

Index	page.	1
1. Introduction	page.	2
2. Software installation	page.	2
3. Program Startup	page.	3
4. Main page	page.	3
5. Switching	page.	4
6. Sensors	page.	7
6.1. <i>Sensors page</i>	page.	8
6.1.1. <i>Level sensor set-up</i>	page.	9
6.2. <i>Temperature sensor management</i>	page.	10
6.3. <i>Pressure sensor management</i>	page.	10
7. Carburetion map	page.	12
7.1. <i>Compensations</i>	page.	15
7.2. <i>Acceleration</i>	page.	16
7.3. <i>Extra-injected or short injected</i>	page.	17
7.4. <i>OBD graphic button</i>	page.	17
7.5. <i>Manual modification of the map</i>	page.	18
8. Gas / Petrol	page.	19
9. Lambda	page.	22
10. OBD	page.	23
11. Monitor	page.	31
12. Auto-Tuning	page.	32
13. Diagnosis	page.	36
14. Errors	page.	45
15. Advanced	page.	47
16. Configuration	page.	48
17. Logger	page.	49
18. Software update	page.	51

1 INTRODUCTION

This operating manual has been created to comprehend the aspects, the procedures and the contents of the Power OBD system. At this purpose we suggest you to read it carefully in every part and to keep it nearby your workspace for an easy and fast consultation, if you need it during the use.

2 SOFTWARE INSTALLATION

For a correct working of the system some basic characteristics are necessary, such as:

Free space in Hard Disk: 5MB

From Windows XP Operating System on

Basic video resolution: 800x600 pixels

USB connection

To install the software in the PC you need a CD or USB key containing:

Installation software

Installation driver with a USB interface cable

As an alternative it is possible to download the software directly from the website www.autogasitalia.it , in the section about the Power OBD system.

How to install the software from the CD:

Insert the CD in the player

Open Documents and settings in your PC

Select CD player

Open Power OBD folder

Select "SETUP.EXE" file

Follow the instructions at the video till the end of the procedure.

How to install the interface cable drivers from the CD:

Don't connect the cable

Insert the CD in the player

Open Documents and settings in your PC

Open the folder "Driver"

Select the "Setup.exe" file concerning the operating system of your PC

Follow the instructions at the video till the end of the procedure.

How to install a software from a USB key:

Insert the USB key in one of the free USB doors and memorize the "name" of the device

Open Documents and settings in your PC

Select the removable disk: the "name" read before

Open Power OBD folder

Select "SETUP.EXE" file

Follow the instructions at the video till the end of the procedure
 How to install the interface cable drivers from the CD:
 Don't connect the cable
 Insert the USB key in one of the free USB doors and memorize the "name" of the device
 Open Documents and settings in your PC
 Select the removable disk: the "name" read before
 Open the folder "Driver"
 Select the "Setup.exe" file concerning the operating system of your PC
 Follow the instructions at the video till the end of the procedure.

3 PROGRAM STURTUP

Connect the interface cable between the ECU power OBD and the USB door of your PC
 Start the Power OBD program by clicking the icon on the desktop
 The window below will appear to select the language to use

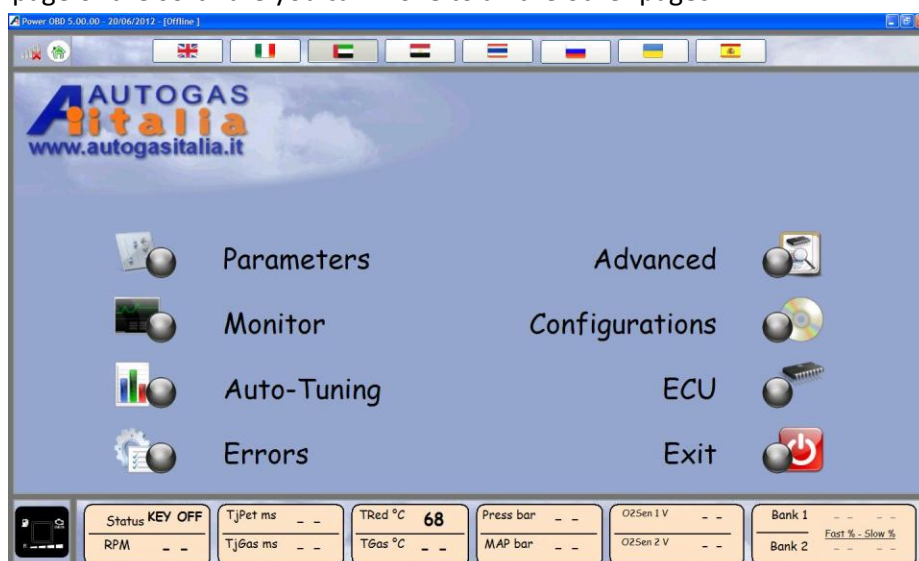


Pic. 3.1

Select the language you want to use. Now the program starts with the main page of the program while the system tries to find the communication port. If the search doesn't get to any results, go to page Advanced (section...of the manual) in order to start a new search by following the instructions of the chapter.

4 MAIN PAGE

From the main page of the software you can move to all the other pages.



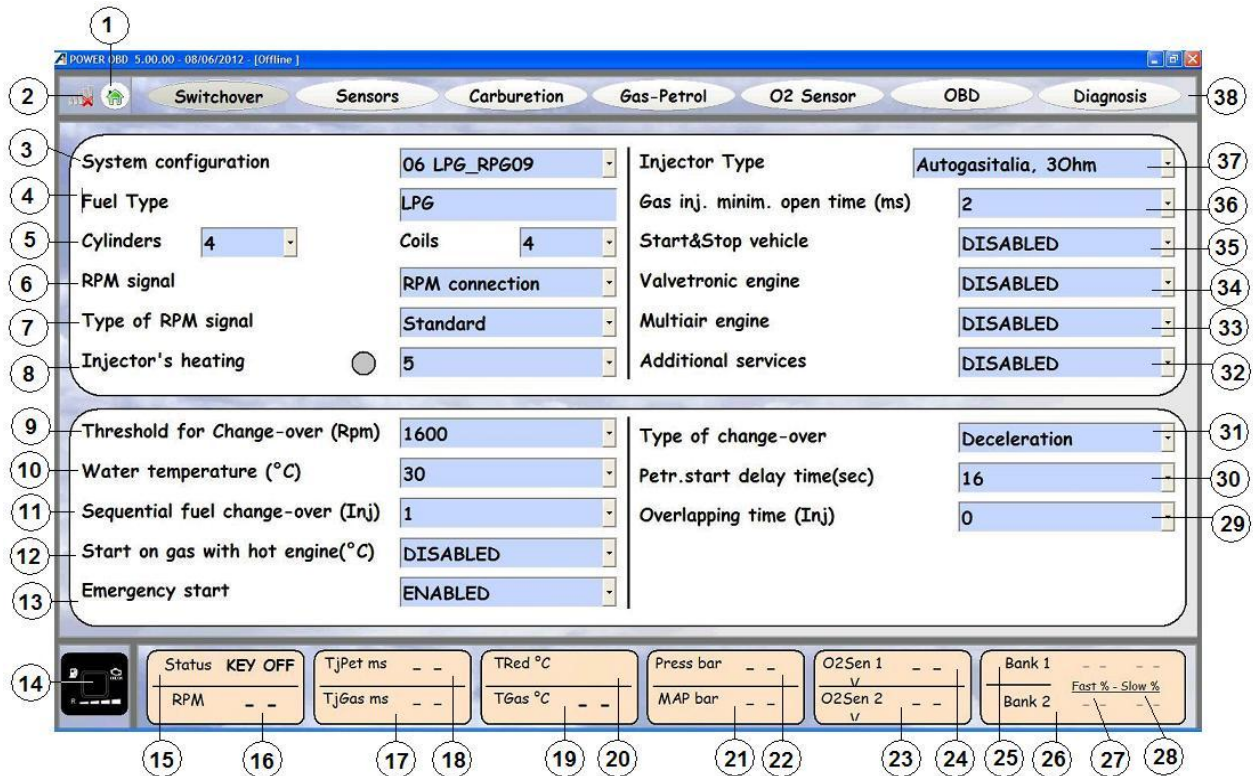
Pic.4.1

Parameters: if you put the mouse arrow on the icon beside the function you want to choose, the icon will turn to green.

Diagnosis: when the diagnosis icon is orange it means there are errors in diagnosis.

ECU: when the ECU icon is orange a software update is available.

5 SWITCHING



Pic.5.1

1. Icon of the main page (visualized in the menu bar of each page)

Button to return to the main page of the menu.

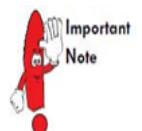
2. Connection (visualized in the menu bar of each page)

Green: connection established **Yellow:** search

X (red color): Off-line mode

3. Configuration: select the adaptor you have installed. Automatically the point n°4 is selected.

ATTENTION: by selecting the adaptor and the kind of used fuel, automatically different default values of the system are selected.



4. Kind of fuel (LPG/Methane)

Automatically by selecting point n°3.

5. Engine cylinder number

Select the number of the cylinders of the engine to convert to gas.

Ignition coil

Select the kind or number of coils. If you are not sure about the selected value, change the choices till the RPM visualized at point n°16 don't match with the RPM value visualized on the car tachometer.

6. RPM signal

From RPM wires: connect the brown RPM reading wire to the tachometer or to a negative coil signal.

X1: the RPM number is automatically calculated by the petrol injection times for sequence injection systems.

X2: the RPM number is automatically calculated by the petrol injection times for semi-consecutive or Full-group injection systems. **Default = from RPM wires**

7. RPM Signal Intensity (RPM Signal Filter)

In case the RPM signal is not stable (oscillating, disappearing or invisible RPM) select weak.

Default=normal

With an ECU mono-connector a chart in Volt values is inserted. The chart presents values from 0 to 12 V. The value of 5 Volts corresponds to the normal signal. The value of 2,5 V. corresponds to the weak signal. In case of unstable values even with 2,5 V., select lower values till the stabilization of the engine RPM.

- 8. Injector heating:** gas can contain oily substances or paraffin only. These substances, mainly in the winter season or in the cold periods, can provoke some slowing down (movement) of the gas injectors during the first working periods after the start with a cold engine, just after the switching. So it is possible to select a temperature (°C) below which the system activates shortly and alternatively the gas injectors, during the petrol startup, by heating and moving their inner mechanism. In this way any possible locks or slowing down are avoided. A setting of very low values can vanish the function.

Default = 20°C

9. RPM to change

Number of RPM over which the system switches from petrol to gas. **Default = 1600**

10. Adaptor water temperature for the switch from petrol to gas

Water temperature circulating inside the pressure adaptor below which the system doesn't switch from petrol to gas. **Default = 30 ° C methane and 40 ° C LPG**

11. Sequential fuel change-over of gas injectors

It's a particular strategy for the switch from petrol to gas. The gas injectors are activated in sequence one by one. The value corresponds to the petrol injection cycles necessary to activate the next gas injector. Values from 0 to 4. **Default=1**

12. Start on gas with hot engine

If the function is disabled, the switch begins when it gets to the temperature arranged in point 10. If with the hot engine you want to start directly on gas, set a value between 60 and 90°C. **Default = Disabled**

13. Emergency start

Enabled: the car can start on gas as in emergency. How to start in emergency: key OFF/push the switch button/put key ON by keeping pushed the switching button/with the switching led turned on in fixed light, start the engine/release the switching button when the engine starts. **Default = enabled**

14. Virtual switch

It is the same of the car switch and it has the same indication and commutation functions, if pushed.

15. Key

It indicates the key status. Key OFF = disabled ignition key contact. Key ON = enabled ignition key contact.

16. RPM (revolution engine number per minute)

It indicates the RPM engine number. It must correspond to the value read on the car tachometer. If it differs, modify the parameters of point 5 if the RPM reading wire is connected, or the settings X1 and X2 of point 6 if the RPM reading wire is not connected.

17. Gas injection time (second thousandths)

It indicates the opening time of the gas injector.

18. Fuel injection time (second thousandths)

It indicates the opening time of the fuel injector.

19. Gas temperature (centigrade)

Gas temperature (OPTIONAL). The value -62 indicates that the sensor connector is not connected.

20. Adaptor water temperature

Water temperature circulating inside the pressure adaptor.

21. Map (Manifold Absolute Pressure) Measuring in bar.

Pressure inside the intake manifold. Pressure arrives to MAP sensor with a rubber tube connecting to the intake manifold.

22. Gas pressure

Gas pressure in the channel between the adaptor and the injector. It is a differential pressure because it keeps normally at a "X" value that is higher than the pressure inside the intake manifold. The pressure reading is used for the automatic petrol return when the gas finishes and for various

adaptive maps. The pressure gets to the sensor through a rubber tube connected between the sensor and the rail gas injectors.

23. Lambda n°2

It shows the reading of the lambda sensor n°2 for engines with two banks. If it is not connected no reading is possible. If you don't connect it, you don't have working problems in the gas plant. The reading of the lambda sensor is also possible automatically through the connection to an OBD socket (with appropriate connected electric wires).

24. Lambda n°1

It shows the reading of lambda n°1 (before the cat). If it is not connected no reading is possible. If you don't connect it, you don't have working problems in the gas plant. The reading of the lambda sensor is also possible automatically through the connection to an OBD socket (with appropriate connected electric wires).

25. Bank 1

In engines with only one lambda sensor (in front) on all cylinders, the system automatically memorizes the number of banks if connected to the OBD diagnosis socket.

26. Bank 2

In engines with two lambda sensors only (in front).

27. Fast carburetion corrector OBD

Reading of the **fast corrector** of the OBD car original system, both for bank 1 and for bank 2 if existent.

28. Slow carburetion corrector OBD

Reading of the **slow corrector** of the OBD car original system, both for bank 1 and for bank 2 if existent.

29. Overlapping fuels

Alternative possibility (or in combination) to point 11 in order to obtain a sweet switching from petrol to gas. It indicates the cycles to inject during which the two fuels are overlapped (petrol and gas) in the switching. It's useful in case long tubes connecting the gas injectors to the nozzles on the intake manifold. **Default =0**

30. Petrol-gas switching delay time

Got to the arranged value at point 10, before the switching to gas, the system waits for a time (in seconds) corresponding to the arranged value. **Default = 5 seconds**

31. Switching direction

Select the type of the change-over. Acceleration / Deceleration **Default = deceleration**

32. Additional services

Activate, if the connection is possible, some outer electronic devices such as a timing advance processor or a relay to stop the petrol pump. The electronic wire to connect to manage these services during the gas functioning is the blue/black.

33. Multiair

Select in case of Multiair engine. **Default = disabled**

34. Valvetronic

Select in case of Valvetronic engine. **Default = disabled**

35. Start & Stop

Select in case of Start & Stop engines. In this case check that the 12 V. under key wire is connected in a point where the 12 V. are always present also in the Start & Stop period. **Default = disabled**

36. Gas injectors minimum opening time

It's a physical characteristic of the gas injector. It corresponds to the necessary time to move its inner parts. The value is automatically modified by the software on the strength of the selected injector. We suggest you to modify it only in case of necessity and if you know the gas injector very well.

37. Injectors type

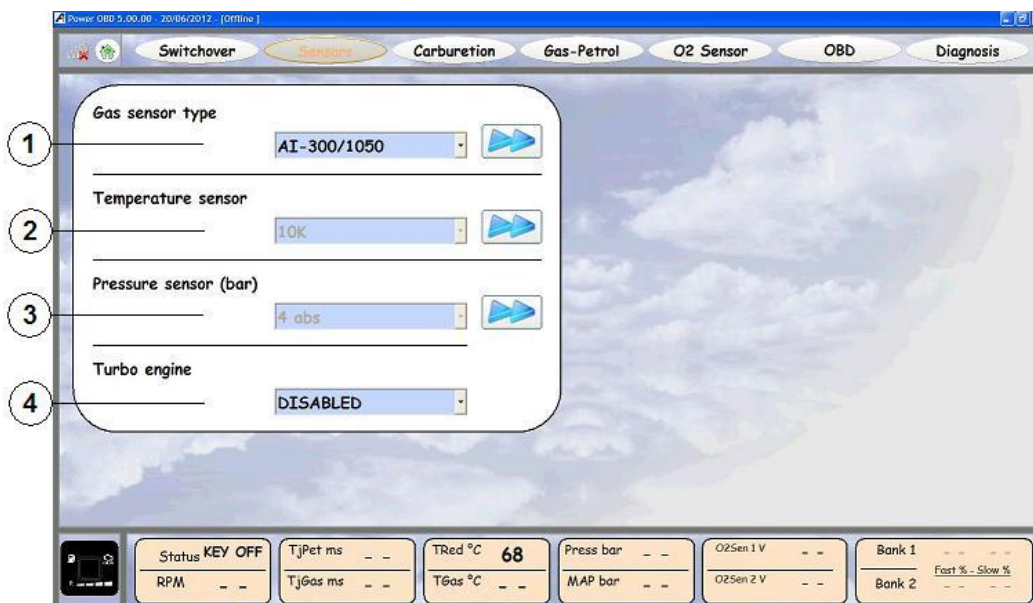
By clicking the arrow on the right, it appears a drop-down menu with a list of the available injector drivers in the software. If you select the injector models, the software automatically installs the most appropriate drivers.

38. Menu bar

By selecting the functions you can move inside the OBD Power menu.

6 SENSORS

6.1 Sensor main page



Pic. 6.1

1. Gas sensor type

Select the sensor type to read the gas level contained in the tank. In case of LPG the sensor is placed on the multivalve tank. In case of a methane system, the sensor (pressure gauge) is normally placed in the car engine compartment and connected with a high pressure tube to methane cylinder. **Default = AI 300**

2. Temperature sensor

The sensor in the kit is from 10 K ohm. The setting is not changeable.

3. Pressure sensor

Differential pressure sensor.

4. Turbo engine

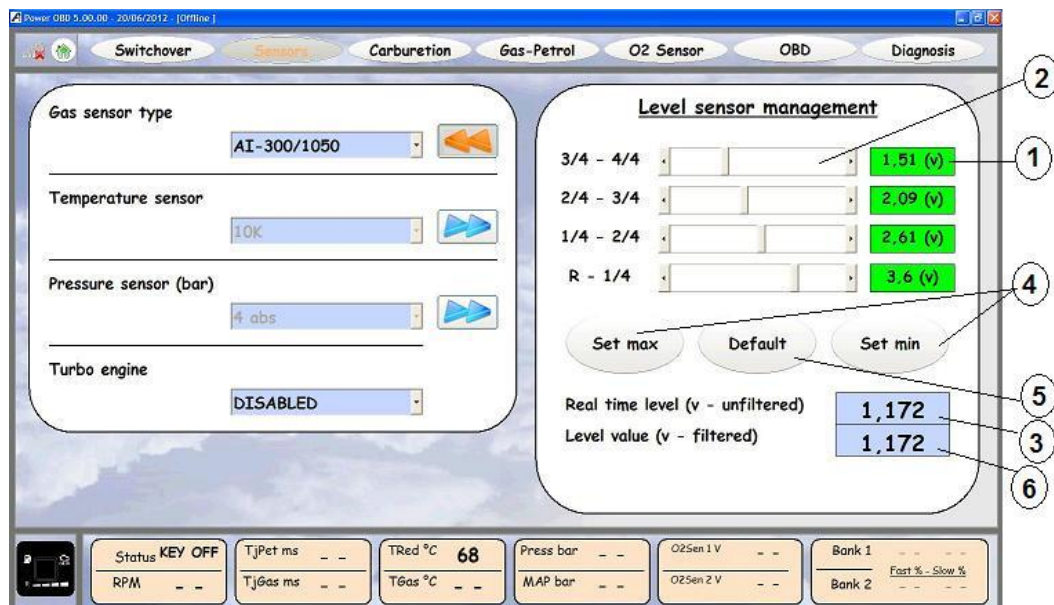
Select only in case of turbo engine cars.

By clicking with the mouse on the arrow  , it changes of color and direction  and on the right side of the monitor the window “modify parameters” appears, matched with the sensor type.

By clicking  again the window disappears and returns  .

