

# **INSTRUCTIONS & MANUAL FOR THE AUTOGAS ECU**

**MA-V4**

**MA-V4mini**

**MA-X6**

**MA-X8**

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## 1. The connection of MA-V4

To connect the MA-V4 controller to diagnostic program you will need an interface. Every USB interface produced by us, is compatible with this controller.

For the interface to function correctly, you need to install the drivers designed for each type of interface. Port COM of the interface, is chosen automatically at every connection. In case of no connection, please check if the installed interface is visible on the list PC/TOOLS MANAGER/PORT COM.

After interface installation, you can start working with the application. The ignition key should be switch on. The program always starts in the PARAMETERS window.



Application can also be started in the NO CONNECTION or DEMO mode. In this case, you should choose 1 of the option.

## 2.The program features description

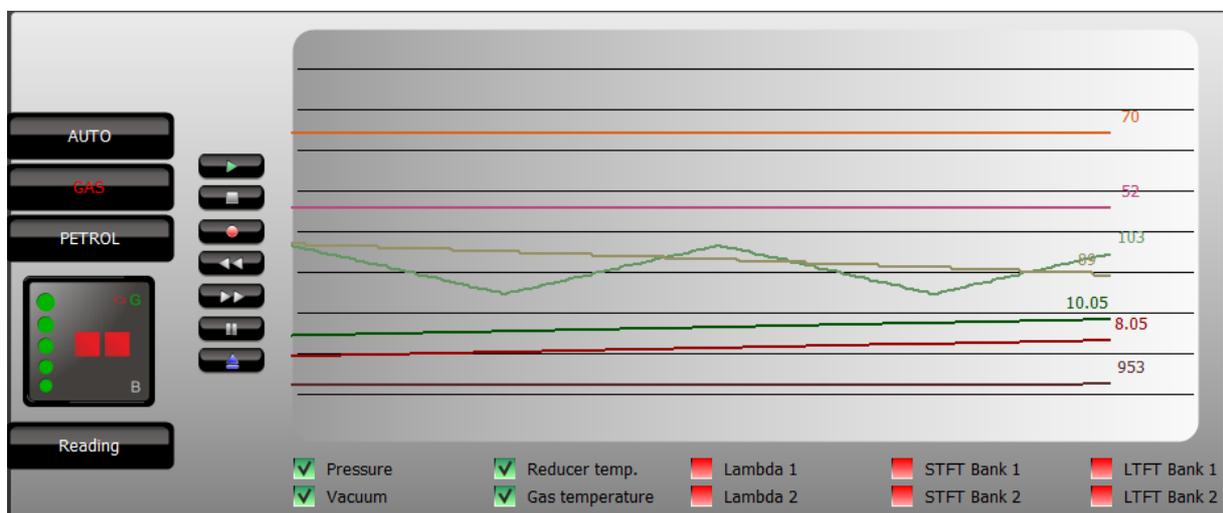
The controllers' application was designed and laid out in such way so all necessary basic features are in one window without the necessity to switch between several windows. The application was divided into few windows.

## 2.1 Indicators

Here, you will find all the needed information for the diagnostic process. The parameters are displayed in the form of clearly visible and easy to read gauges. From the top we have: RPMs and vacuum pressure, gas pressure, gas and reducer temperature.



The Parameter Gauges window also contains the possibility to save the diagnostic files. When you press REC, the new window will open in which the oscilloscope files will be recorder under the chosen name. Then you can take the car on the road. Mark the parameters which you want to see and after you're done test driving, press STOP. To view the saved file press EJECT and the window with the oscilloscope files will open automatically. In case o any problems with the interpretation of the recorded graphs, please send the file along with the description of the installation and the problem to [info@femitec.eu](mailto:info@femitec.eu)



The working mode switch AUTO-GAS/ PETROL and electronic visualization of the switch are there to choose between the fuels and to set the correct gas level indication after the edition in the INDICATORS window.

Below, you have the injection times of petrol and gas shown in two ways. Graphically, in the form of columns, the red for petrol injection and the green for gas injection. Electronically, in

the form of table with digital display of injections of the subsequent injectors. Here, you also have the possibility to switch the chosen cylinders to petrol or gas. The active gas cylinder is highlighted in green and the active petrol cylinder is highlighted in red. When you want to change the fuel supply of the 1st gas cylinder to petrol, for example, just left-click your mouse on the petrol injector icon, and the system will switch this cylinder to petrol, illustrating this by highlighting the icon of the petrol injector red and the lack of visualization of the gas injection time. This function is very useful during diagnostics of the insufficiency of the gas injectors.

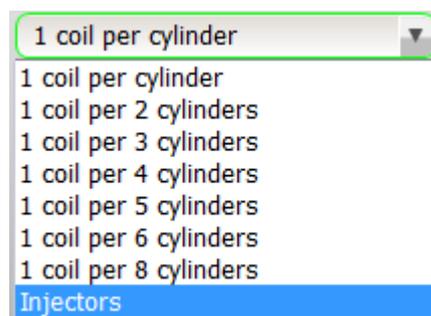


## 2.2 SETTINGS

The settings panel is divided into limited number of sections to avoid the unnecessary scrolling between them in case of editing. The functions are divided so one section contains all the basic settings needed for the initial vehicle settings and all others as the advanced settings used in the further steps of the vehicle settings.

