LANDIRENZO®

SOFTWARE MANUAL
DIRECT INJECTION

VERSION 4.0.0.28 C

REVISION STATUS				
Rev. no.	Date	Description of change	Created by	Approved by
0	November 2019	First issue	M3	R&D

CONTENTS

Introductory note

The Software program described in this manual applies to different types of ECUs.
The program automatically recognises the ECU connected to it through the firmware loaded during the initial programming carried out by the manufacturer.

For the Software to work properly, the Hardware dongle supplied must be plugged into a USB port (1.1 or 2.0) on the computer.

On selecting the different value boxes, the minimum and maximum ranges which can be set will appear.

ATTENTION: if you enter a value that is outside the range, that maximum and minimum applicable value will be saved. not the previously set value and no warning box will appear.

To activate any change made using the parameter boxes, press Enter.
If you change to another box without pressing Enter, the previous value will remain in force.
The functions available in the drop-down menu appear when you click the relevant box.

Software

Minimum hardware requirements for installation

- Operating system - Windows 98 2nd edition or later versions;
- Memory (RAM) - At least 16 Mbyte;
- Hard disk - At least 20 Mbyte free at time of installation;
- Display resolution - 800 x 600 or more;
- Internet Explorer version 5.5 or better must also have been installed

Software distribution

LANDI RENZO S.p.A. distributes the software program and future updates through its website:
“www.landi.it/reserved area/download software programs” or by CD.

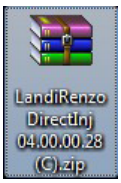
Software installation

Program distributed by CD

Insert the CD in the computer CD reader and wait until the installation wizard appears.
If the installation does not start, select “Start” from the Application Bar. Select “run” and enter: “D:\setup.exe” (where D is the CD reader).
During installation, you will be asked in which directory you want to install the program: we suggest not changing the preset directory.

Software distribution by Internet

Click on the icon and select: *setup.exe.*



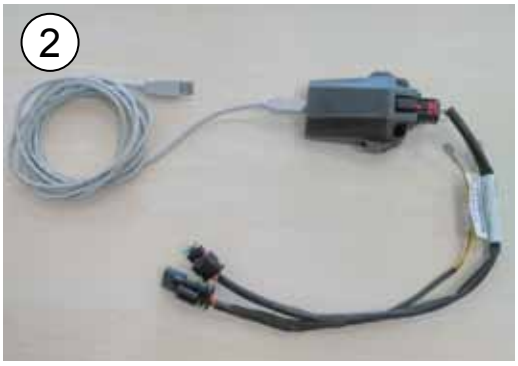
When the installation has been completed, the program icon will remain on the desktop screen.

Connection interfaces

① USB-SERIAL INTERFACE 2.0 cod. 203934000;

② SERIAL INTERFACE USB CAN cod. 203000055;

③ WIRELESS INTERFACE KIT cod. 1685001.



Software program error codes

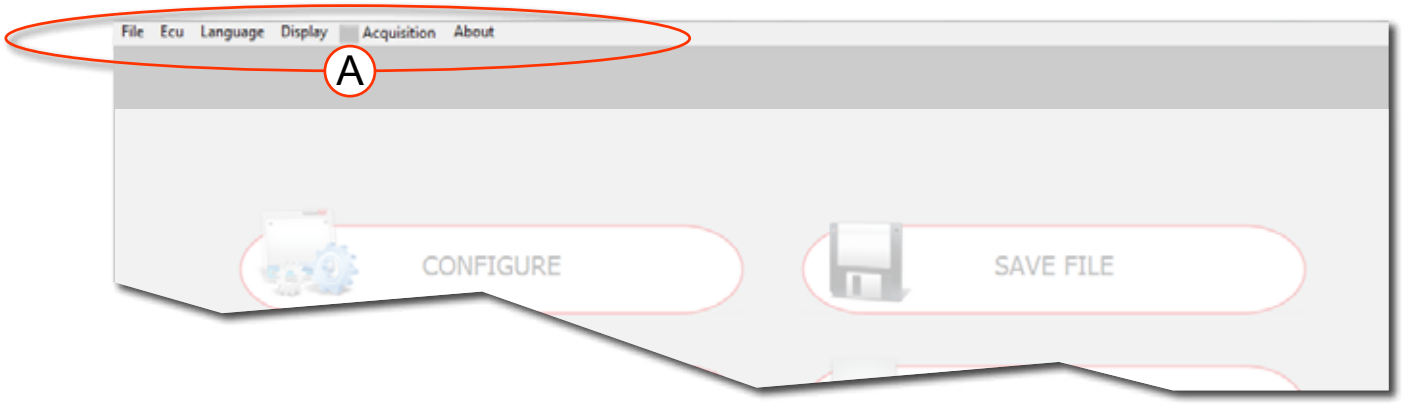
CONNECTION ERRORS (C)

ERROR CODE	DESCRIPTION	POSSIBLE CAUSES
C10	Can't find an ECU to connect with. Can't connect.	ECU off, incorrectly wired, cable disconnected, serial interface faulty, USB drivers not installed, ZigBee too far away or not linked.
C11	Can't connect with the ECU. ECU in boot loader.	The ECU is in the boot loader. Before connecting, make sure you load with compatible firmware.
C12	Can't connect with the ECU. ECU model incompatible.	You are connecting with an AEB product but it is not AEB3000A, AEB3000B DI108, DI60.
C13	Can't connect with the ECU. Can't ask the ECU for the client code	Contact R+D.
C14	Can't connect with the ECU. Client code not compatible.	ECU OK, connection OK, SW OK, but there is a customised setting on the ECU that is different from that available on the SW.
C15	Can't connect with the ECU. The current software is not compatible.	Obsolete SW. Update the SW.
C16	Can't connect. The ECU memory is not "writeable".	Contact R+D.

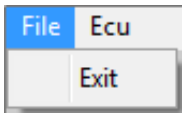
PROGRAMMING ERRORS (P)

ERROR CODE	DESCRIPTION	POSSIBLE CAUSES
P10	Can't reprogram the ECU.	Wrong connection.
P12	Can't reprogram the ECU.	The current ECU is not compatible.
P13	Can't reprogram the ECU.	Can't correctly identify an ECU.
P14	Can't reprogram the ECU.	The current client ECU is not compatible.
P15	Can't reprogram the ECU.	Can't decrypt the file selected.
P16	Attention! The firmware selected is not suited to this ECU.	Firmware not recognised.

Program home page

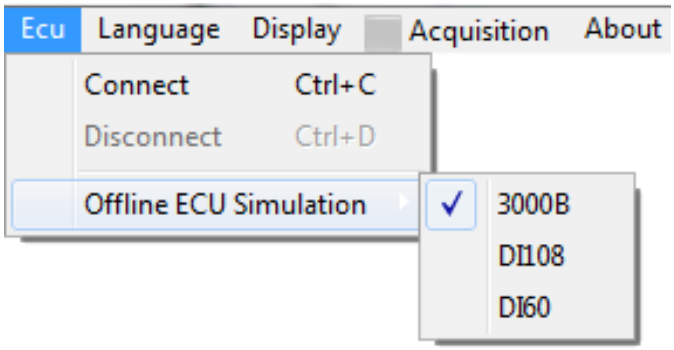


Ⓐ The main menu and drop down sub-menu on the home page lets you access different software calibration functions.



File

Exit: lets you exit software calibration.

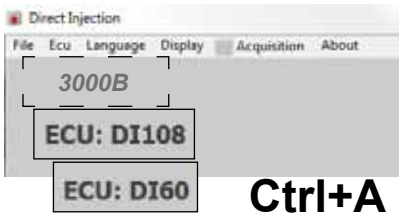


CONTROL UNIT

Connect/Disconnect: lets you connect/disconnect the gas ECU from the software calibration.

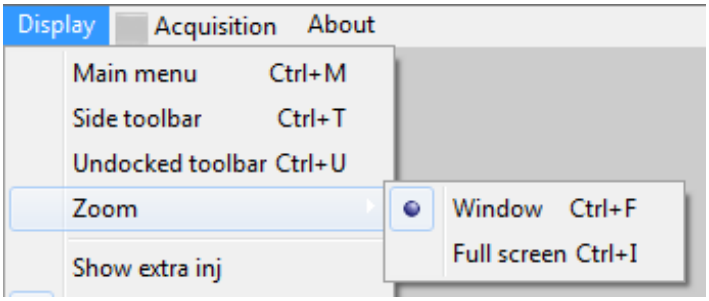
- **Off-line ECU Simulation** (3000B; DI108; DI60): on selecting the ECU model, you can display and load the programming files for just the model of ECU selected. Alternatively, simultaneously press "Ctrl+A".

NOTE: With no ECU connected, the program is set for the 3000B *ECU Use Ctrl+A to change the ECU settings. Base settings:* 3000B *no reference; with the DI108 and DI60 ECUs, the following wording appears.*



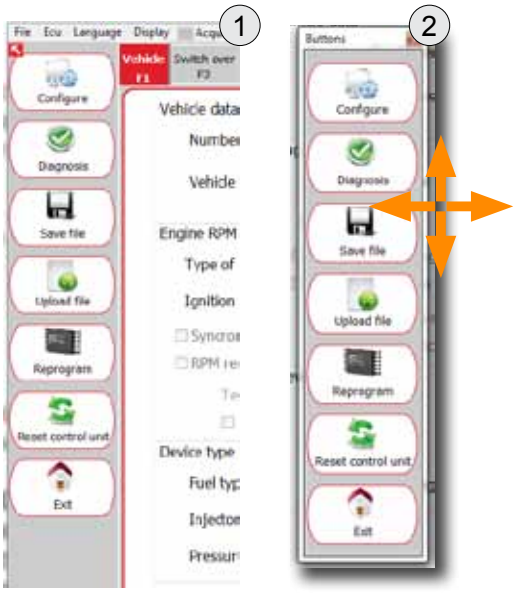
Ctrl+A

Language: click on the flag to select the software language. Confirm your choice with "Select".



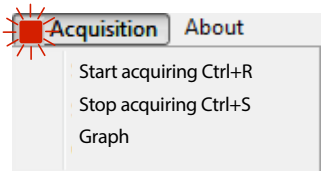
View: Lets you set the view of the software to meet your needs. The view options are as follows:

- **Main menu (Ctrl+M)**: takes you back to the main menu at any time regardless of what menu you are using at that time.
- **Toolbar to the side (Ctrl+T):** lets you always have the main menu in view at the left (1) side of the configuration menu. The arrow at the top left or the menu item **Unlocked Toolbar** let you view the main menu in a separate window (2) which you can place wherever you want on the screen.
- **Zoom**: lets you set the Software view in **Window mode (Ctrl+F)**, default setting or in **Full Screen mode (Ctrl+I)**.

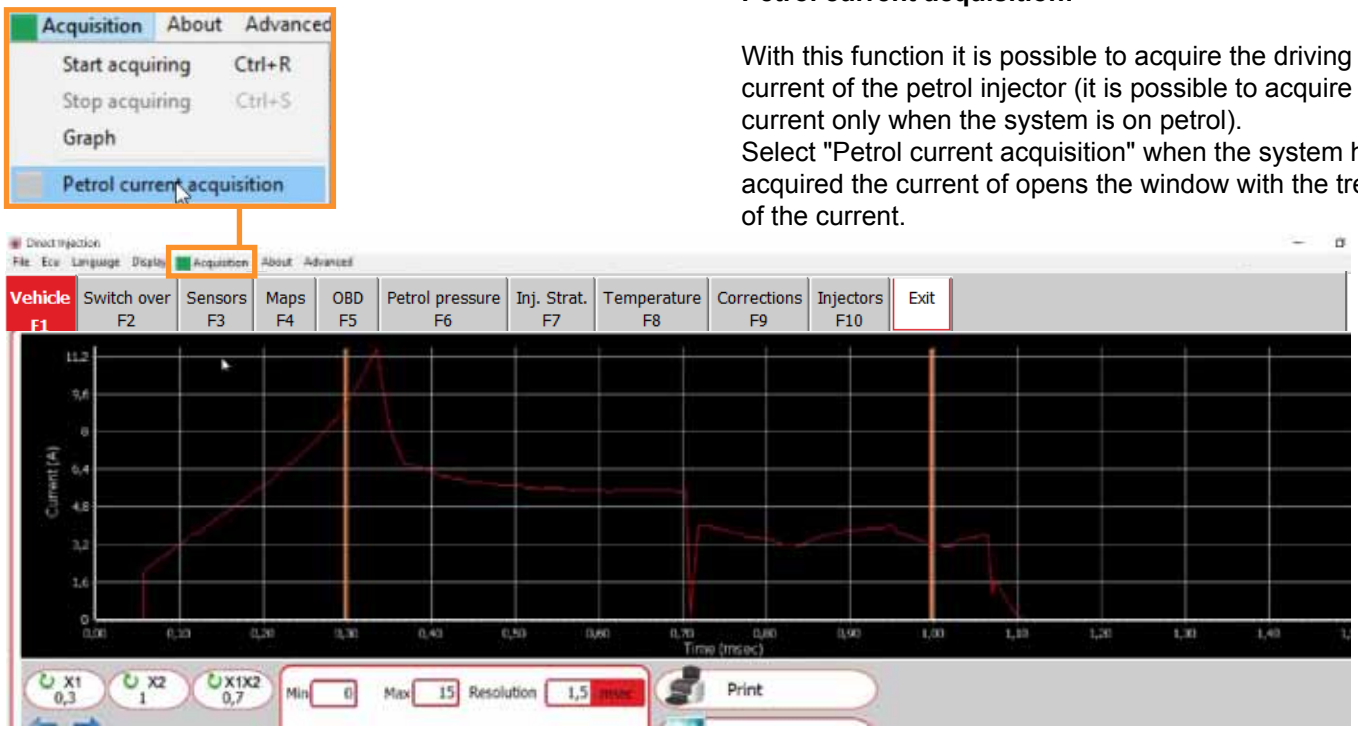


Acquisition: use this menu to detect problems in the gas system.

- **Start acquisition (Ctrl+R)**: when the “RED” dot is lit, this indicates that the program has started the acquisition procedure (function available with the engine switched off or running). You can repeat the procedure to detect the problem several times. When you feel you have acquired sufficient data, press **Stop acquisition (Ctrl+S)**. The program needs to save the acquired data which will be archived in the “**Acquisition**” file.
- **Graph**: lets you open the saved acquisition or other previously created files.

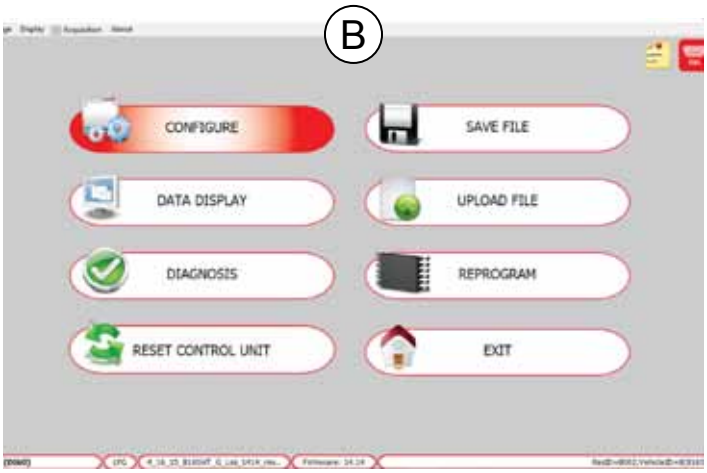


There is a more detailed description of the **Acquisition** menu in the "DISPLAY DATA" section.



Petrol current acquisition:

With this function it is possible to acquire the driving current of the petrol injector (it is possible to acquire the current only when the system is on petrol).
Select "Petrol current acquisition" when the system has acquired the current of opens the window with the trend of the current.



About - provides information about the version of software installed.

Ⓑ **Program page selection keys.**

Ⓒ **PC/ECU communication status bar.**

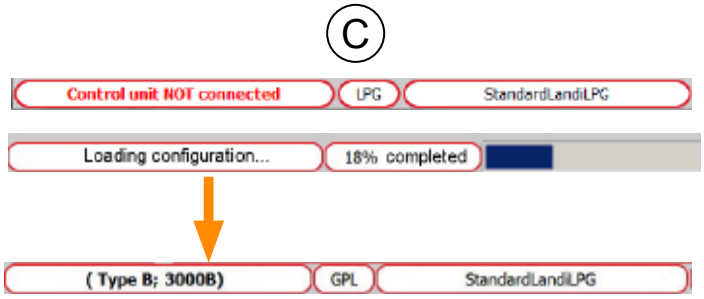
	► serial connection type
	► CAN bus connection type
	► AUTO connection type.