6.1.1 Level sensor management

It is possible to modify the default values arranged for the level sensor by clicking 



Pic. 6.2

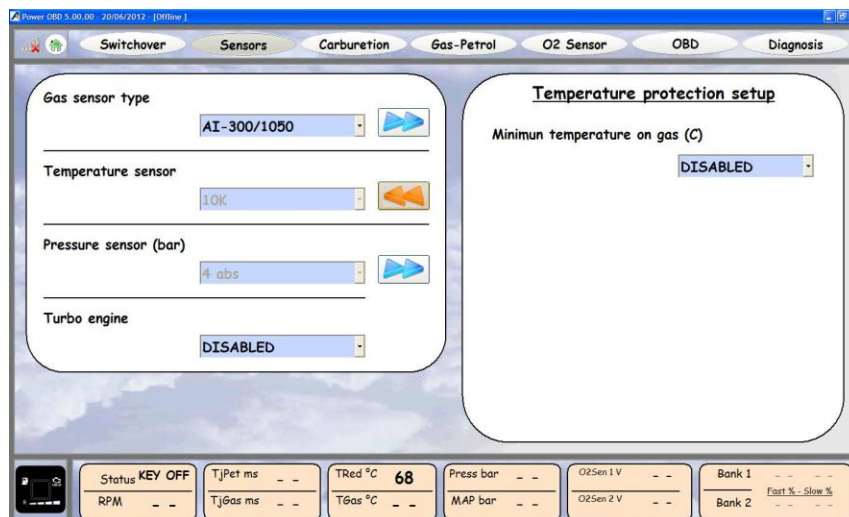
1. In the four boxes there are the values (volt) to turn on and off the led on the switch through the signal from the level indicator that is placed on the LPG tank or manometer, if it is methane. They correspond to tank portions as indicated on their left ($\frac{3}{4}$ $\frac{4}{4}$ – $\frac{2}{4}$ $\frac{4}{4}$ etcetera). When the boxes are green the respective led on the switch are on. In grey color the led on the switch are off. The working range is in Volt and differs if the tank is full or empty considering the sensor type selected at point 1 of chapter 6.1.
2. The cursor modifies (manually) the values at point 1. It modifies the settings and optimizes the led on the switch. If you move the cursor on the left the values decrease, on the right they increase. If

the values between the steps are too distant, the shift from a led to another one on the switch will be very slow (many km of stay on the same led), so not correspondent to the real gas consumption. We suggest to modify if necessary with little shifts compared to the values set in the production.

3. Value (Volt) transmitted in real time from the level indicator. To take it into consideration if you decide to modify the values of boxes 1 by cursor 2.
4. The two buttons, if selected, modify the values (boxes point 1) automatically. Procedure to follow to modify: with an almost empty tank, select with the mouse **"Set min"**. Fill the tank with gas and push **"Set max"**. The software automatically creates the division of the various sections.
5. Restore the values selected in the production.
6. It's the same reading (Volt) of point 3 but with a slower acquisition speed. This function is important in LPG systems because the fuel in the tank is liquid. The liquid mass, depending on the type of drive (climb-slope-braking-curves-accelerations) moves and creates possible sudden movements of the multivalve float. This shift is read by the level sensor (installed on the multivalve) generating a signal in Volt. In order to avoid a continuous turn on/off of the led on the switch, the value acquisition is delayed (value average).

6.2 Temperature sensor management

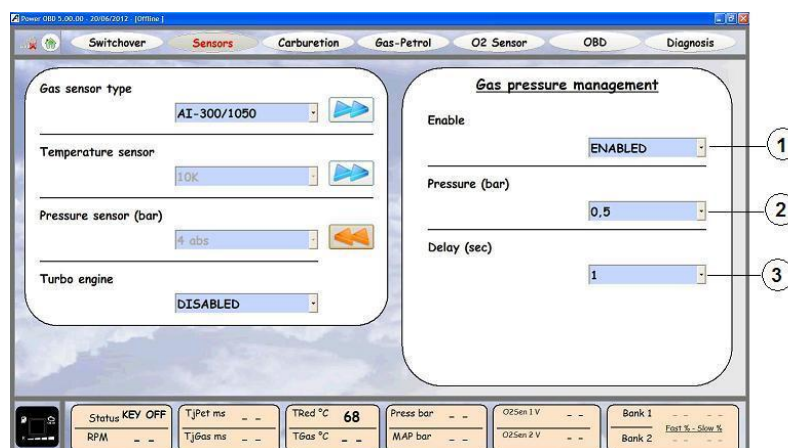
The temperature sensors are both of 10 K Ohm (both the water and the optional gas) and are proposed automatically. By selecting the arrow  it's possible to set a minimum temperature for the gas passage in order to obtain the back passage (automatic) for the petrol in case the gas temperatures are too low. In this case a gas temperature sensor must be installed and connected. To exit push  .



Pic. 6.3

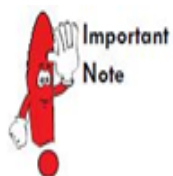
6.3 Pressure sensor management

It's possible to modify the pressure sensor settings. Select  and this window opens: **Gas pressure management**



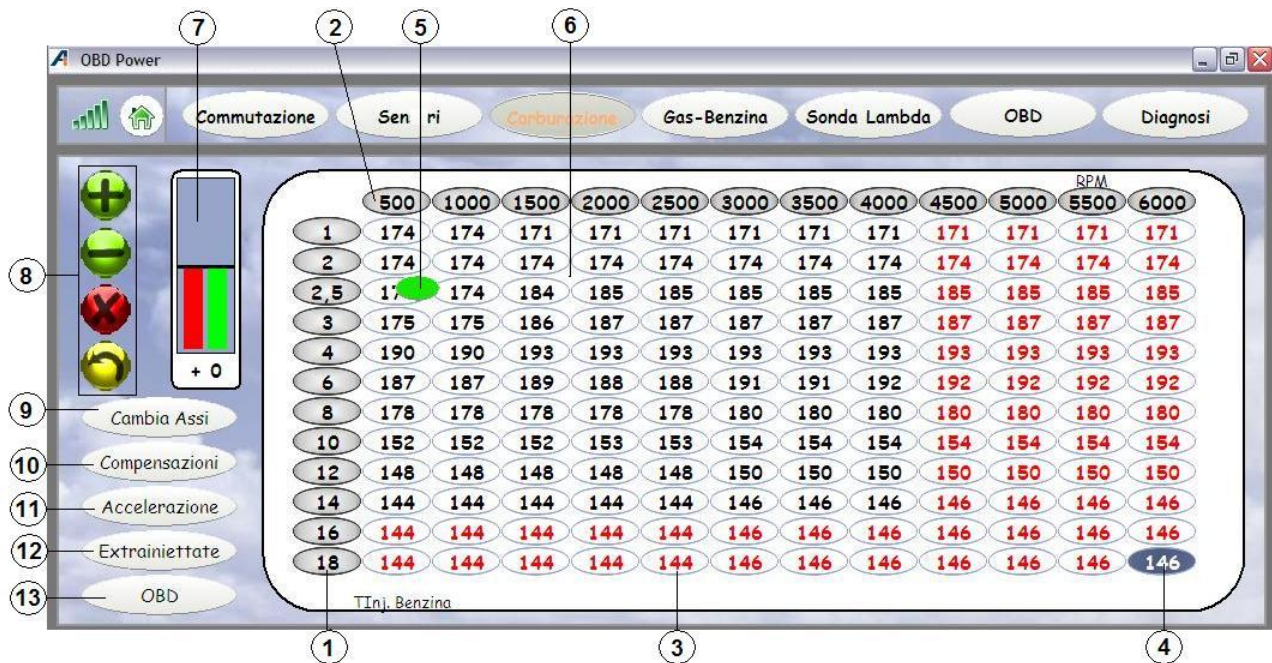
Pic. 6.4

1. It enables or disables the function of gas end (automatic petrol return). With the arrow on the right edge of the window, select **Enabled** (automatic petrol back passage when the gas ends) or **Disabled** (the petrol switching, once the gas has ended, must be done manually through the driver's switch).
2. If at point 1 you select Enabled, when the system working pressure decreases too much, the ECU Power OBD switches automatically to petrol (with a switch acoustic notice to inform the driver about the fuel change). To stop the sound the driver must push manually the button on the switch. When the pressure value is lower than the arranged one (2) the petrol switching in automatic. This value is different for LPG or methane systems, as the working pressure of the systems is different. The referential value is automatically set when you select the type of adaptor at point 3 (fig. 5.1) of chapter 5 Switching.
3. Time of permanence below the pressure value point 2 before the automatic switching from gas to petrol. With automatic enabled back passage, (1) when the gas pressure contained in the tubes (between the reducer and the injector rails) is under 0,5 bar (2), for a period longer than a second (3), the system switches automatically from gas to petrol because the working pressure is too low for a correct carburetion. In case of methane reducer, the back passage value (automatically set) is 1,2 bar.



Important Note It may occur that the petrol automatic return may appear with a gas tank not empty too. In this case you must understand the reasons: a low pressure of provided gas, (especially during the winter time, if we run with LPG) / a clogged reservoir filter of the reducer valve / clogged or blocked high pressure tubes / a reducer with a low gas capacity compared to a high-potency engine / a blocked low pressure gas filter (in tube between the reducer and the injector rails).

7 CARBURETION MAP



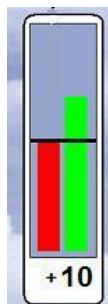
Pic. 7.1

The carburetion map is a fundamental part of the system. It can be created automatically (auto calibration) or manually.

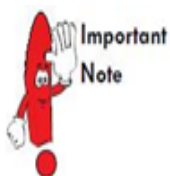
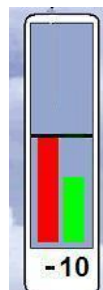
1. The column reports the opening time of the petrol injectors (petrol injection times in thousandths of seconds ms.).
2. The engine revs. (RPM) are indicated in the single boxes of the line.
3. The values in the boxes are coefficients used by the ECU gas to establish the correct opening of the gas injectors (correction element).
4. It is possible to modify completely or partially the map. You can work it out with buttons of point 8 of this chapter, or do the modifications by selecting with the mouse a box or a group of boxes that will turn to blue. **At the end of chapter 5 you can find the detailed instructions about the modifications linked to this point**
5. The cursor 5 moves on the map depending on the RPM number and on the injection times. It indicates the point on the map corresponding to the position where the engine is running. Not all the cars have similar petrol injectors and similar engine managements, so there are cars with a maximum fuel injector opening, for example of 20 ms., and others that can have very low maximum opening times.
6. In order to help the operator to distinguish the complete engine working area, we color in red the map numbers (6) that the engine uses when it runs at top speed. By pushing completely the throttle pedal we usually get the maximum and the best injector opening and at the same time the RPM increase. So a red colored section is created and it indicates (see picture above) what was the maximum opening of our injectors (from 1 to 12 ms.) and the maximum of the revs. engine (RPM) we obtained. Considering the picture situation it doesn't make sense to modify the column part (1) from 14 to 18 ms., because the engine doesn't arrive to this part of the map. In this case the maximum injector opening appears at 12 ms. (related to the petrol injector opening). **To correctly**

operate in manual mode, it's important to remind that the referential injection time for the corrections is always the injection petrol time , both in the petrol engines and in the gas engines.

7. The red column indicates the petrol injection opening. The green column indicates the gas injection opening. The black line is the reference when there is the switching to petrol. Example : 1. Petrol idle engine (with no ventilators and variable loads) 2. A red line is created 3. Now we can switch to gas and after 20/30 seconds we can evaluate how the green column works. 4. If our carburetion goes up beyond the black line (at the top of the red column) it means it is not enough (the petrol ECU tries to correct the poor carburetion by increasing the injector opening times – emulated by gas ECU) 5. The result is highlighted also by the numeric value at the base of the two columns (for example 10) 6. In this case, to enrich the carburetion we have to increase the correction coefficients as reported in the boxes 3 of the surrounding area of about 10 points and evaluate again the success of the variation.



Instead, if after the car switching from petrol to gas (always at the minimum) the green column is placed at a lower level than the black line, the carburetion (gas) will be rich, so: 1. Decrease the part of the map interested by the negative numeric value as reported under the picture, as explained previously for the poor carburetion.



It's important the comparison operation is done in a RPM fixed point with equal times both for gas and for petrol. The example above wants to indicate the simplest point to test (minimum) with RPM and constant engine load. As well as the minimum, another example can be at 2500/3000 constant RPM. If you want to make the same comparison on the road, it's fundamental to find a straight road with few slopes to be sure that the two readings are done in similar conditions. A little climb or slope of the road can alter the injection times and by consequence the modification.

8. These buttons are quick commands to correct the map values reported in the boxes 3.



The mark "+" increases the reported value of one unit ($130 + 1 = 131$) in the three selected boxes every time you push it (with the mouse arrow). During the modification operation at the center of the map page the word "**UPDATE**" appears.



The mark “-” decreases the reported value of one unit ($130 - 1 = 129$) in the three selected boxes every time you push it (with the mouse arrow). During the modification operation at the center of the map page the word “UPDATE” appears.



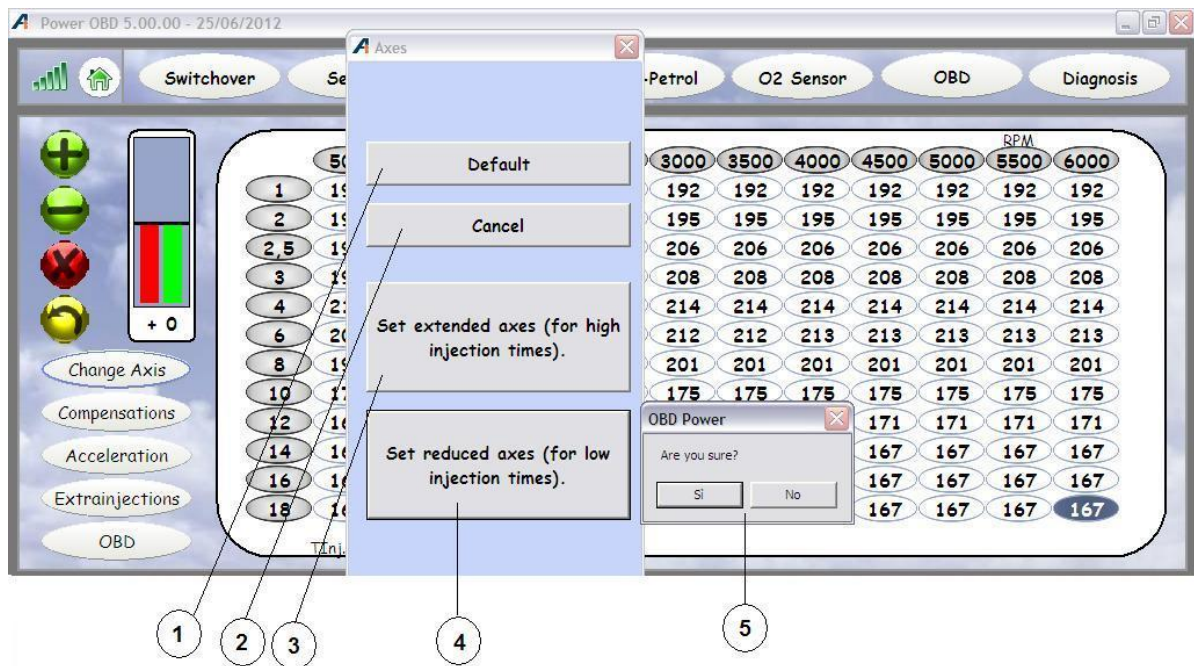
If you push this button with the mouse arrow the value of selected boxes 3 will return to the previous one. (example: $130 + 1 = 131$ push the button = 130).



Every time you push this button with the mouse arrow, the coefficients of selected boxes 3 reset to 128 (considered 0 on the map).

9 Change axis

This function allows to reduce the injection time scale (reference to an injected petrol) or to restore it at the top level in case of reduced scale.



Pic. 7.2

1. It restores the arranged values in the production.
2. It cancels the late modification.
3. It extends the axis column ms. (thousandths of seconds) till 18 ms. (corresponding to the petrol injection times).
4. It reduces the axis column ms. (thousandths of seconds) till 12 ms. (corresponding to the petrol injection times).
5. The window informs us that we are going to modify the axis (column) of the injection times. To confirm select “YES”. “NO” maintains the arranged values.

10 Compensations: It opens the window to activate/disable the function of compensation corrections. See point 7.1

11 Acceleration: It opens the window about the correction of the gas injection times in acceleration. See point 7,2

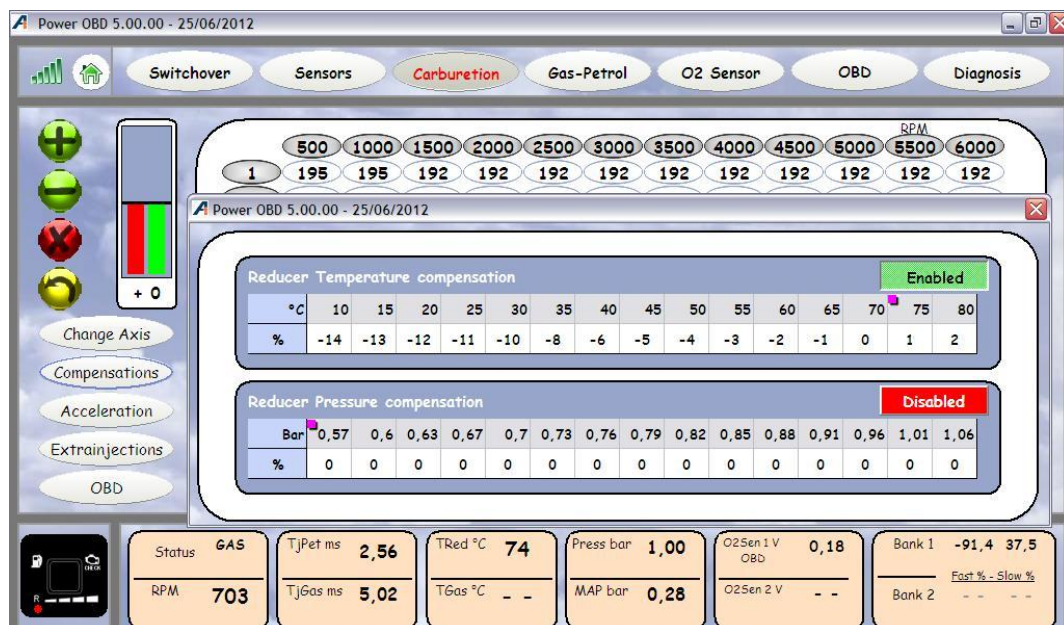
12 Extra injections: it cancels the too short injections, a possible problem (correct opening) for the gas injector. See point 7.3

13 OBD it makes the correction window OBD appear on the general map. See point 7.4

7.1 Compensations (button 10)

Reducer temperature compensation

By default the function is enabled. The line (1) °C expresses the temperature in centigrade. The line % is a percentage value that increases or decreases the correction (petrol injection times + map correction + % temperature = gas injection time) reported in the map boxes. To disable the reducer temperature compensation, click on enabled. It appears “disabled”. Now the reducer temperature compensation correction is not enabled. **The values in the boxes are not alterable.**



Pic. 7.3

Pressure gas compensation

The chart is automatically suggested in version “disabled”, so no correction depending on the reducer working pressure is active. When you select the type of reducer in the switching page, automatically a chart is created, linked to that type of selected reducer. The line “bar” indicates the reference pressure, the line % the value in correction percentage (petrol injection time + map correction + temperature compensation + pressure compensation = gas injection time). By clicking on button “disabled” the state shifts to “enabled”. Now the pressure compensation is active. **The values in the boxes are not alterable.**

7.2 – ACCELERATION (button 11)

Carburetion control in acceleration

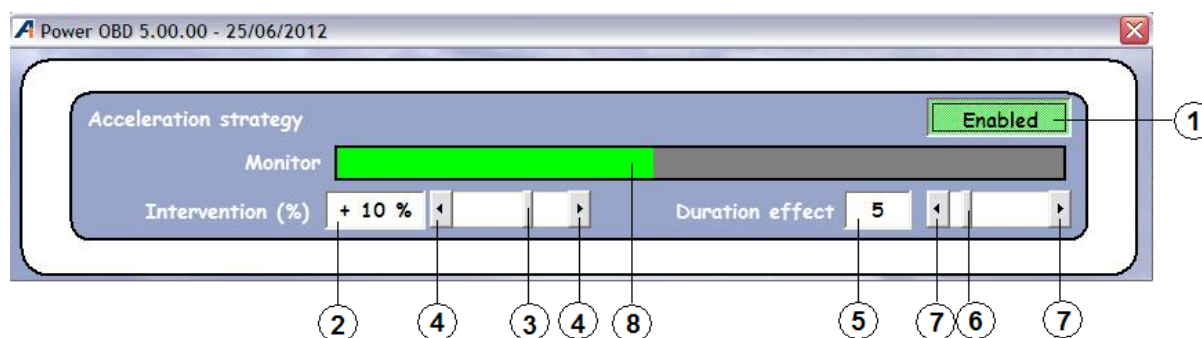
By default this function is not active (1).