**FUEL TYPE-** factory set to LPG/ mode CNG changes the controller algorithms dedicated for CNG.

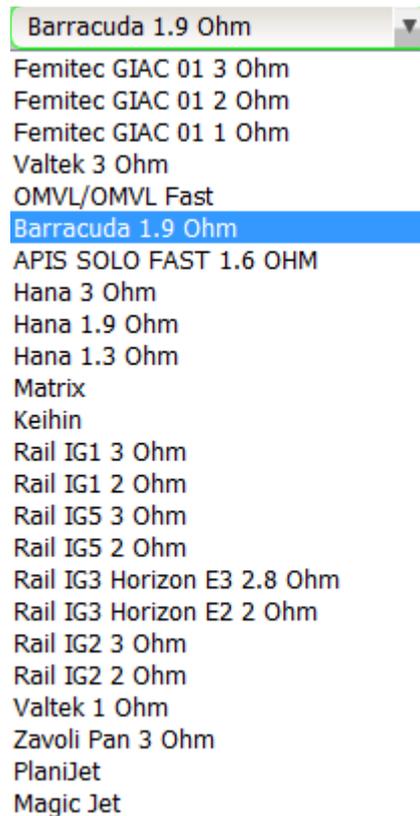
**RPM SIGNAL-** the source of the engine repetition speed. Depending on the ignition system, you have few choices of the RPM signal. The RPM signal wire could be connected to: ignition coil, camshaft or crankshaft sensor, petrol injectors or the RPM gauge (tachometer). There is also an option not to connect the RPM wire. Then you choose the **Injectors** function in the application. The RPMs are calculated from the vacuum pressure and petrol injection times. If needed, you can use **the divider** to set the correct RPM readout.



**SYGNAL TYPE**- signal sensitivity, the voltage threshold above which the RPM signal will be read. This value can be chosen depending on the repetition speed of the signal source.

**DIVIDER** – this function allows you the setting of the correct RPM readout from the signal of the repetition speed of crankshaft, camshaft or INJECTOR.

**INJECTOR TYPE**- this window gives you possibility to choose any gas injector from the list. After the injector is chosen, its characteristics and heating parameters are saved in the **ADVANCED** section of the program.



**PETROL-GAS SWITCHOVER**- The basic system setting parameters.

- **RPM threshold**- The RPM level at which the changeover to Gas will take place after the switchover temperature or the temperature of the injector heating is reached.

- **Temperature threshold** – after the right reducer temperature is reached, the system will switchover to Gas.

- **The injector switch-on delay** – This function allows you to sequentially switch gas injectors. For example, each gas injector can be switched on after 1s until all of them are switched on. If the setting is to 0s, all injectors will be switched on at once.

- **Switchover delay**- additional delay allowing more gas to be pumped in the system despite the appropriate switchover temperature and RPMs. This function works on cold engine only and it can be set to 0s.

**PRESURE-** The basic system setting parameters.

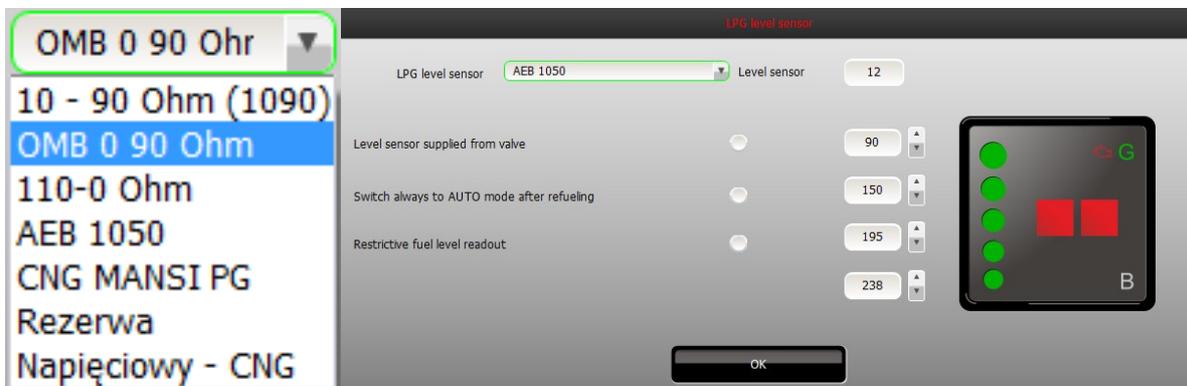
- **Working pressure-** measured after the viper phase filter and calculated automatically during auto-calibration.

- **Minimal pressure-** under which the system will switch over to petrol. Calculated automatically during the auto-calibration process and it is 60% of the working pressure.

**THE PRESURE SENSOR-** factory set to ABS 4 Bar which is included in our kit.

**TEMPERATURE SENSOR-** factory set to **10 kOhm** which is included in our kit. If you use sensors other than those included in our kits, it is very important to check and choose the correct value of the sensors. Different sensor values will impact the system changeover (in the case of a reducer temp. sensor) as well as system corrections measured from the gas temperature (in the case of the gas temp. sensor). There is a possibility to choose from 4 most popular sensors with the resistance from 2,2 kOhm to 10 kOhm.

**THE GAS LEVEL SENSOR-** factory set to 0-90 Ohm but it can be chosen from few types. The level sensors available in the list of sensors, are calibrated with the Tomasetto multivalve. In the case of an incorrect fuel level readout, you have an option to manually modify any gas level sensor. This option is available after editing the **READING** window.