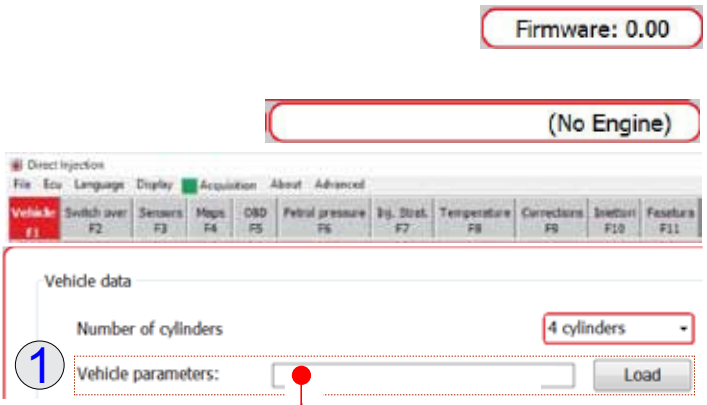
In sequence:
ECU not connected / (FW:Type ...; HW:...) - shows whether the ECU is connected to or disconnected from the Software.

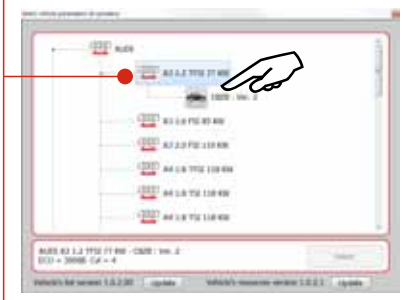
If the ECU is connected through a wireless interface, the strength of the signal is shown by a bar with vertical blue lines:

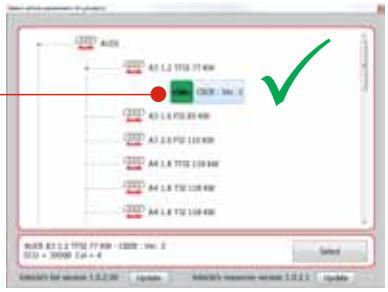
It is important to remember that any settings made with an unconnected ECU will be lost when the ECU is connected unless they have been previously saved in a configuration file (see "Load File" menu).
On connecting the ECU (Ctrl+C or “Connect” on the drop-down menu), the SW will automatically try to connect with the ECU.
When the connection is made, the left side of the bar will change colour and description.

NOTE: If the PC fails to connect, a window will appear showing an Error Code (e.g. "ERR.CODE: C10"). *See "SOFTWARE PROGRAM ERROR CODES " - CONNECTION ERRORS on page 5 of this manual to find a solution for the problem.*









LPG - CNG - shows the type of fuel selected when the program is being saved (the type of fuel can be selected from the sub-menu "Type of fuel " on the "Vehicle - F1") page.

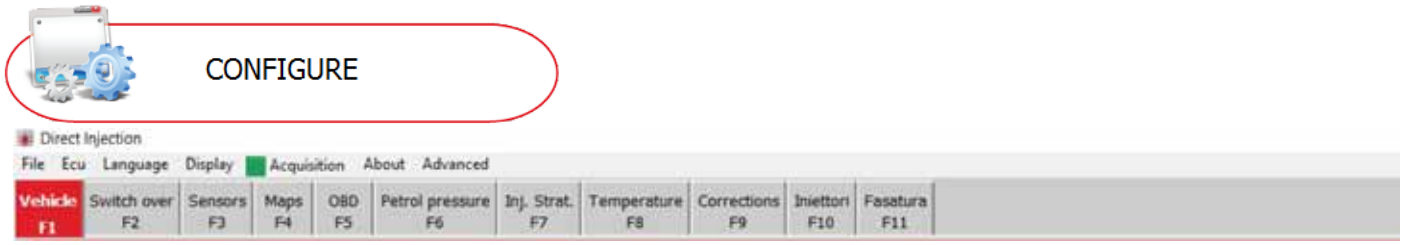
Configuration - this is the name used for the calibration map on the ECU (displays max 28 characters for model 3000B and 43 characters for models DI108 and DI60).

NOTE: To load a pre-existing configuration, the ECU must be connected to the configuration software (see the "LOAD FILE") section.

Firmware - shows the version of firmware loaded in the ECU to which it is connected. To update the firmware, click "REPROGRAM" on the Software home page and when the Import window opens, select new firmware from those displayed.

(No Engine) / LRxID_14T_12_ .... - shows the specific configuration parameters for the vehicle selected from the program library which is accessed from the "Vehicle - F1" page; when you click on "Vehicle Parameters" (1) a tree menu will appear to let you select your configuration file.

It is important to remember that all settings made with an unconnected ECU will be deleted when the ECU is connected unless they have been previously saved in a configuration file.



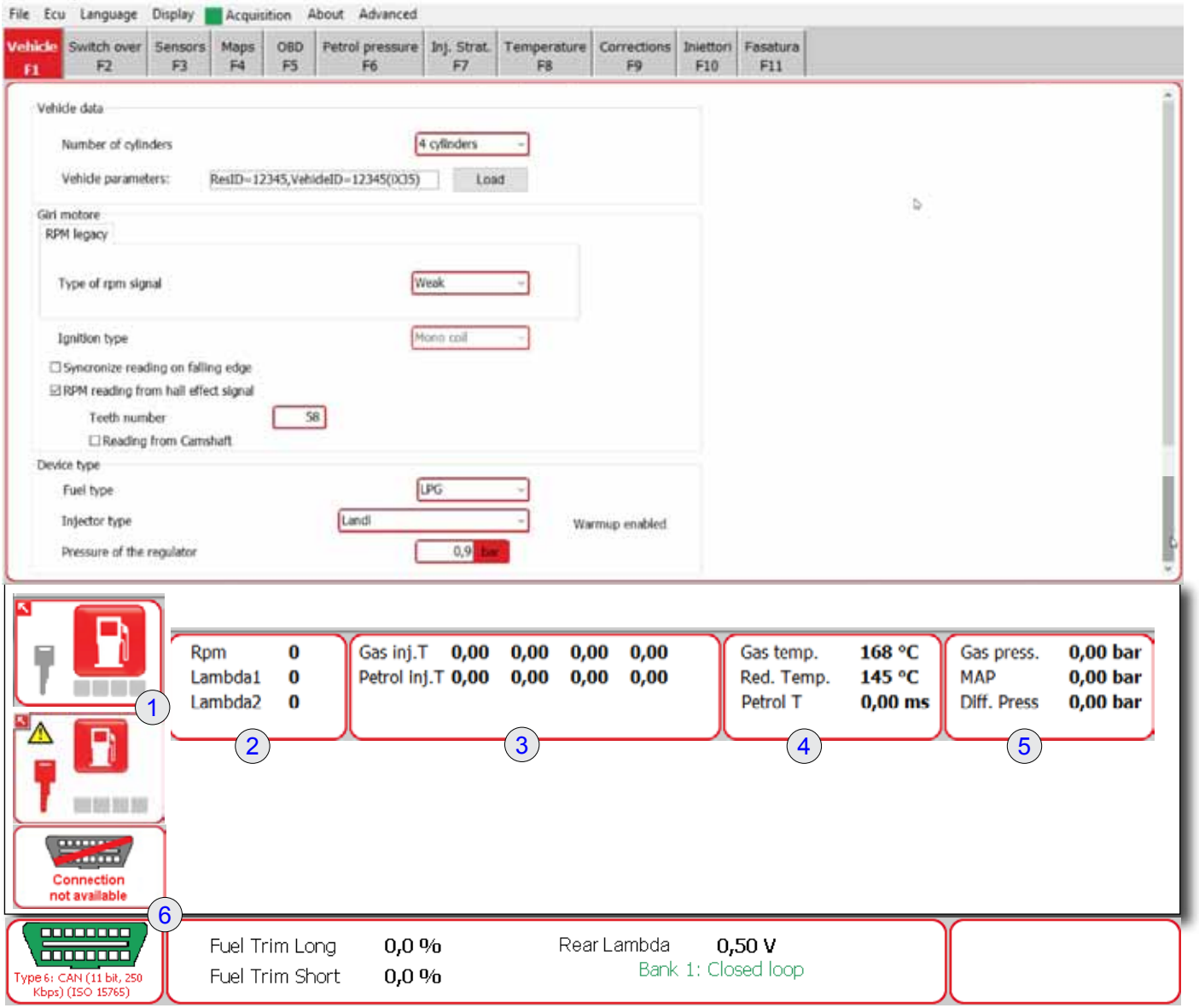
Configuration

The "Configuration" section contains pages that you can access by clicking the relative tab (e.g. "Vehicle", "Changeover" etc.), or by pressing the appropriate function key on the computer keyboard (F1, F2, etc.).

Vehicle F1	► To set the key calibration control parameters: vehicle data, RPM, type of fuel, injector and regulator pressure.
Changeover F2	► To set the parameters and modes which affect the fuel switch over from petrol to gas.
Sensors F3	► To select the type of gas level sensor connected and the gas and MAP pressure sensors.
Maps F4	► To display the coefficients of multiplication, known as K, used by the ECU for calculating GAS injection times.
OBD F5	► To carry out "On-Board Diagnostics" (OBD). From here, you can also display system reports.
Petrol Pressure F6	► To implement the settings relative to the petrol pressure sensor- and its possible emulation.
Injection Strategy F7	► For setting temporary petrol modes, transitions between petrol and gas, for managing extra-injections and other strategies.
Temperature F8	► For setting gas temperature and engine temperature sensors.
Corrections F9	► To correct gas time calculations in relation to gas temperatures and pressures.
Injectors F10	► To set the association and phasing between petrol and gas injectors.
Phasing F11	► To set the parameters of the phasing strategy.

Vehicle F1

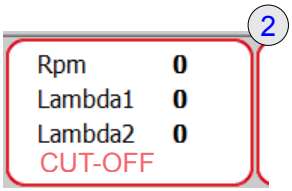
Vehicle page - F1



(1) Panel showing instantaneous data about:

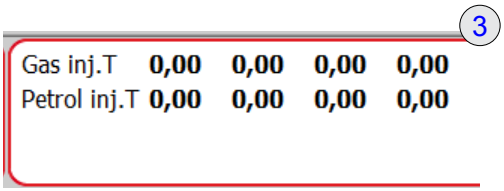
- type of fuel used: petrol or gas G;
- The presence (in red) or absence (in grey) of power from the ignition circuit;
- The LED bar which shows the amount fuel in the GAS tank.
- The presence of this signal denotes an error in the "**DIAGNOSIS**" page (see main screen).

The panel with the arrow at the top left lets you unpin the bar with the instantaneous data and position it or minimise it as you please.



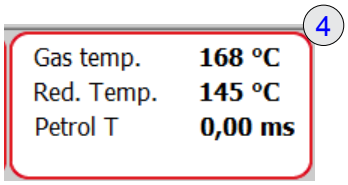
2 Panel showing instantaneous data about:

- **RPM**: i.e. the engine speed signalled in real time from the gas ECU.
- **Lambda 1:** sensor reading. To see the values read by the sensor, in addition to connecting the PURPLE wire, you also have to set the sensor connection in "Lambda".
- **Lambda 2:** sensor reading. To see the values read by the sensor , in addition to connecting the PURPLE/BLACK wire, you also have to set the sensor connection in "Lambda".
- **CUT-OFF:** this appears when the system that feeds fuel to the injectors is interrupted.



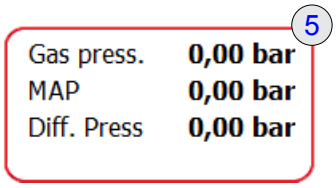
3

- **GAS** (Tinj.gas) and **BENZINA** (Tinj.benz) **INJECTION TIMES** differ for every injector in order of the sequence of cable connection (A-B-C-D) and the cut-off of petrol injectors by means of paired wires: Blue; Red; Green; Yellow.



4

- **TEMPERATURE GAS** (**Temp.gas**): is the temperature of gas measured by the gas sensor (depending on the ECU used, the sensor is positioned on the injector rails or on the pipe which connects the regulator for pressure/injectors).
- **TEMPERATURE REGULATOR** (**Temp. rid**): detects the temperature from the water temperature sensor (positioned on the pressure regulator heater hose or on the regulator itself).
- **PETROL TIME** (**T benzina**): is the petrol injection time expressed in milliseconds



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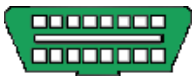
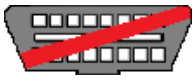
- **GAS PRESSURE** (**Press.gas**): is the gas pressure reading at the gas injector inlet.
- **MAP**: is the inlet pressure reading in the inlet manifold.
- **Press Diff:** is the difference between the gas pressure and the pressure in the inlet manifold (MAP). This difference shows the real time pressure of the gas being fed.
- **P1:** real petrol pressure, read by the petrol high pressure sensor.

6 This panel shows the connection/disconnection status of the OBD communication protocol and the type of protocol used for the connection (data shown below the connector symbol).


Connection active.


Connection inactive.

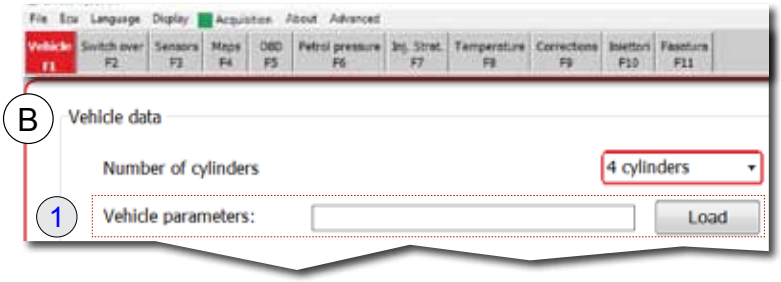
In addition, if OBD errors are detected, the following symbols may appear:


OBD errors detected.


OBD errors deleted.

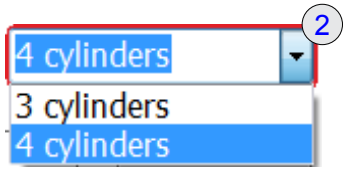
This panel shows:

- The value of the slow trimmer (**FUEL TRIM LONG**) expressed as a percentage.
- The value of the fast trimmer (**FUEL TRIM SHORT**) expressed as a percentage.
- The voltage reading for the **REAR LAMBDA SENSOR.**
- **BANK1: CLOSED LOOP** appears when the PETROL ECU manages the injection time based on values taken from the lambda sensor.
- **BANK1: OPEN LOOP** appears when the PETROL ECU manages the injection time independently of the values taken from the lambda sensor.
- **BANK1: TRANSIENT OPEN LOOP)** appears when the PETROL ECU manages the injection time independently of the values taken from the lambda sensor for just a brief moment before passing to being managed by CLOSED LOOP.

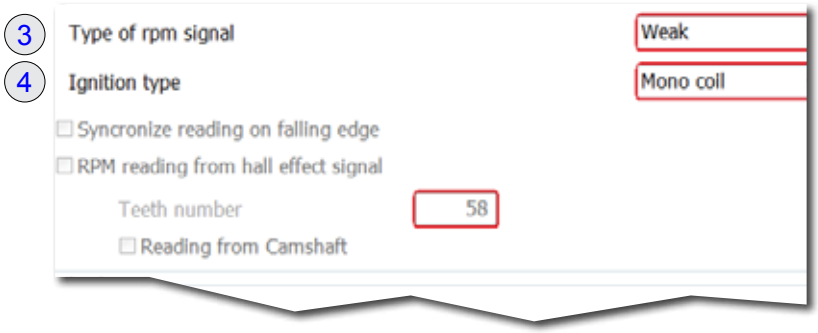


(B) VEHICLE DATA

(1) VEHICLE PARAMETERS: on pressing "Load", you can select the configuration files from a tree menu (see page 9).

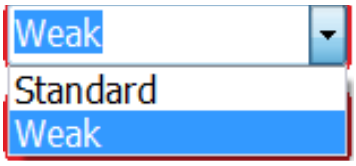


(2) NUMBER OF CYLINDERS*:
This parameter tells the ECU how many cylinders the engine has and therefore how many injectors it must manage.
Set 3 - 4 cylinders as appropriate.
In the version for **DI108** 5, 6 or 8 cylinders can be set.

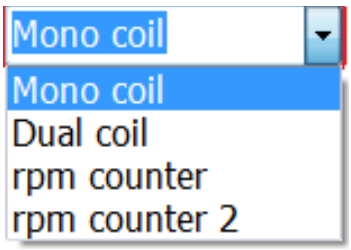


(3) RPM Signal type*: Standard / Weak. Leave the setting at “Standard” with signals that vary between 5V and 12V. Select “Weak” with signals that vary between 2V and 5V.

NOTE: Select WEAK signal if the RPM input is being sent to the ignition coil amplifier; Select STANDARD in the event of connecting two wires to the negative pole of the ignition coil. If connecting instead to the rpm counter, you can use either setting although WEAK SIGNAL is preferable. With signals lower than 2V, you need to fit an additional signal amplifier.



(4) TYPE OF IGNITION



Mono-coil, Dual-coil, rpm counter, rpm Counter 2. This information is used by the ECU to correctly calculate the RPM setting that it uses in fuel mapping and as a safety system. If the engine is accidentally switched off, when the ECU senses no RPM signals but ignition on, it cuts off the power supply to the solenoids on the regulator and fuel tank.
Select **Mono-coil** if the engine has one coil per cylinder and the signal is taken from the coil negative pole or transistor. Select **Dual-coil** if the engine has one coil for two cylinders and the signal is taken from the coil negative pole or transistor.