Pic. 7.4

It is useful to increase or decrease the gas quantity, sent to the engine, in acceleration. Normally in the LPG systems it enriches the mixture in the acceleration. In the methane systems it is useful to reduce the quantity of injected methane in acceleration for the particular characteristics of the fuel. With negative correction values (2) we will have a weight loss of the carburetion in the acceleration phases while with positive values we will have an enrichment. The percentage of enrichment/weight loss visualized (2) is calculated by the ECU automatically depending on the different gas injection times and on the different RPM during which the acceleration phase starts.

Effect duration (5): it indicates the duration of the effect (enrichment/weight loss) at the end of the acceleration. The more values are distant from 1, the fastest will be the return to the normal management after the acceleration phase. With values higher or equal to 1, after the acceleration is finished, the return to the normal management will be slow. By default the function is not active.



Pic. 7.5

Enabled function:

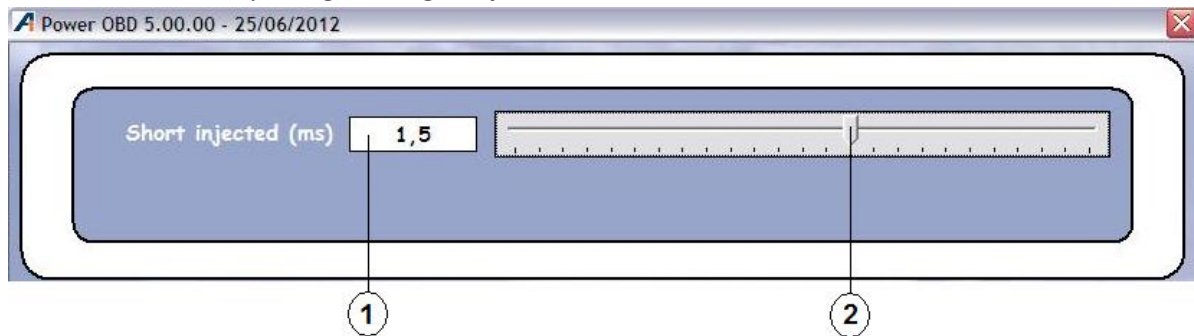
Button (1) "enabled". The modification coefficient (2) can be negative or positive sign. If positive it's an **"enrichment in acceleration"**, if negative it's a **"weight loss in acceleration"**. By moving the cursor (3) we increase or decrease the value (2). By moving the cursor on the left the values decrease. On the right values increase. The arrows (4) have the same function of the cursor (3). On the left they decrease while on the right they increase.

Effect duration: (5) the cursor (6) and the arrows (7) have the same modification modes.

The scroll bar (8) provides the graphic indication of the movement. When we aren't in acceleration the bar will be still, placed on its left side. When we are in acceleration the bar colors and goes on the right side. Once the acceleration has finished the bar returns on its left (no working position).

7.3 Extra injections or short injections (button 12)

In the modern petrol systems, different strategies are adopted to improve both the perfect working order and the engine performances. Sometimes some short petrol injections are made both for the control of the pollutant emissions and for a better car handling. These short opening times of the petrol injector are normally defined as “**extra injections**”. In the gas mode sometimes these very short times can't be elaborated from the gas carburetion control system in a fast way. So we decide (for example in case of engine irregularity during the drive) to cancel them, or better, not to consider them in our calculation that determines the exact opening of the gas injectors.



Pic. 7.6

1 Short injections

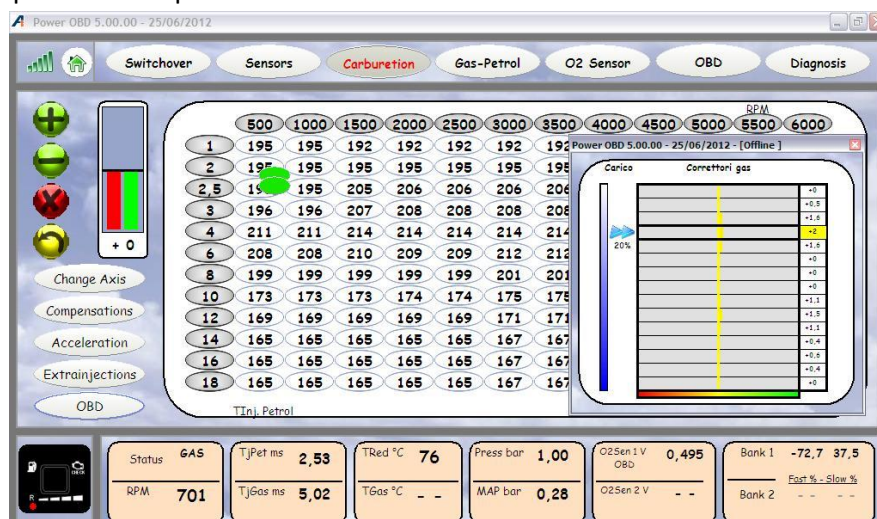
Time numerical indication (in thousandths of second). It indicates the value of the injection that is not considered. In the production it is set at 0,1 ms. (disabled function).

2 Cursor

The cursor moves with the mouse. For every notch corresponds a value of 0,1 ms. With 0,1 the gas ECU copies the petrol working strategy without eliminating any **extra injection**.

7.4 OBD graphic button

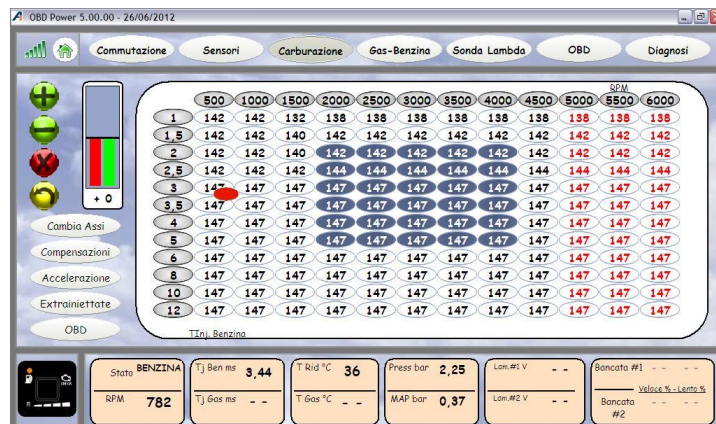
By pushing button 13 the OBD chart correction graphic appears (see the right corner at the top of the picture below). This function becomes important when you decide to modify the map with the OBD GAS correction enabled. It's possible to cross the information about how the OBD GAS system works with the map corrections to evaluate the possible corrections to make to the main page. The OBD complete information is reported in chapter 10.



Pic. 7.7

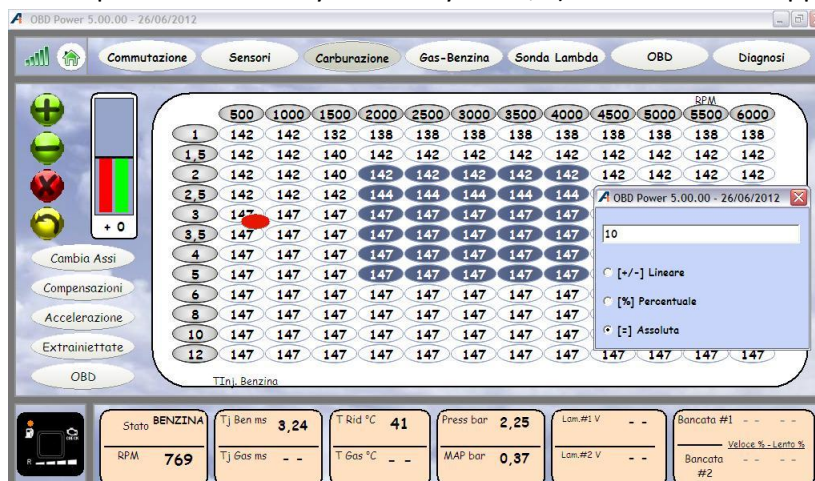
7.5 Manual modification to the carburetion map

We have already described how to modify the map or some parts of it by using buttons +/- (point 8 chapter 7). There is a second change modality: 1) Select the part of the map you want to modify with the mouse. 2) Put the mouse arrow on a box, 3) Push the left mouse button, 4) By dragging the mouse to the top, down, or sideways, we determine the area to modify fig. 7.8,



Pic.7.8

5) Once selected the area push the enter key of the keyboard, 6) The window 7.9 appears,



Pic.7.9

7) Now it is possible to decide the type of modification to do: **LINEAR** = increase to map values in a linear way (ex. $130+10=140$). It is possible to increase (+) or decrease (-) the values. **ABSOLUTE** = the inserted value is reported in every selected boxes. **PERCENTAGE** = percentage increase or decrease corresponding to the numerical value inserted (ex. $130+10\%=143$). By manually modifying the carburetion map you must remind that too big variations (both in positive and in negative) between the lines, can provoke some driving problems by shifting from an area to another one. It's important not to have any contrasting values of more than 10 points between the lines. To select one of the three variations put the mouse arrow on the circle beside the function and push the left mouse button. It appears a black sign in the circle center confirming the selection. Now push the enter key to confirm the operation. The box disappears and at the centre of the monitor for a brief instant will appear the word UPDATE (operation in progress). Now the modification is active. If you decide to return to the previous values select  that restores the map before the previous modification.

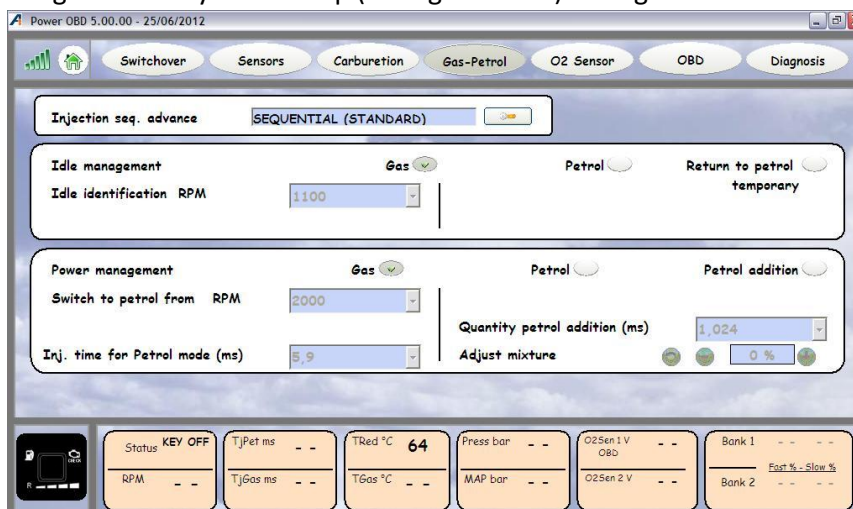
8 GAS / PETROL



The more and more sophisticated managements of petrol ECU can (under some circumstances) bring difficult compromises if you drive a gas car and not a petrol car. These problems usually begin with the idle engine cars, or in high speed or in the acceleration periods. In order to reduce these problems some petrol “help” functions have been inserted in the software for gas engine vehicles. The modifications to this page allow to match an alternate working or overlapped of gas/petrol to optimize the engine efficiency under the following conditions:

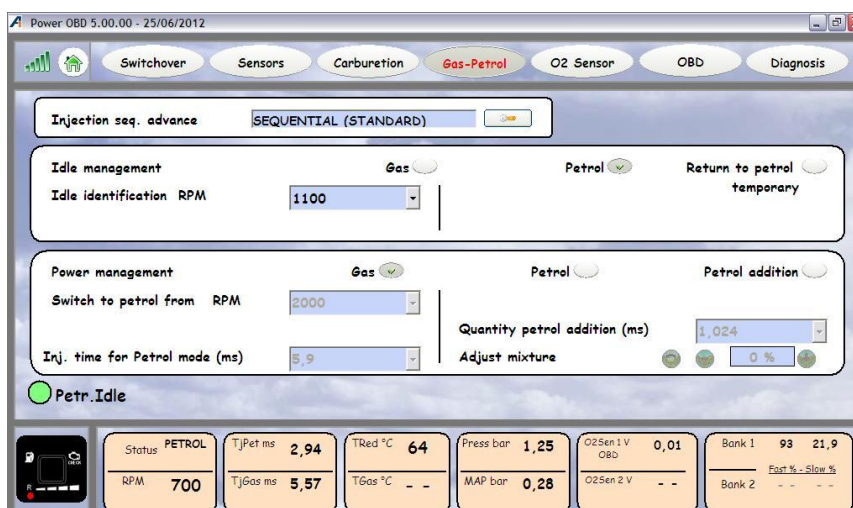
- **Power**
- **Idle running rate**

When (as in the picture 8.1) the gas functions are selected both for the idle management and for the power management, the engine is always stoked up (with gas switch) with gas.



Pic. 8.1

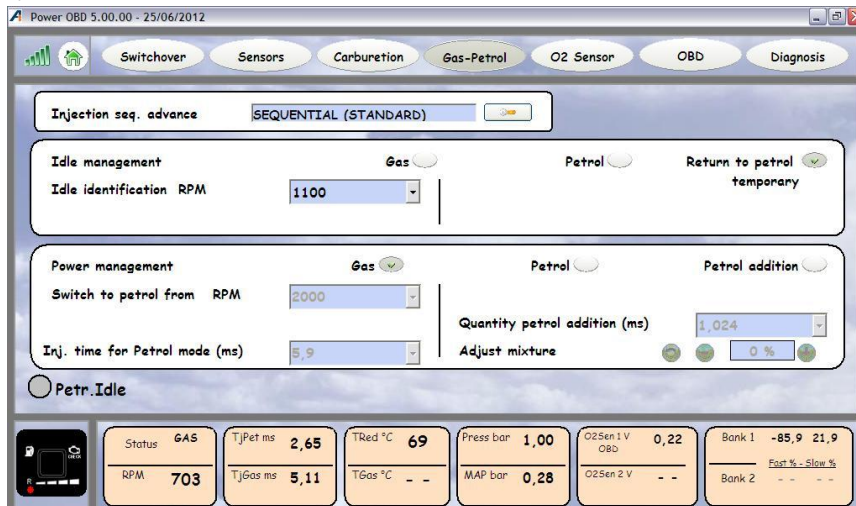
When (as in picture 8.2) in the idle management the function petrol is selected, at idle speed the engine is stoked up with petrol even with the switch placed on gas. In deceleration, when the RPM are lower than 1100 (arranged default value but adjustable) automatically the system commutes from gas to petrol and stops till the RPM won't be more than 1100. The switch remains on gas, it doesn't indicate the temporary switching to petrol.



Pic. 8.2

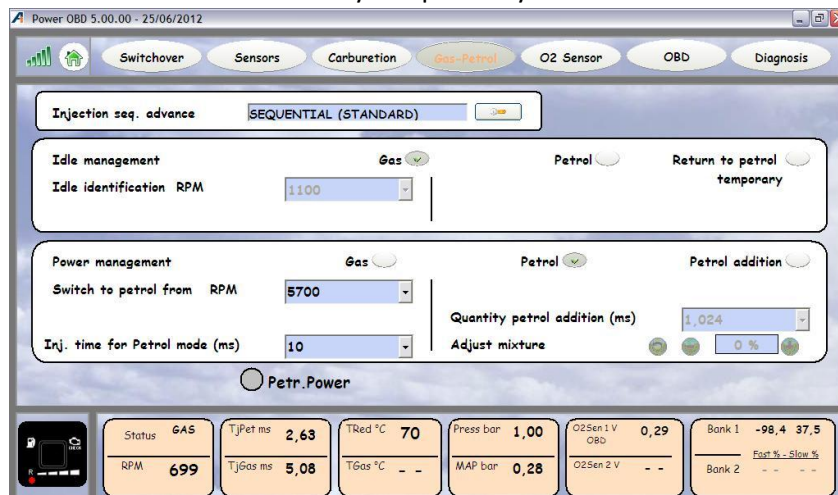
When (as picture 8.3) in the idle management it is selected the function “**temporary return to petrol**” , at idle speed the engine is stoked up with petrol even with the switch on gas, but only for a short time (the time necessary to return to idle speed and stabilize the engine). After this short period (about 4/5 seconds) the system automatically switches to gas both if the engine is at idle speed or not. In deceleration when the RPM are lower than 1100 (arranged default value but adjustable) automatically the system switches from gas to petrol and stops for a short time, then it returns automatically to gas. The switch always remains on gas, it doesn’t indicate the temporary switching to petrol. A green led (bottom part of the video) with description activates when the function is on.

The petrol idle return functions can be useful if travelling on gas the idle return is not sure (power off, jerks, RPM oscillations...).



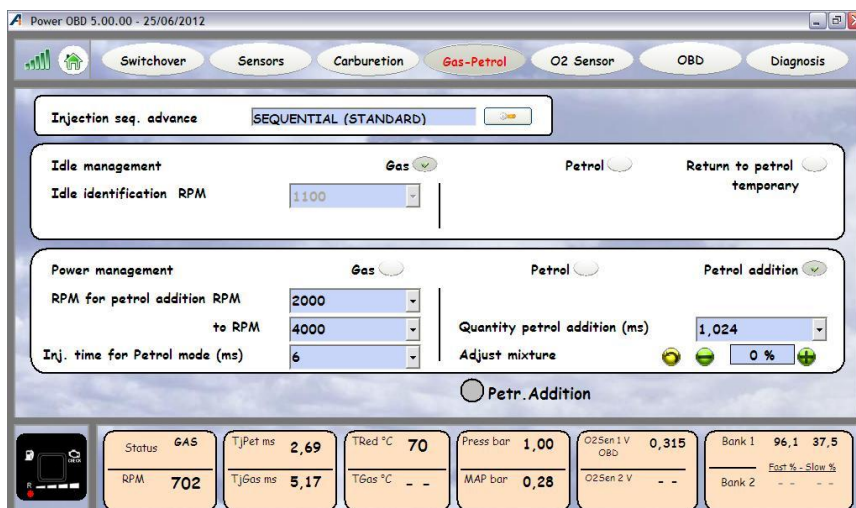
Pic. 8.3

When (as picture 8.4) in the “Power” management the function “petrol” is selected, at a high number of RPM the engine is automatically commutated to petrol with the switch placed on gas. Over the RPM value (5700 in default setting but adjustable) the system switches automatically to petrol. To switch it’s necessary (by the gas system) to satisfy the “required injection time” (by default it is 10 ms.). If both the parameters are reached, the automatic power switching from gas to petrol starts. The engine will be stoked up with petrol till the RPM number won’t come back below 300, compared to the arranged value (ex: with a default of 5700 the gas return begins at 5400). A green led with description activates when the function is on. The petrol power function can be useful if there is the necessity to obtain from the vehicle transformed to gas the same performances of the one obtained by the petrol system.