There are two types of gas level sensors, mechanical and electronic. The easiest way to recognize them is by the housing, or the amount of wires in the sensors wire-set. Two wires and the needle tell us that it is a mechanical sensor. The LED indicator and three connecting wires – electronic sensor. The electronic sensor requires a power supply. The controller's wire-set contains three level sensor connecting cables regardless of what kind of level sensor is being used, mechanical or electronic. Only the necessary wires should be used and the rest should be insulated. The power supply to the electronic sensor can be taken from the multivalve. Then we choose **Powered from the valve**.

**SWITCHOVER TO PETROL-** the set of parameters necessary with insufficient injectors or reducers.

- **maximum RPM threshold-** it is the threshold above which the system will be switched to petrol. The switchover to gas threshold must be set at the lower value.

- **maximum load threshold-** it is the gas injector opening time limit, protecting the injector from damages and driving in open loop. The system will switch over to petrol above the chosen value. The safe value should be 40 ms.

- **minimum RPM** - under which the system will switch over to petrol. This function should be used in case of problem with low RPMs when the gas injectors are too slow with nonlinear output during the shortest opening times (minimum value 500 RPM)

- **minimum gas temperature** - this function protects gas injectors from working with liquid phase gas. The switchover to petrol will occur under the set gas temperature value (minimum value 0 degrees C)

**THE LUBRIFICATION-** the revolutionary solution of adding the lubrication to the engine through the petrol injectors. Using our products, the value should be set to 5% which means that the system will permanently add petrol with lubricant when driving on gas. This amount is sufficient to protect the valves and the valve seats in the engines in which such protection is needed. (Ford, Kia, Mazda, Suzuki itd.)

## 2.3 ADVANCED

The functions for more advanced installers, being able to diagnose the system insufficient and with these functions being able to apply the necessary corrections resulting in properly functioning system. Here you have more functions, useful with insufficiently working reducers, injectors as well as few additional settings and corrections.

**THE INJECTOR SETTINGS-** the factory set parameters assigned automatically with the choice of gas injector type in the BASIC section.

- **the injector warm up** – factory preset function allowing the gas injectors to be warmed up while the vehicle is still working on petrol. The initial gas injector start-up is done by opening it by short impulses so the gas dosage does not disturb the engine working on petrol and after the set time, allow the smooth changeover to gas. The warm-up parameters of each injector are chosen automatically upon your choice of injector type. Mostly as the half of the

additional time after the temperature switchover threshold is reached when the fuel changeover will take place.

- **minimum LPG time** – this function allows you to use slow gas injectors for the short petrol injection times. Regardless of the petrol injection times, there is an option to open gas injectors with the full impulse. This function allows to control the gas injectors with very short timing by which they can not physically open. After the minimum linear opening value of the chosen type of gas injector is entered, the gas injector, regardless of the opening time of the petrol injector, will get the set impulse.

- **gas to petrol injection - offset** – permanent timing delay of the beginning of gas injection to the beginning of the petrol injection.

- **cut-off option** – this function allows you to eliminate the reducer and gas injector insufficiency during cut-off. During the cut-off the gas injectors are closed and the valves on the reducer are open. This raises the pressure in the fuel supply system. Every gas injector has allowed maximum pressure by which it can still open. Higher pressure in the system, may cause difficulty in the gas injector opening which can cause the engine to turn off. In that critical moment, there is a possibility to switch the system to petrol, let the pressure out of the system and, within the normal working pressure, switch back to gas. In this function, you should enter the pressure threshold to switch over to petrol, the pressure output time and the subsequent cylinder switchover times when switching back to gas.

**PETROL INJECTION SYSTEM** – another useful option used sporadically but necessary for the correct system functioning.

- **12 V injector switch** – this option is necessary to change the polarization of petrol injection signal if, in given car, you have an unconventional signal polarization. Conventionally, petrol injectors are switch by „ground“. Exceptionally, there is an inverted signal polarization. How do you know if the polarization is inverted? While on idle in petrol mode, there are stable and very long injection times (over 100ms and they decreases in higher RPMs). After this option is switched on, the „normal“ injection times should appear.

- **ignoring injection times shorter as** – this option allows you to set the injection time which will be ignored while controlling gas injectors (cutting). This is useful in some Mazda and Rover engines as well as engines with incomplete cut-off.

- **controlling the continuous petrol injection** – this option allows you to control the petrol injector signal at the continuous opening (continuously open petrol injectors above certain RPM level). For example, at 5000 RPM, the petrol injection times above 20ms cause the continuous petrol flow. The standard behavior of the MA V-4 controller is to cut the gas injection (the lack of impulses on petrol injectors). When using this option, the controller, at the continuous injection, also switched to the same mode allowing the continuous engine performance. This option is helpful mostly with „tuned“ cars, although it does appear in

factory models (e.g. Peugeot 407 2.2 L after 2007 R, Peugeot 206 1.1L from 2000) By default, this option is off and for 99% of vehicles it is not necessary. How do you recognize the continuous petrol injection? If the vehicle has long injection times (e.g. Over 25ms) then you check if they shorten during acceleration to about 4500 RPM. If the injection times are not shorter at 5000 RPMs, then you have continuous injection. Then, the injection times disappear from the MA V-4 gauges (no impulse signal, petrol injectors are switched on continuously until the engine is out of acceleration).

- **fast RPM signal fault detection** – This option is useful in case of power supply connection +12V after the ignition key, where there is still a power supply after the ignition key is switched off which sometime causes the gas dosage to be let out from the injection rail when the engine is being turned off. This way of connection can cause a difficult start up right after the vehicle was turned off. When this function is on, the controller is automatically turned off when the RPMs are lower than 400 which prevents the gas dosage when the engine is being switched off.