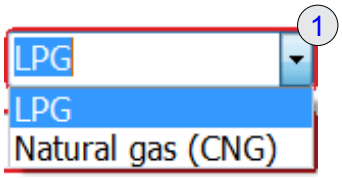
*NOTE: some engines with one coil per cylinder may need this selection. In other cases, select the **rpm counter** option. Select **rpm counter** 2 if the rpm levels seen in the "rpm counter" setting are two times the real value.*

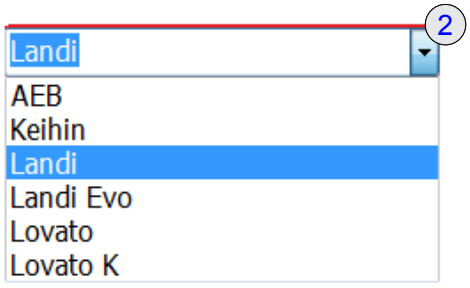
- **Synchronisation of readings when going downhill:** can only be used in the case of weak RPM signals. This system allows RPM signals measured when the vehicle is going downhill to be considered, instead of those measured when going uphill (to be used only if the RPM signal is irregular).

- **Hall Effect RPM signal readings:** you will need to select this if you want to use RPM signals from the phonic wheel sensor camshaft phase sensor). In this case, you will need to specify the number of teeth on the connected sensor in the "Number of Teeth" field. Lastly, if you connect a phase sensor, you will need to tick the "Phase sensor reading" option to specify that the number of teeth is related to two engine cycles and not just one.

NOTE: on AEB3000, the maximum permissible number of teeth is 15.

C





C **TYPE OF SYSTEM**

① **TYPE OF FUEL***: **LPG / CNG**: select the type of fuel used.

② **TYPE OF INJECTOR***: this window lets you select the type of GAS injector supplied in the installation kit. In the event of loading a previously saved configuration, this window shows the type of gas injector provided for in the configuration file.

③ **PRESSURE REGULATOR* (range 0.8 - 5 bar)**: in this window, you can adjust the regulator fuel feed pressure set during the initial vehicle calibration phase.

To adjust the pressure on the pressure regulator:
- run the engine at tick-over on gas and adjust the regulator using the screw;
- check the pressure reached by the regulator in "Press.gas".

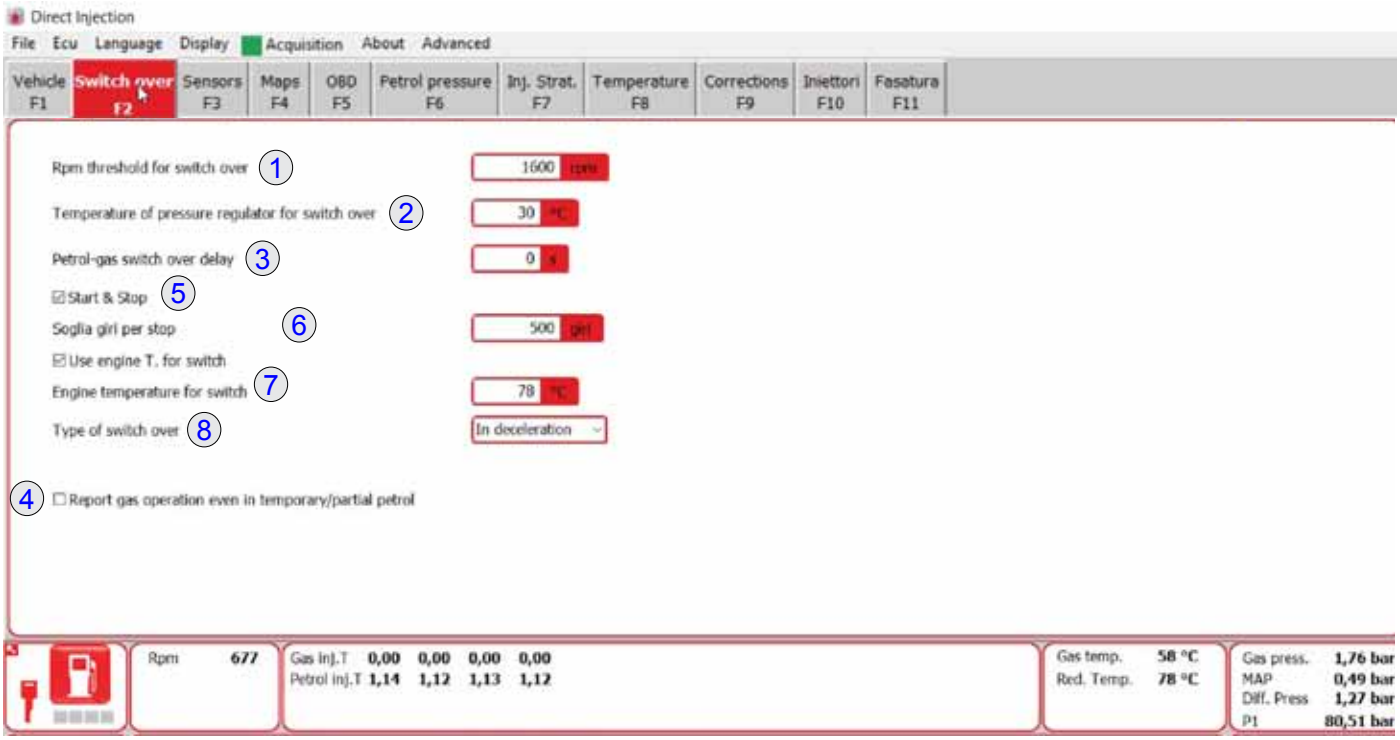
In this way, the software can correctly calculate the pressure compensation.

ATTENTION: some vehicles at tick-over nay run on PETROL, in this case, you will need to keep the engine running fast so as to exit from PETROL mode.

ATTENTION: changing parameters in an existing calibration file marked with an asterisk will affect the proper running of the gas system as these parameters are preset during the initial vehicle calibration phase.

Changeover F2

Changeover page - F2



[0 - 3000] 1

① **RPM THRESHOLD FOR CHANGEOVER** (range 0-3000 RPM)**:** identifies the RPM at which the switch over from PETROL TO GASoccurs.

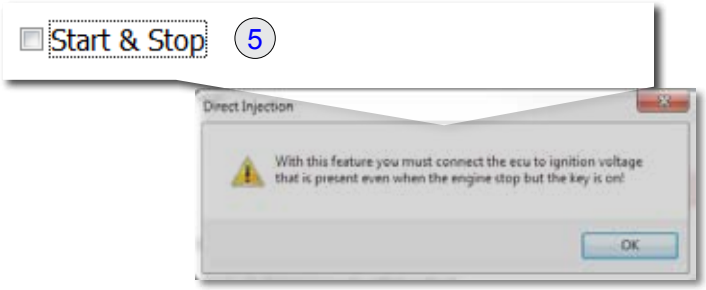
[-40 - 100] 2

② **REGULATOR TEMPERATURE FOR CHANGEOVER** (range 40-100° C): indicates the temperature which the sensor must detect so that switch over to gas is allowed. If while running on gas, the temperature drops below the value set, the ECU will continue running in gas mode.
This parameter can be personalised for engine type and at the user's discretion; however, if you sett a temperature which is too low, the switch over from PETROL TO -GAS might take place before the regulator is sufficiently hot and this would hinder the correct feed of gas. If you set a temperature which is too high, too much time would pass before the switch over between to GAS.

[0 - 250] 3

③ **DELAY IN PETROL-GAS CHANGEOVER** (range 0-250): indicates the minimum time and the RPM setting from when "ignition on " is detected and the RPM reading so that the switch over from PETROL to GAS occurs. This time remains fixed whether the engine is hot or cold. With the engine hot, once the time set in "CHANGEOVER DELAY" has passed the RPM switch over threshold, the ECU allows the change to gas. With the engine cold, in addition to the above-mentioned parameters for changing to gas, the temperature for switch over must also exceed the value set.

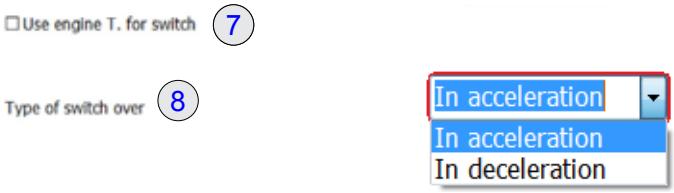
④ **Signals running on gas also on transition/partial petrol:** you can select if you want to keep the output dedicated to running on gas active (red-blue wire for **DI108/DI60**, EV2 output for **AEB3000**) during transitory or partial running ion patrol.



⑤ **START & STOP:** if you enable this function, the system will continue running despite the loss of RPM signals and will recognise the situation as operating on "ignition on signal" only condition (15). This system also allows the reading of RPM signals when connected to the ignition coil. In “Stop”, RPM signals are absent. This function allows the engine to start on gas after an “S & S” and avoids the initial delay in the P/G switch over . If the function is enabled, the program displays the supply connection warning.

NOTE: the system normally enables the safety function when there are no RPM signals. In this case, to ensure that the solenoid (tank and pressure regulator) remain open in the event of an impact, the ignition wire (15) has to be connected to the petrol pump power supply control or to an ignition that is independent of the inertial switch.
When a STOP condition is recognised, after 3 seconds, the GAS SOLENOIDS will be closed and will then automatically re-open at the nest START.

⑥ **RPM THRESHOLD FOR STOP** (range 0-3000 RPM)**:** just in the case of phonic wheel strategy, below the set rpm threshold the system recognizes the start and stop function.



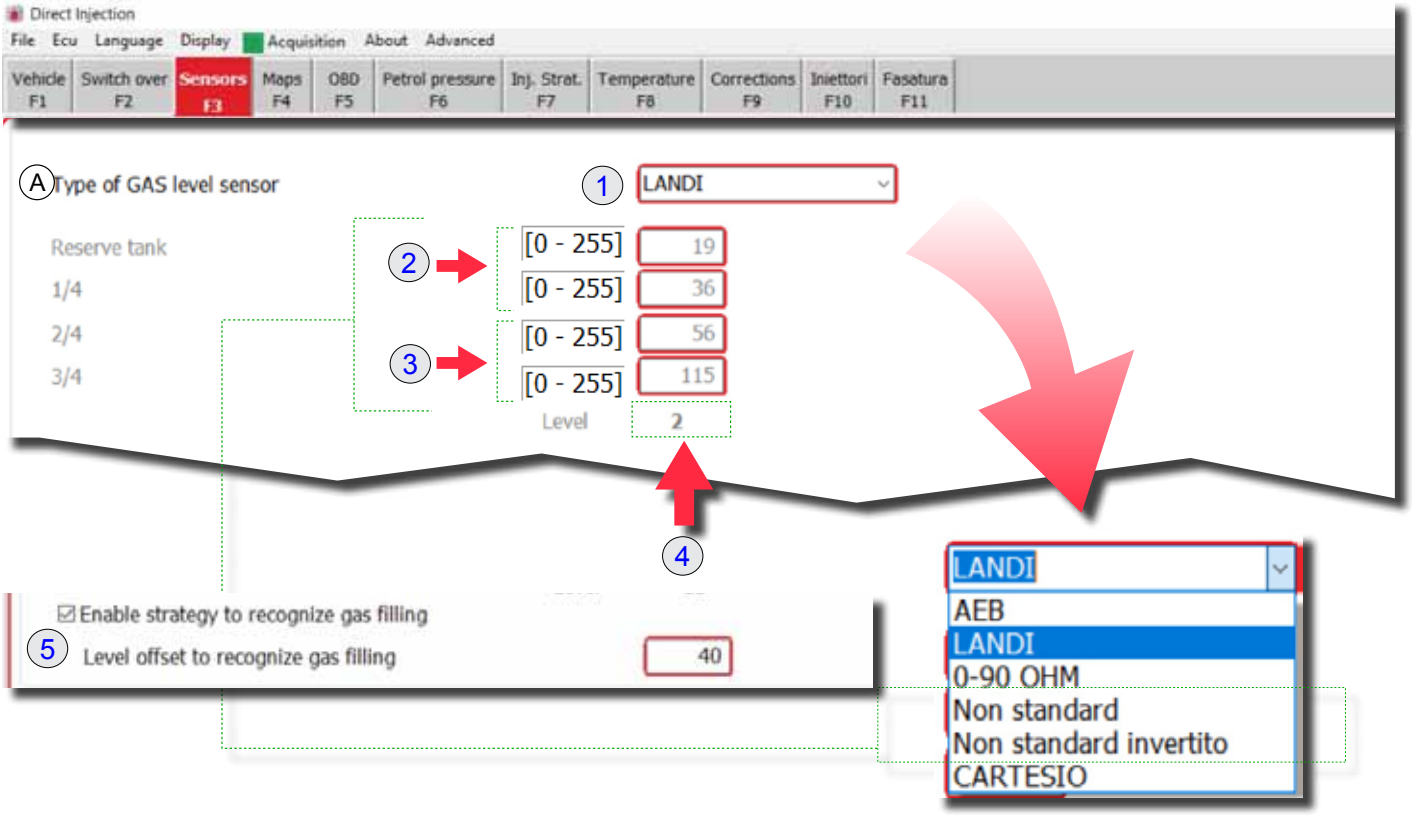
⑦ **USE OF THE ENGINE TEMPERATURE FOR CHANGEOVER**, when this function is enables, the following wording appears: **ENGINE TEMPERATURE FOR CHANGEOVER (range 50-215)**
Shows the temperature which the engine must reach to before switch over to GAS is allowed.
This parameter, detected by the OBD system, needs specific cables to be connected to the vehicle diagnosis connector.

⑧ **TYPE OF CHANGEOVER - In acceleration; in deceleration**.
To implement the switch over to gas when you set:

- **In acceleration**: the number of engine revs must exceed the threshold set in “**RPM threshold for switch over** ”.
- **In deceleration**: the system must recognise higher then lower revs than the value set in “**RPM threshold for switch over"** and the condition of petrol cut-off.

Sensors F3

Sensors page - F3

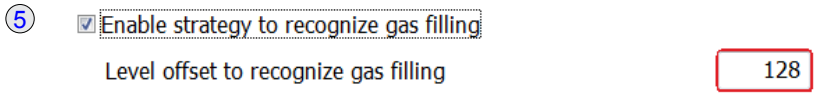


Ⓐ **Type of gas level sensor**: lets you select the type of gas level sensor installed. The following level indicators are available①: AEB - LANDI - 0 - 90 OHM - Non standard - Inverted non standard and Cartesio.
The preset sensors: AEB, LANDI and 0-90 OHM, have pre-loaded fuel level thresholds in the Software preset, so the fuel level boxes are not active.

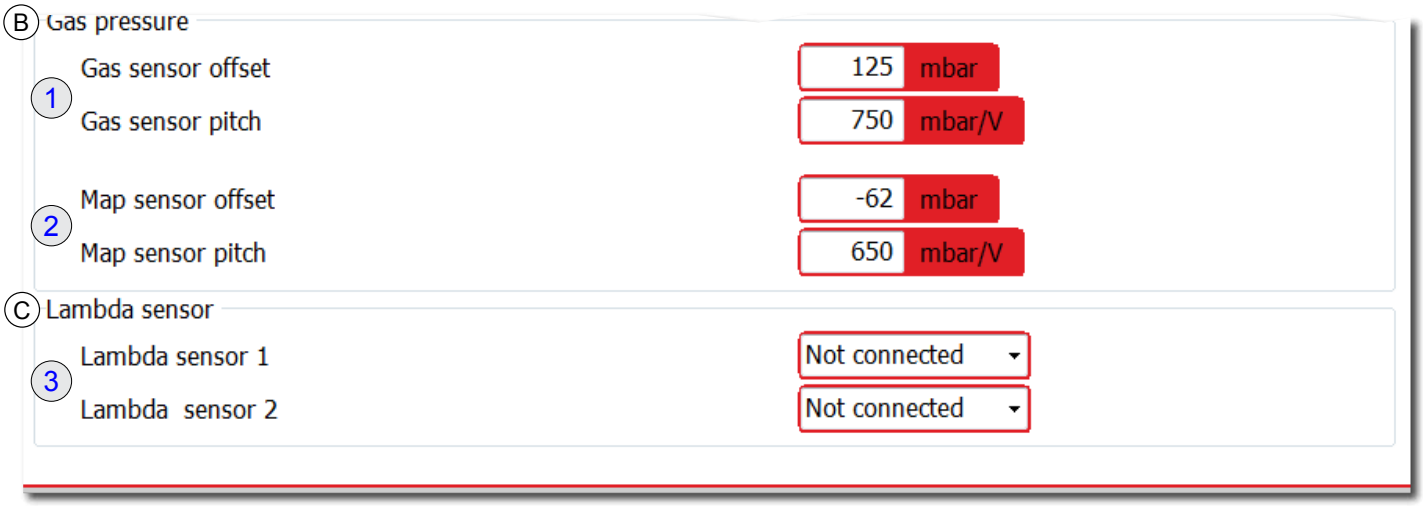
With the "**Non standard**" and "**Inverted non standard**" options, you can personalise the settings for the type of gas level sensors used and set suitable ascending or descending thresholds in the "1/4", "2/4" and "3/4" "Reserve" boxes.
The following procedure lets you set the thresholds at which the lights on the LED display on the switch come on:

Important: the following procedure needs the manual input of some information in certain boxes. To save the value entered in the box and before going to the next box, press Enter on the computer keyboard.

