



# EXPERT MODE USER MANUAL

***ultima***  
GAS INJECTION SYSTEM

[www.nazorati.com](http://www.nazorati.com)



## Presentation & Index

-----  
**- WARNING -**

This manual is related only to the Expert section of software version 4.xx

The index of this “Expert” Manual refer to the same chapters of “Standard” Manual

Please read the standard manual, before consulting this one.  
 -----

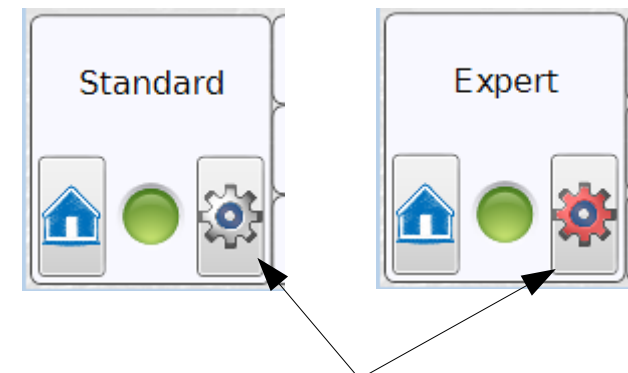
All functions shown in this manual are referred to latest version of ECUs firmware available with software.

**- IMPORTANT NOTE -**

### HOW TO ACCESS EXPERT SECTION

To access the Expert section, simply press the Gear button that you find in almost every page of the software (picture on the right). Once Expert Section is enabled, you'll find many new parameters in the software pages. All these features are shown in red.

INDEX		
6	Tune Adjust: Mapping	
6.0.1	Tune Adjust: Mapping – Change Axis	
6.1	Tune Adjust: Line	
6.2	Tune Adjust: Line – Additional Mapping	
6.3	Tune Adjust: Map Adaptivity	
6.4	Tune Adjust: Gas/Petrol	
6.5	Tune Adjust: OBD Adaptivity	
6.7	Tune Adjust: Contribution (Contributions Map)	since ver. 4.7
7	Configuration	
7.1	Configuration: Sensors	
7.2	Configuration: Lambda	
8	Diagnosis: Errors	
8.2	Diagnosis: Injectors	
8.3	Diagnosis: Information	





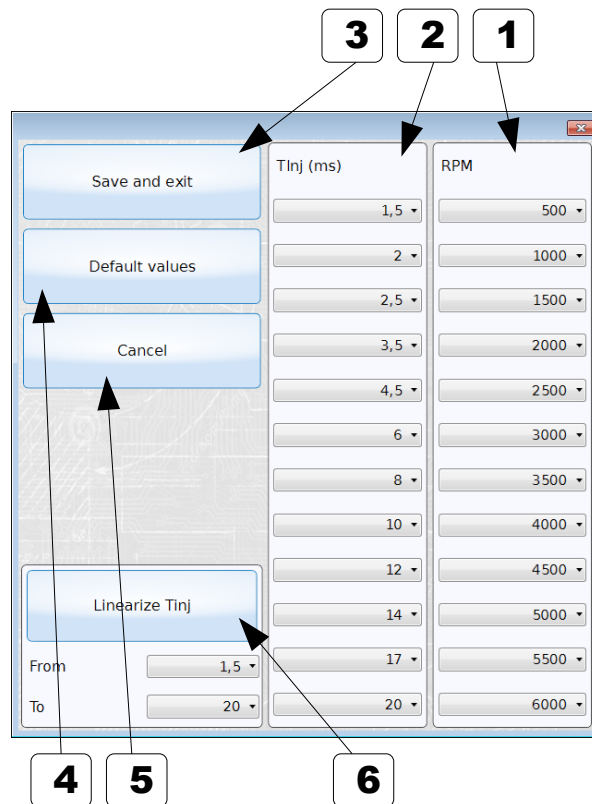
## 6 - Tune Adjust: Mapping

The screenshot shows the Mapping software interface. At the top, there are four callouts labeled 1, 2, 3, and 4. Callout 1 points to the 'Change axis' button, callout 2 to the 'Line conversion' button, callout 3 to the 'Restore line' button, and callout 4 to a yellow warning icon. Below the buttons is a grid of values for different RPM and Injection Time (IT) settings. The grid has 12 columns (500 to 6000) and 12 rows (1.5 to 20). The values are mostly 158, 159, 161, 155, 146, 137, 131, 128, and 128. At the bottom, there is an 'Expert' section with various parameters like Status (Key off), TJPet(ms), Press(bar), T.Red (°C), O2Sen.(V), RPM, TJGas(ms), MAP(bar), T.Gas (°C), Adat.corr., Bank 1, Fast(%), Slow(%), OBD O2Sen.(V), and OBD Corr.

	Description	Value
1	<p><b>Change Axis</b></p> <p>Shows the Change Axis section, that allow the user to modify RPM and Injection time scales.</p>	
2	<p><b>Line Conversion</b></p> <p>Change the Tune Adjust system from Mapping to Line transforming the current map into the LINE</p>	
3	<p><b>Restore Line</b></p> <p>This button is available only if during this software working session you have converted the Line to Map. Press it to go back to Line mode with Line values as before convert to Map.</p>	
4	<p><b>ALERT Button</b></p> <p>It is enabled only if the map reports cells with values that can generate invalid gas time. Pressing the button the invalid cells are shown on grid like this example.</p>	

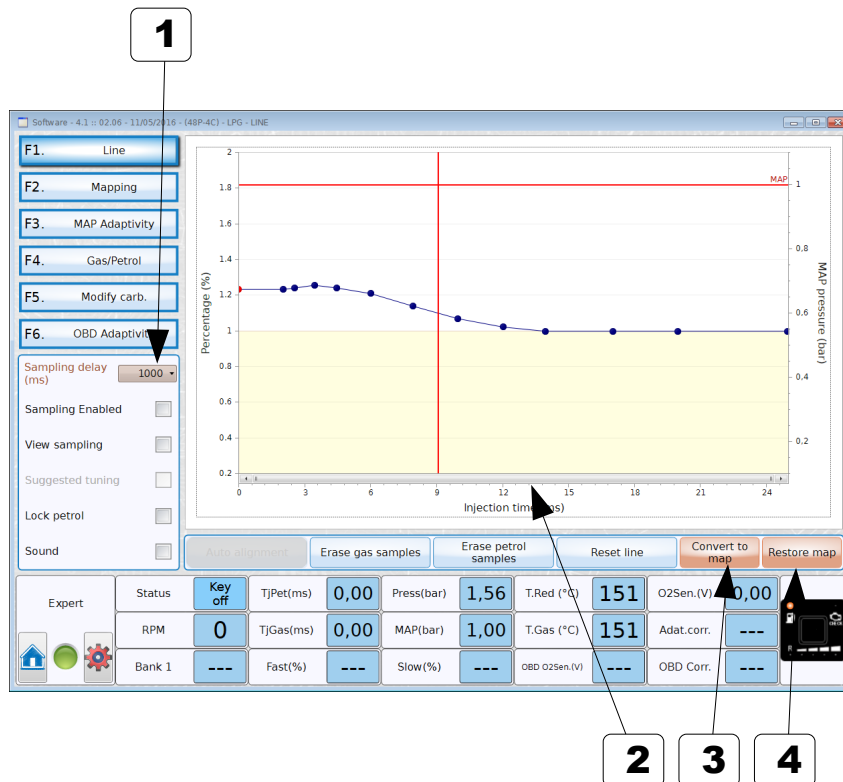
This screenshot shows the same Mapping software interface as the previous one, but with some cells in the grid highlighted in yellow. These cells are located in the first row (1.5) for RPM values 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, and 5500. The value in the last cell (5500) is 135, while the others are 158. The 'Alert' button is now active and highlighted in yellow.

### 6.0.1 - Tune Adjust: Mapping – Change Axis



	Description	Value
1	<b>RPM</b> In every combo you see the RPM reference. You can change the values as you wish, but you've to keep always incremental values.	
2	<b>Tinj (ms)</b> In every combo you see the petrol injection time reference scale. You can change the values as you wish, but you've to keep always incremental values.	
3	<b>Save and exit</b> Stores in the ECU the modified axis values.	
4	<b>Default Values</b> Reload in the ECU the default axis values.	
5	<b>Cancel</b> Close the Change Axis window, without changing anything.	
6	<b>Linearize Tinj</b> By pressing this button, the value selected in the combo <b>From</b> became the first value of the Tinj (ms) column, while the value in the combo <b>To</b> became the last value. All the values in between will be linearized from the first to the last value.	

## 6.1 - Tune Adjust: Line



1

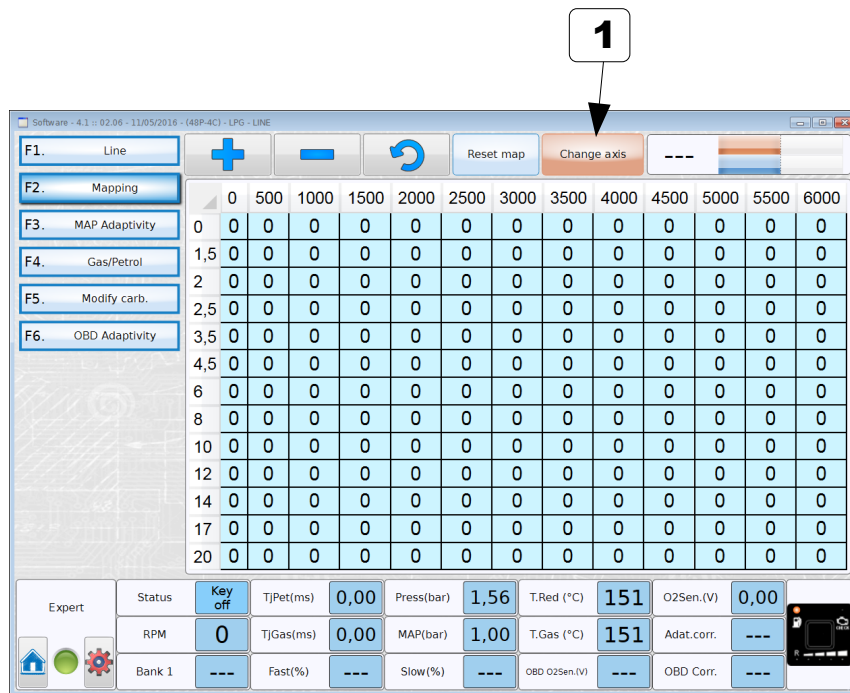
2

3

4

	Description	Value
1	<b>Sampling delay</b> Interval (in milliseconds) of engine working range stability needed to acquire a petrol or gas sample.	
2	<b>Injection Time zoom bar</b>	
3	<b>Convert to map</b> Change the Tune Adjust system from Line to Mapping, transforming the current Line into the Map	
4	<b>Restore map</b> This button is available only if, during this software working session, you have converted the Map to Line. Press it to go back to Mapping mode with map values as before convert to Line.	