- **temperature based corrections** – the set of algorithms responsible for constant gas injector opening corrections based on the temperature on injected gas. Algorithm was design to keep the fuel mixture as close to the desired amount as possible in all the save temperature range.

- **reference** – reference temperature, base

- **nachylenie** – 0,3 correction algorithm. Every level of the temperature change from the 0 degrees the 0,3% correction is applied so when the gas temperature changes by 20 degrees – the injector opening time correction will be 6%.

- **the low temp. correction threshold** – minimum temperature from which the corrections will be applied.

- **the high temp. correction threshold**- maximum temperature from which the corrections will be applied.

## ADDITIONAL CONTROLLING ALGORITHMS

- **Faster LPG switching** – if the reducer, after the engine has been shot off, is still maintaining the necessary temperature to automatically switch to LPG, at the next engine start up, the system will start on gas without further delay.

- **LPG Valve turn on before switch over** – this function is useful in low temperatures insuring the tightness of the reducer. The gas valve is turned on at the time when reducer has reached the appropriate automatic switchover temperature and not 5 seconds after the engine has been turned on as it is in normal conditions.

- **minimum injection time on switchover** – this option is helpful when the slower gas injectors are applied, especially when there are short petrol injection times on idle and the switchover threshold is set accordingly. In this case, you can additionally set the fuel switchover based on the minimal injection time of the petrol injector which is being set. Therefore, the three conditions must be met for the switchover to take place. ( the automatic switchover temperature, the RPMs for the automatic switchover and minimal petrol injection time).

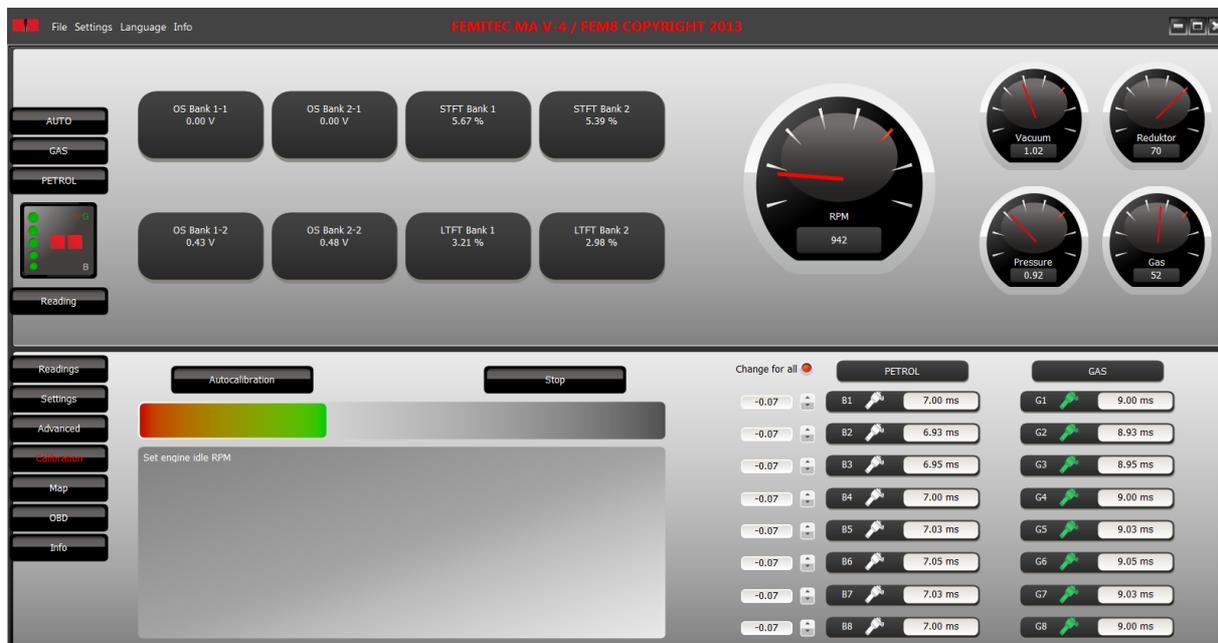
- **Switch to LPG enrichment** – this option gives you the possibility to enrich the gas dosage by percentage based on the set injection time during the initial petrol to gas switchover, with slight reducer heater insufficiency.

- **minimum power supply voltage** – the factory set nominal parameter for minimum voltage needed to power the gas system. The decrease of voltage below the nominal value will cause the gas installation to switchover to petrol.

- **delay in pressure readout** – this option causes the pressure corrections to be turned off during the petrol to gas switchover. During that time, the system uses the working pressure set at reference, ignoring the real pressure during the switchover.

### 3. CALIBRATION – REGULATION

Auto-calibration will initially adjust the installation to the engine it is being used on, with the elements installed on the vehicle. During the process you will be guided by the instructions displayed on the screen.



After the choice of: RPM signal, the switchover parameters, temperature sensors (if other than provided in the kit), gas level sensor, type of gas injector, you can start the auto-calibration by pressing AUTOCALIBRATION and leaving the car in neutral.

The system will start switching between petrol and gas to calculate the main correction. This is the first calibration configuration setting the opening time difference between the petrol and gas injectors as the permanent timing for the whole injector working range. This parameter should be between 0,5 – 1,5 where the lower value indicates the over-efficient injector and the higher value indicates under-efficient injector for the given engine. Optimal parameter should be 0,8~1,2. Also, during auto-calibration, the working and minimal pressure are calculated.