- With the fuel tank completely empty, put in the amount of fuel you want to consider as the "Reserve" level;
- connect the ECU with the computer then turn the switch to petrol mode;
- enter the number which appears in ④ **"Level"** in the ② **"Reserve"** box.
- fill the fuel tank up to the top;
- enter the values ③ in proportional scale between the maximum value that appeared in ④ **"Level"** and the value previously entered in **"Reserve"**.



Recognition strategy for full gas. If you select "Enable Recognition strategy for full gas " ⑤ and the system passes back to petrol due to a low level of gas (low gas pressure with the indicator showing RESERVE), the level measured by the indicator is saved. In this case, every time you turn the engine on, if the level of gas measured by the sensor is greater than the level set in "Increase in level due to recognition of full gas", gas functioning mode is automatically set.



Ⓑ **GAS PRESSURE** This panel shows the parameters which characterise the sensors used for measuring gas and MAP pressures, with a typical linear curve between voltage (in volts) and pressure (in mbar):

$P_{(mbar)} = P_{(volt)} * \text{gradient}_{(mbar/V)} + \text{offset}_{(mbar)}$

① **Gas sensor offset /Gas sensor gradient:** characterise the sensor used for measuring gas pressure.
② **Map sensor offset /Map sensor gradient:** characterise the sensor used for measuring gas pressure in the inlet manifold.

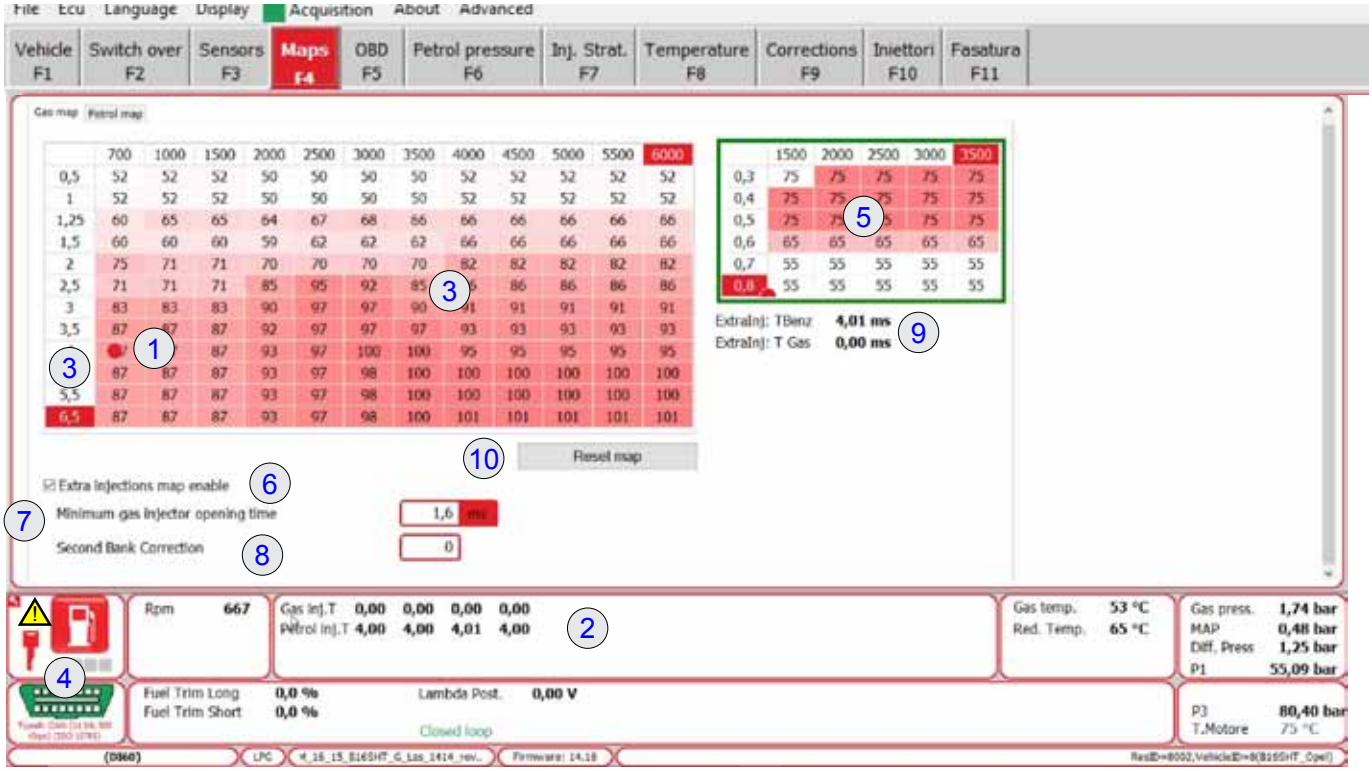
Ⓒ **LAMBDA**

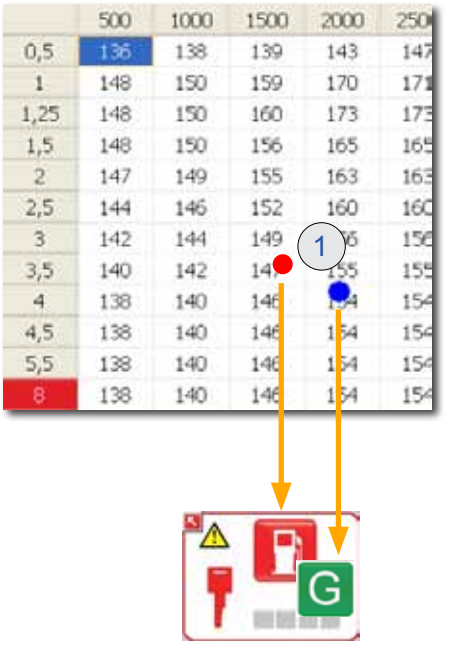
Two lambda sensors can be read and emulated. Two front lambda sensors can be connected (such as UEGO linear Lambda, in current emulation) or ON-OFF (Lambda ON-OFF 0-1V or 0-5V) and/or rear (ON-OFF 0-1V type only).

③ **Lambda sensor 1-2:** select which Lambda sensors are connected to the ECUs: FRONT OR REAR If the Lambda sensors have not been connected , leave “Not connected”. If there is at least one Lambda sensor, a new **"“Emissions - F11”** page will appear which is dedicated to emulating sensors (see"Pagina Emissioni - F10*" a pagina <?> in this manual).

Maps F4

Mapping page - F4





T inj. gas 0,00 0,00 0,00 0,00
T inj. benz 0,00 0,00 0,00 0,00 ②

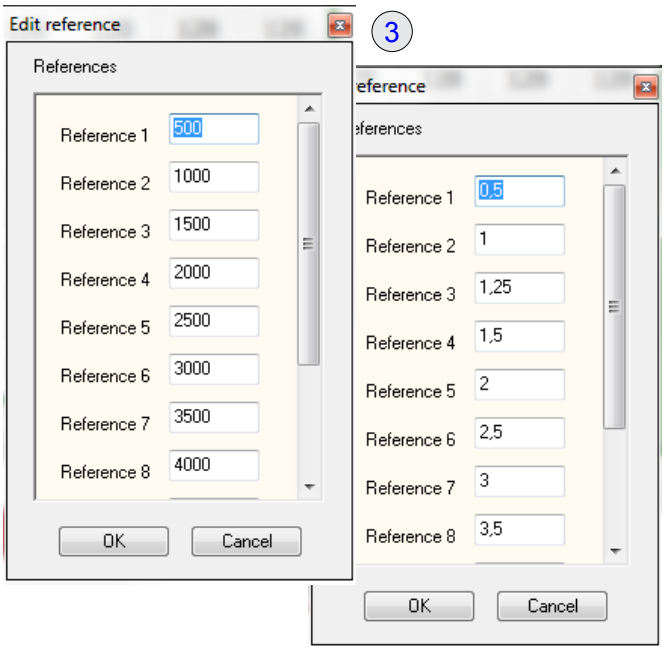
"Gas mapping" chart

This chart shows the coefficients of multiplication, known as **K**, used by the ECU for calculating **GAS** injection times.
The three variables of the main fuel mapping system are as follows:
- RPM on the X axis;
- Petrol injection time (Tinj) on the Y axis;
- K Coefficient in the cells.

The calculation chain for gas injection times is obtained from:
- petrol injection time
- petrol injector dead time
- gas injector dead time
- map K coefficient
- gas pressure compensation
- water temperature compensation

The dot on the map identifies the RPM and petrol injection times of the engine at that moment.
the colour of the dot and the symbol ① indicate the fuel supply status of the engine:
RED: engine running on petrol;
BLUE: engine running on gas.

Connecting to the vehicle OBD socket displays the parameters for fuel feed while the engine is running on (Slow and Fast Trimmers) ② expressed as positive or negative percentages.



3 **Changing map references**: you can change the map break points respectively for:
• RPM (range: 0 - 8000)
• Petrol injection times (Tinj range: 0 - 12 ms)
To optimise the fuel feed map, we recommend limiting the values based on the characteristics of the engine and identifying the maximum rev limit and maximum petrol injection time. To adjust these values, set the new values then press OK.

NOTE: Changing the parameters on an existing calibration map may lead to incorrect fuel supply.

CHECKS TO BE CARRIED OUT BEFORE HANDING A VEHICLE OVER

- Check that the vehicle is driving properly;
- ensure that the OBD trimmers (fast and slow) do not affect the fuel supply in such a way as to lead the ECU astray.
- check that in determined fixed points on the map, the OBD trimmers remain at roughly the same values whether the engine is running on petrol or gas.

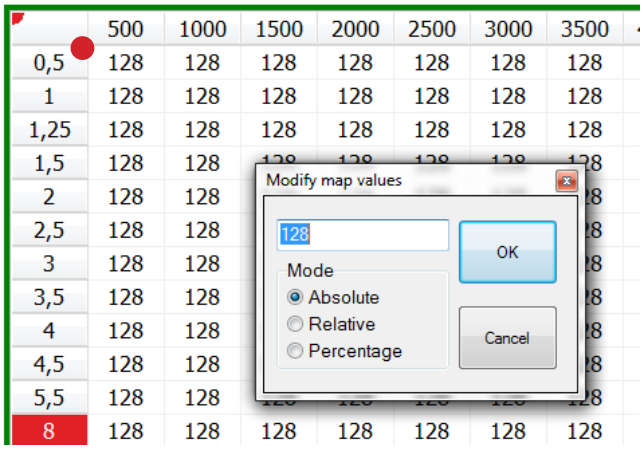
4

Pressing the 4 Petrol/Gas panel lets you switch directly between the two fuels and avoid the delays set by the system (manual pressure on the switch).

ATTENTION: when making trimmer adjustments, it is important that they remain as stable as possible inside a map cell.

NOTE: during these checks, variations in RRPM or engine load will not provide accurate data.

5



5 With the dot inside a single cell, check that the trimmers (fast and slow) remain at roughly the same values whether the engine is running on petrol or gas.
If these values do not match, make manual adjustments on the map.

- With the RPM and engine load stabilised at various points of the map, press the switch.

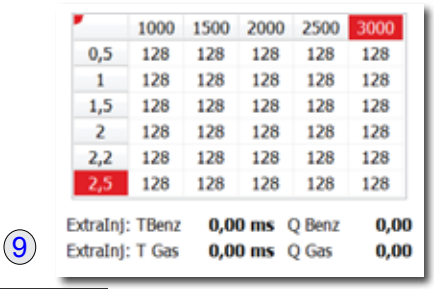
In the first few seconds after the switch to gas, you can observe the change in trimmer settings.

Double clicking on a single cell will let you modify mapping values. If you select "**Absolute**" mode, the written number is the number that will appear in the cell. If you select "**Relative**" mode, the written number is the number that will be added to or subtracted from the number currently shown in the cell. If you select "**Percentage**" mode, the written number is the percentage increase that will be added to the number currently shown in the cell.

WARNING In "Absolute" mode, the program suggests an estimated value of the correction (trim) to be implemented. We advise you to think very carefully about whether to accept that value or whether to vary very slightly the value to be entered. If you want to modify fuel feed during moments of "fuel transition", you need to select a number of cells at the same time; in this case, "Percentage" mode is more appropriate for better mapping results.

6 **Enable extra-injection mapping:** extra-injection mapping can be managed by means of a dedicated map. In this case, you will have to enter the K multiplication coefficients in the RPM – petrol extra-injection time table used for calculating the gas injection time of the extra-injection so that everything matches the main table.

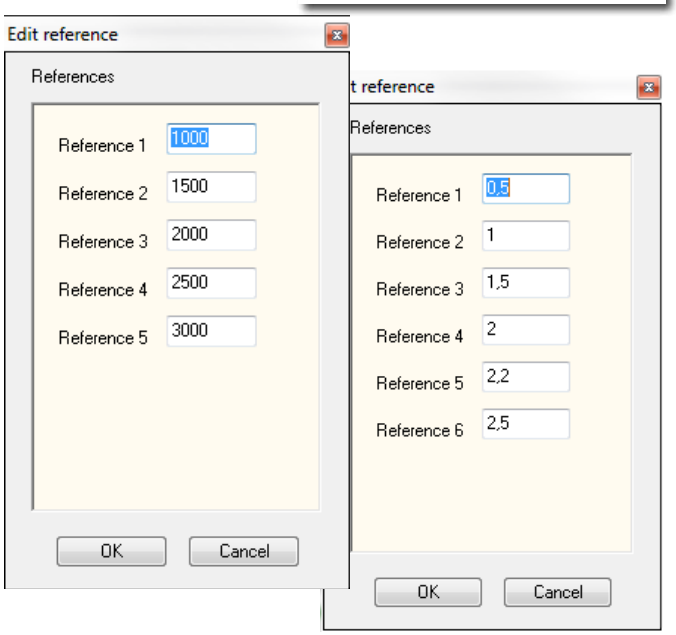
7 **Minimum gas injector opening time:** this is the minimum opening time that a gas injector needs to remain open to ensure that the minimum quantity of gas enters (a shorter time would not guarantee that the injector opens). The data is loaded automatically when you select the type of gas injector installed (see page F1).



9

NOTE When the 2 maps are present and the software is connected to the gas ECU, if there are no extra-injections, the main map is surrounded by a green line; if instead, there are extra-injections the extra-injection map will be surrounded by a green line.

8 **Second bank calibrator:** specifies the number of banks on the engine. If there are two banks on an engine, you can set a "Second Bank Trimmer" which consists of a corrective K factor to be added to or subtracted from the K factor taken from the gas map (on page F4) for injections on the second bank only.



9 **Modifying extra-injection map values**: you can modify the mapping break points of respectively:
• RPM (range: 0 - 10000)
• Petrol injection times (Tinj range: 0 - 6 ms)
To optimise the fuel feed map, we recommend limiting the values based on the characteristics of the engine and identifying the maximum rev limit and maximum petrol injection time. To adjust these values, set the new values then press OK.

NOTE: Changing the parameters on an existing calibration map may lead to incorrect fuel supply.

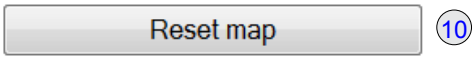
ATTENTION: when making trimmer adjustments, it is important that they remain as stable as possible inside a map cell.

NOTE: during these checks, variations in RRPM or engine load will not provide accurate data.

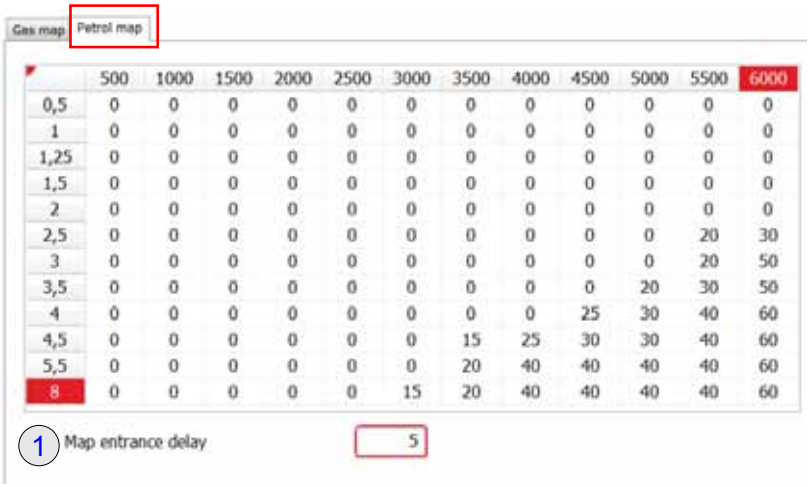
With the dot inside a single cell, check that the trimmers (fast and slow) remain at roughly the same values whether the engine is running on petrol or gas.