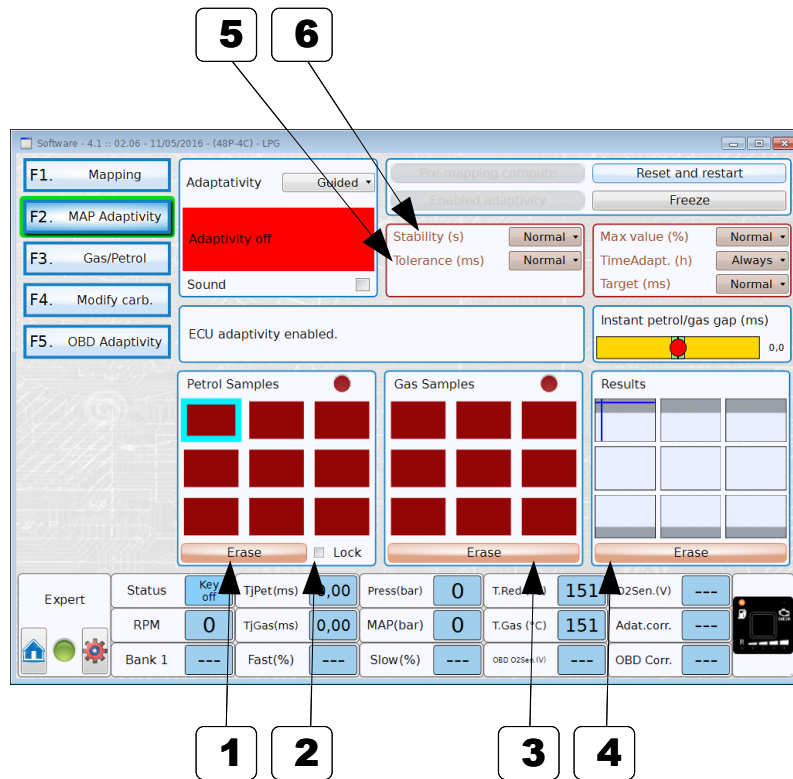
## 6.2 - Tune Adjust: Line - Additional Mapping



The screenshot shows the 'Change axis' button highlighted with a circled '1' and an arrow. The interface includes a menu on the left with options like 'Line', 'Mapping', 'MAP Adaptivity', 'Gas/Petrol', 'Modify carb.', and 'OBD Adaptivity'. The main area is a grid for mapping values across various RPM and throttle positions. The bottom section shows expert parameters like Status, Key off, TJPet, Press, T.Red, O2Sen, RPM, TJGas, MAP, T.Gas, Adat, Bank 1, Fast, Slow, OBD O2Sen, and OBD Corr.

	Description	Value
1	<p><b>Change Axis</b> Shows the Change Axis section, that allow the user to modify RPM and Injection time scales.</p> <p>See chapter 1.1</p>	

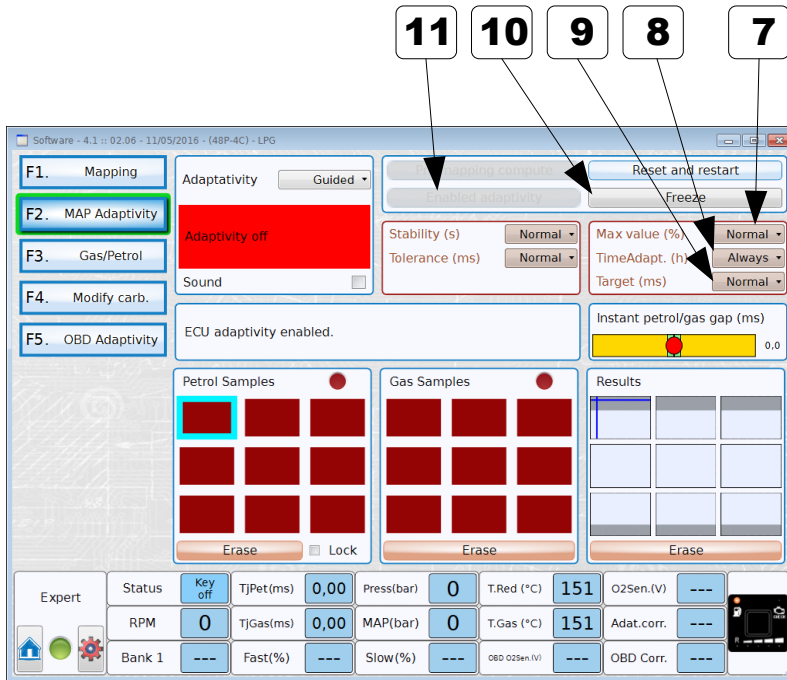
### 6.3 - Tune Adjust: Map Adaptivity (1/2)



	Description	Value
1	<b>Erase</b> Erase all the petrol samples.	
2	<b>Lock</b> While flagged, lock the petrol samples, to prevent further acquisitions. It is enabled only after completing the petrol section of the guided/customer adaptivity. Keep it unflagged to adjust petrol samples acquisition once more.	
3	<b>Erase</b> Erase all the gas samples.	
4	<b>Erase</b> Erase the results of the adaptivity.	
5	<b>Tolerance</b> This parameter is used to fix how much must be the difference between petrol sample and gas sample to start the adaptivity process.	<b>Narrow:</b> very close tolerance, to get high precision adaptivity. <b>Normal:</b> standard tolerance. <b>Wide:</b> larger tolerance, when high precision is not needed.  This is limited to the sensitivity of each car to get the check engine to come on. Keep it as wide as possible for an easier adjustment.
6	<b>Stability</b> Requested stability time length, to properly acquire new samples.	<b>Fast:</b> faster acquisition process, but less accurate. <b>Normal:</b> standard acquisition. <b>Slow:</b> slower acquisition process, but more accurate.

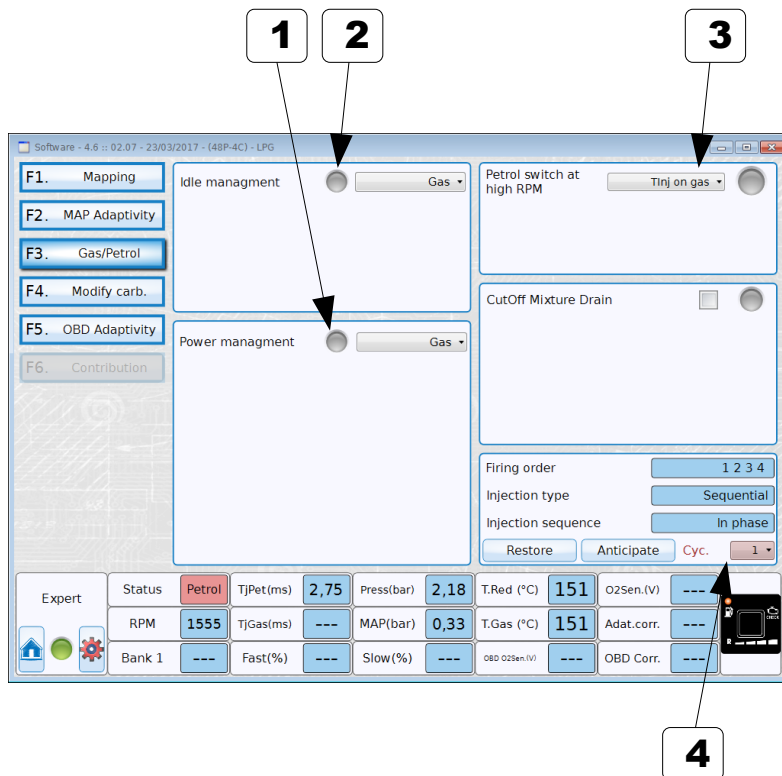


### 6.3 - Tune Adjust: Map Adaptivity (2/2)



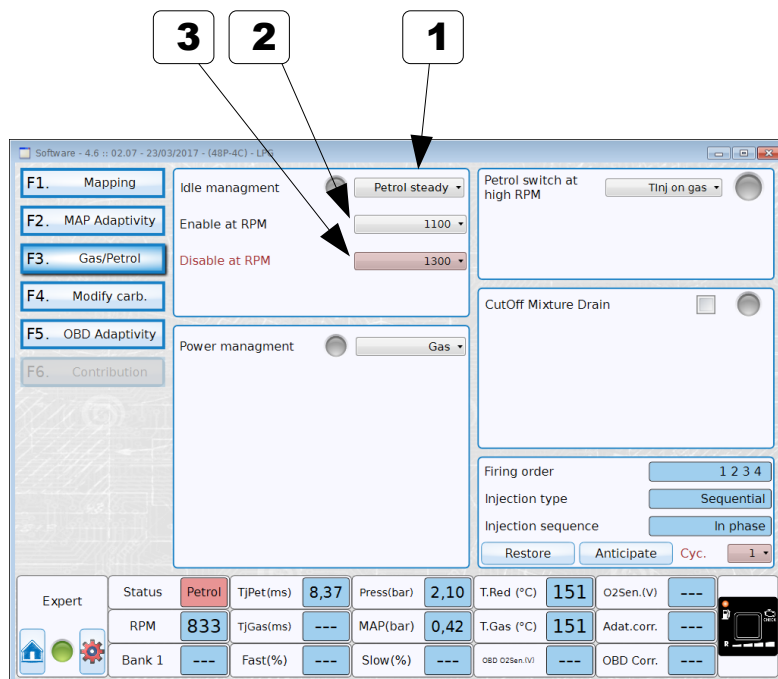
	Description	Value
7	<b>Max Value</b> Maximum adaptivity reachable value (total range).	<b>Small:</b> reduced range, allows tiny adaptations. <b>Normal:</b> standard range. <b>Wide:</b> expanded range, allows large adaptations.
8	<b>Time adapt</b> Select if the adaptation have to stop after a specific number of hours. <b>Note:</b> at the end of the process, the adaptation will not progress further. The values acquired during the adaptivity process are retained.	<b>Always:</b> adaptivity is always running. <b>&lt;5&gt; to &lt;900&gt;:</b> duration (in hours) after which the adaptivity stops.
9	<b>Target</b> Target value for the adaptivity process.	<b>Normal:</b> target is 0, the ECU will aim to have NO difference between petrol and gas samples. <b>Lean:</b> target is slightly lean, to have a little bit leaner mixture (used overall in CNG systems).
10	<b>Freeze</b> If the adaptivity is in run, pressing this button will freeze the adaptation process. All the previous corrections will be kept, with no further modifications.	
11	<b>Enabled adaptivity</b> Shows when the adaptivity process is running. It's available only if all petrol samples are collected.	