The table below table will hep you to choose the right nozzle size for the engine capacity for the injection rails in our kits.

#### **FEMITEC GIAC 01, RAIL IG5**

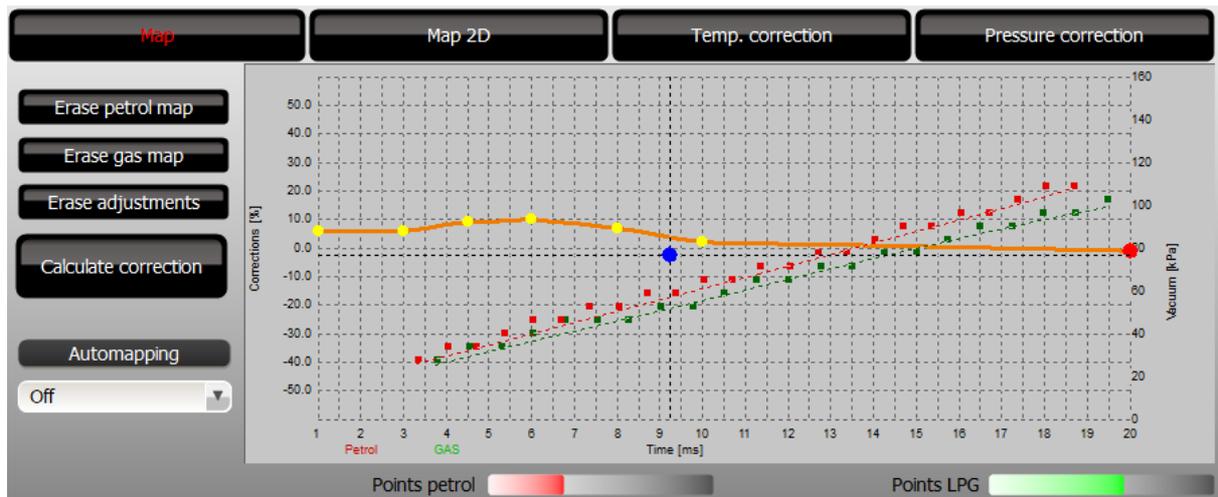
| kW per CYLINDER | NOZZLE SIZE     |
|-----------------|-----------------|
| 12 kW – 17 kW   | 1,8 mm – 2 mm   |
| 18 kW – 24 kW   | 2,1 mm – 2,3 mm |
| 25 kW – 32 kW   | 2,4 mm – 2,6 mm |
| 33 kW – 40 kW   | 2,7 mm – 2,9 mm |
| 41 kW – 48 kW   | 3,0 mm          |

#### **BARRACUDA**

| kW per CYLINDER | NOZZLE SIZE     |
|-----------------|-----------------|
| 12 kW- 17 kW    | 1,8 mm – 2,1 mm |
| 18 kW – 24 kW   | 2,2 mm – 2,5 mm |
| 25 kW – 32 kW   | 2,6 mm – 2,8 mm |
| 33 kW- 35 kW    | 3 mm            |

For the 4 cyl engine, the auto-calibration takes several seconds and when completed successfully, the further instructions will appear in the window.

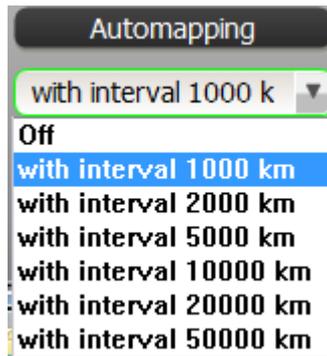
The next step is to collect maps at various engine load. This type of calibration, known as mapping, should be done during the normal driving on the road or on the engine test stand (rolling-road).



To do that, press ERESE PETROL MAP and ERESE GAS MAP in the MAPS window and start driving your vehicle on petrol. The system will automatically start collecting (drawing) the petrol map which is signaled by the red progress bar. When it reaches the maximum level, the petrol map collection can be considered finished and the system can be switched over to gas. Keep driving and now collect the petrol injection time points, while driving on gas. The point collection progress this time is indicated by the green progress bar. When the system recognizes the both maps as efficient, it will automatically suggest and save the correction map as the orange line. If the orange correction line is smooth and without sharp drops or increases, it should be taken as correct. The map can be manually edited and corrected at any time after it's been saved. To edit and/or correct the map, press the left or right arrow on your keyboard to change the position of the yellow point (the activated point will be highlighted in red), press ENTER to confirm and by pressing the arrows up or down, change the position of the correction map at the given point (up - will enrich the fuel mixture, down - will make it leaner) Acceptable range of corrections for any given point is +/- 50%.

The correction bigger than 20-25% for each range is not recommended. In this case it is recommended to use bigger injector nozzles and in case of the maximum nozzle size, increasing the pressure of the reducer.

The system has the auto-adaptation function by every set kilometer range. With this option, the system, while driving on gas, will turn on the mapping by itself, and if needed, will apply appropriate corrections based on previously saved petrol map. The procedure will be repeated automatically after every kilometer range, set in the **AUTOMAPPING** window.