If these values do not match, make manual adjustments on the map.

- With the RPM and engine load stabilised at various points of the map, press the switch.



(10) **MAP RESET**: press the key on the initial configuration map.



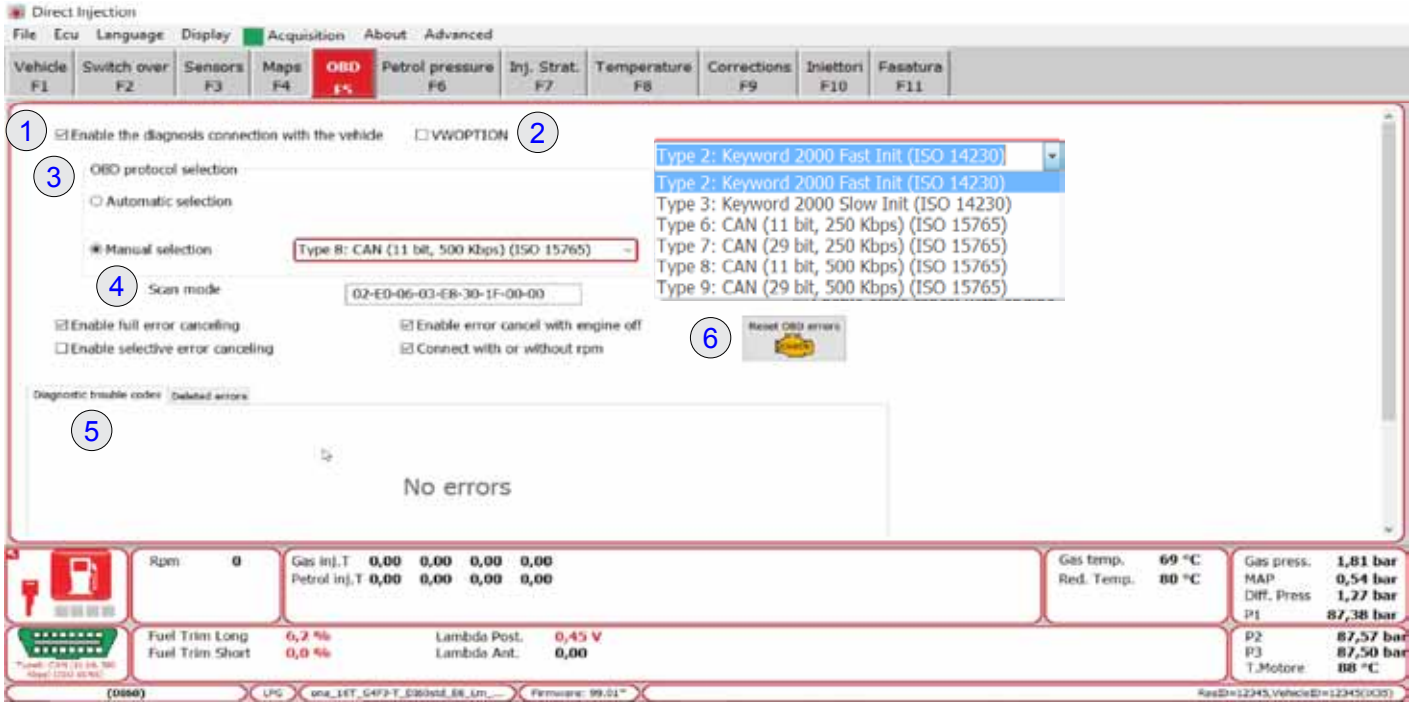
"Petrol mapping" chart

The “Petrol mapping” chart is RPM – Petrol injection time table which, under certain conditions, lets you define partial running on petrol. Partial running on petrol is enabled by entering the petrol percentage value that you want to use in the desired area of the map (the relative cells become red). In these cases, more petrol will be fed to the engine and gas injection times will be shorter. If the percentage is too low and would provide less petrol than the duration of petrol injection emulation, no petrol contribution will be given: in this case, the cell will not become red.

(1) **Map entry delay:** usually, the passage from a cell without petrol contribution to another cell with petrol contribution occurs immediately. With this parameter, you can set a progress between injectors i.e. the number of injections to allow before making the same petrol contribution on the next injector.

OBD F5

OBD page - F5



The functions of this page are set when the calibration file is created and it is best not to modify them unless advised to do so by the Technical Assistance dept. These functions however are as follows. Changing the status of the "ticks" for items or some parameters can interrupt communication between the OBD system and the engine electronics.

① **Enable vehicle diagnostic connection:** lets you enable the OBD (On Board Diagnostics) connection in one of the possible connection modes.

② **VW OPTION:** used exclusively with calibration files dedicated to engines made by the Volkswagen Group.

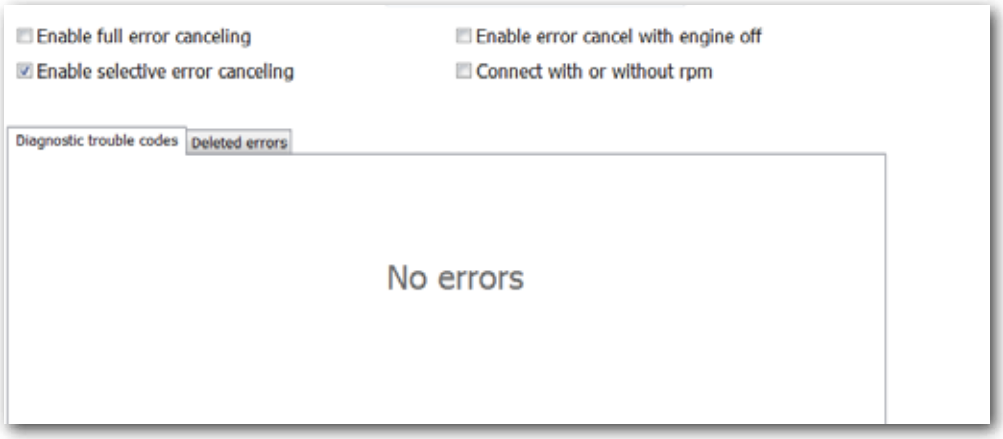
③ **Selection of OBD protocols**

- **Automatic selection:** when you enable this connection mode, the software will automatically try to connect with the vehicle by testing all the possible OBD connections until it finds the right one.
- **Manual selection:** enabling this connection mode, you can select the type of vehicle OBD connection by choosing from the list shown.

④ **Scanning mode:** alphanumeric OBD connection coupling codes.

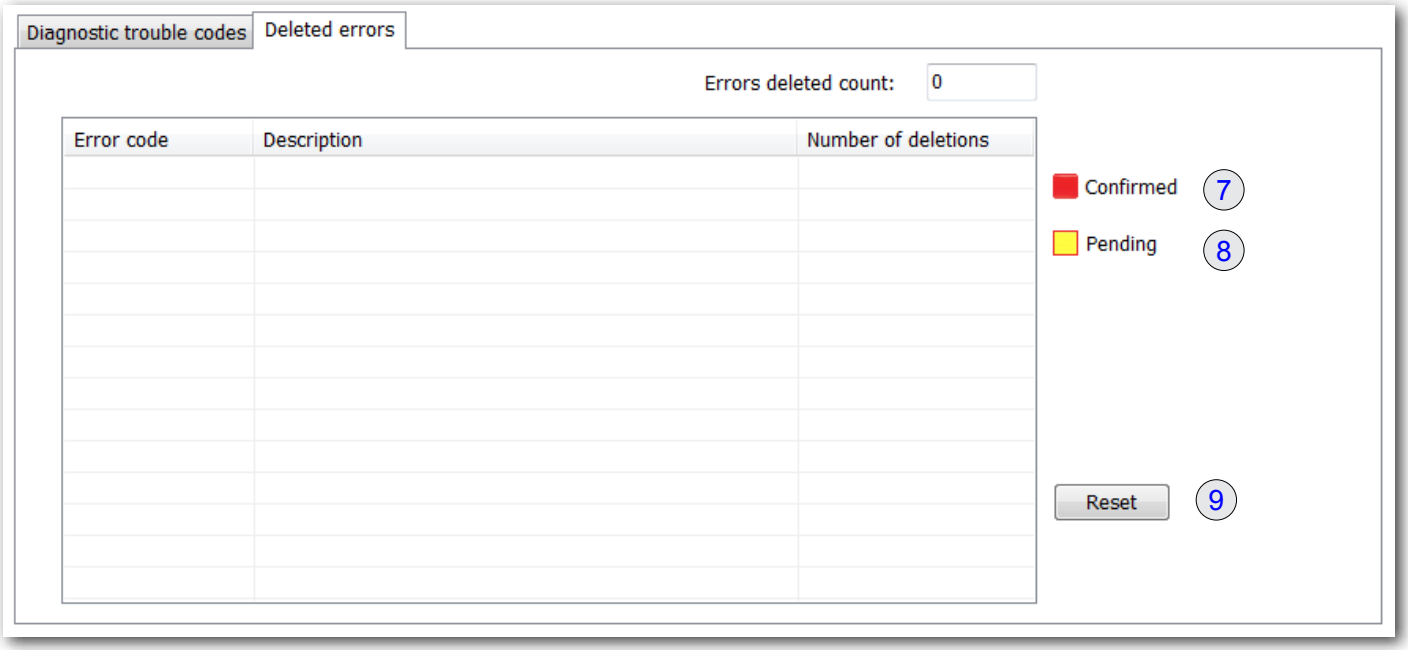
⑤ **Errors in the OBD:** this panel shows if there are any errors in the OBD system that have been detected by the petrol injection ECU and displayed by the MIL warning lights on the dashboard.
Every error in the table has a code number and a coloured square which specifies if it is a permanent error (red square⑦) or a latent error (yellow square⑧) as well as a brief description.
To cancel these errors, you have to turn the engine off, disconnect the power supply to the gas ECU (removing the fuse is sufficient), connect a diagnostic tester to the OBD socket and carry out the tester OBD error cancellation procedure.

⑥ **Cancelled errors:** shows a list and the number of the errors cancelled.



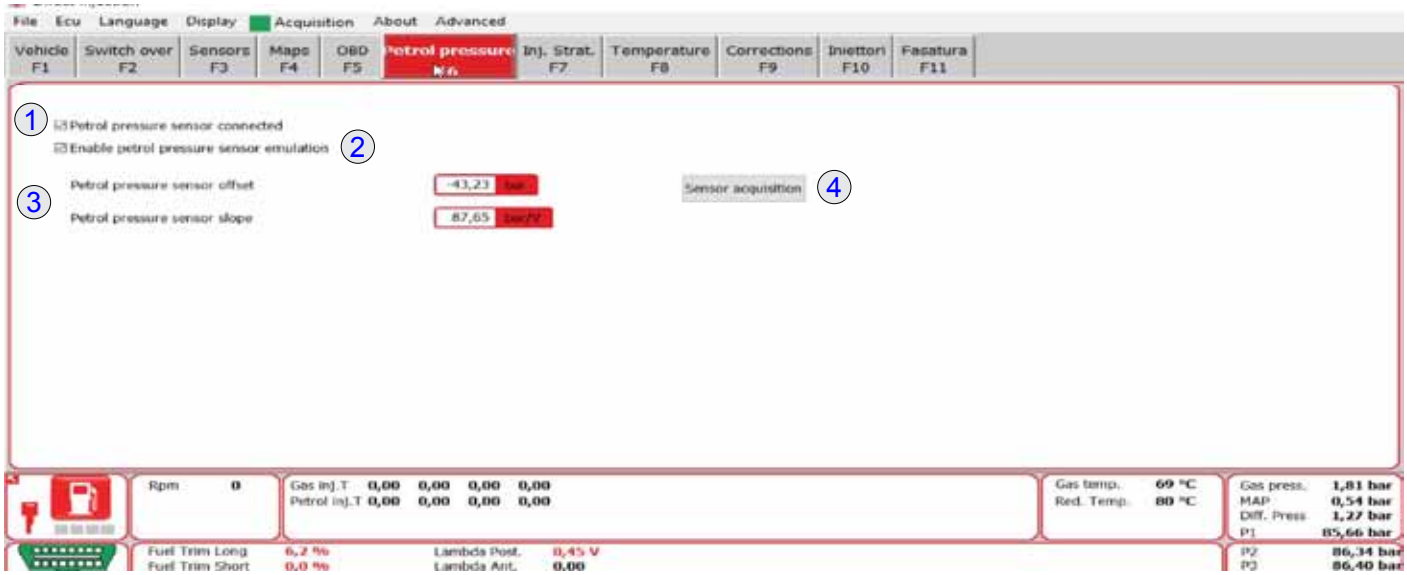
As regards managing errors, the following options are available:

- **Enable complete error cancellation:** the gas ECU will try to cancel all errors detected by the OBD.
- **Enable selective error cancellation:** only some OBD errors will be cancelled (the list of these errors is not selectionable).
- **Enable cancellation with the engine turned off only:** the gas ECU will only try to cancel errors when it detects no engine revs.
- **Connection also when there are no engine revs:** the gas ECU will connect with the OBD system even when the engine is turned off (provided that the switch is in gas mode).

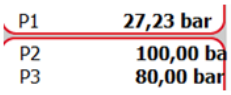


Petrol pressure F6

Petrol pressure page - F6



From this page, you can implement the settings relative to the petrol pressure sensor and its possible emulation. For this purpose, the following parameters are shown at the bottom right:



- **P1:** REAL real petrol pressure, read by the petrol high pressure sensor.
- **P2:** Target petrol pressure, read by the OBD (if available on OBD and if the OBD connection is enabled)
- **P3:** Petrol pressure read by the petrol ECU. This too is read by the OBD (if the OBD connection is enabled). During emulation, it also corresponds with the emulated pressure.

Tick the (1) "Petrol pressure sensor connected" box if a pressure sensor has been connected. The gas ECU reads the petrol pressure so as to make suitable compensations in calculating the gas time. The pressure read is displayed in the P1 parameter.

Tick the (2) "Enable petrol pressure sensor emulation" box to enable petrol pressure emulation. If it is not emulated, the real pressure corresponds with the pressure read (P1 = P3). Otherwise, one of the following strategies is enabled for emulating petrol pressure:

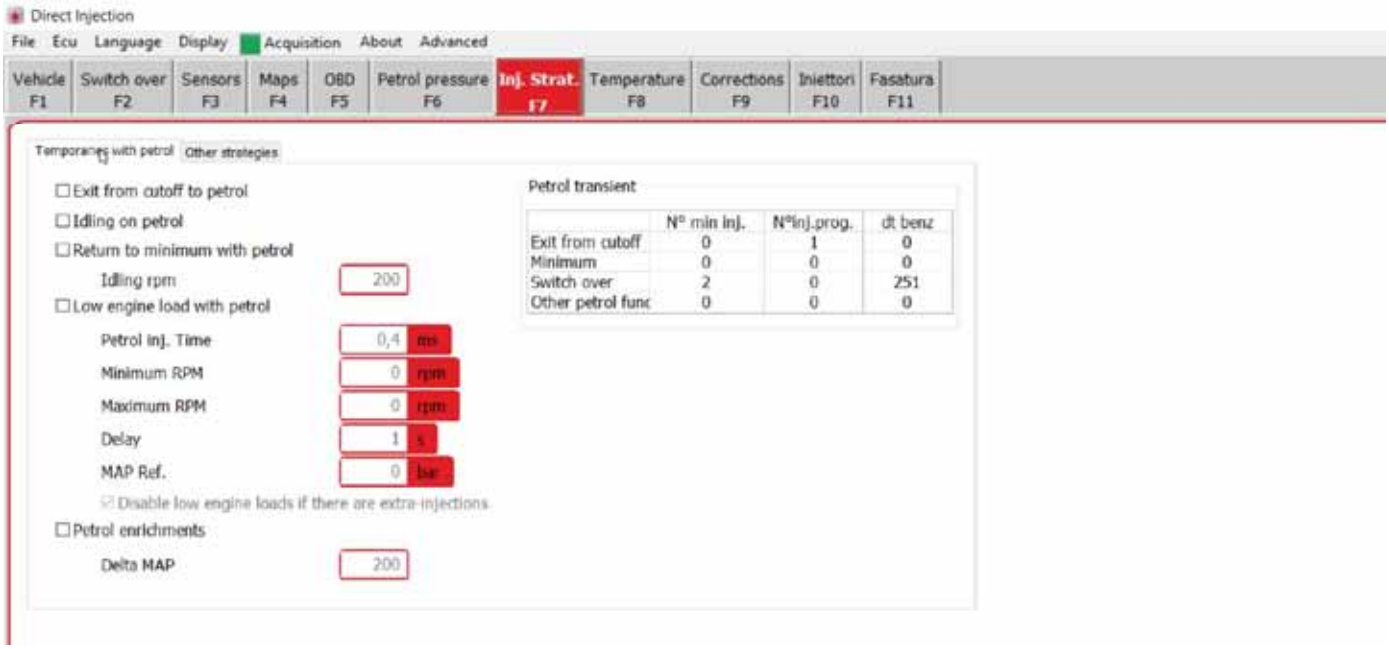
A. “PURSUE TARGET” STRATEGY.
B. EMULATION WITH REAL FIXED PRESSURE.