## 6.4 - Tune Adjust: Gas/Petrol



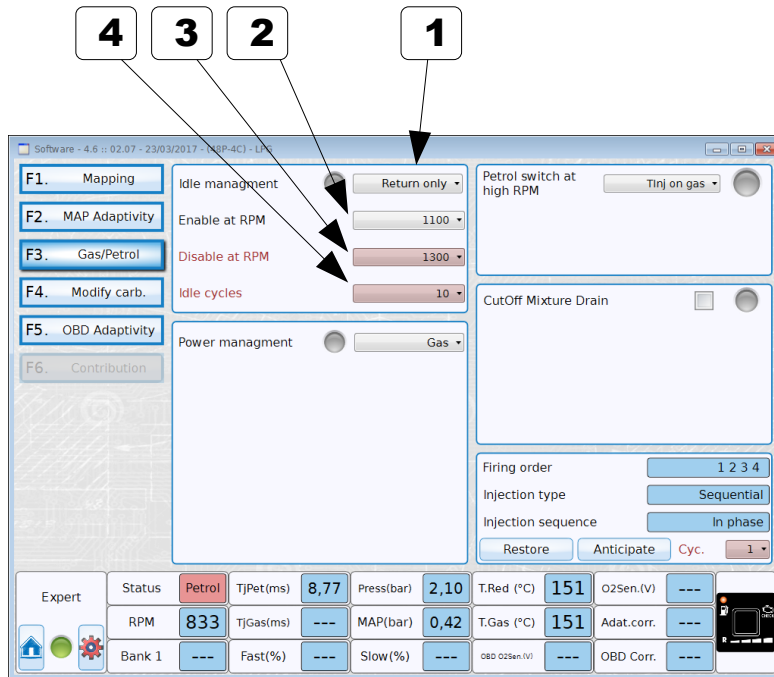
	Description	Value
1	Led is on if the Power Management strategy is working	
2	Led is on if the Idle Management strategy is working	
3	<b>Petrol switch at high RPM</b> <b>Tinj on Gas:</b> enable the temporary switch to petrol when consecutive gas injections get too close. <b>Tinj on Petrol:</b> since Software version 4.7 enable the temporary switch to petrol when consecutive injections from petrol injectors get too close.	<b>Disable,</b> <b>Tinj on Gas,</b> <b>Tinj on Petrol</b>
4	<b>Cyc</b> Select how many engine cycles you need to advance.	

### 6.4.1 - Tune Adjust: Gas/Petrol → Idle Management → Petrol Steady



	Description	Value
1	<b>Petrol steady</b> By selecting this option, the vehicle remains on petrol when the engine is on idle (basically when the RPM are below the “Enable at RPM” threshold).	
2	<b>Enable at RPM</b> Below this RPM threshold the ECU switches back to petrol.	
3	<b>Disable at RPM</b> Over this RPM threshold the ECU switches back again on gas (after idling on petrol). This value is always greater then the “Enable at RPM” threshold.	

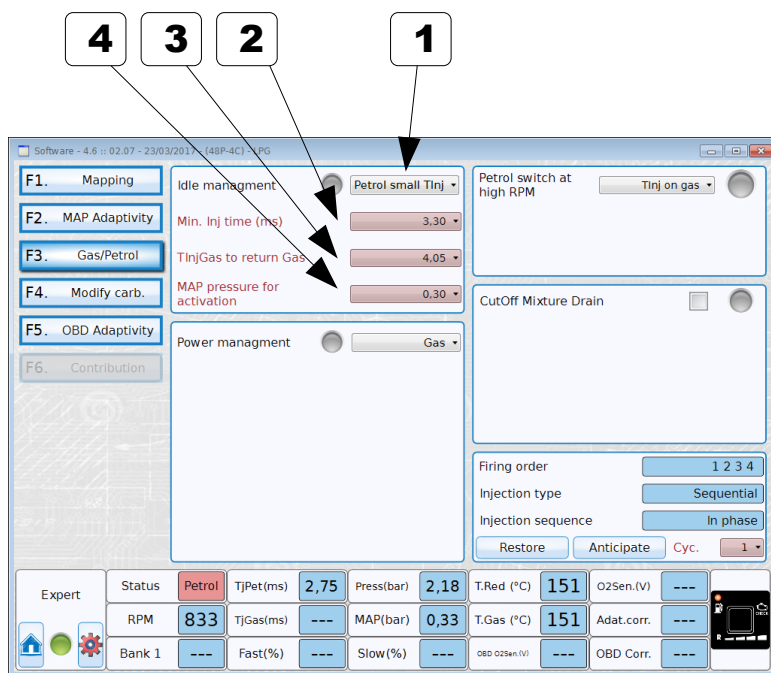
### 6.4.2 - Tune Adjust: Gas/Petrol → Idle Management → Return Only



	Description	Value
1	<p><b>Return only</b>            Selecting this option, the vehicle switches to petrol for a specific amount of engine cycles (point #4) when the engine returns on idle (basically when the RPM falls below the “<b>Enable at RPM</b>” threshold).</p>	
2	<p><b>Enable at RPM</b>            Below this RPM threshold the ECU switches back to petrol.</p>	
3	<p><b>Disable at RMP</b>            Over this RPM threshold the ECU switches again on gas (after idling on petrol). This value is always greater then the “<b>Enable at RPM</b>” threshold.</p> <p>Used in combination with #4 below, whichever come first.</p>	
4	<p><b>Idle cycles</b>            Number of engine cycles on petrol after returning to idle. Once expired, the ECU will switch again to gas.</p> <p>Used in combination with #3 above, whichever come first.</p>	

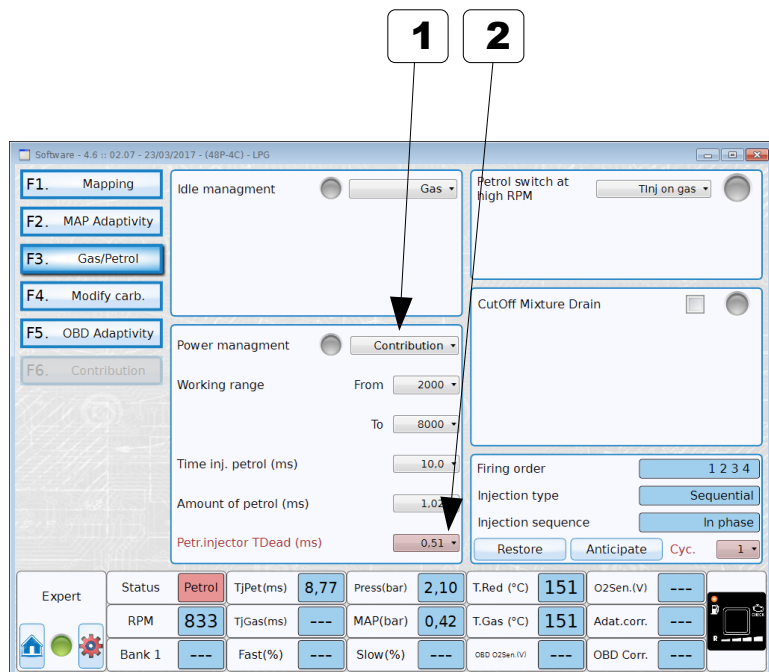
### 6.4.3 - Tune Adjust: Gas/Petrol → Idle Management → Petrol Small TinjGas

Function available since Software version 4.7



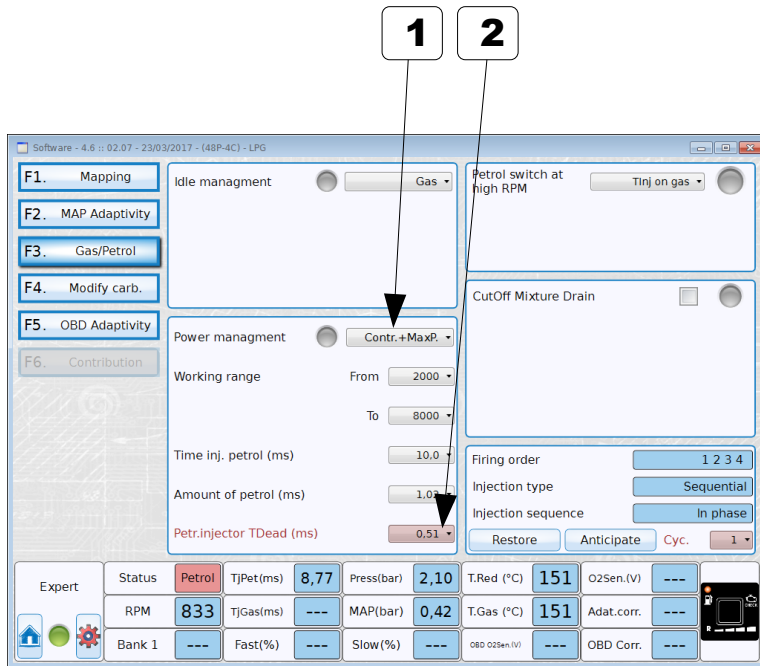
	Description	Value
1	<b>Petrol small TinjGas</b> Selecting this option, the vehicle switches to petrol when the calculated time of gas injection is lower than <b>Min inj. Time (#2)</b> . The vehicle return to gas when calculated time return upper than <b>TinjGas to return Gas (#3)</b> . This function works when MAP pressure is lower than <b>MAP pressure for activation (#4)</b> .	
2	<b>Min inj. Time</b> Lower threshold for calculated Tinj Gas	
3	<b>TinjGas to return Gas</b> Threshold to return GAS after enabling of strategy	
4	<b>MAP pressure for activation</b> The strategy works only if MAP pressure is lower than this threshold.	

### 6.4.4 - Tune Adjust: Gas/Petrol → Power Management → Contribution



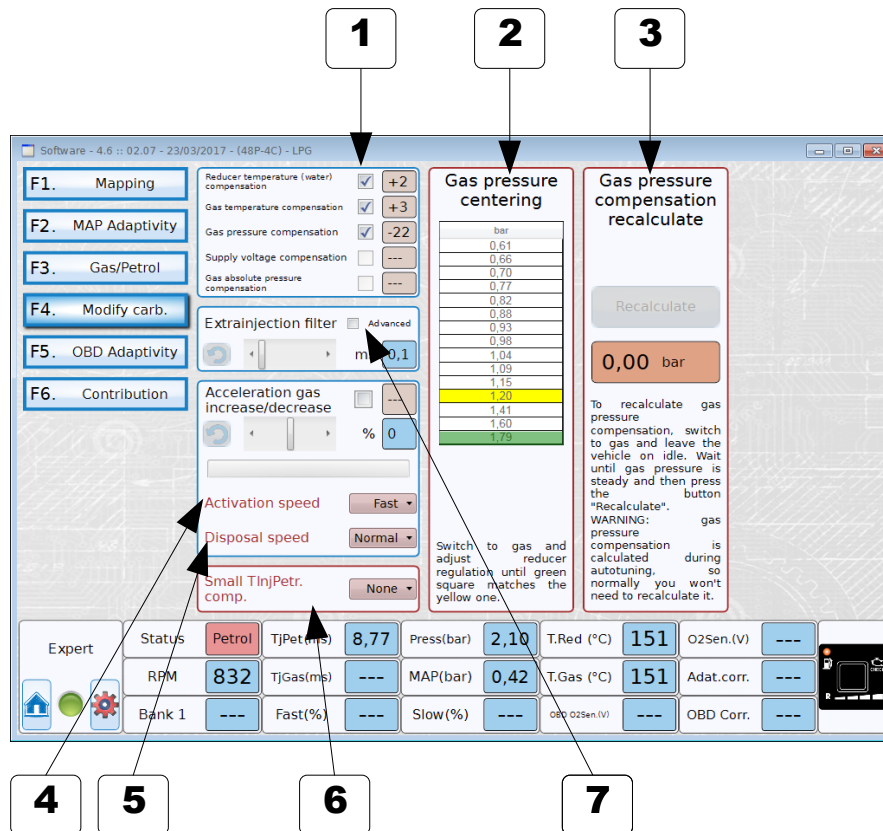
	Description	Value
1	<b>Contribution</b> Selecting this option, the vehicle will inject a small amount of petrol, in the selected conditions, while running on gas.	
2	<b>Petr. Injector Tdead</b> This is a hypothetical dead time related to the petrol injector. This parameter affects the carburation in this way: lower values leads to a richer mixture (increases gas amount) while higher values leads to a leaner mixture (decreases gas amount).	