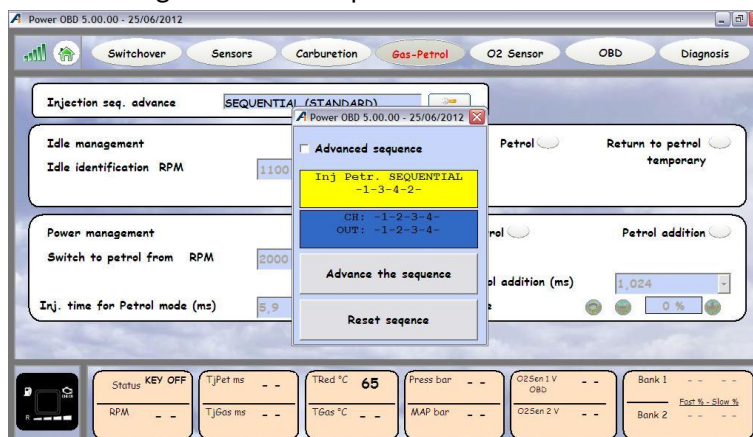
Pic. 8.4

When (as picture 8.5) in the “Power” management the function “petrol addition” is selected, it is possible at a certain RPM number to help the gas working with the addition of a small quantity of petrol (addition) always automatically and with the switch in gas position. If we consider the picture below we can describe the working as follows: after 2000 RPM, the system adds a petrol quantity to the gas injection. It adds 1024 ms of petrol by cancelling at the same time a quantity of 1024 ms of gas. By adding petrol without removing gas, the risk is to have very rich carburetion and possible jerks in the engine. The addition (help) of petrol is activated only if the injection time (about the petrol injections), as you can see below, is more than 6 ms (adjustable default). Over the 2000 RPM with petrol injection time less than 6 ms. no petrol addition is to be added. Over the 4000 RPM the petrol addition finishes and the engine returns to run with gas only. During this function the switch always remains on gas. The values of the picture below are by default. All the values are adjustable in a certain range. The carburetion function with buttons + and – can be used if during the carburetion time there is a poor carburetion (to determine this value it’s necessary to link a OBD tester and control the carburetion and the OBD values). The yellow button returns the values to 0 (default value). A green led with description activates when the function is on. The petrol power function can be useful if there is the necessity to obtain from the vehicle transformed to gas the same performances (in some sections of engine rotation) of the one obtained by the petrol system. In some cases it could be useful to reduce or diminish some possible jerks (in acceleration) caused by a bad functioning of electronic components such as: spark plugs, plug cables or ignition coils. A green led with description activates when the function is on.

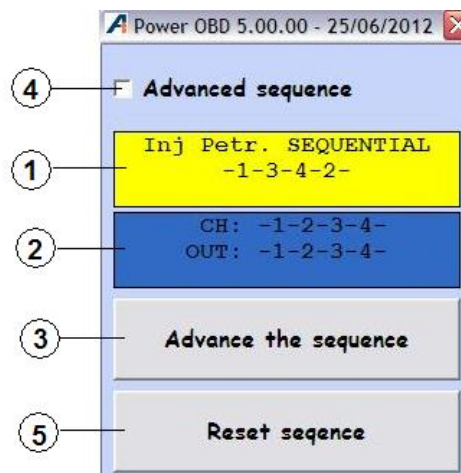


Pic.8.5

By selecting  the following window will open:



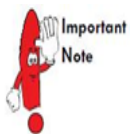
Pic. 8.6



Pic. 8.7

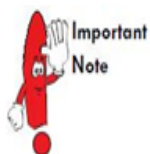
This modifies the opening phase of the gas injector compared to the corresponding petrol injector.

When to use this function: there isn't a precise occasion to suggest the use. Usually it is useful to anticipate the injection in case of idle speed unstable engines and transistors adjacent to idle speed. In some cases the function may be used to solve possible mechanic problems, such as the gas rubber length between injectors and the intake manifold, the equal shape of the manifolds, the presence of variable geometry (intake) manifold. In these cases to anticipate the gas injection helps to put in advance a gas quantity ready to the engine needs.



ATTENTION: if this function activates, the functions of the Petrol-Gas page will be disabled.

1. Automatic indication of the car petrol injection sequence.
2. Indication of the cylinder combination with gas injector. CH indicates the entry injector. It anticipates the injection sequences for the gas injectors only.
3. Button to select the anticipation. If the function "anticipate sequence" is enabled, automatically in the box 4 a sign will appear to indicate that the function is on.
4. Indication of enabled function.
5. It resets the modifications and restores the car original sequence.



ATTENTION, THE MANUAL PROCEDURE IS DELICATE TO MANAGE, IT MAY CAUSE BAD WORKINGS IF YOU ARE NOT SURE OF THE MODIFICATION. USE ONLY IF YOU ARE SURE OR UNDER SUGGESTION OF THE CUSTOMER CARE IF NECESSARY.

9 LAMBDA

The readings of the Lambda sensor values **are not essential** for the gas system working. You can connect (and read) or not the cables of our wiring to the oxygen sensor. By default the choice (1) is "disabled" and the sensors can't be selected. If you connect the oxygen sensor, it is necessary to select (1) active to read the values at the monitor. Moreover you have to select "connected". It is possible to connect two sensors in case of two banks such as engines with 6 or 8 cylinders.



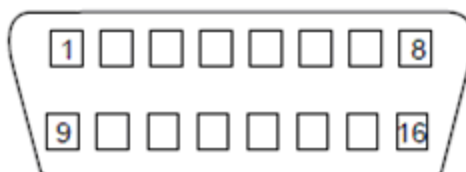
From version sw. 5.00.00 the reading of Lambda sensor is managed directly through a OBD connection (if the wires are connected to the cockpit outlet). So it's not necessary to connect the wires that are not present in the ECU gas wiring anymore.



10 OBD

The OBD term is the short form of On Board Diagnostics and it is an international standard that manages the car diagnosis system on engine vehicles. The OBD system is an on board diagnosis that identifies, through error codes in the computer memory, an element on which a bad functioning happened. In Europe the OBD system is known as EOBD (European On Board Diagnostics) and it is compulsory for every sold petrol vehicle since 2001. Now in Europe the EOBD-II standard (Enhanced On Board Diagnostics) is in force. It uses better parameters and information compared to the previous systems. In the future a new OBD-III standard will be inserted and it could also record the overtaking of the ejection levels by using remote transmission systems. The OBD interface system comprehends a female connector (where to connect a diagnosis tester) at 16 Pin (2 files from 8 pin) that usually it is placed in the cockpit, on the driving side or near the central console of the dashboard.

View of the contacts and their description



Pic. 10.1

"OBD" Protocol	PIN	Connection tester AEB
ISO 9141	Pin 7 (K-line)	Connection type 1
KWP-2000 Fast	Pin 7 (K-line)	Connection type 2
KWP-2000 Slow	Pin 7 (K-line)	Connection type 3
-	-	Conn. Type 4 not supported
-	-	Conn. Type 5 not supported
CAN standard-250 kbps	Pin 6 (CAN-H) Pin 14 (CAN-L)	Connection type 6
CAN extended-250 kbps	Pin 6 (CAN-H) Pin 14 (CAN-L)	Connection type 7
CAN standard-500 kbps	Pin 6 (CAN-H) Pin 14 (CAN-L)	Connection type 8
CAN extended-500 kbps	Pin 6 (CAN-H) Pin 14 (CAN-L)	Connection type 9

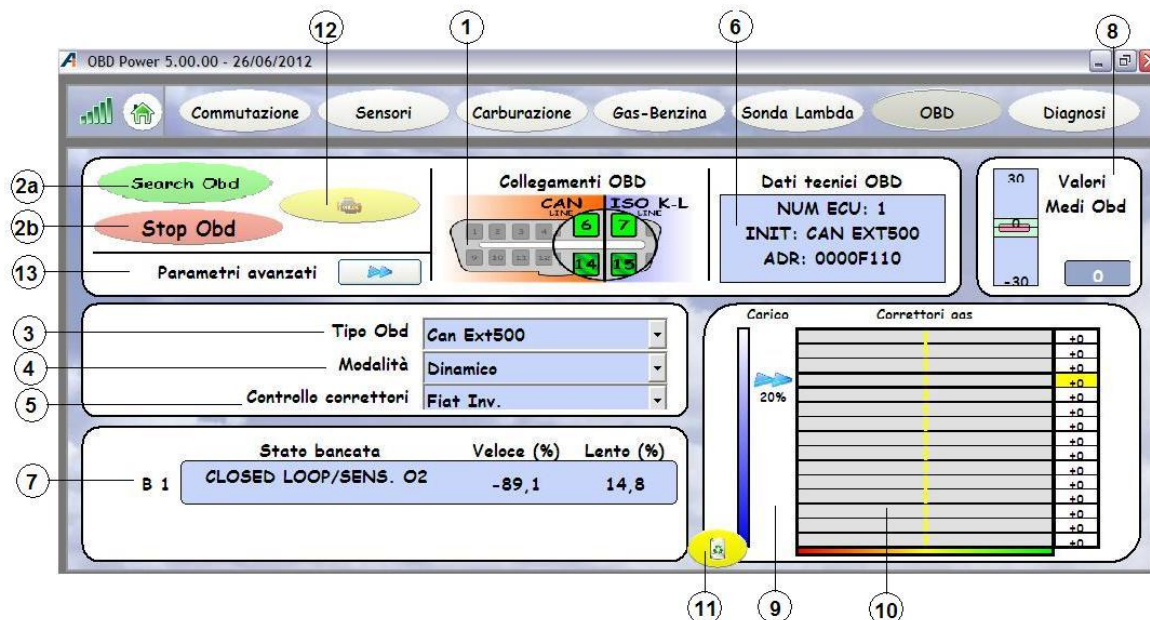
The most important parameters to visualize and consider for a good gas carburetion are:

- Fast Corrector
 - Slow Corrector
 - Front Lambda Sensor (A)
 - Back Lambda Sensor (B)
- In the normal petrol working we have the following actions:

The **Fast Corrector**: it does an immediate short-term correction that the petrol ECU applies on the map.

The coefficients rapidly change:

The **Slow Corrector**: it does an appropriate correction on the petrol map after the information analysis sent to the Fast Corrector. So the Fast Corrector immediately reacts to the carburetion modifications by obliging the Slow Corrector to change if the gap from the values arranged by the ECU projectors becomes considerable. When the Slow Corrector changes, the Fast Corrector returns to its default parameters by continuing to monitor and make the necessary rapid variations.



Pic. 10.2

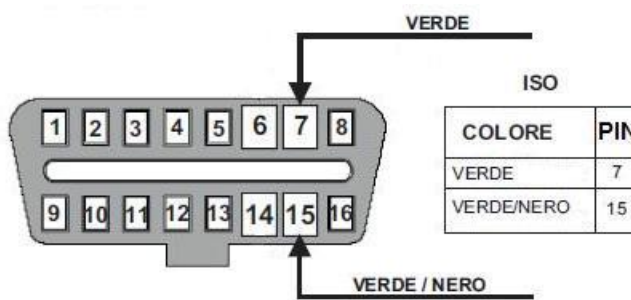
1. OBD connector picture (connections to the connector of the ECU gas wires)

It's the OBD socket picture, placed in the car cockpit usually under the wheel or near the central console of the dashboard. How to connect the gas system wires to the original OBD car socket: identify the cable (F from the picture of the electric wires pic. 10.3) from which four wires of different colors come out.



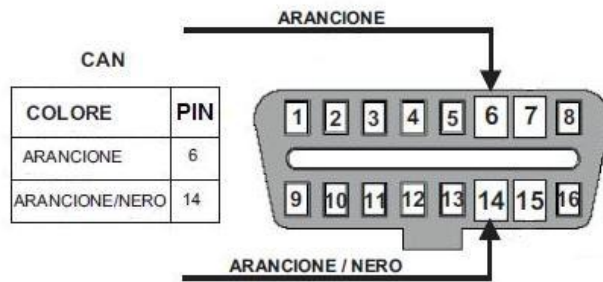
Pic. 10.3

Now control the OBD socket (seen from the contact side). In case of ISO protocol follow the diagram below:



Pic. 10.4

In case there aren't the wires of Pin 7 and 15 (in some cases it's not present) follow the connection plan of CAN protocol.



Pic. 10.5



How to understand if it is an ISO connection or a CAN connection? Pin 6 and 7 are never present at the same time in the OBD socket.

2. Search OBD

By selecting button (2a), the software searches and automatically recognizes the OBD system installed in the car. At the center of the monitor a window for the search appears and it indicates the operation in progress and the found protocol. If the OBD protocol used in the car is not in the managed ones, the message **type not recognized** will appear. By selecting button (2b), the software close automatic the connection with the original system OBD of the car.

3. OBD type

It indicates the type of OBD protocol used in the car to manage the diagnosis. If you use the automatic search (button 2), the OBD protocol is automatically determined by the software. If you decide to select manually the type of OBD protocol (because you know the type used in that type of car, for example), click with the mouse and it will select the correct option among the suggested ones. Then click to confirm.

4. Mode

It has the function to select the type of work to adopt in order to make the OBD correction working with gas engine cars. The possibilities are the following:

Monitor/ only the reading of the correctors (slow/fast) without the software modifies the gas carburetion.

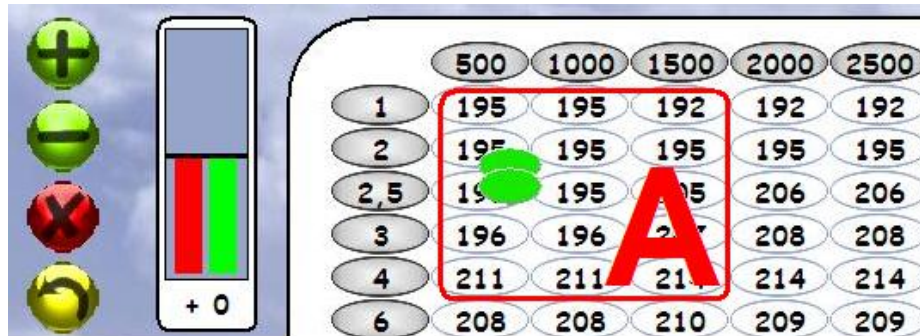
Static/ it freezes the gas OBD correction system till the selection of "static" mode. The car will travel with the correction values (gas OBD) till the selection of "static" mode. Select in case you don't want to make the OBD gas system work continually or in case of breakdown of some of the original car components that can modify the correct work of the OBD trims.

Dynamic/ the OBD system is always active. It reads the data transmitted from the original car OBD system and by interpreting the values of the two connectors (Slow and Fast) it decides if and which variations to make to the gas carburetion in the different working conditions. In case of carburetion modification, the calibrated map is never modified. A second adaptive map is modified.

5. Trim Control

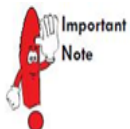
Select the OBD trim mode. The trims can be **normal** or **invert**. If you don't know the trim direction of working, to recognize it follow these information:

- Connect the PC to the ECU and make a gas calibration.
- Start the automatic search of the OBD system (point 2) and select at point 4 the **monitor** mode.
- Switch to gas and leave the engine at idle speed.
- Select Carburetion (menu bar) to enter the main map.
- Control how the trims (Slow and Fast) work and memorize their values.
- After some tenths of seconds (30/40) decrease by 10-20 points the idle area (see area "A" in the picture 10.6) where the pointer moves (green cursor).



Pic. 10.6

- Memorize the values of the trims (Slow and Fast).
- Wait for some seconds (10/20) and check how the trim Fast or Slow is moved compared to the memorized value (when the map wasn't decreased by 10 or 20 points).
- If the trims are moved to the positive sign (+) they are "normal" (example: I read 5% the Fast trim / I remove 20 points from area A / now I read a value of 15% on the Fast trim). With this operation I got the carburetion thinner (-20 points on the map) and the car OBD system has increased the correction (more hypothetical time of the petrol injector opening) to maintain the correct injection times. The value of the trim has gone up from 5 to 15%. To resume: in case of normal trims, if the map gets thinner, the OBD decreases the correction to support a fuel drop.
- If, by doing the same operation to decrease the trims in area "A", they moved to a negative sign (-) it means they are "invert" (example: I read 5% on the Fast trim / I remove 20 points in the area "A"/now I read a value of -5% on the Fast trim). With this operation I made the carburetion thinner (-20 points on the map) and the car OBD system has brought its coefficient to a negative sign in order to give more fuel. In this case the OBD system has worked in an invert way compared to the modification.



Attention, once this try has finished remind to restore the map in the area "A" by putting the 10/20 points left and returning to the map initial values, or make a new calibration.

Rarely it may happen that, even if you work as explained above to understand the direction of the trims, you can't see the variations. Probably it happens because the trims are not visible. To establish if it is true or not, bring the map back to the correct values (restore the 10/20 points removed by the map in area "A") and wait for 1 or 2 minutes, then remove again 10/20 points of the area "A". While you do this operation, check the Fast trim: it has to move for a few seconds before going back to the initial value. If this move is towards the positive sign, the trims are "normal". If the shift goes negative, the trims are "invert".



Attention, once this try is finished remind to restore the map in the area “A” by putting the 10/20 points left and returning to the map initial values, or make a new calibration.

- The window automatically reports the technical data of the OBD system installed originally in the car.

7. OBD system status

The window shows the bank referential data of the engine. Normally in the 3/4/5 cylinder engines only one bank is present. In the 6/8 cylinder engines there are two banks. **B1**=bank number one. **B2**=bank number two (if a second bank is present, the window B2 automatically appears).

Bank status: there are some information about the bank working mode in that precise moment (example: open Loop / closet Loop / cut off).

Fast/Slow, the correction coefficients are shown.

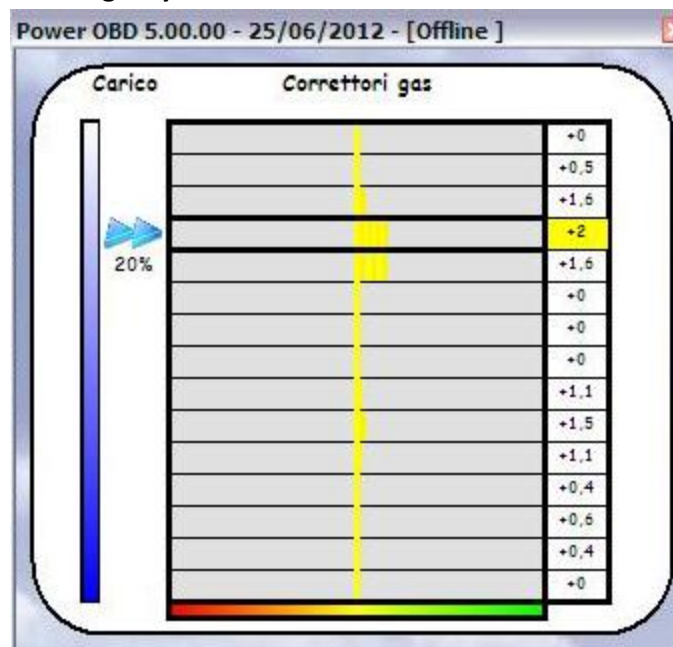
8. Graphic showing how the OBD gas trim works

Graphic indication to evaluate visually how the OBD gas system is working. The explanation of the functioning is postponed to the following point 13 “**Advanced Parameters**”.

9. Graphic indication of the engine load in %

With idle engines, the load value will always be low and will occupy the top side of the map, point 10, while with the power increase the indicator shifts to the bottom side of the map (increase of the engine load).