(3) **Petrol pressure sensor offset” / “Petrol pressure sensor slope:** characterise the same pressure sensor with a characteristic linear curve between voltage (in volts) and pressure (in bar).

(4) **Sensor acquisition:** performs automatic acquisition of off-set and petrol pressure sensor slope values.

Injection Strategy F7

Injection Strategy page - F7



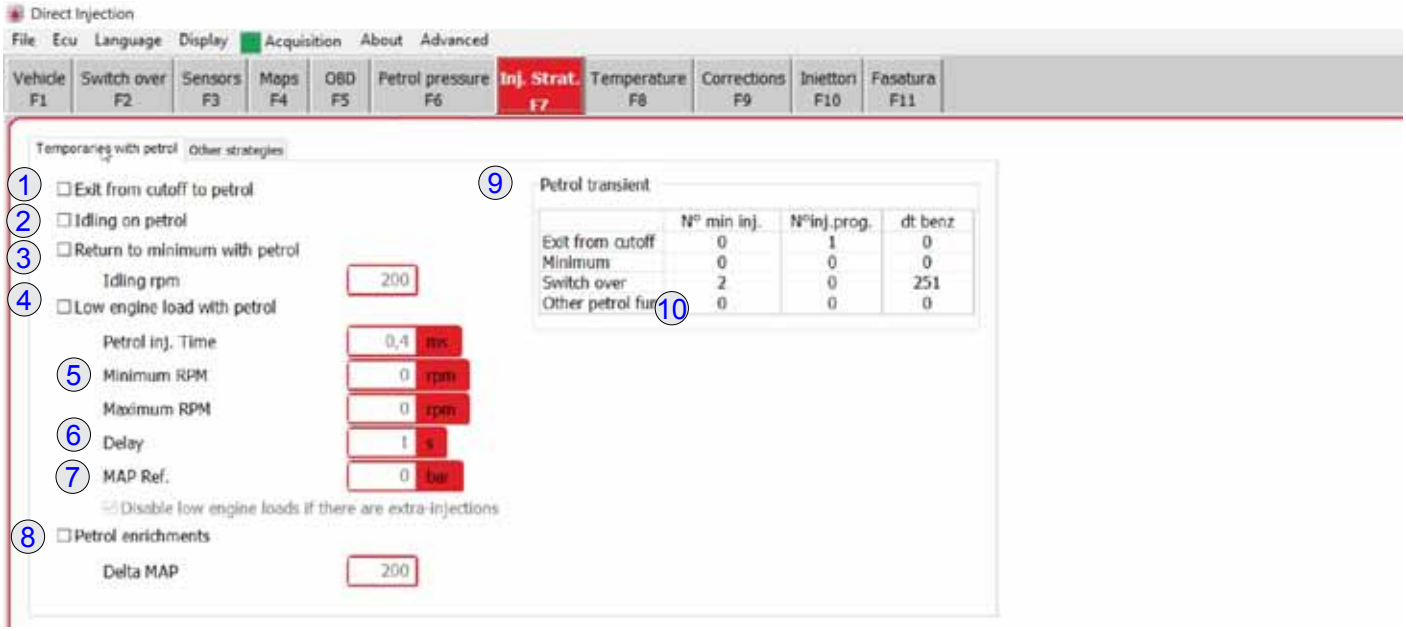
"Petrol transitions" chart

While running on gas, you can program temporary running on petrol while waiting for the system to switch back to gas. The switch to gas will be immediate. The switch from petrol to gas on the other hand can occur gradually by means of a progressive transition between petrol injectors and petrol partial fuel feed. You can program progression/partial feed in the “Petrol transition” table in different ways depending on the transitory petrol options enabled.

NOTE: Progression consists of implementing the switch to gas progressively involving one injector at a time and counting the injections that occur. In the “Petrol transition” table the “N° of injections per min” is the number of injections which are switched to petrol on all the injectors before starting the switch to gas. the “N° of injections per min” is the number of injections between one injector and another in the switch to gas. The switch will be complete after all the injectors have changed to running on gas.
If the “N° of injections per min” is the number of injections parameter is 0, this progression will not occur. The acquisition the figure relates to the change in progression, with the minimum number of injections set at 12 (see injections using the cursor at the first changed injection), and the number of injections set at 4.

The switch over from petrol to gas can be progressive on every injector: as soon as the change to gas a reduced contribution of petrol and a minimum quantity of gas is injected. This contribution is defined in the "dt benz" parameter in the "Petrol transition" table. On the next injection by the same injector, the petrol injection is further decreased by the same quantity until the switch over to gas is complete.

NOTE If the “dt benz” parameter is 0, this partialising will not occur.



The possible petrol transition options are as follows:

① **Exiting from cut-off to go back to petrol:** when after a phase of cut-off, injections restart, they are first made with petrol then go back to gas, then, with the "Petrol transitions" table settings ⑩ for progression/ partial fuel feed (“Exit from cut-off”) row, the system goes back to running on gas.

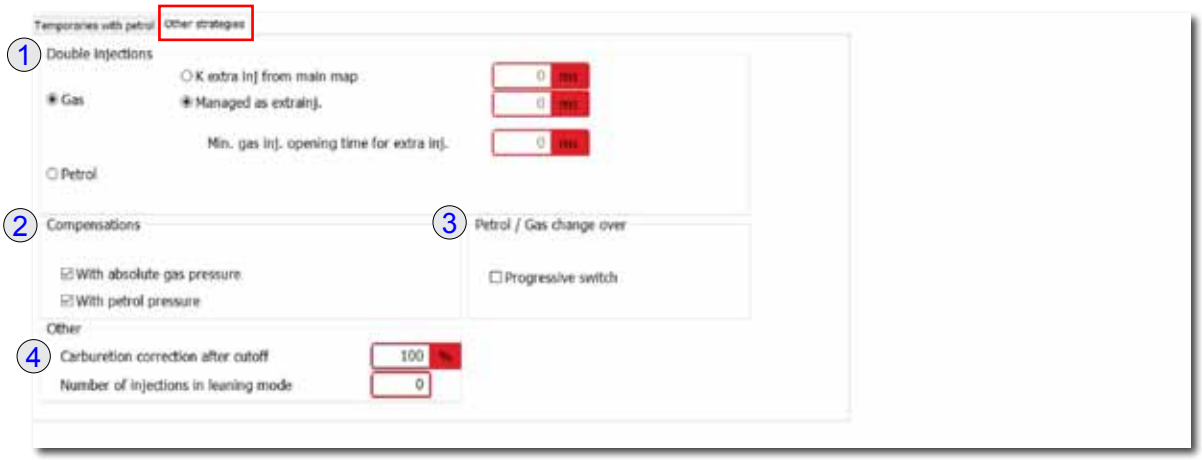
② **Petrol tick-over mode:** if the engine revs drop below the “Minimum tick-over" level”, the system will switch to run on petrol and will remain as such until the revs go back to above the threshold. In this case, it will go back to running on gas with the criteria set in the “Tick-over” row.

③ **Leaving petrol tick-over:** if the engine revs drop below the “Minimum tick-over" level”, the system will switch to run on petrol but will only remain as such for a certain number of injections (set in the "Petrol transitions" table ⑩) and will then go back to running on gas with the criteria set in the "Tick-over" row.

④ **Low loads to petrol:** if the petrol injection time is shorter than the set “petrol injection time” and the engine revs are greater than threshold set in the “RPM” parameter ⑤, the system will change to running on petrol. If the “RPM” parameter is 0, this will always apply.

NOTE: when near the petrol injection time set, there is a lag of 0.15 ms in the petrol injection time; within this band of petrol times, after the “Delay” ⑥, if the MAP is lower than the “Ref.MAP” parameter⑦ shown, the system will go back to running on gas. The switch to gas uses the settings from the “Other petrol functions” row in the “Petrol transition” table ⑩.

⑧ **Enrichment to petrol:** if the difference on the MAP between 2 consecutive injections is greater than the “Delta MAP” value, the system will change to petrol then back to gas using the settings in the “Other petrol functions” row in “Petrol Transitions"⑨.



"Other strategies" chart

① **Double injections**: extra-injections can be managed as follows.

- **To gas – Fixed contribution** (only appears if the extra-injection map is NOT selected on page F4). A fixed contribution of gas is applied, i.e. a fixed gas injection opening time regardless of the duration of extra-injections and revs. In this case, when calculating the effective gas time, the gas offset is totalled up anyway alongside the “Managed as extra-injections” option.

- **To gas – K extra injections from the main map**(only appears if the extra-injection map is selected on page F4). In this case, the K factor used for the gas time of the extra injections will be taken from the main gas map.

- **To gas – Managed as extra-injections:** in this case, the system behaviour depends on the gas ECU firmware. If the extra-injection map is selected (on page F4), the K factor used for the extra gas injections is taken from this map.

- **To Petrol:** always leaves extra-injections to petrol.

NOTE: if the firmware has a single map of the Ks (page F4), a settable offset will be added to the gas times which will let you give more or less weight to the extra-injections. If the time of the extra gas injections is less than “Minimum gas injection opening time with extra-injections”, that value is applied. If the firmware manages the K map dedicated to extra-injections, the calculation of gas times relating to extra-injections is made using the mapping of this table. In this case, the "Managed as extra-injections" offset is also ignored.

② **Compensations:** when calculating gas times in relation to petrol times, you can select if you want to apply dependent corrective factors from the following parameters:

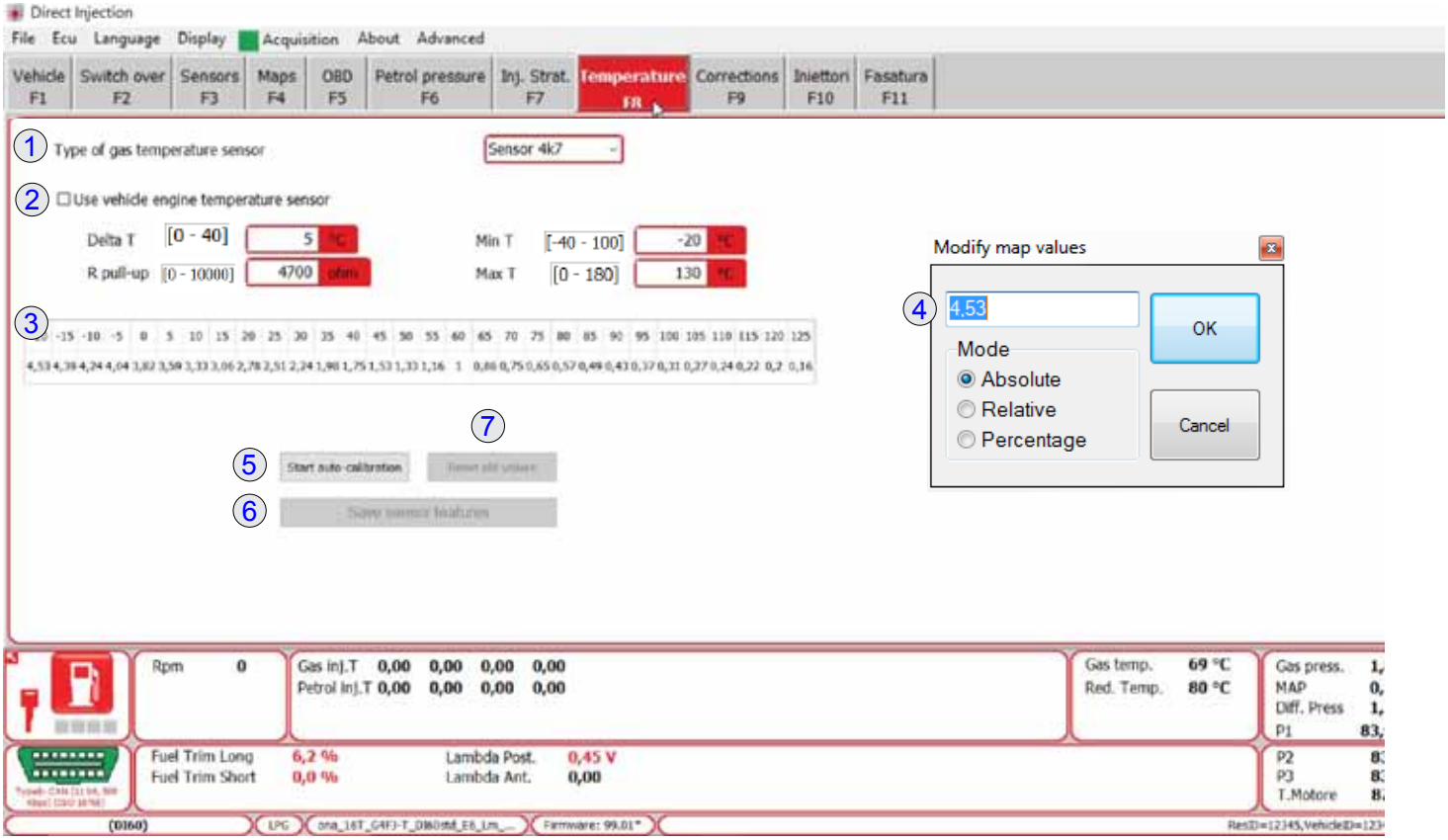
- **With absolute gas pressure:** if selected, the higher the pressure (in line with volume), the greater the quantity of gas injected meaning that a negative trim value will be required at high gas pressures. Vice versa, at low gas pressures, a positive trim value will need to be set to increase the duration of gas injection. The correction factors applicable can be set on page F9 – Trimming.
- **With petrol pressure:** if selected, the higher the petrol pressure, the higher the calculated gas contribution in proportion to the square root of the pressure itself.

③ **Switch from petrol to gas:** (for 3000B only).
Progressive switch over: you can enable the switch from petrol to gas to occur progressively using the parameters regarding the switch over in petrol transition table (page F7 - Transitions on petrol).

④ **Other**
Carburetion correction after cutoff: the K factor for calculating gas time after cut-off can be decreased by a percentage factor defined in this parameter. If it is 100%, no correction (trim) is implemented. This mix leaning phase will last for the number of injections set in “Number of injections in mix leaning”.

Temperature F8

Temperature page - F8



The functions on this page are programmed when the calibration file was created and we do not recommend changing them.

① **Type of gas temperature sensor:** select the Type of gas temperature sensor fitted to the units from the following sensors: 4K7, 2K2, or 10K.

② **Use vehicle engine temperature sensor:** usually an NTC 4K7 sensor is used to measure the regulator temperature. To use the original engine temperature sensor, you will need to type the engine sensor using the table ③.

Table ③ lists the main gas injection times with based on temperature. The first row is the temperature value (in °C). This cannot be changed directly so in “T. Min" you will have to set it the first temperature value in the table, the maximum value in “T. max” and the difference between one value and the next in “Delta T”. The second row is the voltage value (in Volts) associated with the same temperature.
To change to the suggested injection time values, double click on the preset value: the dialogue window ④ will open for the introduction of values in Absolute, Relative or Percentage mode.

NOTE: The signal from the temperature sensor fitted to the pressure regulator heating hose is used for calculating the gas injection times.