### 6.4.6 - Tune Adjust: Gas/Petrol → Power Management → Contr.+MaxP.



	Description	Value
1	<p><b>Contribution + Max Power</b>            Selecting this option, the vehicle will inject a small amount of petrol, in the selected range, while running on gas.            Over the selected range the vehicle will run <b>only</b> on petrol.</p>	
2	<p><b>Petr. Injector Tdead</b>            This is a hypothetical dead time related to the petrol injector. This parameter affects the carburation in this way: lower values leads to a richer mixture (increases gas amount) while higher values leads to a leaner mixture (decreases gas amount).</p>	

## 6.5 – Tune Adjust: Modify Carburation ( 1/2 )



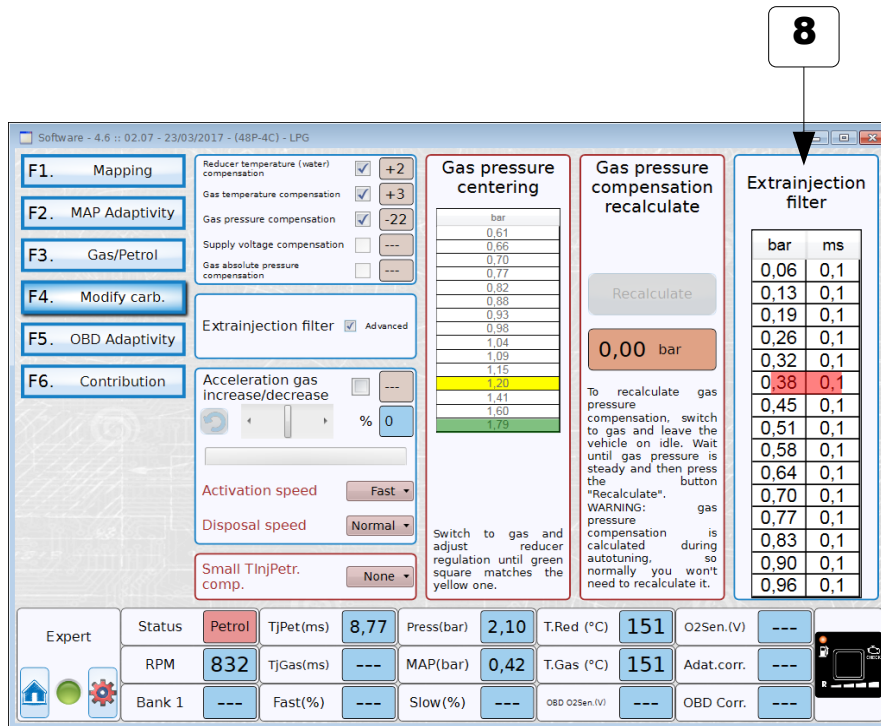
	Description	Value
1	<b>Enables or disables each compensation</b>	
2	<b>Gas pressure centering</b> This procedure it's useful to properly set the reducer pressure (if it has a mechanical adjustment). Usually you have to check this after the "running in" of the installation, or after replacing the reducer. It must be done at idle, with the vehicle on gas. Simply follow the instructions shown in the software.	
3	<b>Gas pressure compensation recalculate</b> This procedure computes automatically the gas pressure compensation table in relation to the reducer pressure. Usually it's made automatically by the software during the auto-calibration, but if for some reason the auto-calibration fails, use this feature before manually calibrate the vehicle.	
4	<b>Activation speed</b> It's the activation speed of the "Acceleration gas increase/decrease". Changing this parameter lead to a faster (or slower) response, when the vehicle is accelerating.	<b>SLOW:</b> activation is slow, response after accelerating is delayed. <b>NORMAL:</b> activation is at medium speed, response after accelerating is slightly delayed. <b>FAST:</b> activation is at maximum speed, response is not delayed at all.
5	<b>Disposal speed</b> It's the disposal speed of the "Acceleration gas increase/decrease". Changing this parameter lead to a longer (or shorter) duration of the correction effect.	<b>SLOW:</b> disposal is slow, duration is longer. <b>NORMAL:</b> disposal is normal, standard duration. <b>FAST:</b> disposal is fast, duration is shorter.
6	<b>Small TinjPetr. Comp.</b> Compensation on petrol injection time to be used before autotuning if the petrol injection times are too low.	
7	<b>Extrajection filter – Advanced</b> when enabled the Extrajection Filter table is shown	<b>Since ver. 4.7</b>



## 6.5 – Tune Adjust: Modify Carburation ( 2/2 )

Function available since Software version 4.7

8

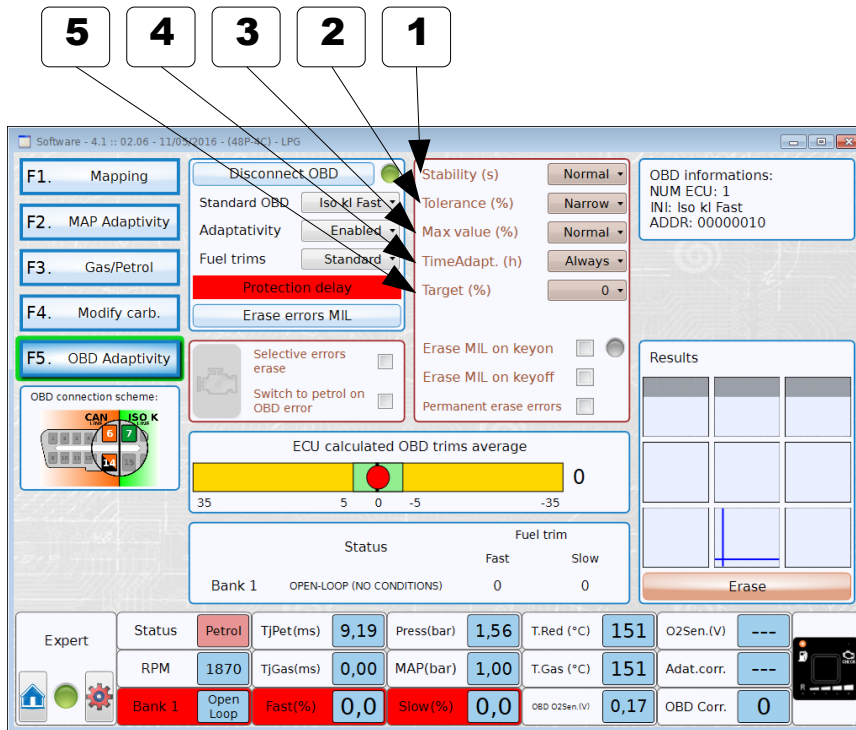


The screenshot shows the 'Extrajection filter' table with the following data:

bar	ms
0,06	0,1
0,13	0,1
0,19	0,1
0,26	0,1
0,32	0,1
<b>0,38</b>	<b>0,1</b>
0,45	0,1
0,51	0,1
0,58	0,1
0,64	0,1
0,70	0,1
0,77	0,1
0,83	0,1
0,90	0,1
0,96	0,1

	Description	Value
7	<b>Extrajection filter Table</b> It's possible to change the value of Extrajection filter by different MAP pressure	

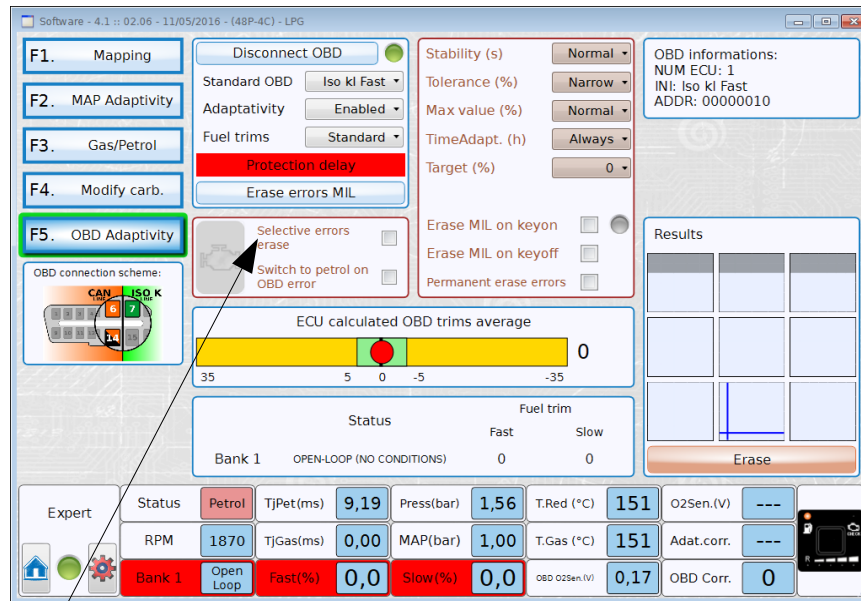
## 6.6 - Tune Adjust: OBD Adaptivity (1/5)



	Description	Value
1	<b>Stability</b> Requested stability time length, to properly acquire new samples.	<b>Fast:</b> faster acquisition process, but less accurate. <b>Normal:</b> standard acquisition. <b>Slow:</b> slower acquisition process, but more accurate.
2	<b>Tolerance</b> How much must be the average of the fuel OBD trims to start the adaptivity process.	<b>Narrow:</b> very close tolerance, to get high precision adaptivity. <b>Normal:</b> standard tolerance. <b>Wide:</b> larger tolerance, when high precision is not needed.  This is limited to the sensitivity of each car to get the check engine to come on. Keep it as wide as possible for an easier adjustment.
3	<b>Max Value</b> Maximum adaptivity value (total range).	<b>Small:</b> reduced range, allows tiny adaptations. <b>Normal:</b> standard range. <b>Wide:</b> expanded range, allows large adaptations.
4	<b>TimeAdapt.</b> Select if the adaptation have to stop after a specific number of hours. <b>Note:</b> at the end of the process, the adaptation will not progress further. The values acquired during the adaptivity process are retained.	<b>Always:</b> adaptivity is always running. <b>&lt;5&gt; to &lt;900&gt;:</b> duration (in hours) after which the adaptivity stops.
5	<b>Target</b> Target value (related to the fuel OBD trims) for the adaptivity process.	<b>&lt;-64&gt; to &lt;+64&gt;:</b> it's the target value that the ECU will try to obtain as fuel OBD trims average, adapting the results table. The largest number of