10. Working map of the OBD gas system



Pic. 10.7

The map in the picture represents the working area of the OBD gas system. It's very useful for the technician who has to evaluate and maybe act on the system automatically made corrections. As before mentioned with the increase of the engine power the load increases and the cursor (at 6% in the picture) will move to the bottom. In the movement it will meet the horizontal lines (generated from the central line) that we see in the picture (it's only an example to show the functioning). They can be completely white (no variation) or with a color gradation as in the picture. The gradation (more or less

extended) indicates the correction the OBD gas system is making at that particular engine load. At the centre of the chart there is a yellow vertical line to be considered as the value 0 of the gas correction. When the coloration occupies the right side of the line, the carburetion is poor. At the end of the line on the right side the column with numerical values indicates the gap (in percentage) from the ideal value (yellow vertical line=0). In case of poor carburetion the sign will be +. To interpret the type of carburetion the colored map at the end of the map is very useful. The more the carburetion is poor, the more the colored lines move to green (right side) and the numbers at the edge of the line increase (the OBD gas system is enriching the carburetion of our adaptive map). The maximum correction value goes to +30%. When the yellow coloration tend to the left side of the map (always starting from the central vertical line) the carburetion is rich as the number with sign –, shown on the right column at the edge of the line. As for the previous case to comprehend the carburetion value the colored bar under the map is very useful, tending more and more to red color. The more the carburetion is rich, the more the colored lines move to the red (left side) and the numbers in the column at the edge of the line (on the right) will be negative (the OBD gas system is getting the carburetion of the adaptive map thinner). The maximum value of the correction gets to – 30%. Considering the behavior of this adaptive map, we can decide to modify the carburetion map or to let the OBD gas system work, if there are no relevant gaps.

11. Cancel

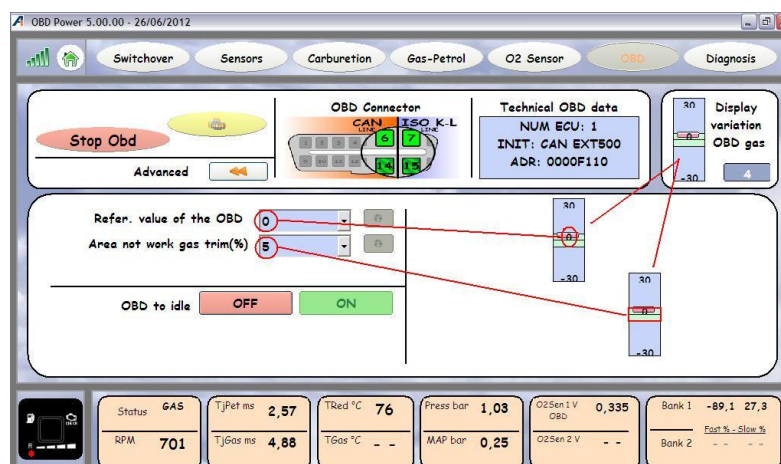
Cancel the corrections you made from the OBD gas system and the adjustment. Once the corrections are cancelled the system works again with the map (Carburetion) creating some new captures and possible variations, if the system is connected to the OBD socket in “Dynamic” function. Once the correction testers are cancelled, at the centre of the map only the vertical yellow line will remain.

12. Cancel errors

If selected it cancels the errors memorized by the petrol OBD system as for a normal tester of OBD diagnosis. The car should be switched to gas to do the erasure. In some cases the engine must be off and the key in position On.

13. Advanced Parameters

By selecting  a window appears to modify the capturing parameters of the OBD gas system.



Pic. 10.8

The adjustable parameters in “Advanced parameters” are the values shown in the picture at point 8 (the OBD average values), the possibility to disable the OBD gas correction at idle speed. Here we have the detailed functions:

Trim OBD target (%): we can consider it as the starting point (the reference, the point 0) of the OBD gas trims. In the majority of the new cars (with few km and short lifetime) the OBD petrol trims tend to move around the value 0 with the sign + or – considering the engine working conditions. When the car gets old and stores km, the OBD system target won't be 0 but higher or lower values (it depends on the type of the trim work and on the real carburetion). The target of the OBD system is also to preserve the characteristics of the polluting emissions during the car obsolescence.



To determine the target once the PJ-OBD installation is finished, start the petrol engine car and let it work on petrol for 10/15minutes by restoring the parameters (if during the installation the battery has not been connected for hours, we suggest to run some km on petrol before the gas calibration, in order to restore the correct reference parameters). Now control on which % the slow trim works and set the value we read as a target.(Pic. 10.8)

OBD tolerance trim (%): the percentage determines the gap (from the target) within which we decide to make or not the gas trim work.

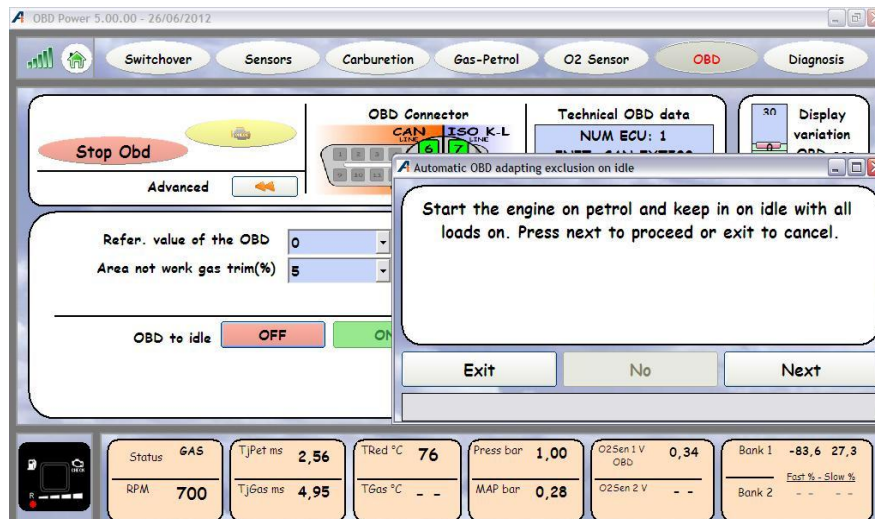


We have an example by using the values of Pic. 10.8 and if our target is to see the OBD trims work around 0 and we set a tolerance value of 10, we can determine as follows: the PJ-OBD system, with cars on gas, will decide to make corrections only when the car OBD trims will be moved beyond +10 (%) or -10 (%). With corrections from 0 to 10 (+ or -) the PJ-OBD system will only use the coefficients of the carburetion map.

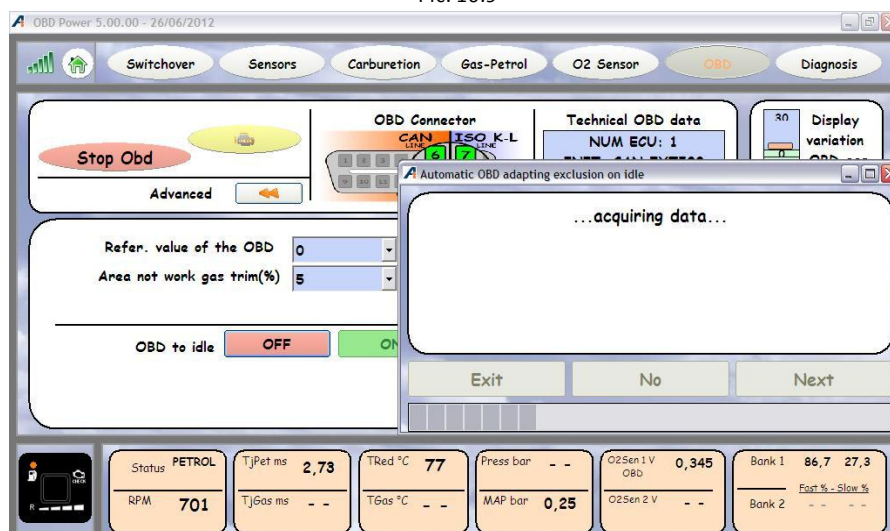
The light green central part at the centre of the picture broadens or narrows on the strength of the arranged value in “Trim tolerance”. With Tolerance = 1 it is not visible, while with higher values (both positive and negative) the size increases with the increase of the arranged numeric value. The maximum allowed correction (travelling on gas) from PJ-OBD is + or – 30%. So by modifying the target we could find some of the following examples: +30/0/-30. In case of negative target (-5) the screen could be the following: +25/-5/-35. As you can see the difference is always +30/-30 from the arranged target.

In some cases during the idle speed gas working it could be necessary not to make the gas correction system work to avoid any idle RPM engine irregularities or in the bad idle returns. That's why the possibility to disable the OBD gas correction with idle speed engines has been inserted.

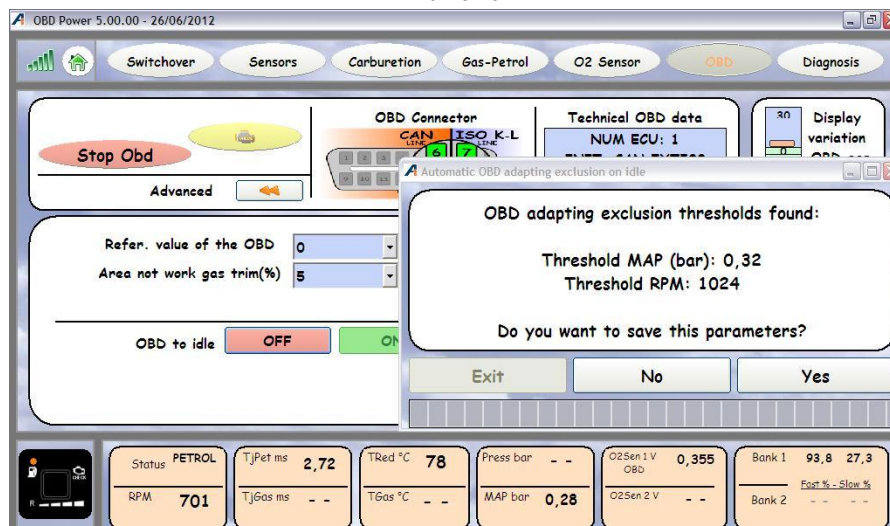
Procedure to disable the idle OBD gas correction: select the button “**Exclude**” (red button). It starts a regulation driven by the PJ-OBD system through some clear and intuitive instructions at the monitor driving the operator in every phase, necessary to establish a correct setting of the parameters.



Pic. 10.9

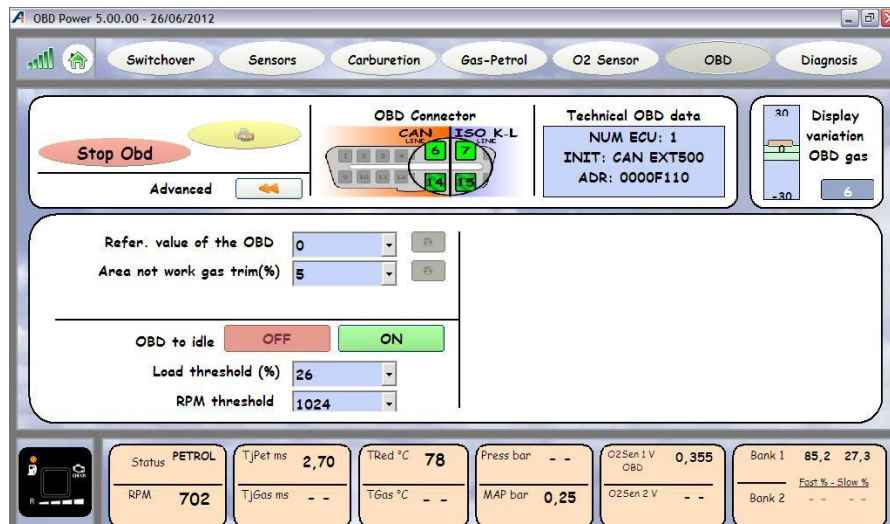


Pic. 10.10



Pic. 10.11

When you arrive at fig. 10.11 you can confirm or not the suggested settings: YES it applies the settings to the system. NO it cancels the parameters got in automatic mode. To quit push button Exit. If you have selected YES the monitor will be like in the fig. 10.12. where you can see the engine load and the number of RPM necessary to disable the gas OBD control.

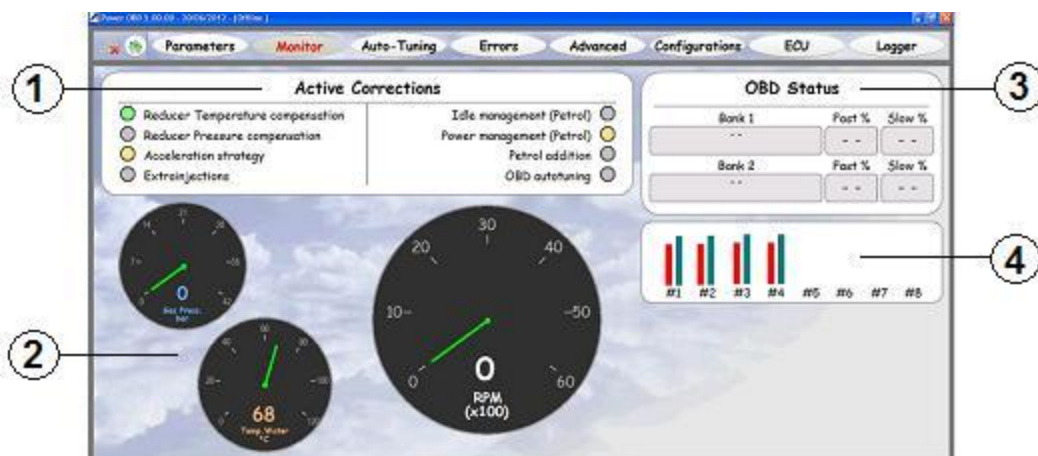


Pic. 10.12

To restore the complete PJ-OBD idle functioning select “**Activate**” (green button).

To quit the advanced parameters select  . .

11 MONITOR



Pic. 11.1

The page “Monitor” wants to represent a help for the operator to interpret in a fast and intuitive way all the active and working functions.

1 Active Corrections

Indications of the selected and active functions:

Green Led = the function is active (in this moment it is working).

Orange Led = the function is selected but not active at the moment (in this moment it is not working). When the function activates, once the arranged parameters have been got, the led turns to green.

Grey Led = function not selected.

2. Gas Pressure

The watch indicates the pressure value to which the system is working. It presents both the graphic indication and the numerical one. Values are expressed in bar.

Water Temperature

The watch indicates the pressure value to which the system is working. It presents both the graphic indication and the numerical one. Values are expressed in centigrade.

Tachometer

The watch indicates the engine RPM. It presents both the graphic indication (value x 100) and the numerical one. Value: RPM per minute.

3.OBD Status

Bank 1: bank working condition (ex.: closet loop/open loop/ cut-off.....).

Bank 2: if present, it's automatically presented by the system and it's the same of bank 1.

Fast: it indicates the correction of the “**fast trim**” of the OBD system, originally installed in the car. Value expresses in %. Suggested both for bank 1 and for bank 2 if present.

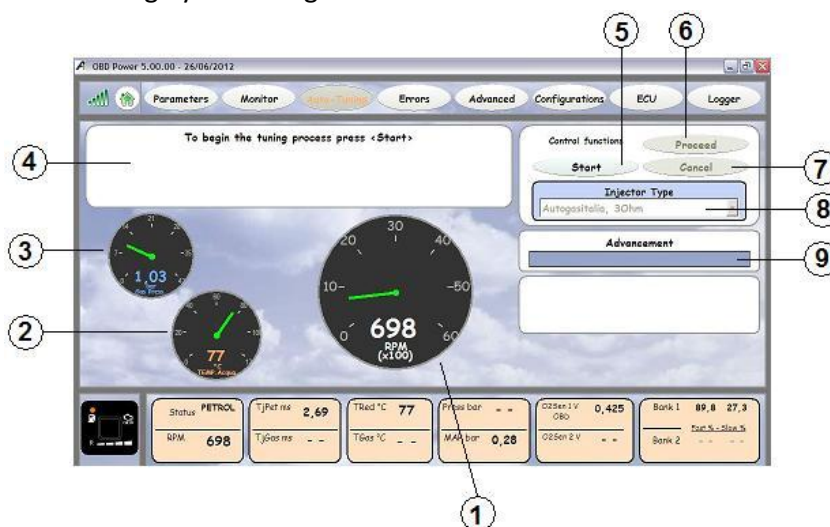
Slow: it indicates the correction of the “**slow trim**” of the OBD system, originally installed in the car. Variation in % compared to the ideal petrol target. Suggested both for bank 1 and for bank 2 if present.

4. Injector graphics

Graphic representation of petrol and gas injector opening. Red color for the petrol injectors, blue for gas injectors. The numbers under the injector columns indicate the injector number compared to the PJ-OBD electric/color layout.

12 AUTO TUNING

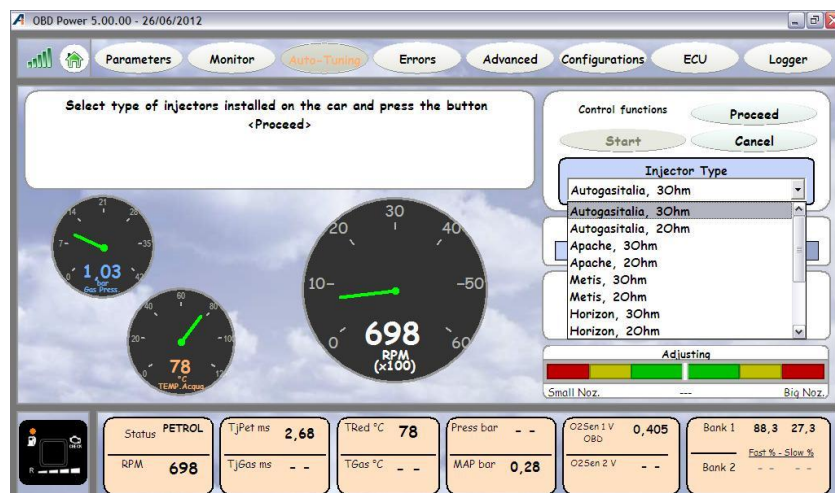
Once the PJ-OBD system installation has finished we have to check the regular petrol engine car working. For this reason it is necessary to drive the petrol car for almost 2 or 3 km (even 10/15 if during the installation the battery has been disconnected for many hours (loss of temporary data in the petrol ECU memory)). To avoid the exaggerate temperatures and the continuous insertions of the cooling radiator valve, during the auto-tuning it's important not to leave the car at idle speed for long time (an excessive increase of the temperatures and some possible variations in the injection times, caused by the activation of the electric impeller). Once these simple but important controls are finished and after the connection of the interface cable between ECU PJ-OBD and the PC, start the software PJ-OBD. Be sure the connection is started. After have worked on page “Parameters” and have set the necessary values, start the auto-tuning by following the information at the monitor.



Pic. 12.1

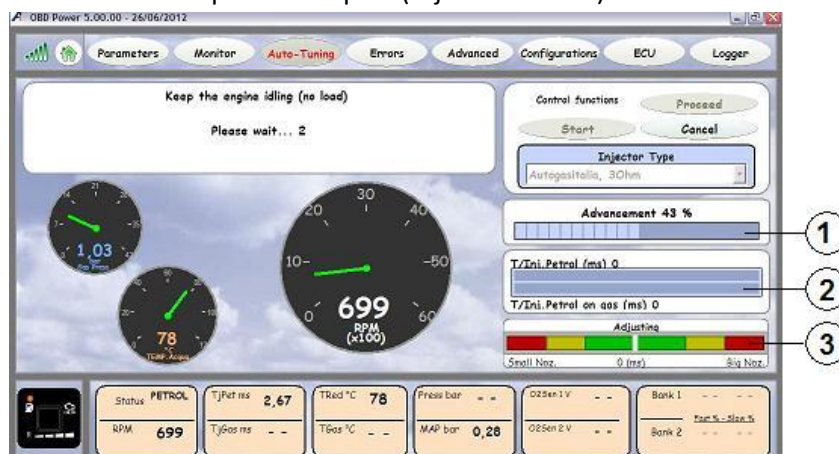
The watch 1 indicates the RPM number. The watch 2 indicates the water temperature in the pressure reducer. The watch 3 indicates the gas pressure in the tubes between the reducer and the injector. In window 4 there are the information/instructions to follow. Insert the service brake (manually), put the gears in neutral position, start the engine, be sure to have disconnected the engine loads (air conditioning, thermal defroster, lights, etc.), check the correspondence of RPM between the PC and the tachometer (in case modify the RPM setting values from page Parameters), the presence of the petrol injection times and the different temperatures. Wait for 1 minute to fix the petrol parameters and start the automatic calibration by pushing the button 5 "Start". If button 7 "Cancel" is selected, it cancels every operation in progress during the auto-tuning.