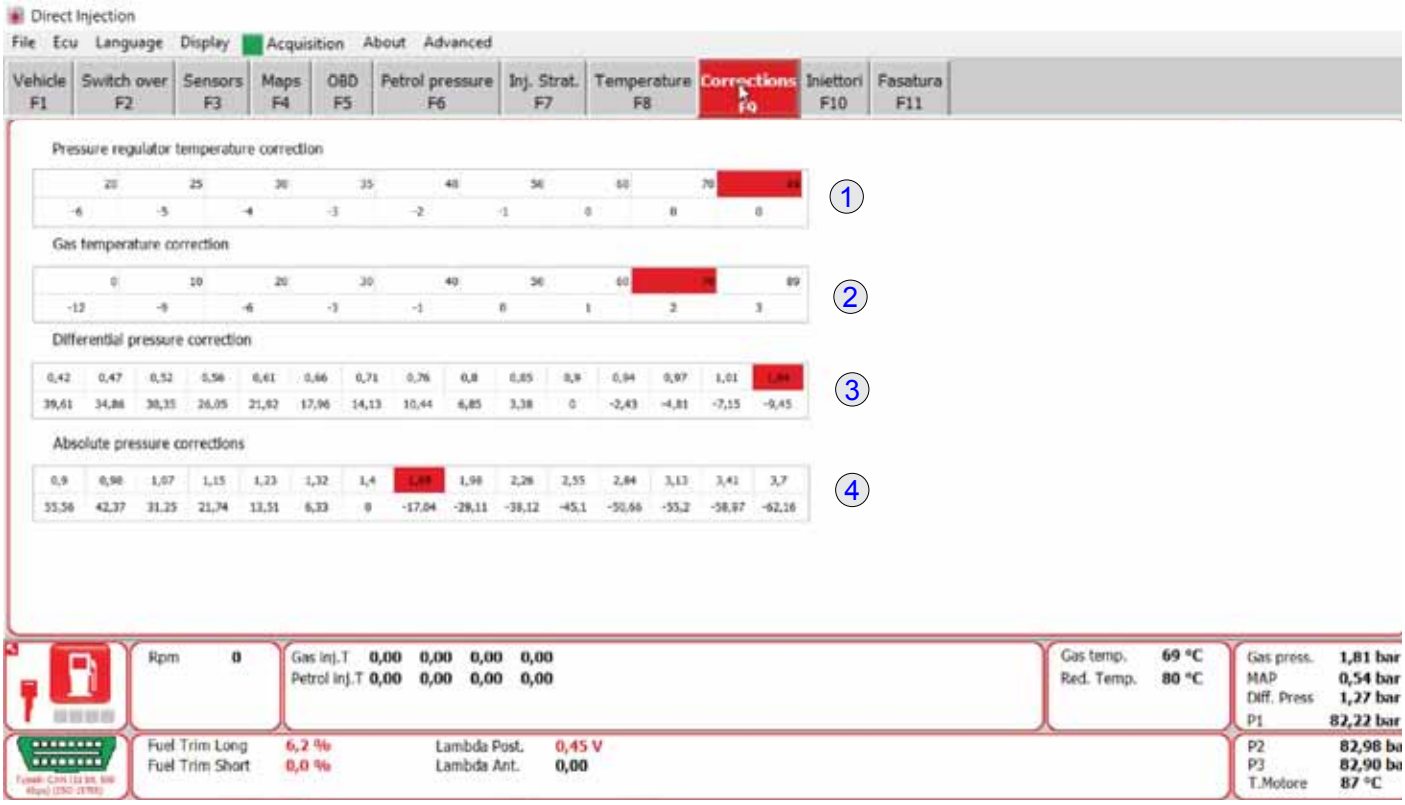
⑤ **Start auto-calibration:** you can carry out auto-calibration to more quickly acquire this conversion table. Press “Start auto-calibration”; select the cell in the second row for every current temperature value and press ‘S’ to load the current temperature value as the desired value and press ‘R’ to restore the previous value. Below every value entered a green tick will appear to show the difference between old and newly entered values.

⑥ **Save sensor characteristics:** press this key to save the auto-calibration procedure.

⑦ **Reset old values:** cancels any changes made to the table.

Corrections F9

Corrections page - F9



When calculating gas times in relation to petrol times, further dependent corrective factors from the following parameters are applied: There is a table for each of these parameters in which: the first row is the reference (temperature values in °C for the first two parameters, pressure values in bar for the last two); the second row is the K factor expressed as a percentage.

(1) **Regulator temperature corrections:** this correction factor is used especially to apply a negative correction (trim) at low temperatures.

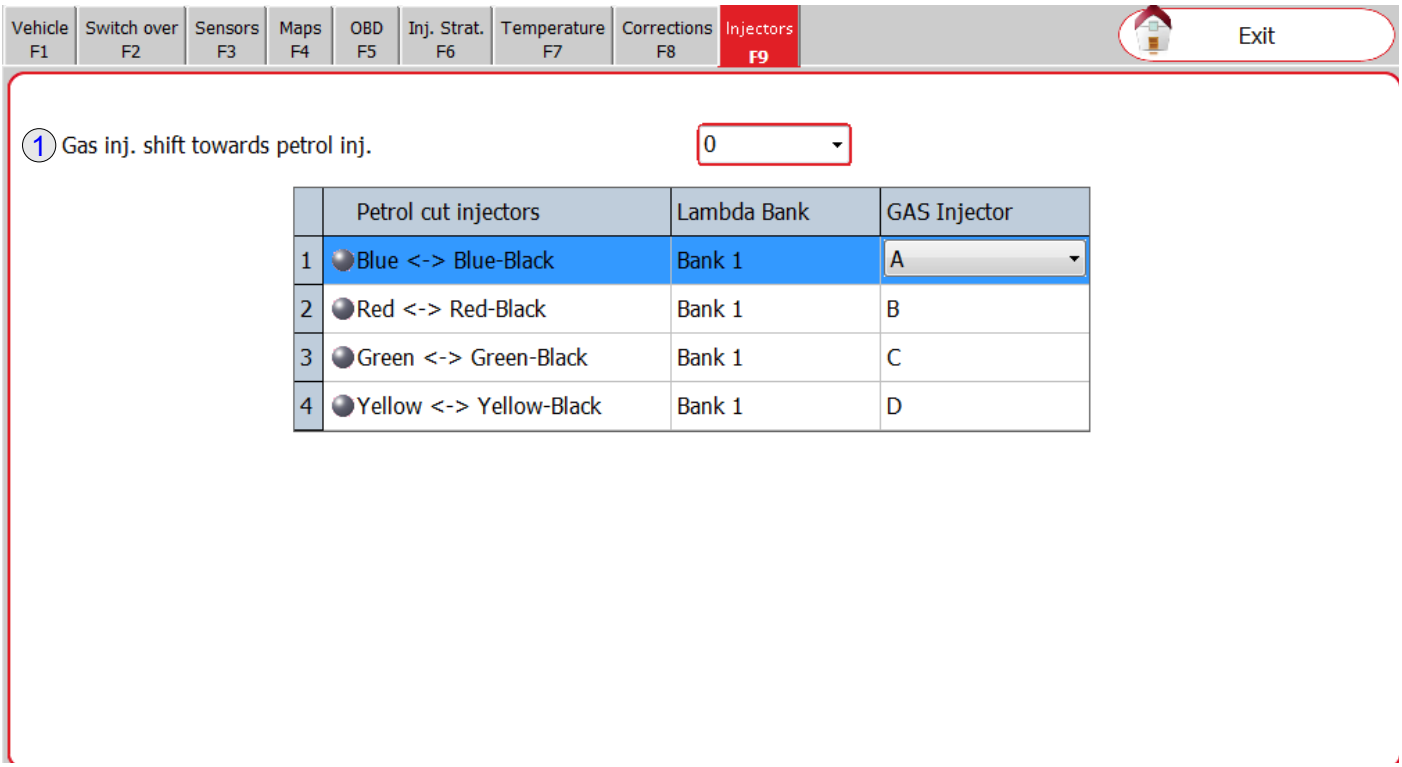
(2) **Gas temperature corrections:** at high temperatures, the gas is more rarified and therefore injector opening times need to be longer meaning a positive trim is needed.

(3) **Pressure differential corrections:** this involves the difference between the pressure of the gas and that at the inlet manifolds (MAP). This trimmer lets you compensate for any delays the regulator may have in governing gas pressure in relation to MAP variations.

(4) **Absolute pressure corrections:** this is the gas pressure before it reaches the gas injectors. Obviously, the higher the pressure (in line with volume), the greater the quantity of gas injected meaning that a negative trim value will be required at high gas pressures. Vice versa, at low gas pressures, a positive trim value will need to be set to increase the duration of gas injection.

Injectors F10

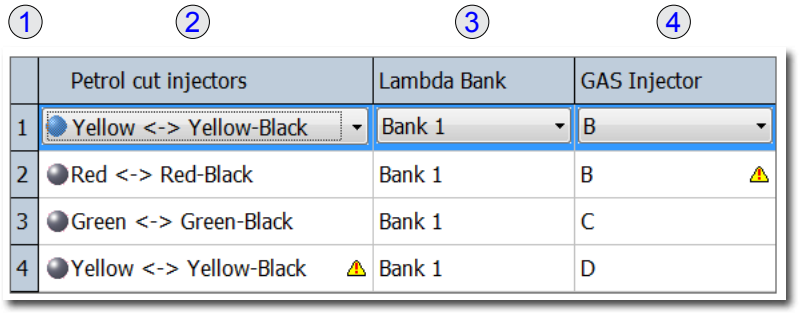
Injectors page - F10



Phasing can be set between the injector on which petrol injection is detected and the injector through which gas is injected. This parameter is known as “Gas injector phasing in relation to petrol”.

(1) **Gas injector phasing in relation to petrol:** phasing is possible for 0, 1, 2, or 3 injectors.

If phasing is set at 0, as soon as a petrol injection arrives, the calculated gas injection time is applied immediately to the same cylinder. If phasing is set at 1, the calculated gas injection time is applied to the next cylinder (following the order of injection). For example, if the injection order is 1 – 3 – 4 – 2 and a petrol injection arrives at cylinder 1, the equivalent gas injection is applied to cylinder 3.
Similarly, if phasing is set at 2 or more, the calculated gas injection time is applied to two or cylinders (following the order of injection).



The table is used to associate the wires used for cutting off the petrol injectors, the number of the original petrol injector , the associated gas injector and the Lambda sensor bank.
The first column ① indicates the number of the original petrol injector on the vehicle (always a progressive number from 1 to the number of cylinders on the vehicle).
The ② “Petrol injector cut-off” column indicates the colour of the injector cut-off wires going to the petrol ECU: blue-black, red-black, green-black, yellow-black. If a DI108 ECU is in use, the grey dot indicates that the wires refer to the main wiring (60-way connector) whereas the red dot indicates that the wires refer to the wiring on the second bank (48-way connector).
The “Lambda bank” ③ column shows the association between the petrol injector and the bank.
The “GAS injector” column ④ shows the association between petrol and gas injectors (without considering phasing); the gas injector is identified by the letter on the wiring. The association of gas and petrol injectors must match the actual connections on the unit.

NOTE: the choices that can be made from the table on the drop down menu ② relating to rows and columns, are unambiguous and cannot overlap, identical data can not coexist in the same column (in the example below, in the “Petrol injector cut-off” and "GAS injector" columns, the data "Blue <-> Blue-Black" and "B" have been entered twice). The error is highlighted by the ⚠ symbol and has to be corrected before you can go any further.

Examples of completing the injector association table

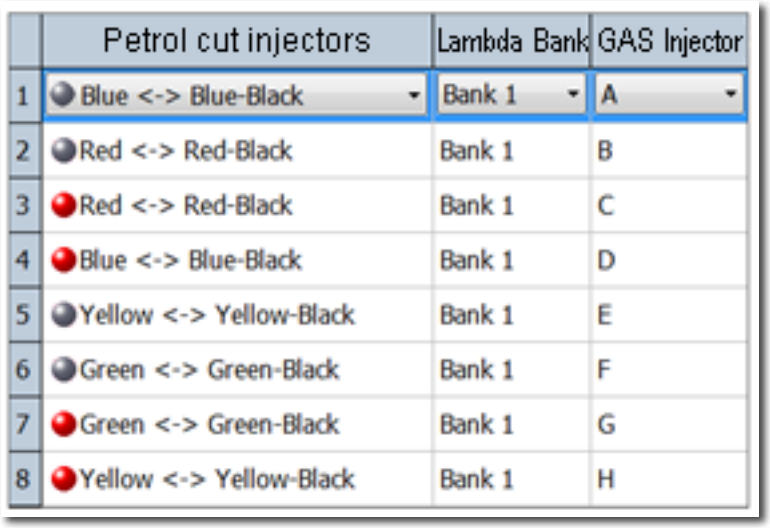
Case 1. Vehicle with pairs of injectors with a common positive

You need to:
1. Identify the pairs of injectors with a common positive.
2. Associate each pair of petrol injectors with the following pairs of injectors:
   INJG1 [Blue<->Blue-Black] – INJG4 [Yellow<->Yellow-Black]; this pair must always be connected!
   INJG2 [Red<->Red-Black] – INJG3 [Green<->Green-Black]
   INJG5 [Blue<->Blue-Black] – INJG8 [Yellow<->Yellow-Black]; for DI108 only
   INJG6 [Red<->Red-Black] – INJG7 [Green<->Green-Black] ; for DI108 only
3. Implement the association table between the petrol injectors and connections in a consist fashion with the connections actually made.

Example
Eight cylinder car with positive petrol injectors in common with a pair connected as follows:
INJB 1 – INJB 5 have the positive in common
INJB 2 – INJB 6 have the positive in common
INJB 3 – INJB 7 have the positive in common
INJB 4 – INJB 8 have the positive in common

A possible association could be as follows:
- INJB 1 – INJB 5 connected with the INJG 1 – INJG 4 pair of the gas ECU
- INJB 2 – INJB 6 connected with the INJG 2 – INJG 3 pair of the gas ECU
- INJB 3 – INJB 7 connected with the INJG 6 – INJG 7 pair of the gas ECU
- INJB 4 – INJB 8 connected with the INJG 5 – INJG 8 pair of the gas ECU

In this case, you will have to implement the injector association table as follows.



	Petrol cut injectors	Lambda Bank	GAS Injector
1	Blue <-> Blue-Black	Bank 1	A
2	Red <-> Red-Black	Bank 1	B
3	Red <-> Red-Black	Bank 1	C
4	Blue <-> Blue-Black	Bank 1	D
5	Yellow <-> Yellow-Black	Bank 1	E
6	Green <-> Green-Black	Bank 1	F
7	Green <-> Green-Black	Bank 1	G
8	Yellow <-> Yellow-Black	Bank 1	H

NOTE: The pair of Blue-Blue-Black wires must always be connected!

Case 2. petrol injectors with disconnected positives

You need to:
1. Identify the order in which petrol injections are generated.
2. Identify the pairs of petrol injectors with time gaps between them in the engine cycle.
3. Associate each pair of petrol injectors with the following pairs of injectors:
   INJG1 [Blue<->Blue-Black] – INJG4 [Yellow<->Yellow-Black]; this pair must always be connected!
   INJG2 [Red<->Red-Black] – INJG3 [Green<->Green-Black]
   INJG5 [Blue<->Blue-Black] – INJG8 [Yellow<->Yellow-Black]; for DI108 only
   INJG6 [Red<->Red-Black] – INJG7 [Green<->Green-Black] ; for DI108 only
4. Implement the association table between the petrol injectors and connections in a consist fashion with the connections actually made.

   Example
   Six cylinder car with disconnected petrol injector positives with the following order of petrol injection generation:
   INJB 1 – INJB 2 - INJB 3 – INJB 4 - INJB 5 – INJB 6
   The pairs of petrol injectors with time gaps between them in the engine cycle are.
   INJB 1 – INJB 4
   INJB 2 – INJB 5
   INJB 3 – INJB 6

A possible association could be as follows:

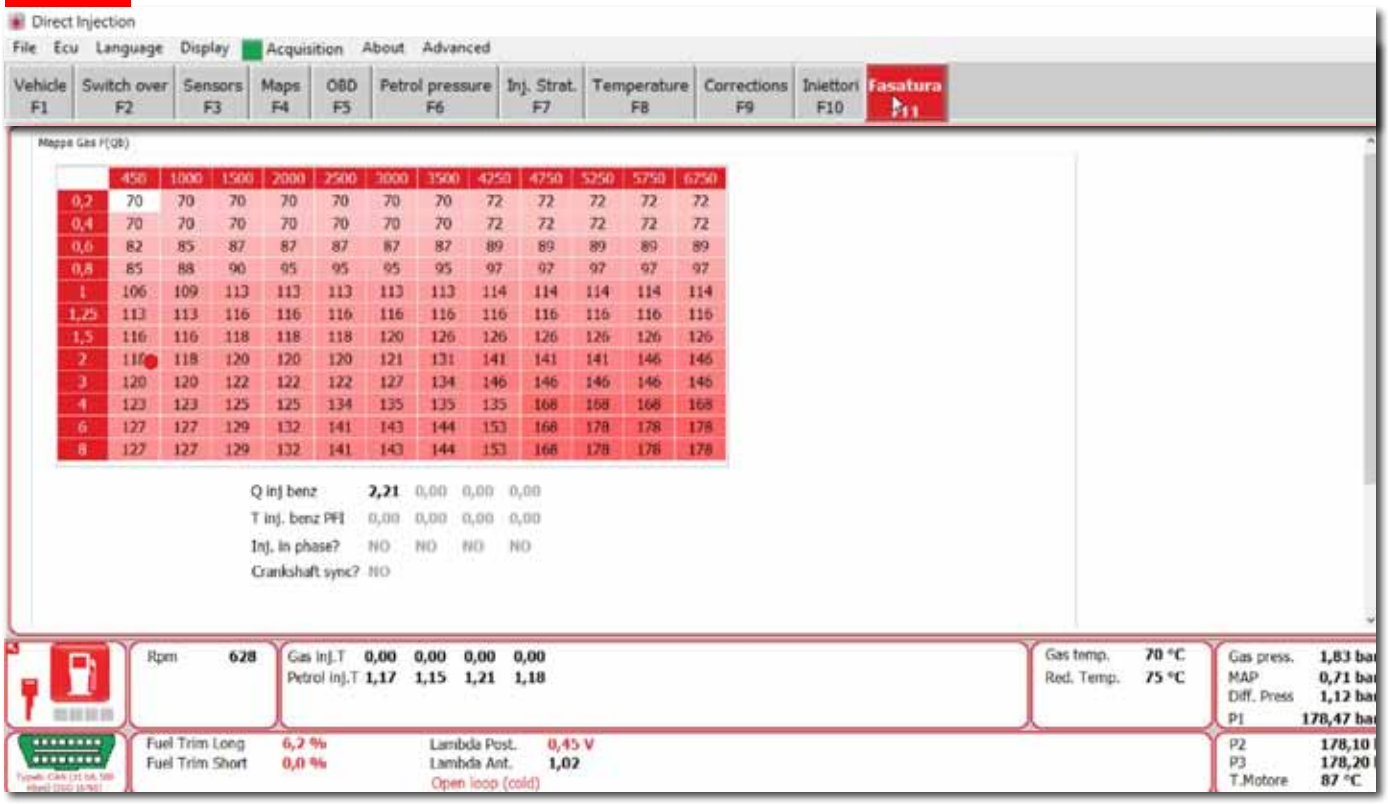
INJB 1 – INJB 4 connected with the INJG 1 – INJG 4 pair of the gas ECU
INJB 2 – INJB 5 connected with the INJG 2 – INJG 3 pair of the gas ECU
INJB 3 – INJB 6 connected with the INJG 5 – INJG 8 pair of the gas ECU

In this case, you will have to implement the injector association table as follows.