## 6.6 - Tune Adjust: OBD Adaptivity (2/5)

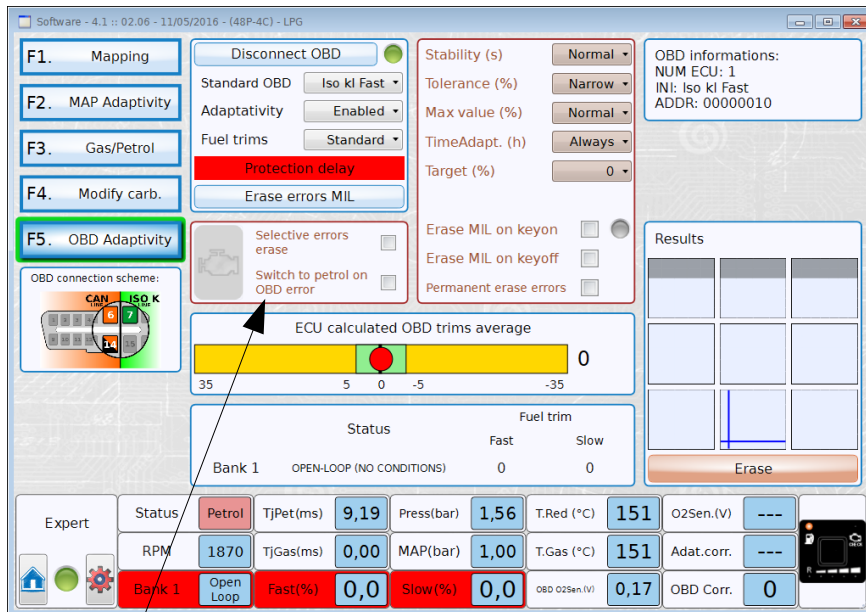
	vehicles are targeted to 0%.
--	------------------------------



6

	Description
6	<p><b>Selective error erase – Part #1</b></p> <p>Once it has been enabled, the system checks for latent errors on the OBD and, in case at least one error is found, it send to the OBD system a clear error request (theoretically before it is shown by the check engine light). The default hidden errors listed for erasing are the following:</p> <ul style="list-style-type: none"> <li>• P0420 Catalyst System Efficiency Below Threshold (Bank 1)</li> <li>• P0430 Catalyst System Efficiency Below Threshold (Bank 2)</li> <li>• P2096 Post Catalyst Fuel Trim System Too Lean Bank1</li> <li>• P2097 Post Catalyst Fuel Trim System Too Rich Bank 1</li> </ul> <p>To show how this feature is running, there's a button with the image of the “Check engine light” on right side. This button can be enabled or not, and can be shown in different colours. Hereinafter the details:</p> <ul style="list-style-type: none"> <li>• <b>GREY</b>: Errors erasing disabled, OBD connection disabled or not present, firmware not up-to-date etc.</li> <li>• <b>RED</b>: the gas ECU is working on petrol (on petrol, latent errors are not monitored).</li> <li>• <b>VIOLET</b>: the request for latent errors has not been sent or is not available. Note: during the change-over to gas it's possible that the button turns violet, as the engine is running on gas but the query relevant to latent errors has not been sent yet. This status remains for few seconds only. In case the violet colour remains, it's possible that the system does not support the service of showing latent errors. Just to be sure, press the button “Disconnect OBD” and afterwards “Connect OBD” to get once more the screen of PID to verify if the problem is still there.</li> <li>• <b>GREEN</b>: erasing errors service is working. No latent error found.</li> <li>• <b>YELLOW</b>: erasing errors service is working. At least one latent error found, NOT present in the list of the Errors to be erased.</li> <li>• <b>LIGHT BLUE</b>: at least one latent error found, present in the list of the Errors to be erased. At the same time, the request to the OBD system for erasing the errors has been sent.</li> </ul>

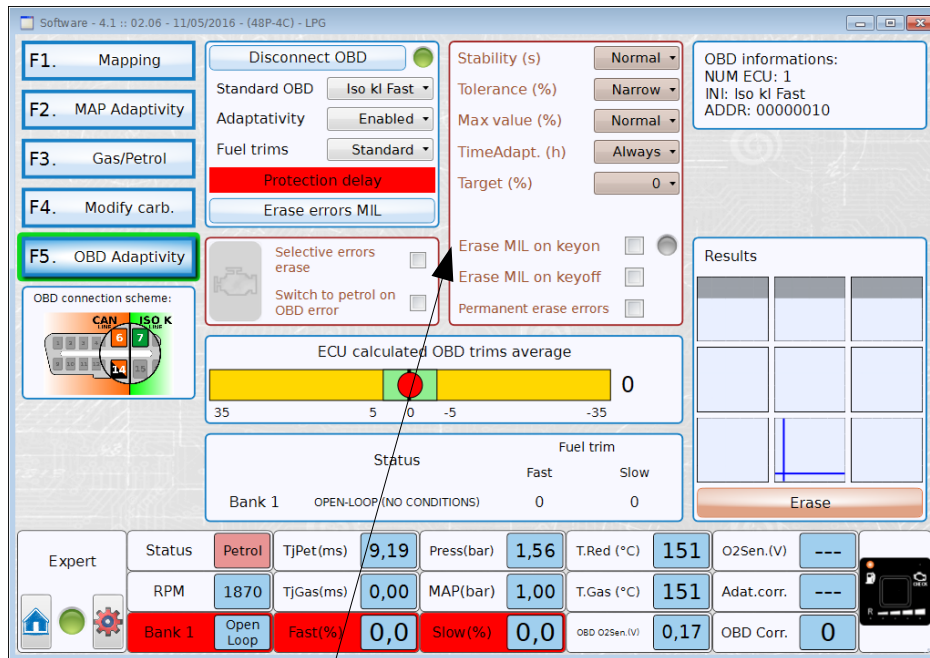
## 6.6 - Tune Adjust: OBD Adaptivity (3/5)



7

	Description
7	<p><b>Selective error erase – Part #2</b></p> <p>It is important to consider the following:</p> <ul style="list-style-type: none"> <li>By clicking the button it is possible to get the list of the latent errors memorized at the moment in the petrol ECU. These data are available ONLY if the button is YELLOW or LIGHT BLUE.</li> <li>If the info are needed in a configuration file (so that the errors can be examined offline) it is important that the file is saved with the engine running on gas and with the erasing errors service working (button must be YELLOW or BLUE).</li> <li>If the latent errors is found continuously (as for example if the oxygen sensor has been disconnected), and the vehicle support the erasing errors service, most likely the colour of the button will be alternatively GREEN and BLUE (of course with the engine running on gas). This behaviour means that the error has been maybe erased, but the car in short time will show it again as the anomalous condition has not been fixed.</li> </ul>

## 6.6 - Tune Adjust: OBD Adaptivity (4/5)



8

### Description

#### 8 Erase MIL on Keyon – Part #1

Once activated, when you turn on the contact key, a request for clear errors it's sent to the OBD system of the vehicle. In order to have this feature work properly, proceed as follows:

- Enable this function on the gas ECU, where the OBD adaptivity has to be enabled or the OBD connection active (adaptivity frozen).
- Once is enabled, it has to be told to the owner of the vehicle that at every engine start (or when is reputed necessary) he will need to:
  - Contact key ON without starting the engine.
  - Wait for the blinking check lamp on the gas switch to turn OFF.

Start the engine.

If the connection can't be made, a long blinking will advise this "non connection" (up to 5 seconds for CAN standard and up to 15 seconds blinking for ISO standard). This usually indicates a problem with the connecting wires. A short blinking (i.e. 2 seconds for CAN standard and 5 seconds for ISO standard) indicates that the connection could be established and the command for erasing has been sent.

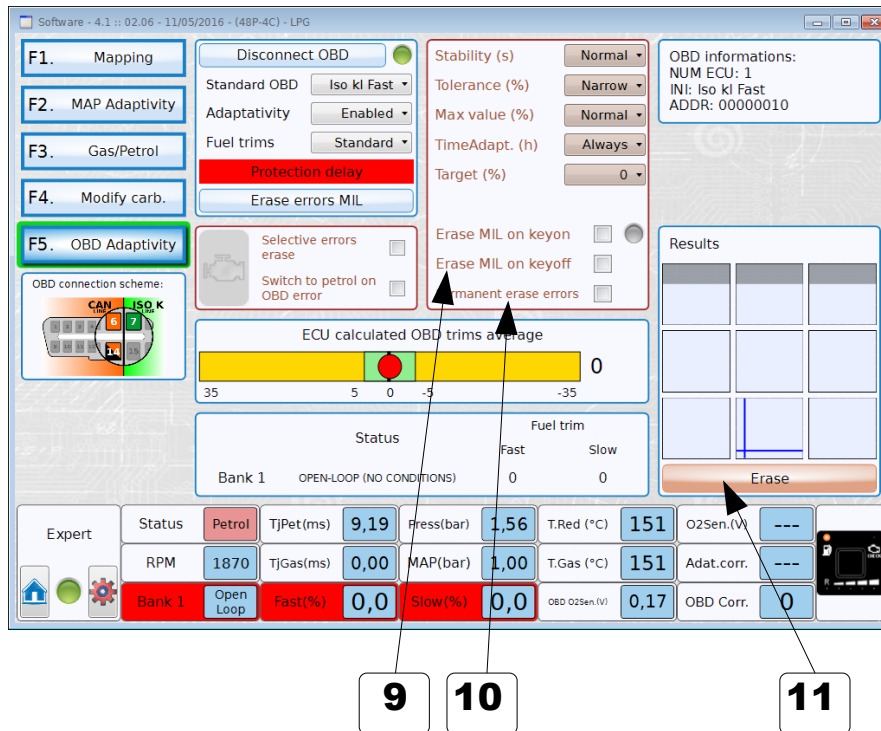
NOTE: the delays for blinking have to be checked in every vehicle as they are different due to different engine management.

It is possible to verify through the software if the erase command has been sent. by checking through the LED "Erase MIL on key ON" following the next steps:

- Connect the software to the vehicle with the key NOT INSERTED (this is most important!).
- Start the engine as described above.
- Wait a few seconds and verify the colour of the led:
  - GREY: no command for erasing has been sent (connection problems).
  - YELLOW: command has been sent but the answer from the vehicle was not correct (erasing command not supported, or the delay for sending/receiving has not been respected).
  - LIGHT BLUE: erasing command was sent correctly.