Before starting the calibration, the system reminds to select the injector type 8 and then to confirm with button 6 "Proceed".



Pic. 12.2

Now the system memorizes the petrol samples (injection times).



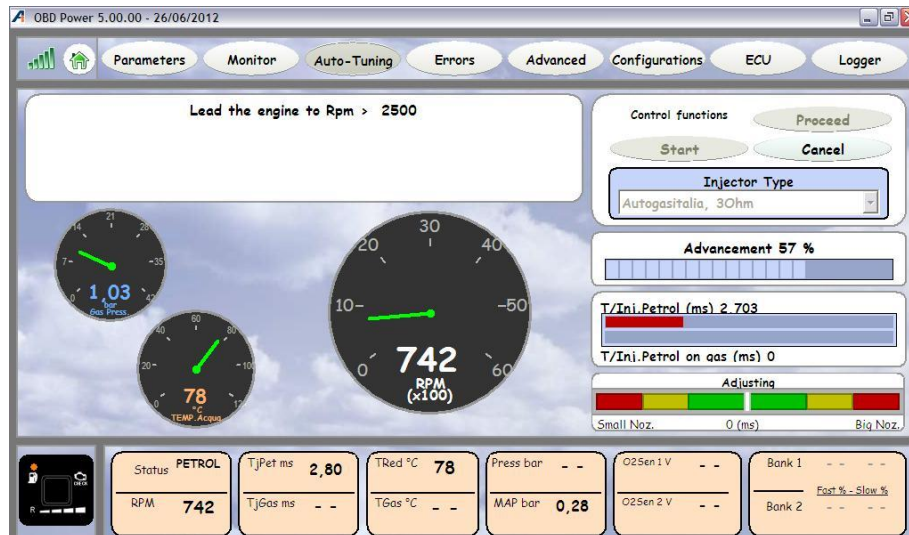
Pic. 12.3

Point 1 indicates the operation time (progress in %). In window 2 the graphic configuration in different color (red petrol / blue gas), graphically visualizes the opening of the petrol and gas injectors. It is also reported a value in thousandths of second (ms.). Window 3 indicates if the injector nozzle size is correct. The central white cursor shifts (alone) both to the left and to the right.

Right side: if the central white cursor goes to the red section, nozzles are big. **I WOULD SUBSTITUTE WITH NOZZLES WITH A SMALLER HOLE OR WITH BIGGER INJECTORS.** If the central white line remains in the **yellow section**, the injector nozzle sizes are small but acceptable too. When the white cursor is in the **green section** the injector nozzle configuration is perfect.

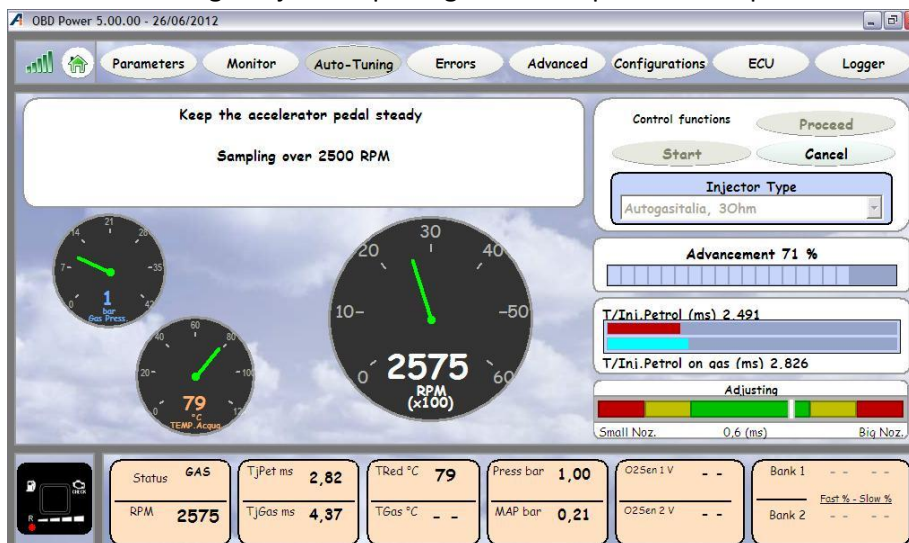
At the center of the bar the correction value in thousandths of second (ms.) is reported. Once the auto-tuning has started, in the first step you have to leave the engine at idle speed and wait... since now follow the indications at the monitor driving all the automatic regulation.

Once the data acquisition with the petrol car at idle speed has finished, the system asks to make the engine work at least at 2500 RPM (stay with the accelerator pedal in a stable position, fixed between 2500 and 3000 RPM).



Pic. 12.4

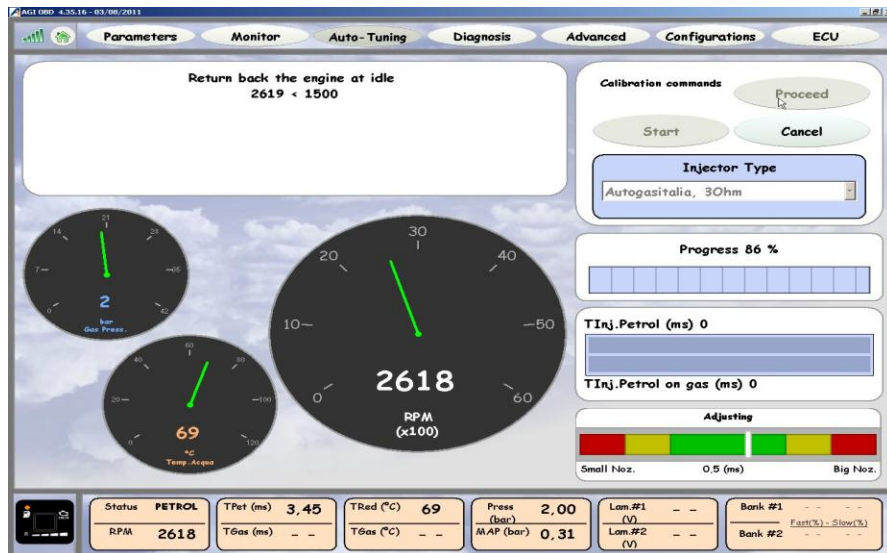
Now the software executes a first reading of the petrol data, then it automatically switches to gas and applies the correction on the gas injector opening times compared to the petrol ones.



Pic. 12.5

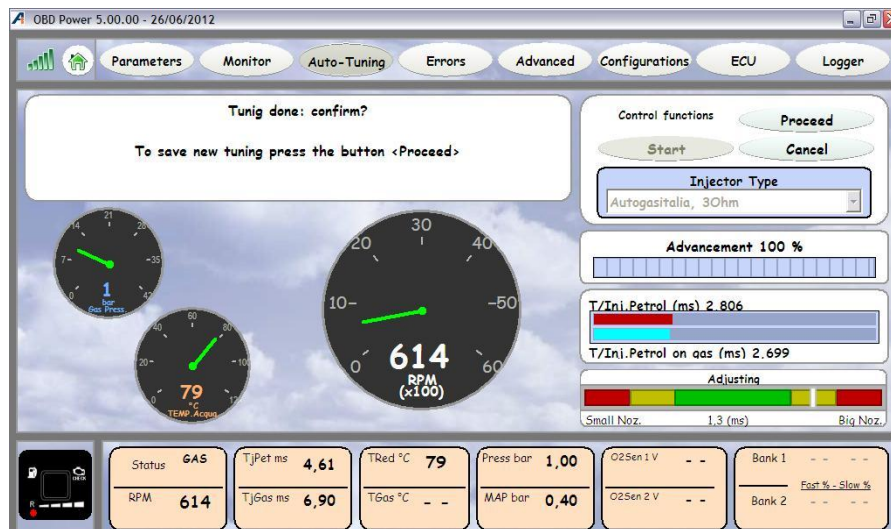
It's important to keep the pressure steady on the accelerator pedal, even during the first change from petrol to gas in this phase at 2500 RPM. Let the engine decreases the RPM at the first change, by keeping the same position/pressure on the accelerator pedal.

Once the 2500 RPM phase is finished bring the engine back at idle speed.



Pic. 12.6

Now the system returns at idle speed switched to gas and begins to modify the correction of the gas injector opening compared to the petrol times till to get the best calibration. Once the automatic calibration has finished, the following screen appears:

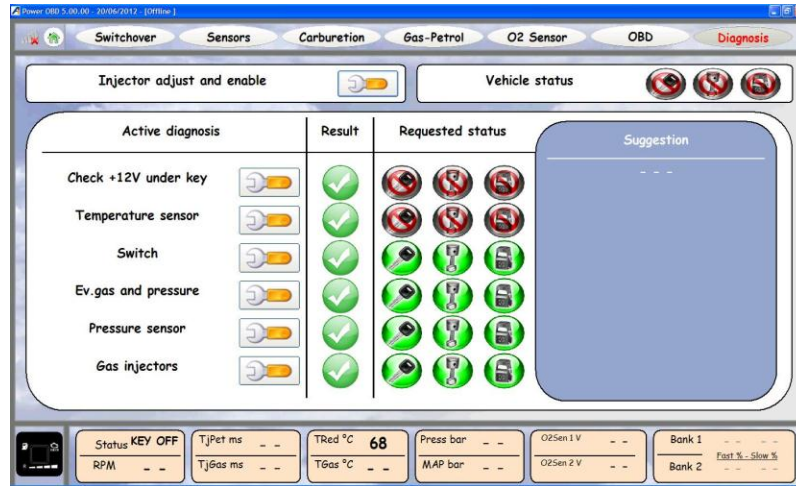


Pic. 12.7

By selecting **PROCEED** the automatic calibration finishes. By selecting **CANCEL** all the regulation is cancelled. In auto-tuning different messages may be visualized to notice about particular conditions such as: low temperature, nozzle size, signal loss, OBD map reactivation in case of a new calibration on a preexisting map where the OBD gas function was active, and more.

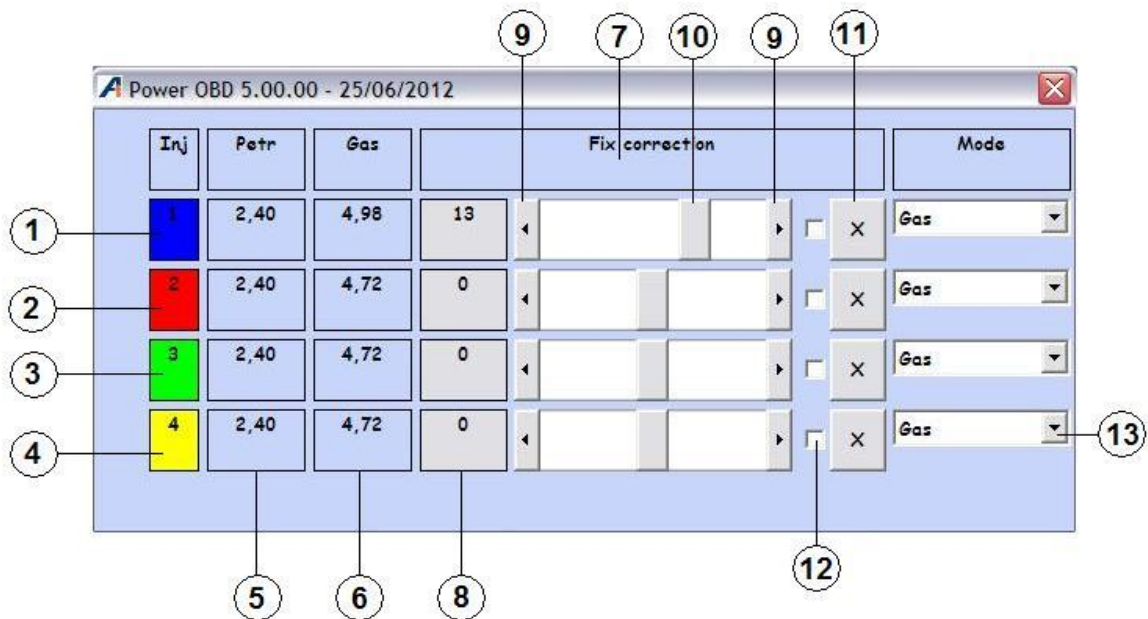
13 DIAGNOSIS

The page "Diagnosis" allows to execute a complete diagnosis of the electric/electronic system, through some simple and intuitive messages to follow.



Pic. 13.1

Injector correction and qualification: by selecting the symbol "key", it appears the window of fig. 13.2



Pic. 13.2

1-2-3-4 the cylinders (in this case a 4 cylinder ECU) with the correspondent injector control wire colors are suggested.

5 Petrol injector opening time (ms.)

6 Gas injector opening time (ms.)

7 Area to modify the correction of the gas injector opening by cylinder.

8 Indication of longer time about the gas injector opening for every single cylinder.

9 Arrows to modify the correction values. The left arrow takes time away (ms.) (it makes the mixture of that cylinder thinner), the right arrow adds time (ms.) (it makes the mixture richer).

10 The cursor is moved by the movement of the two arrows in **9** but it can also be moved directly to obtain faster movements.

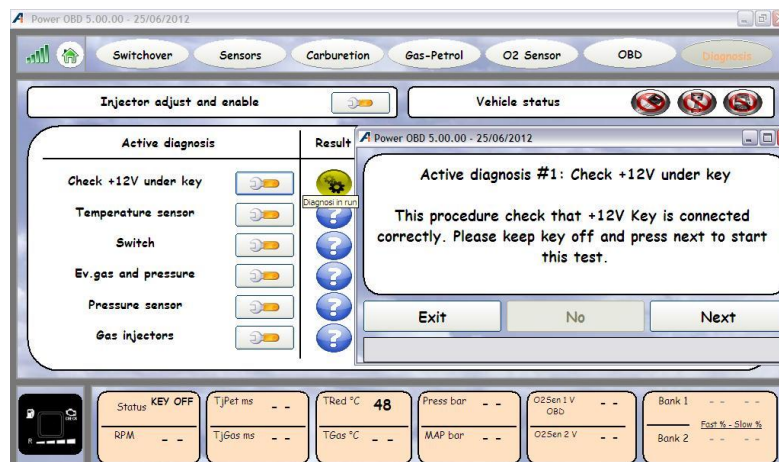
11 By selecting X the cursor comes back to "0" for the line modification of that precise injector/cylinder.

12 By selecting more boxes you can activate "X" to reset more lines at the same time. It can be useful in the car with two banks if some modifications were executed and you want to reset all the bank.

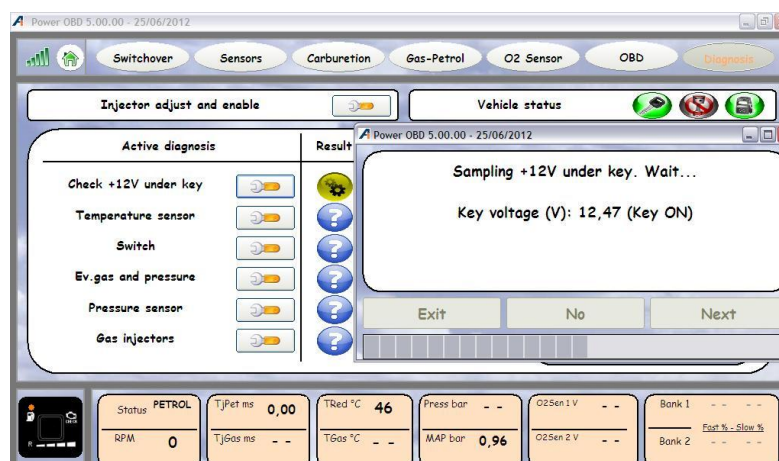
13 The sign "gas" in correspondence to the single injectors indicates that all the cylinders are powered by gas injectors. It is possible to select one or more injectors in petrol mode. In this case we can have for example three gas injectors and one petrol. You can use this function if you want to control the right sequence connection of the gas injectors with the petrol ones. With this kind of connection (with gas engine) by switching with the arrow the injectors from gas to petrol, the engine must always have a good rotation. In case of power off or irregular rotation, check the exact correspondence of the colors between the gas and the petrol injectors.

Now we analyze all the other diagnosis functions of the system electric components:

Under key (12 Volt). Some different messages are suggested driving the operator in the diagnosis. Here are some examples:



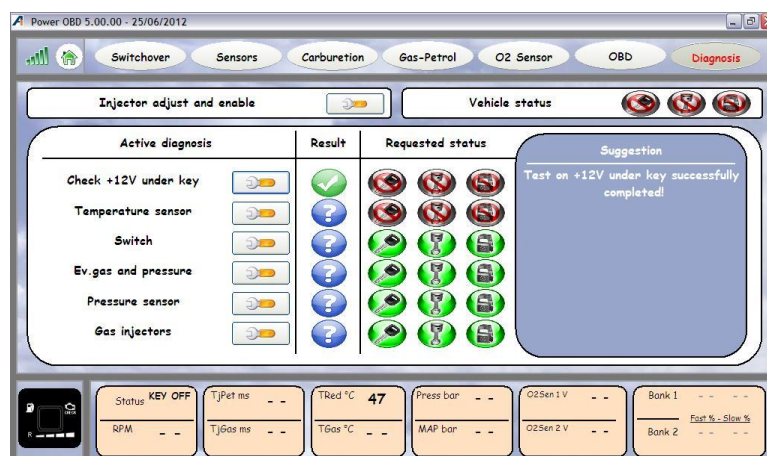
Pic. 13.3



Pic. 13.4

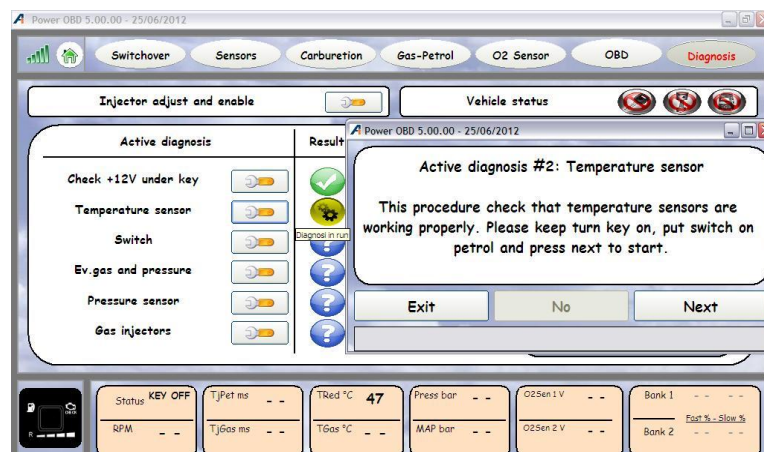


Pic. 13.5

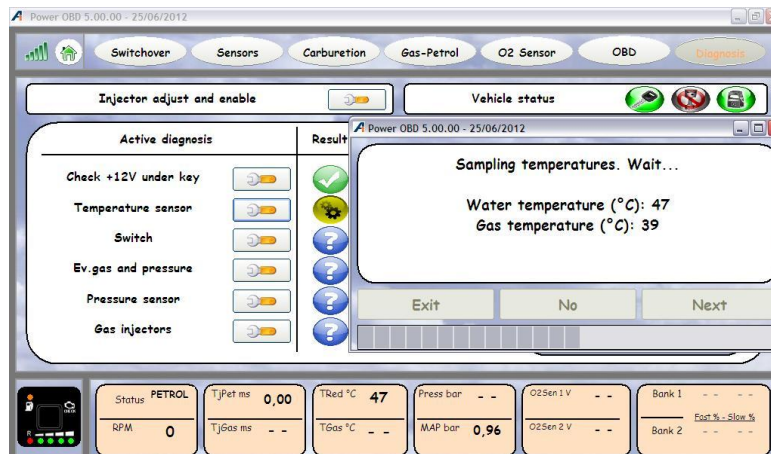


Pic. 13.6

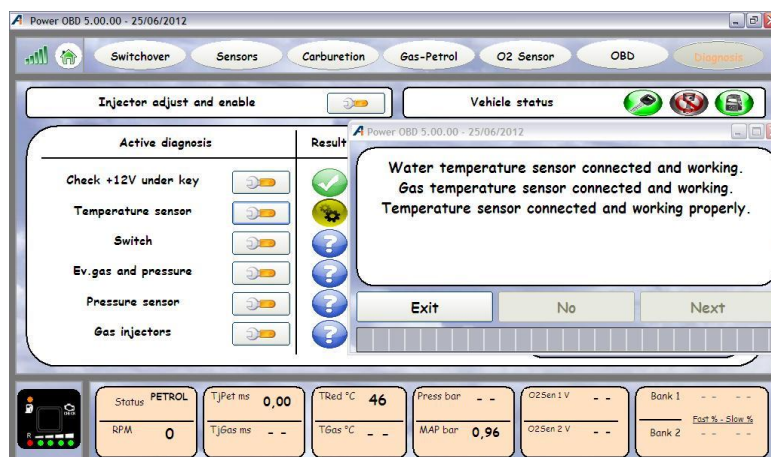
Temperature sensors: follow the instructions the software suggests.