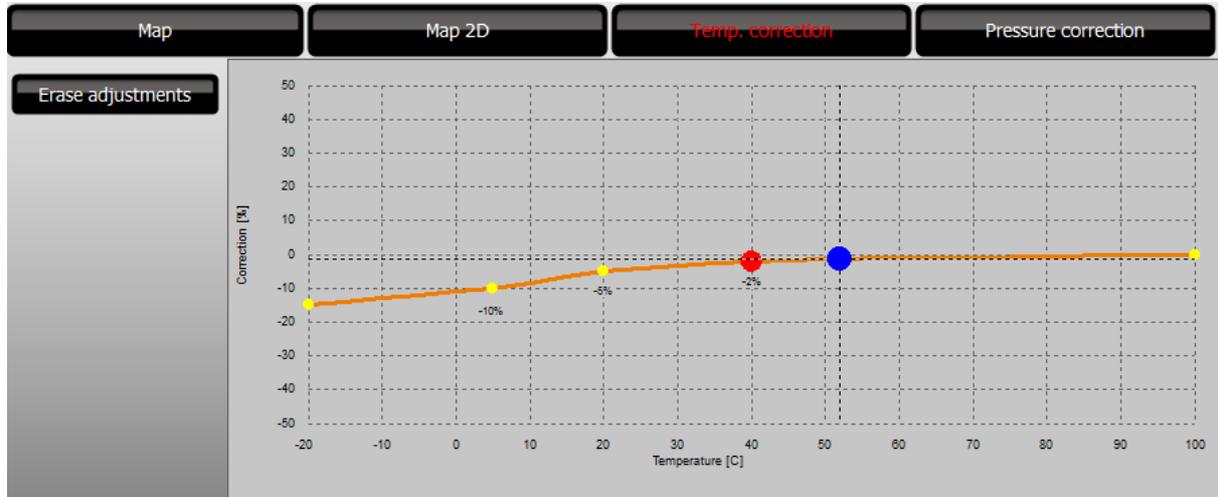
In the 2D MAP window, the system will allow you to perform mapping by using the OBD settings from the petrol ECU. When the MA V-4 controller is connected to the diagnostic connector in the vehicle (see the connection diagram), you have an option to use the OBD settings and set up the very precise map for each point keeping the same correction as on petrol. When the CHANGE ADJACENT option is on, the system will smooth out the settings from the adjacent cells to prevent the possible drops in the set values consequent from the OBD map collection. This type of mapping does not require driving on both fuels but only on gas.

| Map   |  | Map 2D |     |      |      |      | Temp. correction |      |      |      |      | Pressure correction |      |      |      |      |      |
|---|--|--------|-----|------|------|------|------------------|------|------|------|------|---------------------|------|------|------|------|------|
|   |  | ms     | 500 | 1000 | 1500 | 2000 | 2500             | 3000 | 3500 | 4000 | 4500 | 5000                | 5500 | 6000 | 6500 | 7000 | 7500 |
| <input type="checkbox"/> Erase adjustments          |  | 2.0    | 0   | 16   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
| <input type="checkbox"/> Change nearest             |  | 3.0    | 0   | 16   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 4.0    | 0   | 16   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 5.0    | 0   | 15   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 6.0    | 0   | 14   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 7.0    | 0   | 13   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 8.0    | 0   | 11   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 9.0    | 0   | 10   | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 10.0   | 0   | 7    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
| <input checked="" type="radio"/> Map from OBD       |  | 11.0   | 0   | 5    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 12.0   | 0   | 5    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 13.0   | 0   | 5    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
| <input type="button" value="Start"/>                |  | 14.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
| <input type="button" value="Stop"/>                 |  | 15.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 16.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 17.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 18.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
| <input type="button" value="Calculate correction"/> |  | 19.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |
|   |  | 20.0   | 0   | 0    | 0    | 0    | 0                | 0    | 0    | 0    | 0    | 0                   | 0    | 0    | 0    | 0    | 0    |

The map for each point should be collected until the percentage changes for each point will become insignificant or the cells values will remain unchanged. This is signaled by highlighting the cell red or any color close to red. This type of mapping can be repeated multiple times. Each subsequent mapping with this option on, does not erase the previous map but it applies slight corrections.

Such map is also used by more advanced installers to manually modify corrections. You can mark the chosen cell by pressing SHIFT and pressing the arrows on your keyboard or by a mouse with pressed and held left side. The values for the marked cell, can be entered by pressing CTRL and the up/down arrows. There is also a possibility to change the dividers for the injector opening times as well as RPMs. Double-click and highlight the divider point blue, then enter the desired value by the keyboard.

For more demanding and advanced users, we also added the possibility to set the map for the gas temperature and pressure as additional settings, regardless of the automatic corrections saved in the controllers' algorithms. The choice of the points and entering the corrections is done as with correction map. Use the arrows and the ENTER button.



#### 4. OBD FUNCTIONS

The controller MA V-4 with OBD has an advanced interface allowing the OBD connection of CAN BUS (CAN protocols) as well as analog OBD transmission (ISO, KWP protocols). Because of that, the readout and constant automatic corrections of fuel mixture are possible through the modification of the original OBD settings without the vehicle users interference. This function makes the system virtually maintenance free and only mechanical parts of your installation and filters are need to be periodically checked.

##### ***The wire connection to the OBD socket***

In the wire-set of the MA-V4 you will find the four wires designed to connect the controller to the vehicles OBD. Optionally, we can supply the przeciwzłącze for the vehicles diagnostic socket.