It is possible to start the engine without following the sequence as above. In this case, the gas ECU will try anyway to send the erasing command which won't cause any action (most likely), as this happens in vehicles not ready for this service.

## 6.6 - Tune Adjust: OBD Adaptivity (5/5)



Software - 4.1.00.02.06 - 11/05/2016 - (48P-4C) - LPG

**F1. Mapping** | Disconnect OBD  | Stability (s) Normal | OBD informations: NUM ECU: 1, INI: Iso kl Fast, ADDR: 00000010

**F2. MAP Adaptivity** | Standard OBD Iso kl Fast | Tolerance (%) Narrow

**F3. Gas/Petrol** | Adaptativity Enabled | Max value (%) Normal

**F4. Modify carb.** | Fuel trims Standard | TimeAdapt. (h) Always | Target (%) 0

**F5. OBD Adaptivity** | Protection delay | Erase errors MIL | Erase MIL on keyon  | Erase MIL on keyoff  | Permanent erase errors  | Results

ECU calculated OBD trims average: 0

Status: Bank 1 OPEN-LOOP (NO CONDITIONS) | Fuel trim: Fast 0, Slow 0

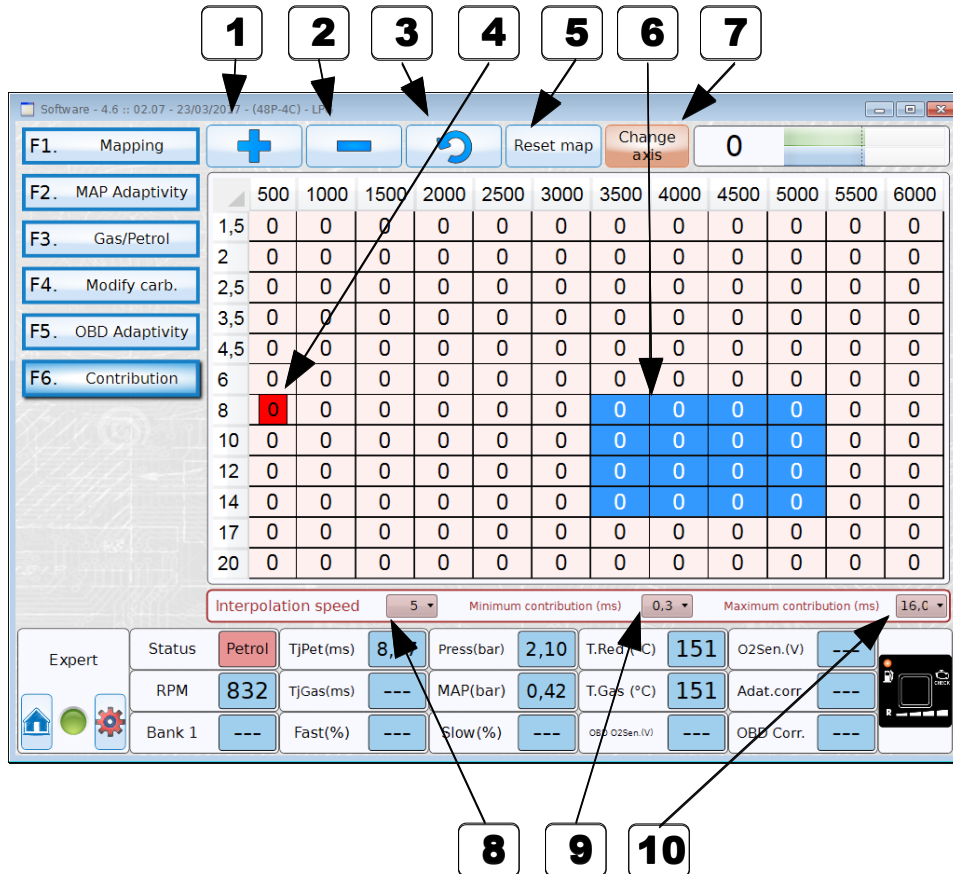
Expert: Status Petrol, TJPet(ms) 9,19, PRes(bar) 1,56, T.Red (°C) 151, O2Sen.(V) ---, RPM 1870, TJGas(ms) 0,00, MAP(bar) 1,00, T.Gas (°C) 151, Adat.corr. ---, Bank 1 Open Loop, Fast(%) 0,0, Slow(%) 0,0, OBD o2sen.(V) 0,17, OBD Corr. 0

9 10 11

	Description
9	<b>Erase MIL on Keyoff</b> Once activated, when you turn off the contact key, a request for clear errors it's sent to the OBD system of the vehicle. To make this feature work properly, is needed to connect the key wire to a delayed command, because both 12V key and OBD connection must be present during this operation. NOTE: not all vehicles supports this feature.
10	<b>Permanent Erase Errors</b> While enabled, it check continuously the MIL status (check engine lamp): if it's on, then a request for clear errors it's sent to the OBD system of the vehicle in order to turn off the MIL. Note: on many of the latest vehicle it will not work because the error erase with the engine on, is often not allowed.
11	<b>Erase results</b> Erase results of the adaptivity.

## 6.7 – Tune Adjust: Contribution ( Contributions Map )

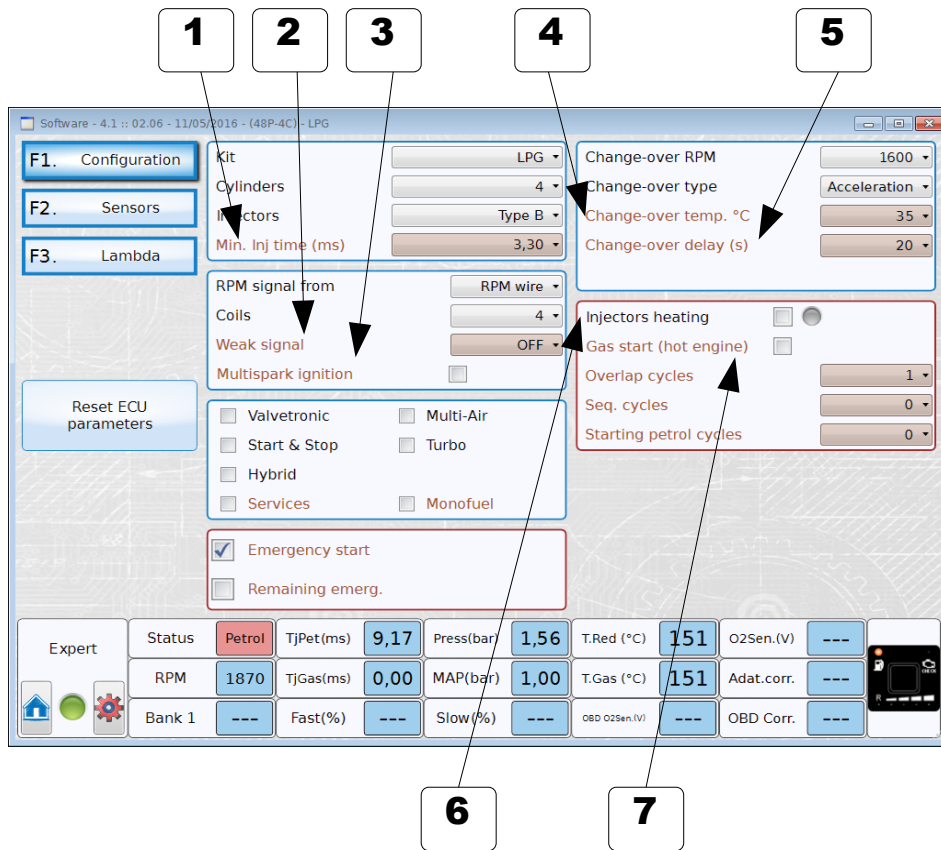
Function available since Software version 4.7



The screenshot shows the 'Contribution' tab in the software. The main area is a grid with RPM values (1,500 to 2,000) on the y-axis and Injection time scales (500 to 6,000) on the x-axis. The grid cells contain numerical values, with a 3x3 area of cells highlighted in blue. Below the grid are controls for 'Interpolation speed', 'Minimum contribution (ms)', and 'Maximum contribution (ms)'. At the bottom, there are various engine parameters like Status, RPM, Press, T.Red, O2Sen, etc.

	Description
1	<b>INCREASE VALUE</b> in the selected are (one or more cells has to be selected)
2	<b>DECREASE VALUE</b> in the selected are (one or more cells has to be selected)
3	<b>UNDO last change</b> It is possible to go back for 1 step
4	<b>ACTUAL Engine Working Point</b>
5	<b>RESET MAP</b> button
6	<b>SELECTION of the MAP AREA</b> where it is required to apply for an increase or decrease in correction values shown. Use the mouse to select one cell or an area. The selected squares change to BLUE colour
7	<b>Change Axis</b> Shows the Change Axis section, that allow the user to modify RPM and Injection time scales.
8	<b>Interpolation speed</b> Is used to calculate interpolation steps when engine moves from a cell to another
9	<b>Minimum contribution (ms)</b> Minimum amount of petrol used as contribution even if the calculated values is lower than this ( if cell values is not zero )
10	<b>Maximum contribution (ms)</b> Maximum amount of petrol used as contribution even if the calculated values is bigger than this

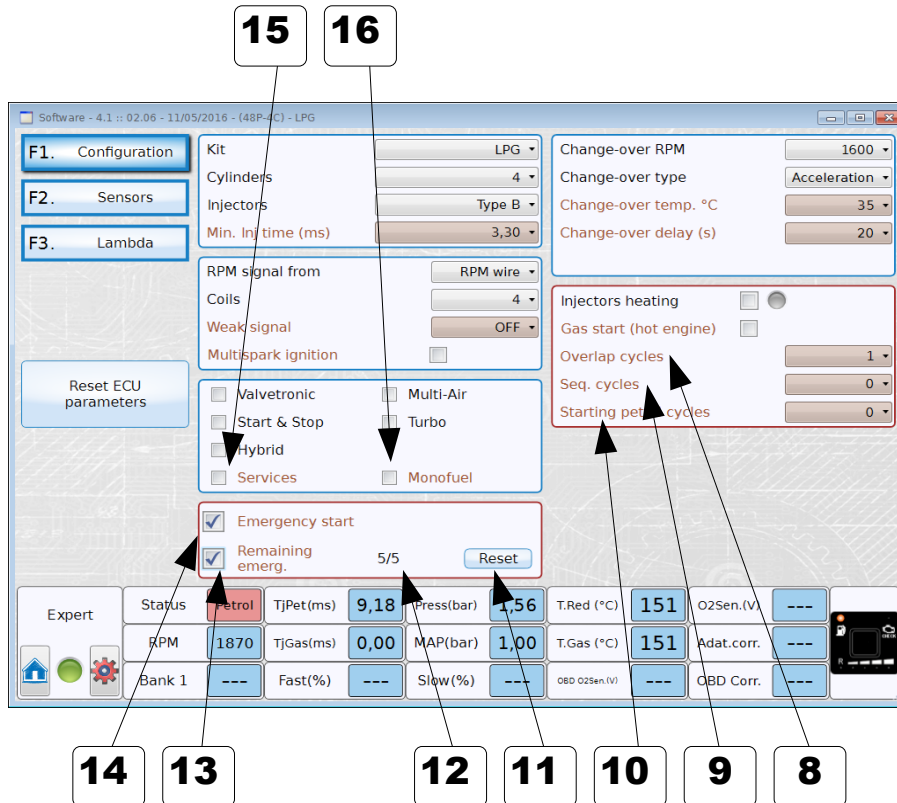
## 7 - Configuration (1/2)



