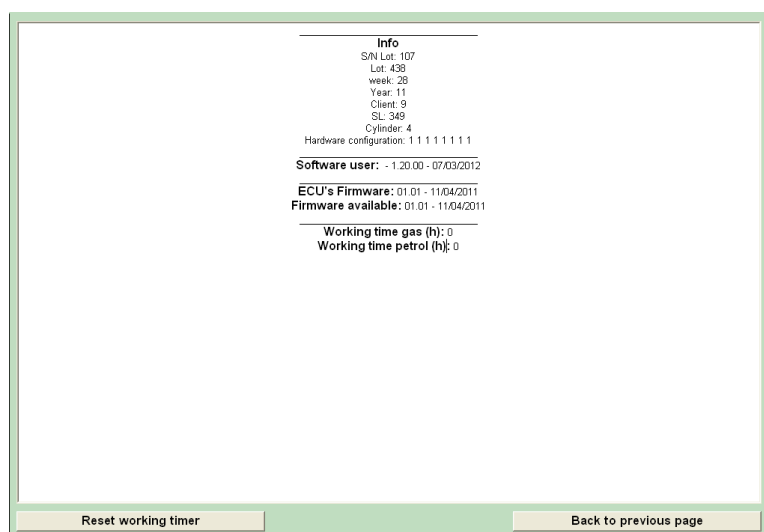
In the section **Communication ports**, you can:

- Select the port **used** for the communication
- Manually search for the communication port (**Search com.port**)
- Work in **offline** mode.

In the central area it is indicated if the firmware of the Ecu needs an updating. If it is so, on the right side there are the buttons to proceed with the Ecu updating.

NOTA during the updating, all programs started on the Pc must be closed down. Moreover, please do not touch any buttons, don't disconnect any wires nor do any operation. If an interruption occurs, the Ecu will lock and all data will be lost. Then, do the updating again to unlock it

By clicking on the button "**Info**" you open the following page about the ECU info:



- **S/N Lot** : ECU serial number .
- **Lot** : lot of production.
- **Week** : week of production.
- **Year** : year of production
- **Client** : customer code.
- **SL** : internal manufacturer code.
- **Cylinder** : number of cylinder configuration.
- **Hardware configuration** : internal manufacturer code.
- **Software user** : software release installed on the pc.
- **ECU firmware** : firmware release present in the ECU.

- **Firmware available**: available firmware release .

- **working time gas (h)** : working time of the ECU on petrol/gas

- **Reset working timer** : button used to clear the working time on gas/petrol

PETROL PARAMETERS

➤ Working at high RPM :

- **Gas**, with this function the vehicle runs on gas only .

Working at high RPM

☒ Gas ☐ Petrol

- **Petrol**: with this function the vehicle runs on petrol only.

The conditions for its activation depend on the parameters **Petrol operating RPM threshold** and **Operating TinjPetr above threshold (ms)**.

Working at high RPM

☐ Gas ☒ Petrol

Petrol operating RPM threshold:

from 4500 to 9000

Operating TinjPetr. above threshold (ms): 15

Petrol operating RPM threshold, it's the engine RPM limit to activate the function only on petrol;

#Operating TinjPetr. above threshold (ms), the threshold injection time (on petrol) to activate the petrol functioning only.

➤ In **Working at low RPM** section are present the following functions:

Working at low RPM

☒ Gas ☐ Petrol

☐ Return to petrol (temporary)

Gas, the vehicle at a idle operates only on Gas.

Working at low RPM

☐ Gas ☒ Petrol

☐ Return to petrol (temporary)

Operating RPM below threshold: 1100

- **Petrol**: with this function the vehicle runs at idle below a certain RPM Threshold selected by the parameter **Operating RPM below threshold**

Working at low RPM

☐ Gas ☐ Petrol

☒ Return to petrol (temporary)

Operating RPM below threshold: 1100

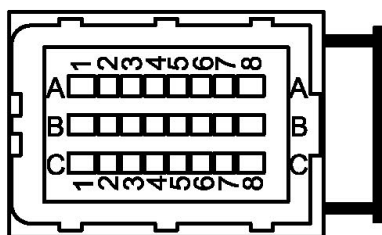
Return to petrol (temporary), it temporary runs on petrol at idle and then comes back to gas automatically

Operating RPM below threshold: below this threshold the vehicle waits before switching to petrol

ESI 10 Wiring Connections Guide

CONNECTOR ECU

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PIN	FUNCTION	COLOR	SEC. (mm2)
A1	EV GAS	BLUE	1.00
A2	OUT_G3	VIOLET	0.75
A3	OUT_G4	BLUE	0.75
A4	SWITCH	WHITE	0.35
A5	INJ B2	YELLOW	0.50
A6	OUT_G1	GREY	0.75
A7	OUT_G2	YELLOW	0.75
A8	INJ B1	GREY	0.50
B1	+V G1,G2,G3,G4	RED/BLACK	0.75
B2	+ 12V KEY	RED	0.75
	+ V LEVEL	GREEN	0.75
B3	+ 5V SWITCH.	RED	0.75
B4	WATER TEMP	PINK	0.75
B5	INJ B4	BLUE	0.75
B6	INJ ECU2	YELLOW/BLACK	0.50
B7	INJ B3	GRAY	0.50
B8	INJ ECU1	GRAY/BLACK	0.50
C1	+ V12 BATTERY	RED/BLACK	1.00
C2	LAMBDA IN	VIOLET	0.75
C3	RPM	BROWN	0.75
C4	SWITCH.TX	GREEN	0.35
C5	LEVEL	WHITE	0.35
C6	INJ ECU4	BLUE/BLACK	0.75
C7	INJ ECU3	VIOLET/BLACK	0.75
C8	GND	BLACK	1.00
	GND	BLACK	0.50
	GND	BLACK	0.50



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WIRING CONNECTORS ESI - 10 (EN)

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