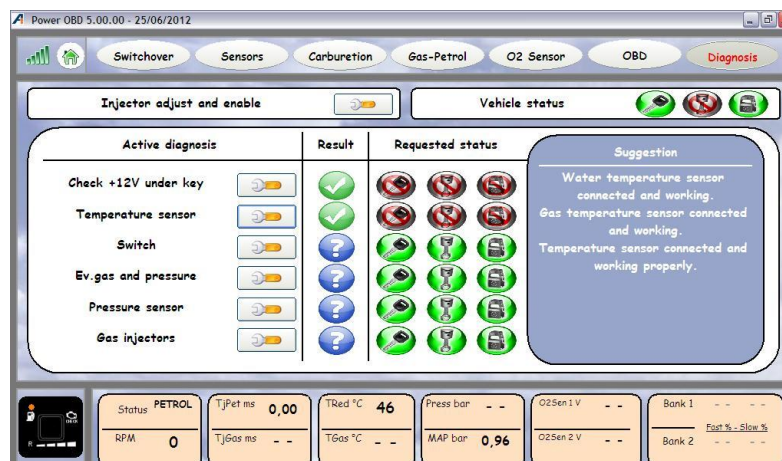
Pic. 13.7



Pic. 13.8

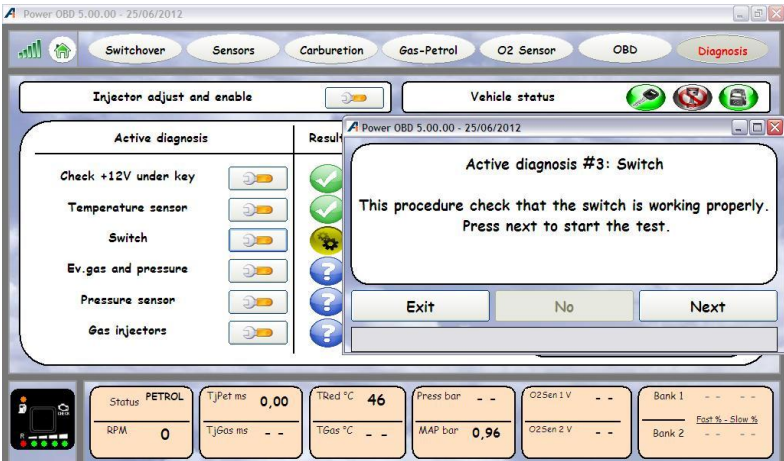


Pic.13.9

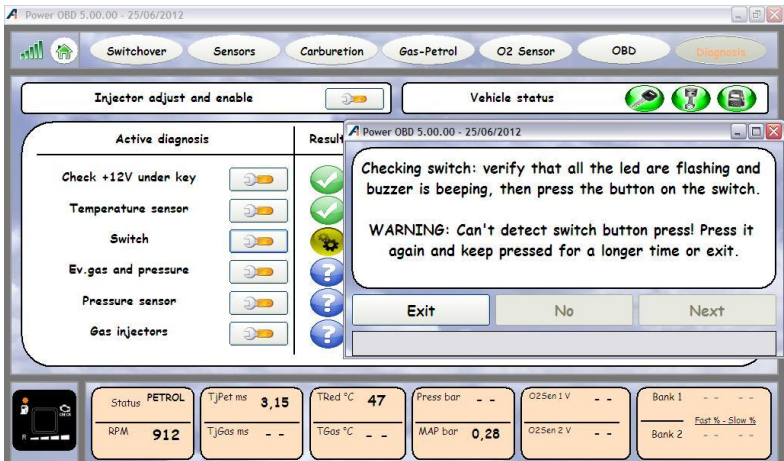


Pic.13.10

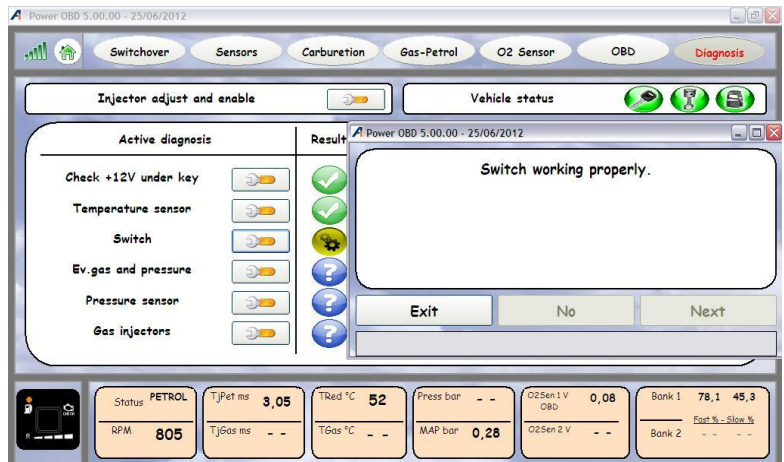
Switch working diagnosis:



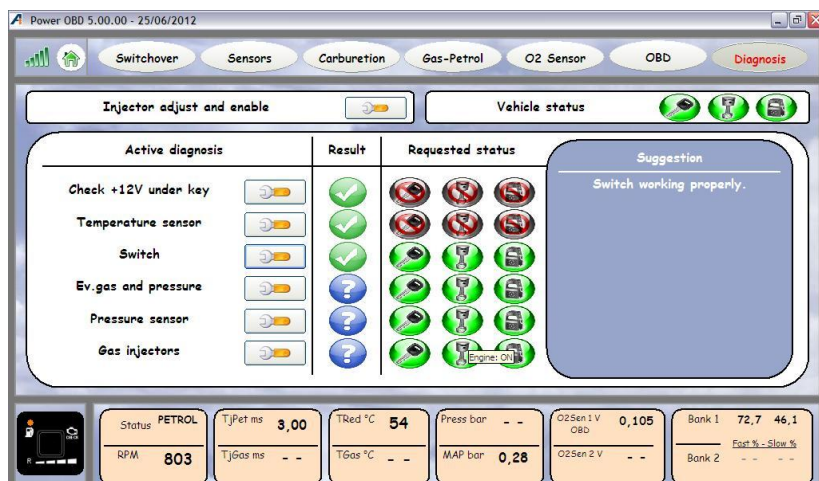
Pic.13.11



Pic.13.12

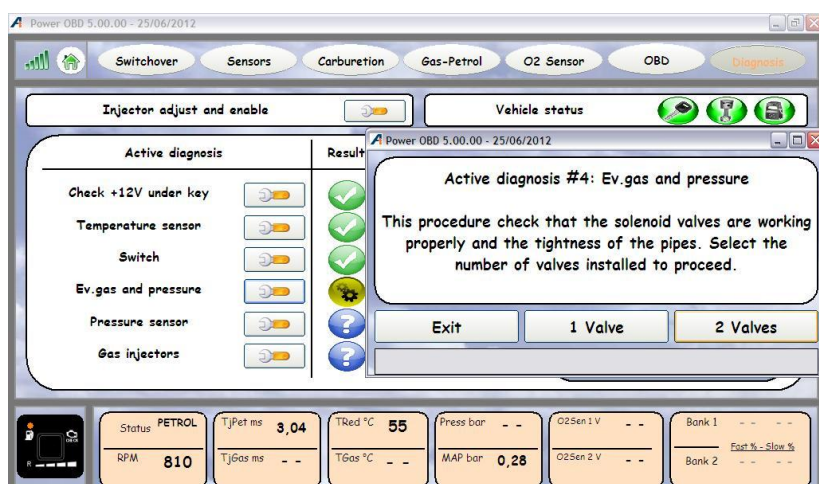


Pic.13.13

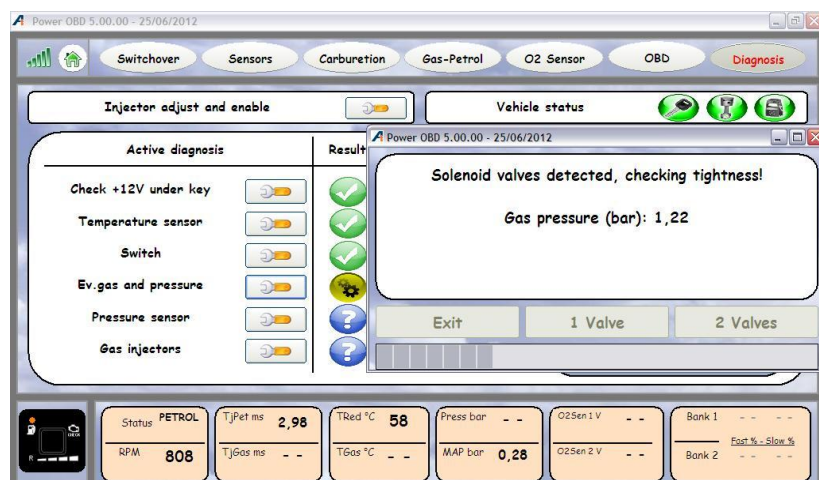


Pic.13.14

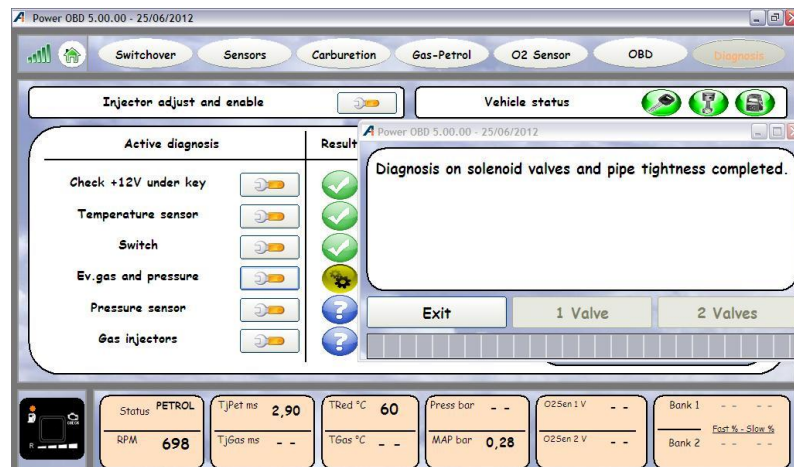
Pressure and electric valves diagnosis:



Pic.13.15



Pic.13.16

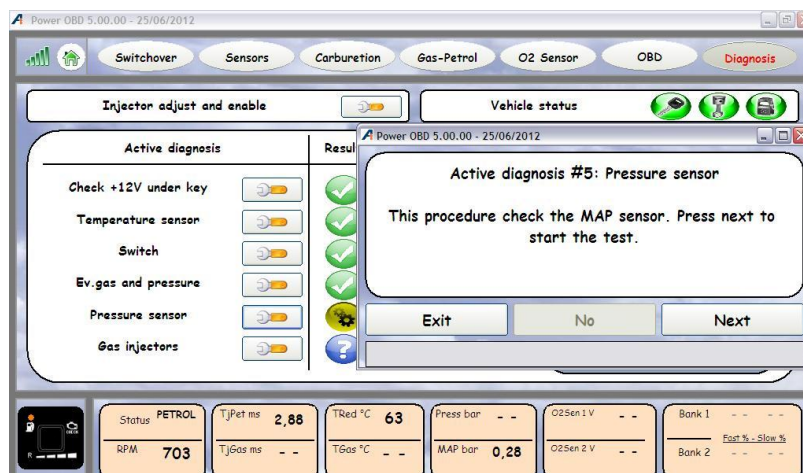


Pic.13.17

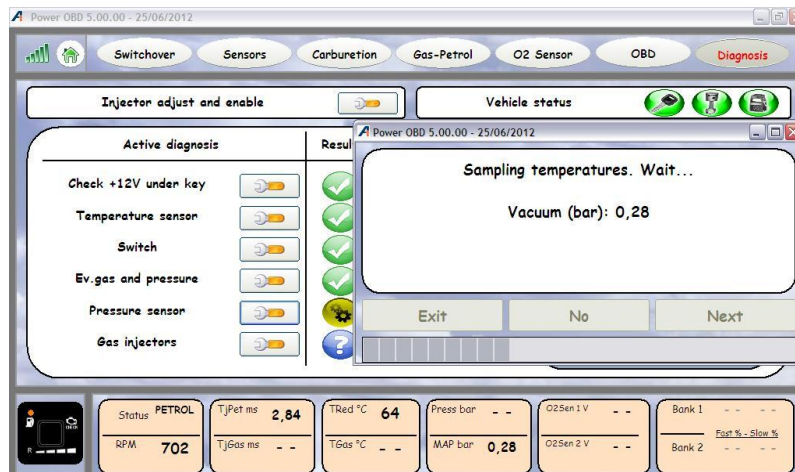


Pic.13.18

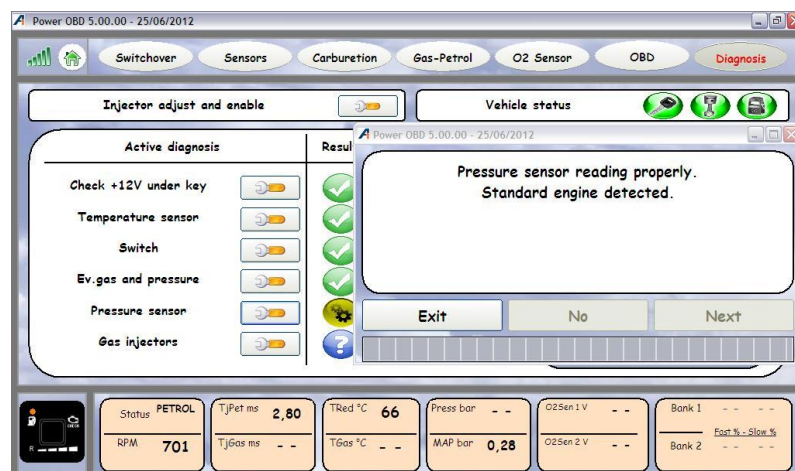
Diagnosis of the exact electric connection of the pressure sensor:



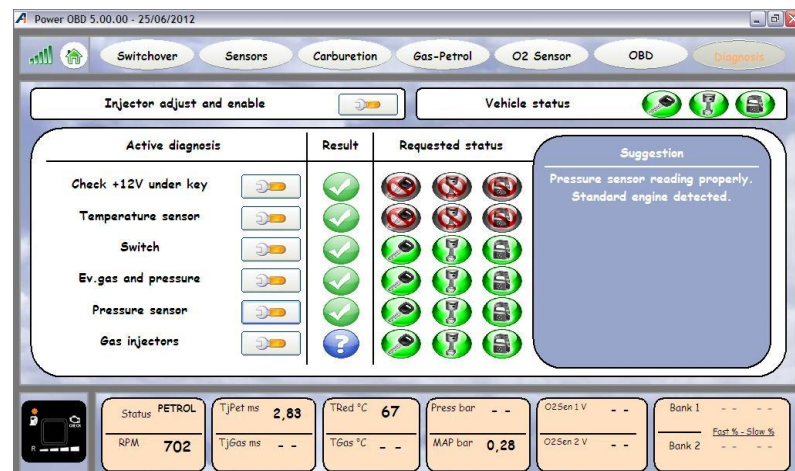
Pic.13.19



Pic.13.20

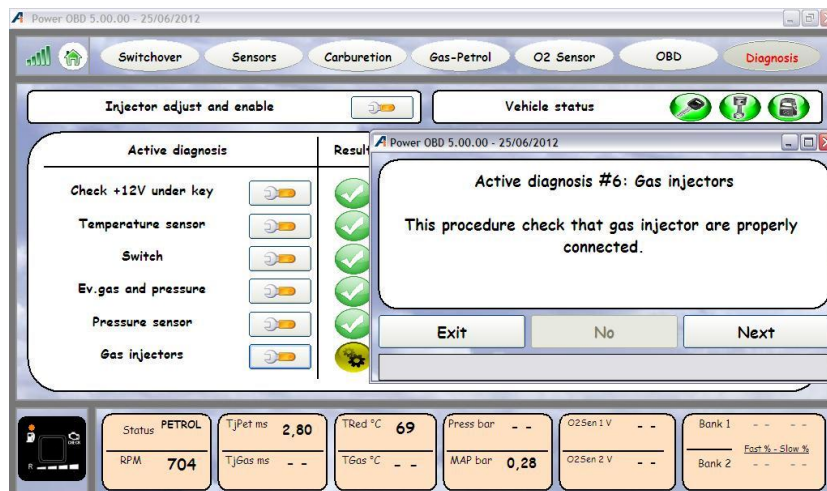


Pic.13.21

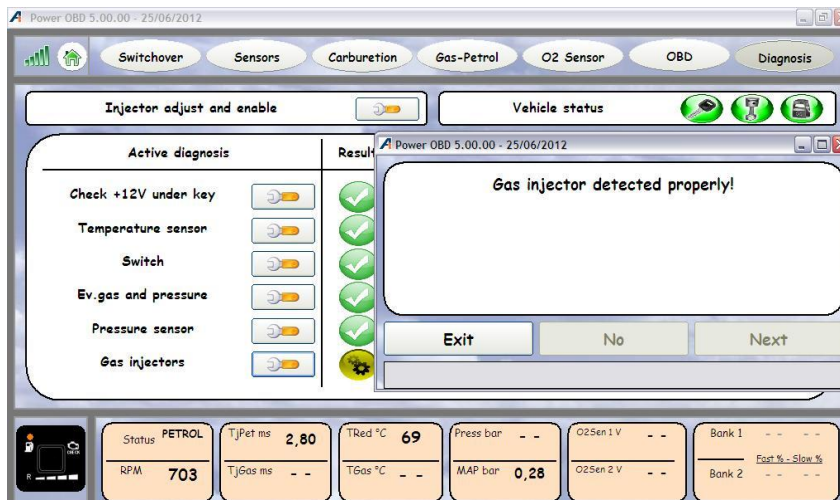


Pic.13.22

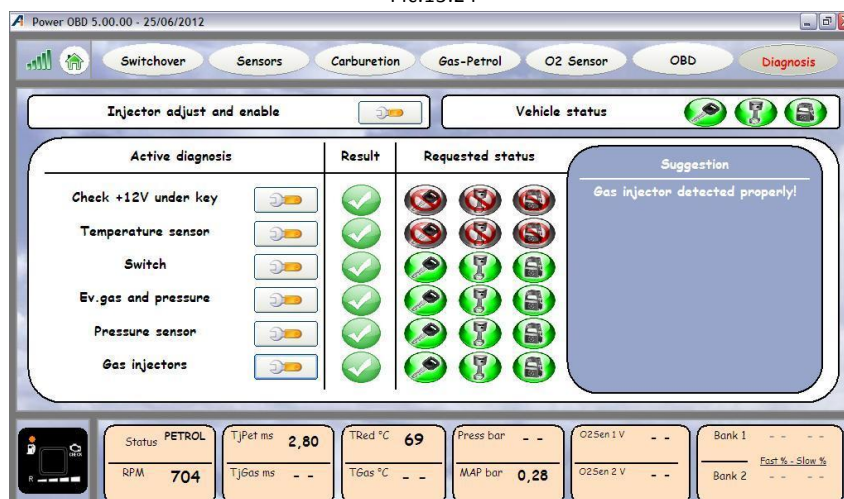
Diagnosis of the exact electric connection of the gas injectors:



Pic.13.23



Pic.13.24



Pic. 13.25

The technician operations are driven also by icons to give indications about the vehicle state (to test) or to indicate the test result.