	Description
<b>1</b>	<b>Min. Inj time</b> Select the minimum opening time of the gas injector. If the gas ECU computes a real-time injection time that's low than this value, then the gas injection is made of the duration shown here. Note: when happens that the gas injector is working at its limit, the TjGas label below (in the cockpit) will turn red.
<b>2</b>	<b>Weak signal</b> Once enabled, the RPM signal will be slightly amplified. It is supposed to use this feature when RPM signal is not read properly.
<b>3</b>	<b>Multispark ignition</b> This feature is used in all those vehicles that, in cold start, are sending a set of pulses to the ignition coils leading a wrong RPM readout to be shown. When enabled, the ECU will automatically filter the pulses in excess.
<b>4</b>	<b>Change-over temp.</b> This value identifies the lowest temperature needed for change-over.
<b>5</b>	<b>Change-over delay</b> This value identifies the shortest amount of time that at every cold start the vehicle remain on petrol before switching.
<b>6</b>	<b>Injectors heating</b> When this feature is enabled, the gas injectors are heated before the first gas switch-over (helpful in cold climates).
<b>7</b>	<b>Gas Start (hot engine)</b> Enabling this feature, if the vehicle is already hot (check is made on the reducer temperature), the engine will start directly on gas.

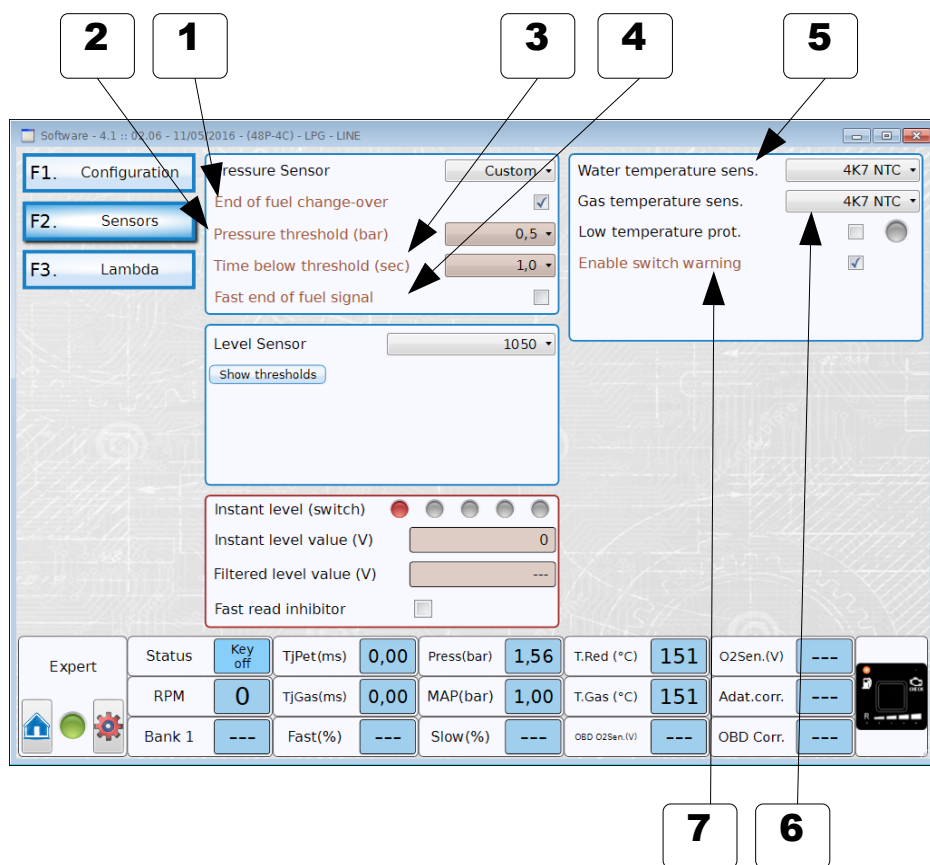


## 7 - Configuration (2/2)



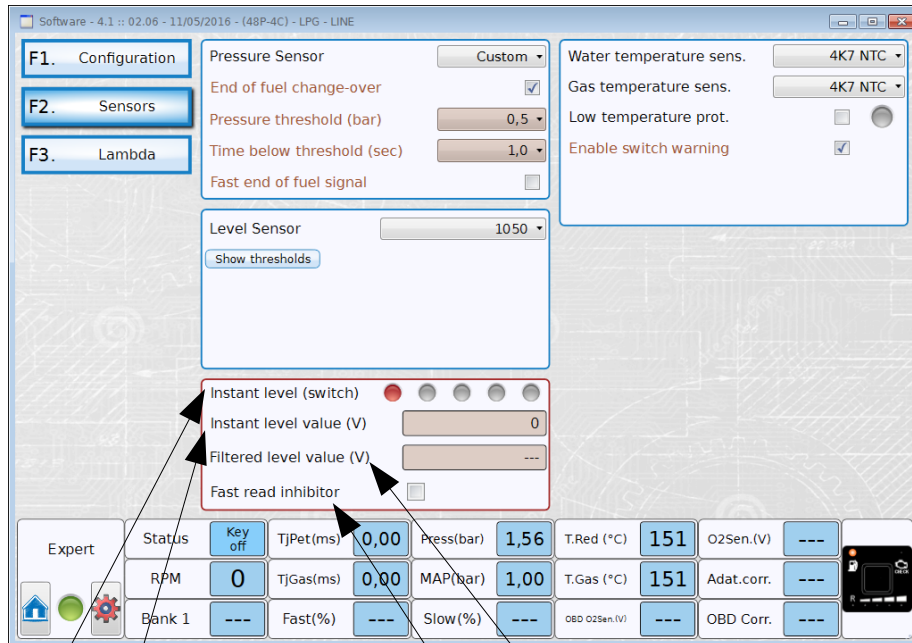
	Description
<b>8</b>	<b>Overlap cycles</b> Select the number of engine cycles, during the change-over, in which both gas and petrol are injected. Usually is kept on 0 in CNG systems, and 1 in LPG systems. It's useful even when the gas section downstream the reducer is not airtight.
<b>9</b>	<b>Seq. Cycles</b> Select the number of engine cycles, during the change-over, that the ECU waits before switching to the further cylinder, in order to finish the process. Usually is kept on 1 in CNG systems, and 0 in LPG systems.
<b>10</b>	<b>Starting petrol cycles</b> Select the amount of engine cycles that the ECU do on petrol at every start, even in gas starting condition (hot engine).
<b>11</b>	<b>Reset</b> Restore the available emergency starts to the maximum value, allowing the user to make emergency starts again.
<b>12</b>	<b>5/5</b> The left number is the amount of the emergency starts still available, the right number is the maximum amount of emergency starts allowed.
<b>13</b>	<b>Remaining emerg.</b> While this flag is enabled, a maximum amount of emergency starts is set (usually 5). Once the available emergency starts are run out, the vehicle will not start again in emergency (at least until this value is restore).
<b>14</b>	<b>Emergency start</b> Once enabled, it is possible to start in emergency mode (keep pressed the switch while turning on the key).
<b>15</b>	<b>Services</b> Enables the command of activation for a petrol pump cut relay or timing advance processor, synchronized with the real switch to gas.
<b>16</b>	<b>Monofuel</b> If enabled, all function that use petrol are ignored by ECU

## 7.1 – Configuration: Sensors (1/2)



	Description
<b>1</b>	<b>End of fuel change-over</b> Enables the end of fuel change-over when the gas runs out (low gas pressure).
<b>2</b>	<b>Pressure Threshold</b> Select the pressure threshold below which the ECU detect that the gas it's over.
<b>3</b>	<b>Time below threshold</b> Select the amount of seconds that the gas pressure must be below the selected threshold, to switch on petrol due to fuel ending.
<b>4</b>	<b>Fast end of fuel signal</b> If flagged, when gas ends, the switch inside the car "bip" only for 5 seconds and not continuously.
<b>5</b>	<b>Water temperature sens.</b> Select the temperature sensor type installed on the systems to read the reducer/water temperature. It's changeable but you can't disable it.
<b>6</b>	<b>Gas temperature sens.</b> Select the temperature sensor type installed on the systems to read the gas temperature. It's changeable and you can also disable it if it's not present.
<b>7</b>	<b>Enable switch warning</b> Once enabled, it shows on the physical switch that the ECU is running on petrol when the feature "Low temperature prot." is enabled and active.