##### ***CAN protocols :***

white - pin 6 CAN H

yellow - pin 14 CAN L

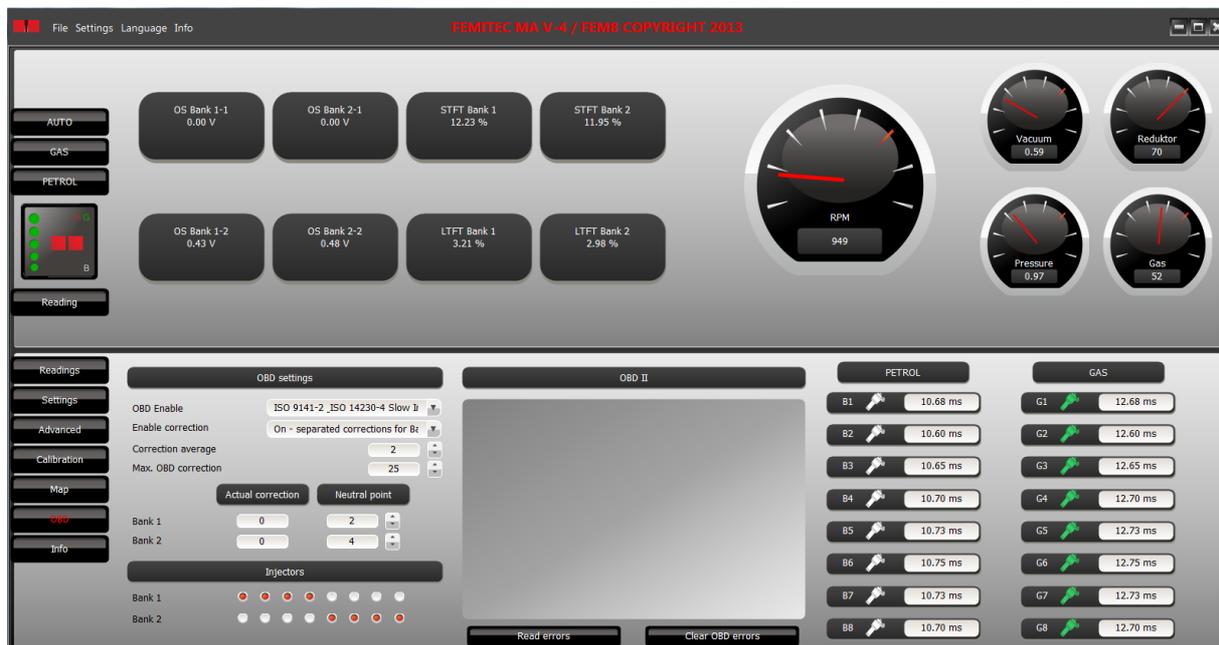
## ISO/KWP protocols

blue - pin 7 K-line

green - pin 15 L-line

The data transition type and the protocol type can be checked by the diagnostic scanner. The scanner will quickly show the protocol in the vehicle and what wires should be connected.

If you do not have a diagnostic scanner, you can check it by the pin layout in the vehicles' diagnostic connector. If the connector has only 6th and 14th pin (the 7th and 15th are missing) then it is CAN transmission. If, aside from 6th and 14th pin there are either 7th or 15th or both of them, then this is ISO/KWP protocol.



The controllers OBD system should be activated in the OBD window by pressing OBD ON. The controller will start communication with the vehicles petrol OBD by showing the protocol mode, the type and the speed of the transmission as well as long term and short term corrections, the lambda settings before and after the catalyst depending on the amount of banks of the transmission data of the petrol ECU.

The external equipment and original diagnostic scanners, always have the priority for communication if they are connected at the same time. In this case, the MA-V4 controller proceeds in a passive OBD readout mode and the OBD data will not be displayed in the application. When the MA-V4 controller will establish communication as first and some errors in communication with other diagnostic devices occur, you should pull out the main fuse from the gas installation and try to connect again.

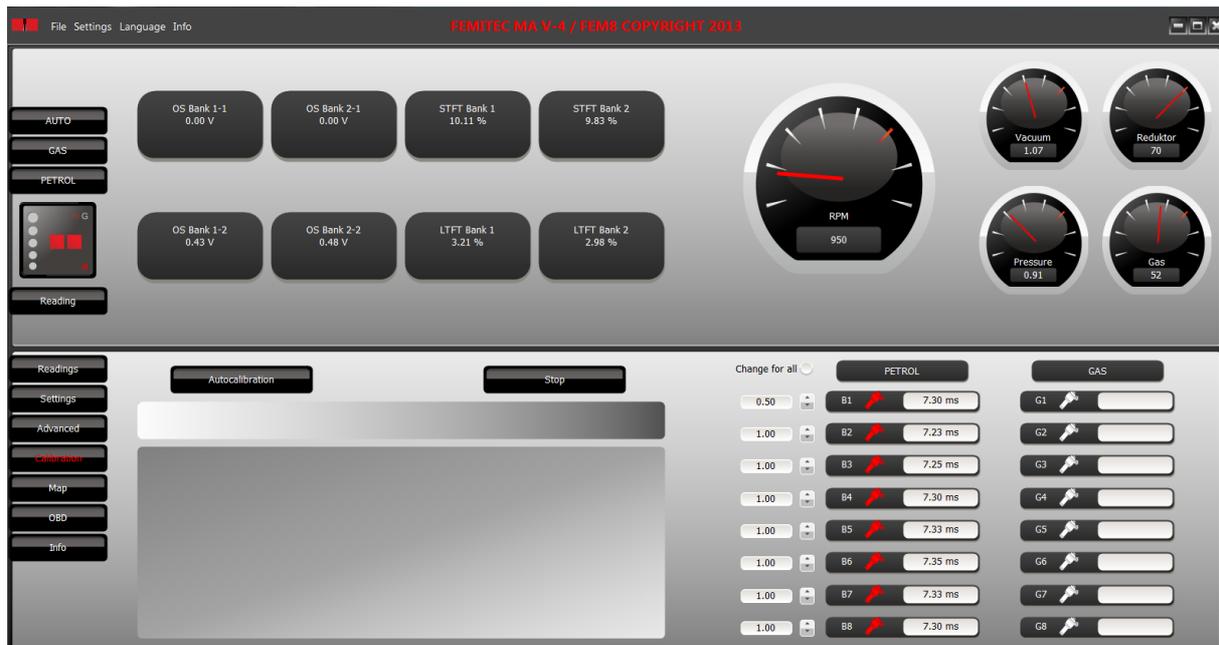
- **average corrections** – the parameter defining the interval of the OBD settings readout.
- **maximum corrections** – acceptable correction scope for the given vehicle type.
- **neutral point** – the original base point of the OBD corrections. In most vehicles the long term corrections remain around 0%