No fue:



Engine off:



Engine: OFF

No key:



+12V Key: NO

Key:



+12V Key: YES

Engine on:



Engine: ON

Petrol engine:



Fuel: PETROL

Gas engine:



Fuel: GAS

Control done:



Diagnosis successful

Test in progress:



Diagnosi in run

Control to do:



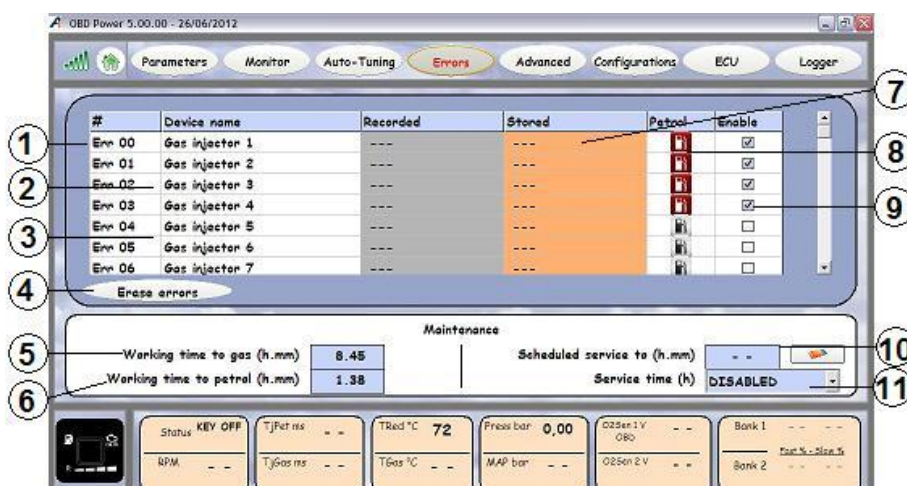
Diagnosis not yet attempted

Control error:



14 ERRORS

The page Errors is about possible errors (working problems) in the system components. The presence of errors is signaled to the driver with a sound from the switch if the acoustic function is active. In the main software page the icon beside the word Diagnosis turns to orange if an error is present or memorized in the ECU. This page is suggested in a standard configuration, but it is possible to modify it by increasing or decreasing, on the strength of the needs, the components to control. The decision is up to the technician/installer.



Pic.14.1

1. Code

Error code (of the working problem).

2. Component name

Name of the component to control.

3. Recorded

The error and the functioning problem is recorded.

4. Erase errors

Button to reset the memorized errors.

5. Working time to gas

Working hours of the gas switched system since the installation moment.

6. Working time to petrol

Working hours of the petrol switched system since the installation moment.

7. Stored

The error and by consequence the working problem is historic, not present now. It was recorded in the past. To cancel the error click icon 4.

8.  Icon with red color in background. If during the gas working, an error comes about in the component, the system automatically switches to petrol and the switch produces an acoustic sound to alarm the driver. To stop the sound, the driver has to switch the petrol system manually from the switch. If this icon is in grey background, the component to which it is associated may be put under control, but there is no automatic petrol return. In this case a short switch sound alarms the driver together with the power on of a red led (chek) on the switch.

9.  The component is put under control, so to the working diagnosis. With no tick (V) the component is not under control.

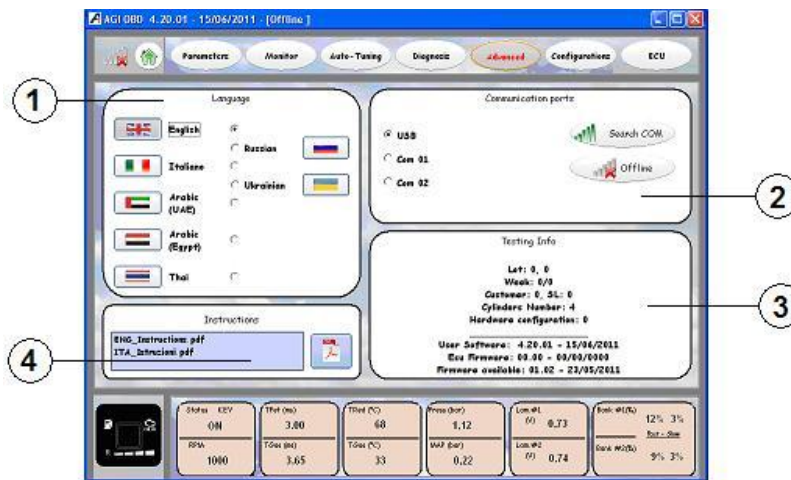
10. Scheduled maintenance

It indicates the number of gas working a car can support before returning to the workshop for a maintenance control. By pushing  the values reset and it is possible to insert a new value for another control.

11. Coupon

By default it is suggested as disabled function. To activate the function select the number of the gas working hours. Minimum value 300 hours, maximum value 700 hours. To know the correspondent km, multiply by 50 (km average value now calculated considering the possible types of urban ways, suburban, highway). Example: $300 \times 50 = 15,000$ the new coupon will be after 15,000 km. If the function is active, to warn the driver about the need of a service control, the switch buzzer does a series of sounds for a short time after the car power off. The sound disappears when the operator resets the function or prepares a new coupon. If disabled there is no sound indication and the time service chart is not active too.

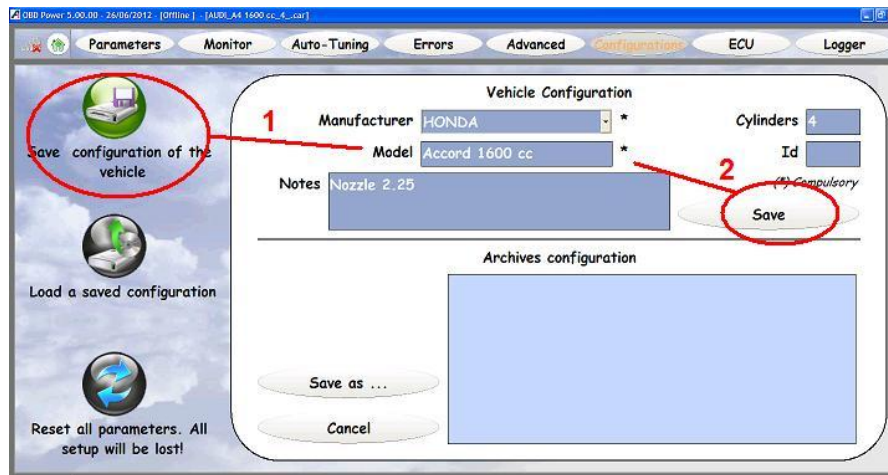
15 ADVANCED



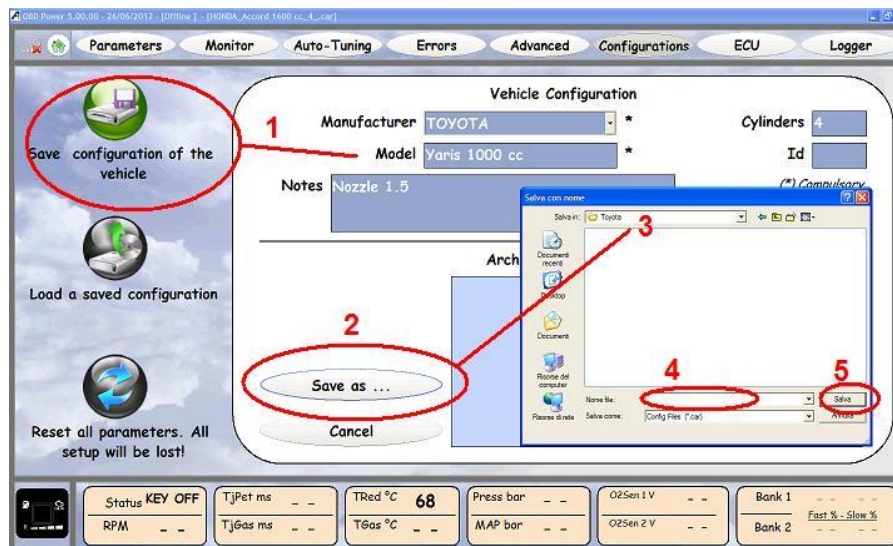
Pic.15.1

1. Language. Select the software language by clicking on the circle beside the chosen language.
2. Communication port selection between ECU and the PC. Automatic search: the system automatically searches the available connection type by clicking on search COM. When the communication port is found between ECU and the PC, it is automatically indicated by a point beside the connection name. it is also possible a manual setting for an expert computer operator, by selecting directly the communication port and clicking on the connection type to activate. **OFF/Line:** if you want to use the software not connected to the PC, click in this icon.
3. ECU information. There are the technic characteristics inserted during the production/testing phase.
4. In this window there are the connection links to the instructions. Scroll up and down to see the available instructions and click on the chosen one. A PDF instruction will automatically open in the selected language.

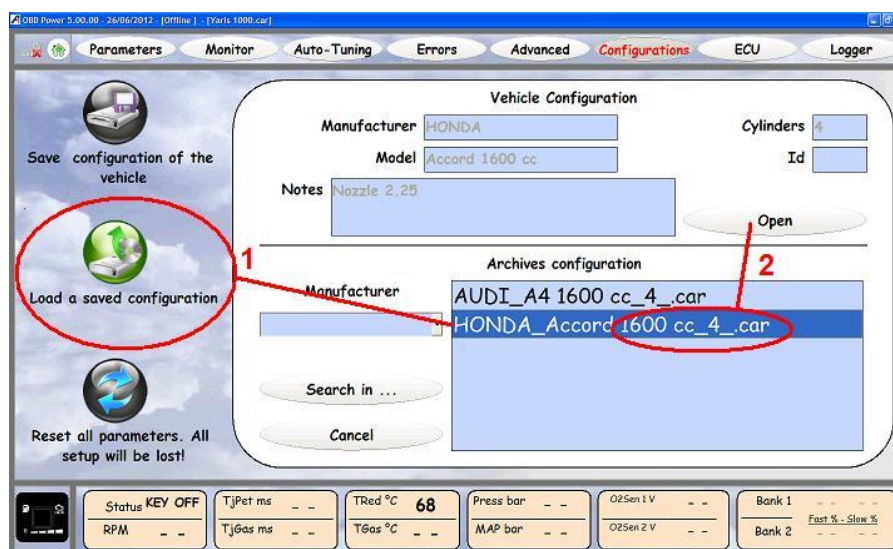
16 CONFIGURATIONS



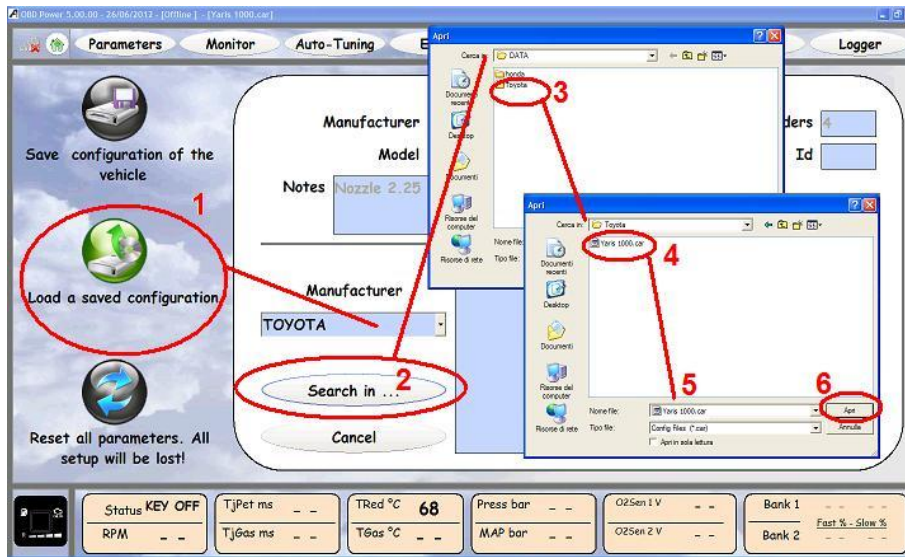
Pic.16.1



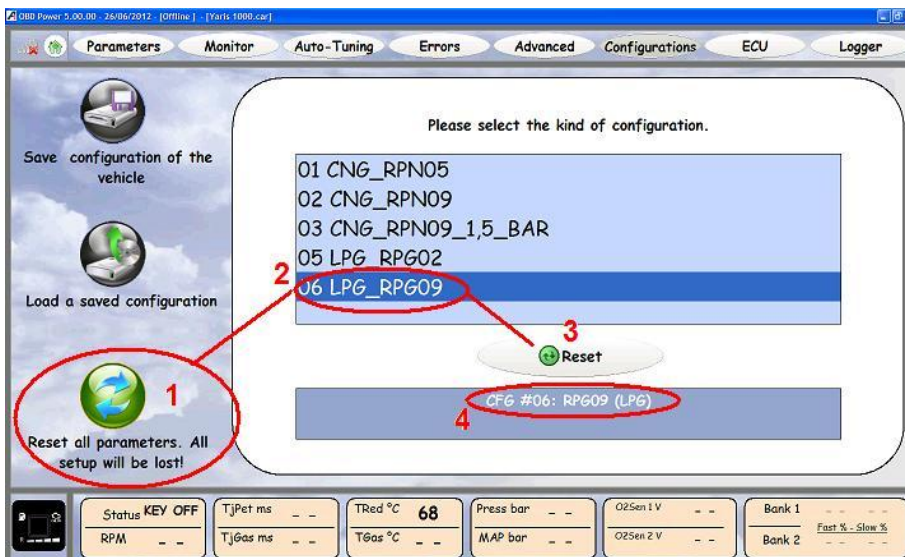
Pic.16.2



Pic.16.3



Pic.16.5



Pic. 16.6

17 LOGGER

Record the input signals to the gas ECU for a maximum time of 170 seconds.

Gas injection time

Petrol injection time

Reducer pressure

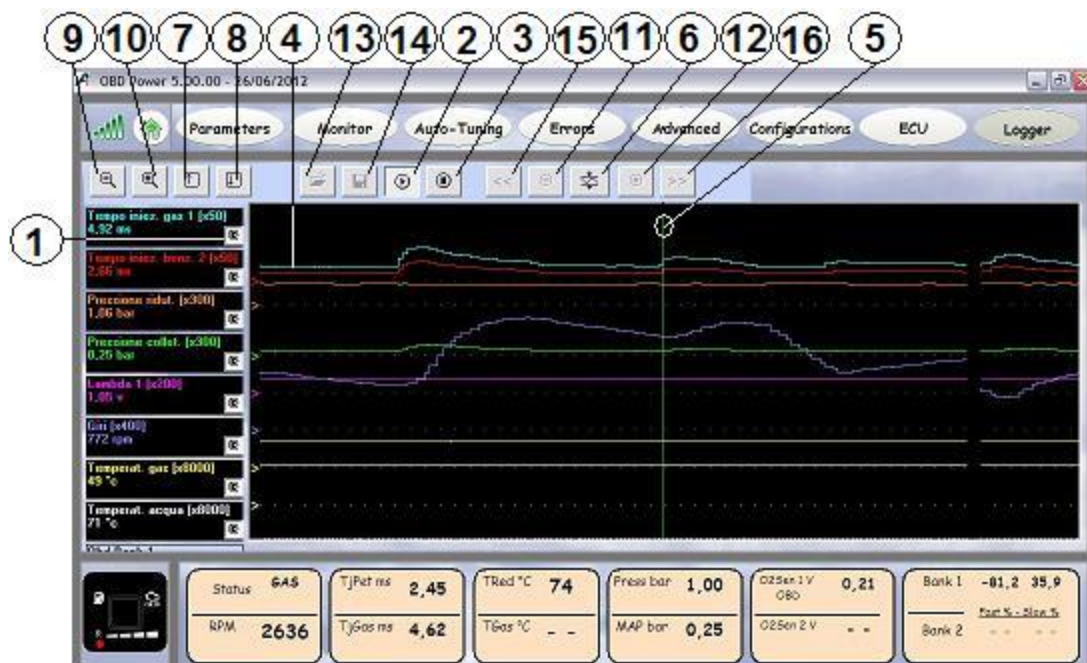
Intake manifold pressure

Lambda

RPM

Gas temperature (if connected)

Water temperature



Pic.17.1

1. If selected, it activates the reading of the respective signal and a line of the same color appears at the monitor.
2. It activates the signal recording.
3. It blocks the recording.
4. Signal line corresponding to the different types of components (line color=service description color).
5. Vertical line placed on a graphic point, it reads the values. To shift the vertical line on the right or on the left, use the mouse arrow on it.
6. In case the > has been shifted vertically (one for every available color of the graphic), select this button and the initial position will be restored.
7. It shifts the selected line to the top.
8. It shifts the selected line to the bottom.
9. It reduces the resolution.
10. It increases the resolution.
11. It returns to the beginning of the recording through the pages.
12. It returns to the end of the recording through the pages.
13. It opens the window of the saved recordings.
14. It saves a new recording.
15. It returns immediately to the beginning of the recording.
16. It returns immediately to the end of the recording.

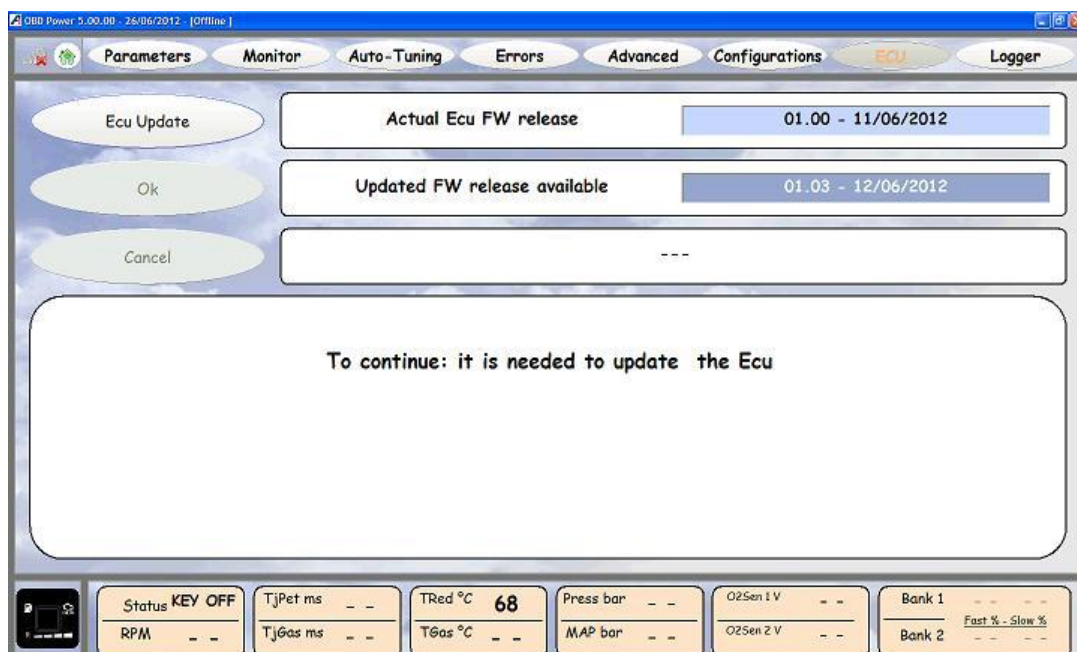
18 SOFTWARE UPDATE

If there is a new software version compared to the ECU installed version, the system informs us and asks us if we want or not the update of the ECU program. By clicking the button ECU Update the new program activates and you have to wait for 2 minutes only. During the procedure you must follow the instructions of the central window.



**Important
Note**

Important: during this phase the engine must be off and the key in OFF position. Never insert the key contact for the programming period. Before starting the programming, check the PC battery status to avoid the power off (to connect it to the electric wire is recommended). Pay attention to the interface cable connection: it mustn't be accidentally disconnected. These cautions must be activated in order to avoid any possible block of the microprocessor during the programming phase.



Pic.18.1