## 7.1 – Configuration: Sensors (2/2)



8

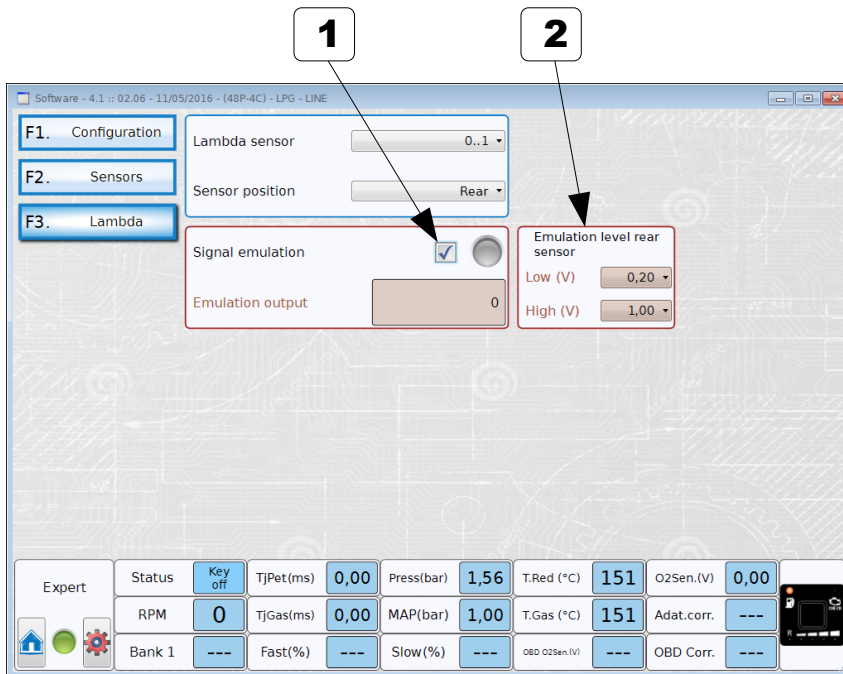
9

10

11

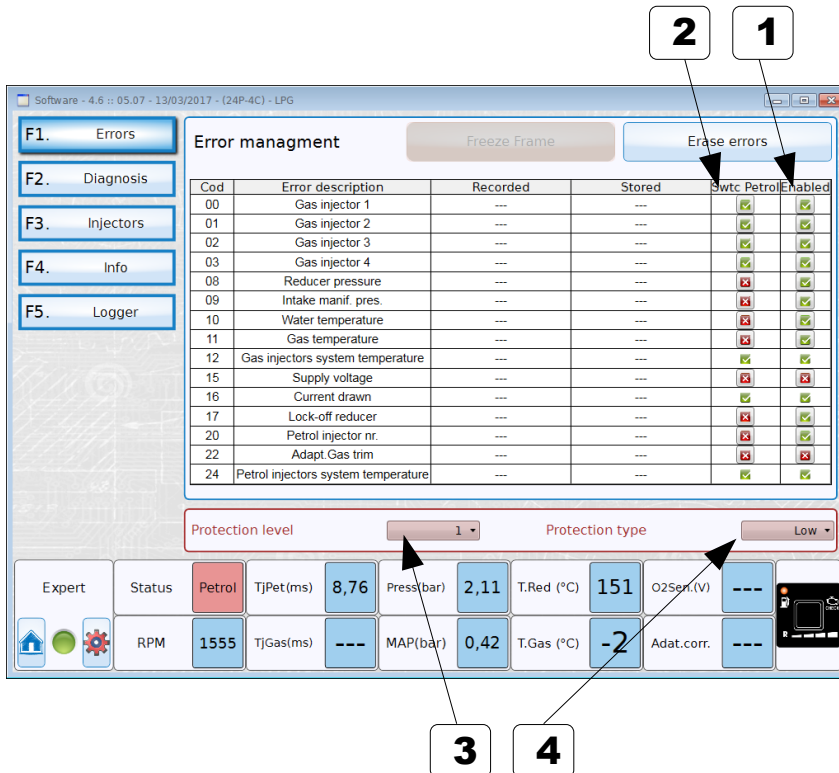
	Description
<b>8 Instant level (switch)</b>	Displays the level shown by the switch without delays (normally level is shown on the physical switch with a heavy delay, while here it's "real-time").
<b>9 Instant level value</b>	Displays the "real-time" voltage value (unfiltered), read by the ECU, on the level signal input. It's the value that is used by the software to simulate the level LEDs coming on in "Instant level (switch)" indicator.
<b>10 Fast read inhibitor</b>	If flagged the ECU does not read the gas level into the tank immediately after a stop and restart of engine.
<b>11 Filtered level value</b>	Displays the voltage value (filtered), read by the ECU, on the level signal input. It's the value that is used by the ECU to command the switch level LEDs to come on.

## 7.2 – Configuration: Lambda



	Description
<b>1</b>	<p><b>Signal Emulation</b> Once enabled, the gas ECU will activate the emulation on the oxygen sensor. This feature is available only on rear sensor, and it works if emulation and sensor wires are connected properly (see electrical schematics supplied with the ECU).</p>
<b>2</b>	<p><b>&lt;Low&gt; &lt;High&gt;</b> Select the working range of the oxygen sensor emulation (the signal output is limited between these two thresholds).</p>

## 8 – Diagnosis: Errors



Cod	Error description	Recorded	Stored	Swtc	Petrol	Enabled
00	Gas injector 1	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
01	Gas injector 2	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
02	Gas injector 3	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
03	Gas injector 4	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
08	Reducer pressure	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
09	Intake manif. pres.	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	Water temperature	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11	Gas temperature	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12	Gas injectors system temperature	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15	Supply voltage	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
16	Current drawn	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
17	Lock-off reducer	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
20	Petrol injector nr.	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
22	Adapt Gas trim	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
24	Petrol injectors system temperature	---	---	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

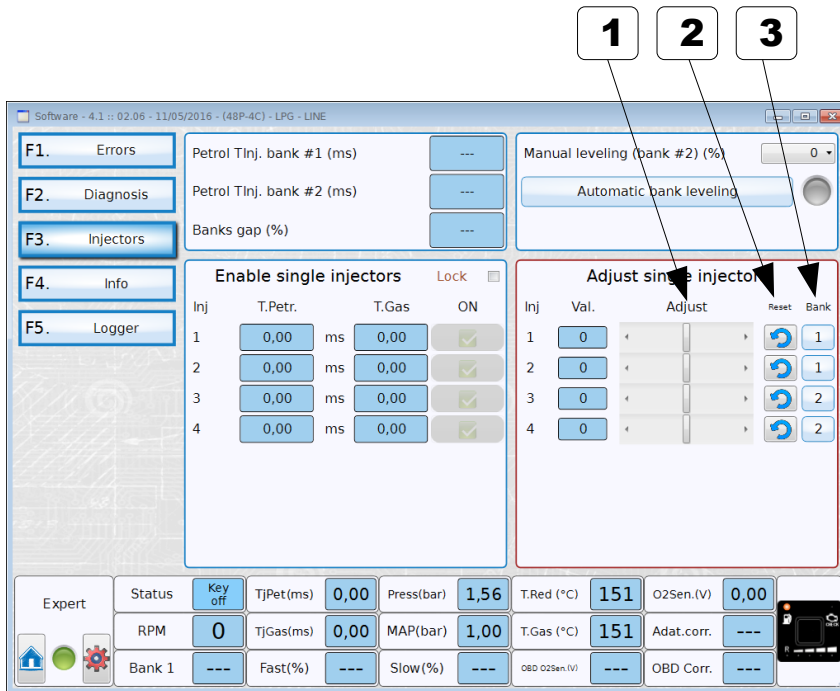
Protection level: 1 Protection type: Low

Status: Petrol TjPet(ms): 8,76 Press(bar): 2,11 T.Red (°C): 151 O2Sen.(V): ---

RPM: 1555 TjGas(ms): --- MAP(bar): 0,42 T.Gas (°C): -2 Adat.corr.: ---

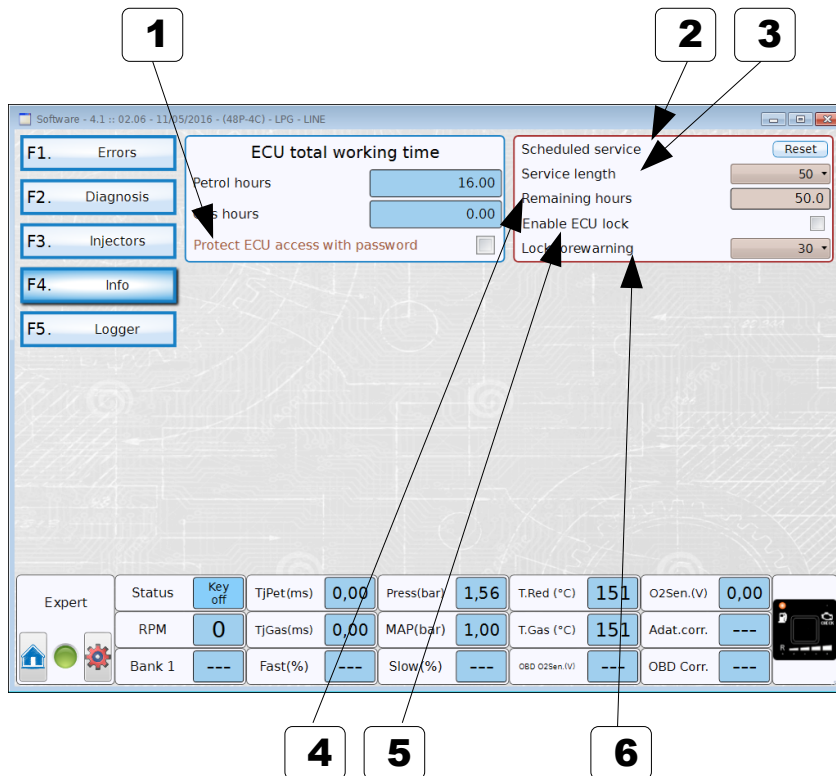
	Description
<b>1</b>	<b>Enabled</b> Sets if the relative error (shown in the row) have to be managed by the gas ECU, or simply ignored. Once enabled, when the error occurs an acoustic advice is heard from the switch and the diagnosis LED turns on.
<b>2</b>	<b>Swtc. petrol</b> Sets if an enabled error has to be managed by switching the vehicle back to petrol (usually used only for serious conditions). Even in this case, an acoustic advice is heard from the switch and the diagnosis LED turns on.
<b>3</b>	<b>Protection Level</b> <u>The visibility of this options depends to ECU type</u> The possible values depends on Installed Injector type.
<b>4</b>	<b>Protection Type</b> <u>The visibility of this options depends to ECU type</u> There are 2 type of protection (Low, Normal, High )

## 8.2 – Diagnosis: Injectors



	Description
1	<p><b>ADJUST SINGLE INJECTORS</b> The values of opening/closing can be modified for each single injectors (i.e. used to correct for defective injector, for different length of the hoses, etc.)</p> <p>Use either the cursor or arrows to change the value. <b>NOTE: the values shown are in points referred to the main map.</b></p>
2	<p><b>RESET</b> Each button reset the value of corresponding injector</p>
3	<p><b>Bank</b> Pressing each button the bank of the corresponding injector switch from bank number 1 to bank number 2</p>

### 8.3 – Diagnosis: Information



	Description
<b>1</b>	<b>Protect ECU access with password</b> If flagged, a password is required on each connection from PC to ECU.
<b>2</b>	<b>Scheduled service</b> Reset button will restart the scheduled service time counter (so the value indicated in “Remaining hours” will be set the value selected in “Service length” combo. When service time expires and you want to restart it, press the button.
<b>3</b>	<b>Service length</b> Select the overall duration of the service time counter. Changing this value will restart/reset the scheduled service feature.
<b>4</b>	<b>Remaining hours</b> Shows how many gas working hours are left, before the scheduled service activation. Once the counter expires, the customer will hear an acoustic signal from the switch every time he turns on the key (and the diagnosis LED is blinking too).
<b>5</b>	<b>Enable ECU lock</b> Enables the lock of the ECU (available only if the programmed maintenance program is active). After this selection, a window will appear where it’s possible to write the password (8 characters). To access the parameters changes it will be needed to insert the password (parameters values will be shown anyway). Once the programmed maintenance will expire, the ECU won’t change to gas till the relevant service parameters will be reset.
<b>6</b>	<b>Lock forewarning</b> When “Enable ECU lock” is enabled, and the “Scheduled service” expires, the gas ECU won’t change to gas, so the customer must be advised with a forewarning. The value selected in this combo, is the amount of hours before the scheduled service counter expires, during which the customer is warned by an acoustic signal from the switch every times he turns on the key (and the diagnosis LED is blinking too).

**xx. Sample page**

Subtitle

	Description	Value
1		
2		
3		
4		
5		



**Notes**

---