When the MA-V4 controller connects with the vehicles' OBD and all available data is displayed correctly, you can turn on the automatic OBD correction option. This function will make constant corrections of the gas controller to the original vehicle ECU parameters, without the owners' interference.

The controller when driving on gas, monitors the difference in the settings between the original petrol ECU settings and GAS ECU (the actual OBD correction). All detected differences at the particular moment are sent to the petrol ECU so the appropriate correction can be applied immediately while driving on gas.

The settings correction for the engines with the multiple banks is done separately regardless of the banks. In this case it is necessary to establish which gas cylinder belongs to what bank. Then it is necessary to establish which gas cylinders correspond to which engine data bank.

To do this, in the CALIBRATION window, you should press on ONE CORRECTION FOR ALL CYLINDERS option and sequentially lower corrections for each cylinder while observing the short term correction changes. Changes in the short term corrections with the + value signalizes the given cylinder belongs to the given engine bank.



After checking all the injectors you should mark which gas injector belongs to particular engine bank.

Soon, there will be an upgraded software version which will make the cylinder-to-bank assignment automatically during autocalibration.

The MA-V4 controller has also the possibility to diagnose the petrol ECU. From this application, it is possible to read the petrol OBD errors as well as erasing them if it's necessary. This can be done by pressing READ OBD ERRORS, ERASE OBD ERRORS.

Outlined above options make our controller unique and unrivaled on the market regarding the level of sophistication and functionality. Soon we will introduce the ECU in OLED technology making the availability of some options from the owners point, without connection of the application or interface.

## 5. INFORMATIONS ABOUT THE CONTROLLER

| Field                      | Value       |
|----------------------------|-------------|
| Device version             | v 3.0.5     |
| Serial No                  | XZ0001      |
| Date of production         | 21/06/2012  |
| Last modified by           | CDCD-CDCD   |
| Current user ID            | 405D-274F   |
| Work on petrol [hh:mm:sec] | 0 h: 00 min |
| Work on LPG [hh:mm:sec]    | 0 h: 00 min |
| Inspection                 | Off         |
| km to inspection           |             |

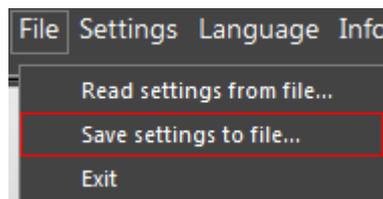
In this window you will find the information about the controller version and firmware, serial number, date of production, the number of compatible injectors, gas and petrol working time statistics, the number of modifications as well as the ID of the person modifying and the first connection.

This window plays role of the diagnostic interface as well. All possible errors regarding the system are to be displayed here. It gives you the easy and quick possibility to detect and erase the flaws.

The error codes are listed at the end.

## 6. SAVING DATA IN FOLDER/ UPLOADING THE SETTINGS

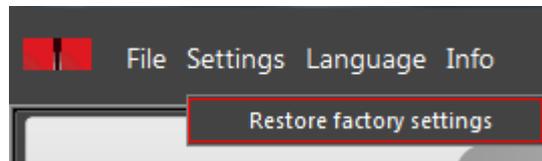
All the data and settings can be saved in to files and re-used on the same vehicle models without the necessity of calibration and mapping. Just save the folder with your settings by clicking in the left upper corner **FILE / SAVE SETTING TO FILE** , name your folder and click **SAVE**.



During the initial file savings, the folder in disc C: is created automatically, for your further data. Uploading the data to the controller is done by locating and opening the saved file, choosing the saves data needed for the particular vehicle.

## 6.1 FACTORY SETTINGS

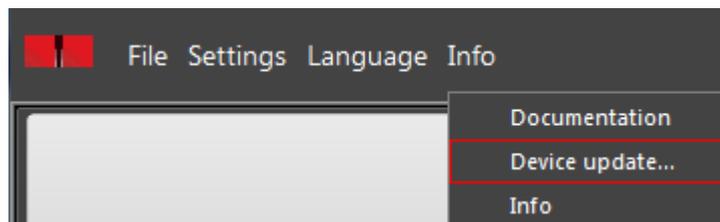
In case your controller, for an unknown reason, is blocked or it is impossible to save data, you will always have the option to restart the controller and return to the factory settings.



This option is available at the **SETTINGS** window in **Restore factory settings/**

## 6.2 UPDATING THE CONTROLLER

The new version of the controllers software includes the FIRMWARE folder. You always have the possibility to update your controller while it is connected and the vehicle is running on idle. The updating process takes few seconds. The system will ask you if you want to update it to the newer version or downgrade it to the older version.



This option is available at **INFO** window in **Device update/**