	Petrol cut injectors	Lambda Bank	GAS Injector
1	Blue <-> Blue-Black	Bank 1	A
2	Red <-> Red-Black	Bank 1	B
3	Blue <-> Blue-Black	Bank 1	C
4	Yellow <-> Yellow-Black	Bank 1	D
5	Green <-> Green-Black	Bank 1	E
6	Yellow <-> Yellow-Black	Bank 1	F

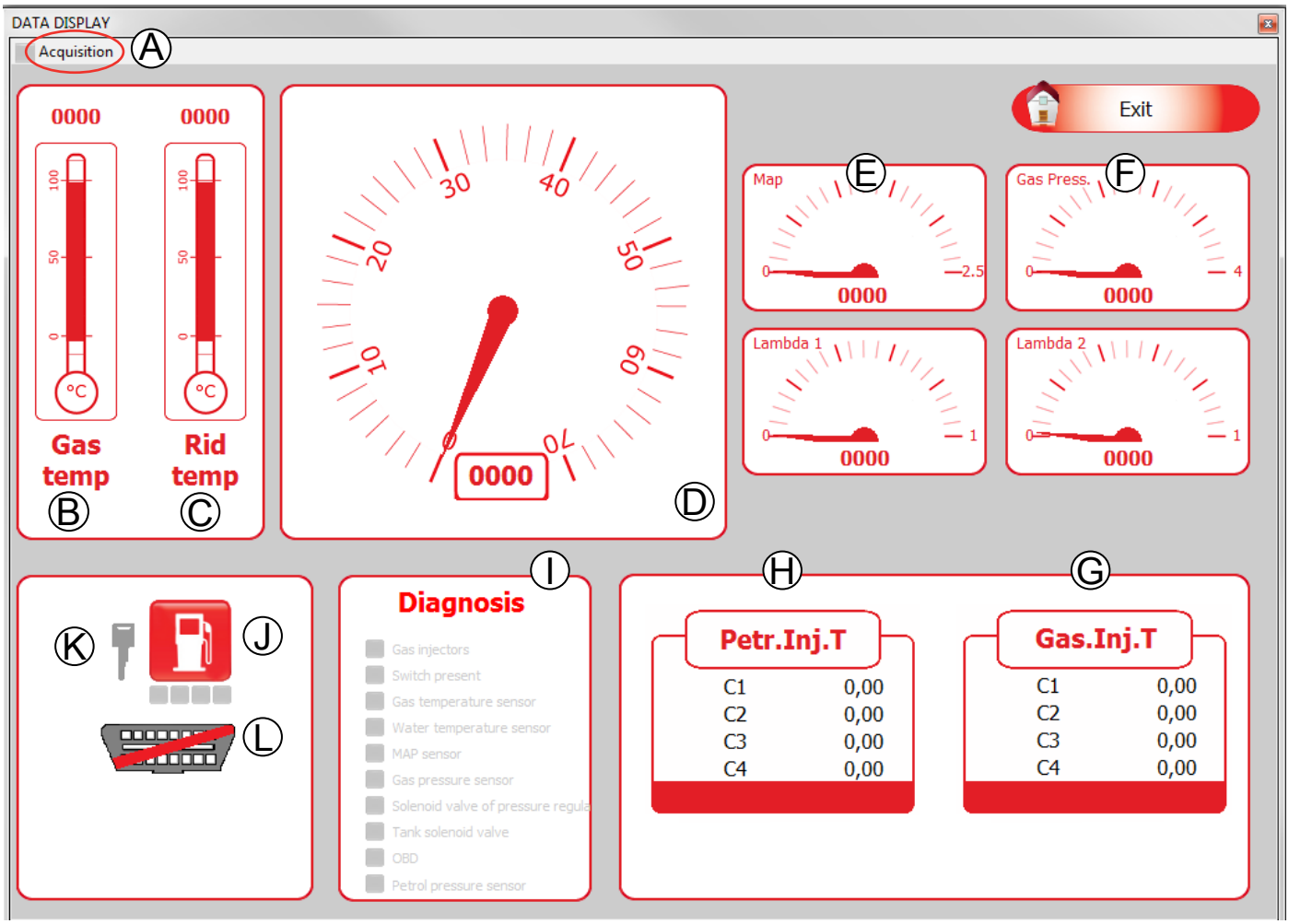
Phasing F11

Phasing page - F11



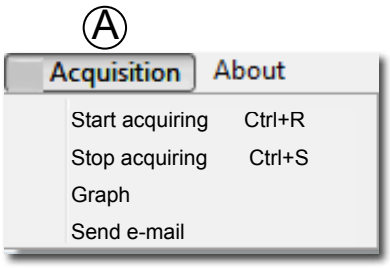
Phasing:

DATA DISPLAY



Data display

This page was designed to be fast and easy to consult the more important parameters to be checked during gas operation.



Ⓐ **ACQUISITION**: this menu is used to detect problems in the gas system. The drop down menu lets you set:

- Start acquisition
- Stop acquisition
- Graph
- Send e-mail

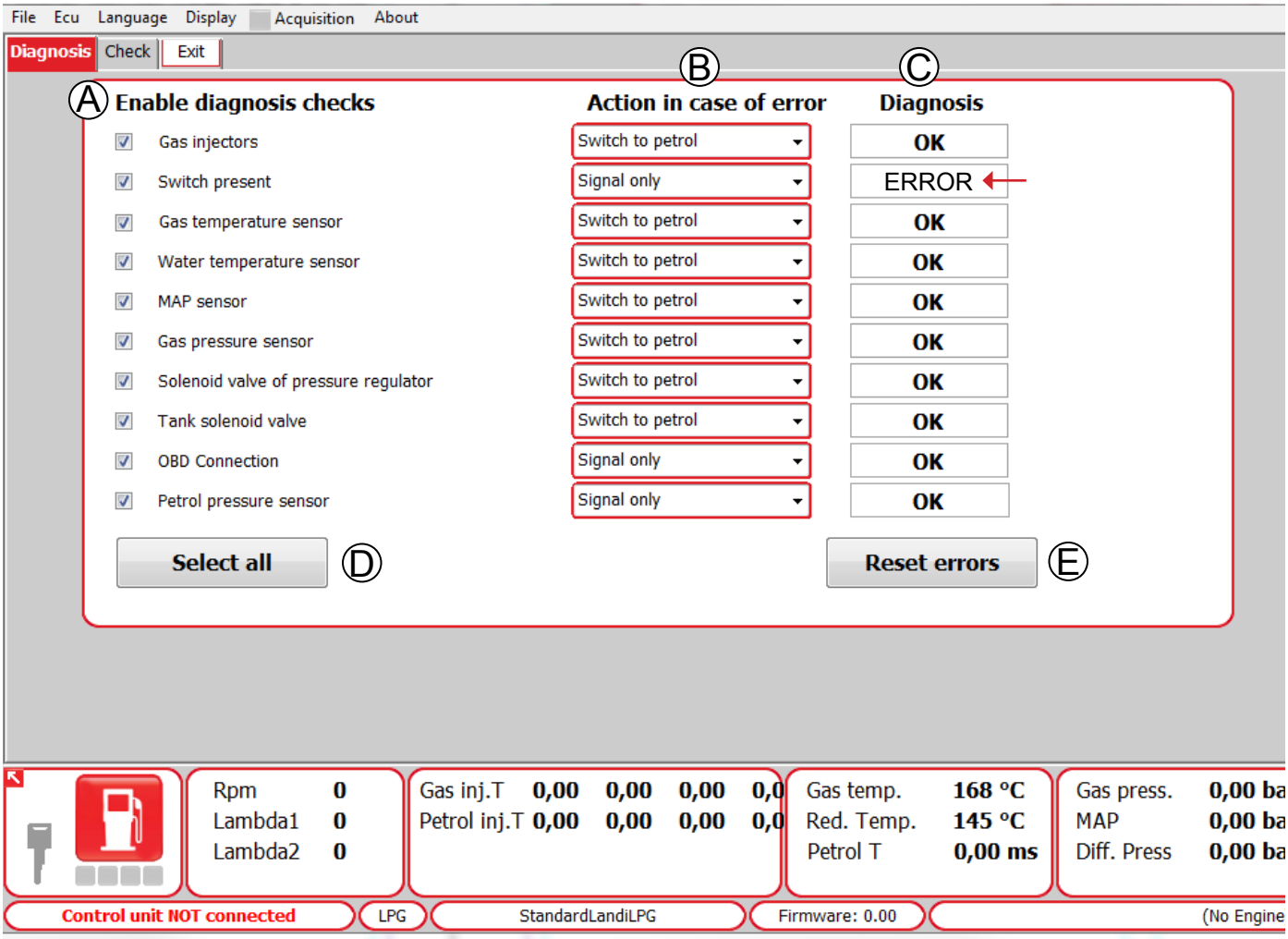
Start acquisition (Ctrl+R): when the "RED" dot is lit, this indicates that the program has started the acquisition procedure (function available with the engine switched off or running). You can repeat the procedure to detect the problem several times.
When you feel you have acquired sufficient data, press **Stop acquisition (Ctrl+S)**. The program needs to save the acquired data which will be archived in the "Acquisition" file.

Graphic: allows you to open the saved acquisition or other previously created files. The graphic displayed shows all the available signal tracks:

Pressing "Options" opens the trace configuration window from which it is possible to select the parameters that will be acquired (✓) and those not acquired (✗), by double clicking on a parameter it is possible to change its status.

It is also possible for each track to determine the color, thickness and type of line.

DIAGNOSIS



Diagnosis

"Diagnosis" chart
Ⓐ **Enabling diagnosis checks:** when the GAS ECU detects a system malfunction of a component Ⓐ, it applies the action that was selected in the Ⓑ "**Action in the event of an error**" box that corresponds with the error Ⓒ detected. Use Ⓓ "**Select all/ deselect all**" to tick/untick all the boxes.

The possible actions Ⓑ are as follows:
- **Notification only**
- **Switch over to petrol**

The Ⓒ "**Diagnosis**" column indicates the corresponding defect with an "**ERROR**" message.
If an error is displayed, after the problem that caused it to occur has been resolved, you can reset with Ⓔ "**Reset errors**".

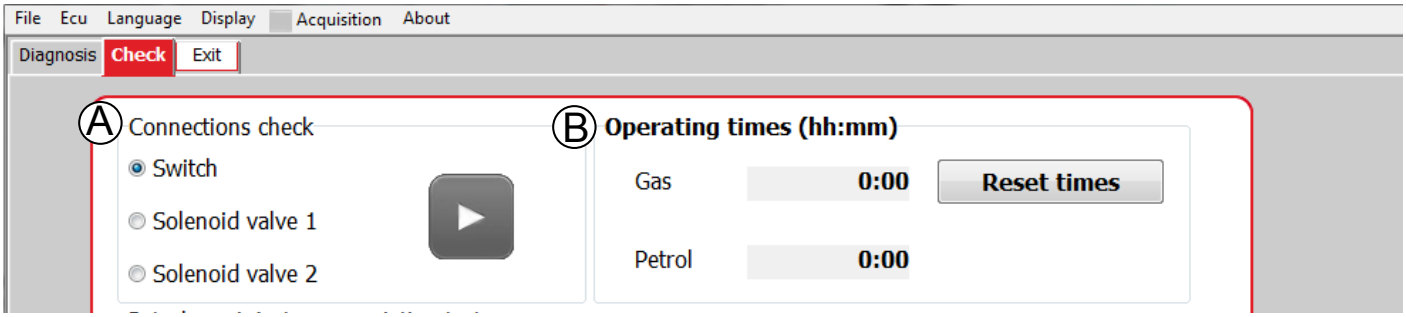
Every error detected matching the "**Switch over to petrol"** action leads to automatic switching to petrol and is signalled through the switch by the YELLOW LED staying lit, the GREEN LED blinking slowly and the buzzer sounding.

To deactivate the buzzer: press the button on the switch which will change the vehicle from running on Gas to Petrol.

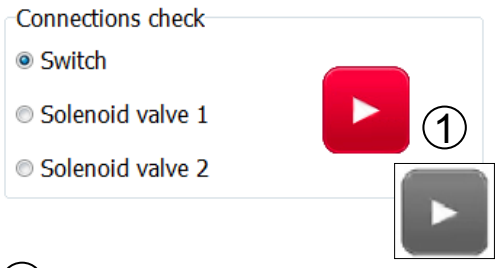
To go back to running on GAS, you will need to switch the vehicle off then start it again.

DEFINED ERRORS

	ERROR	POSSIBLE CAUSE
GAS INJECTORS	The Diagnosis column signals the injector corresponding to the wiring it is connected to (A,B,C or D). THE error is signalled about the corresponding matching gas injector when the ECU fails to recognise the preset parameters for the injector to work correctly.	*Possible damage to the wiring for the relative injector or in the ECU.*
SWITCH PRESENT	This error is signalled in only two types of condition. • During installation if the switch fitted is not compatible with the ECU; • During normal operation if 1 hour has passed since the last time power was supplied or the ignition was on, an error message will be signalled if the electronics in the switch fails to "dialogue" with the ECU. The error (normally "Notification only") will reset every time the switch "dialogues" correctly with the ECU.	*Possible damage to the wiring, to the switch or to the ECU.*
GAS TEMPERATURE SENSOR	Diagnosis starts if the ECU measures a gas temperature for 10 seconds that is lower than or greater than the values set alongside the gas temperature string.	*Possible damage to the wiring, to the sensoror to the ECU.*
WATER TEMPERATURE SENSOR	Diagnosis starts if the signal from the vehicle temperature sensor or optional sensor is missing for 10 full seconds or if the ECU measures a water temperature that is lower than or greater than the values set alongside the water temperature string.	*Possible damage to the wiring, to the switch or to the ECU.*
MAP SENSOR	An error is signalled if, while running on gas, the pressure detected does not stay within the preset parameters for the correct functioning of the sensor, for 3 seconds.	*Possible damage to wiring, to the sensor or to the ECU.*
GAS PRESSURE SENSOR	An error is signalled if, while running on gas, the pressure detected does not stay within the preset parameters for the correct functioning of the sensor, for 3 seconds.	*Possible damage to wiring, to the sensor or to the ECU.*
REGULATOR SOLENOID/TANK SOLENOID	IT is possible to diagnose a short circuit or open circuit on each coil of the gas shut-off solenoids if the power consumption for each of them, measured for 2 seconds, falls outside the operating range.	*Possible damage to coil or ECU.*
OBD CONNECTION	With this software version, diagnosis is only enabled if "VWOPTION" is ticked in the "Configuration" "OBD F5" page. The error occurs, if during "Warm-up", the ECU fails to communicate with the OBD system.	*Possible damage to wiring or ECU.*
PETROL PRESSURE SENSOR	The error occurs when the engine is running on petrol and the ECU reads values that are higher or lower than the preset parameters.	*Possible damage to wiring or ECU. The cause of the problem may also be found in the petrol management system but in this case, the MIL warning light would light up with an error message.*



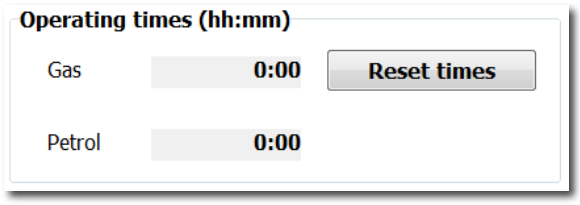
"Controls" chart



Ⓐ **Connection checks**: if you select one of the headings and press ① (red active - black inactive) you can check the following:

- **Switch:** all the LEDs come on in sequence and the buzzer sounds.
- **Solenoid 1**: the ECU powers the pressure regulator solenoid.
- **Solenoid 2:** The ECU powers the tank multivalve solenoid or the shut-off valves (if present) on the gas bottles and any other component connected to the White/Blue - White/Black wires.

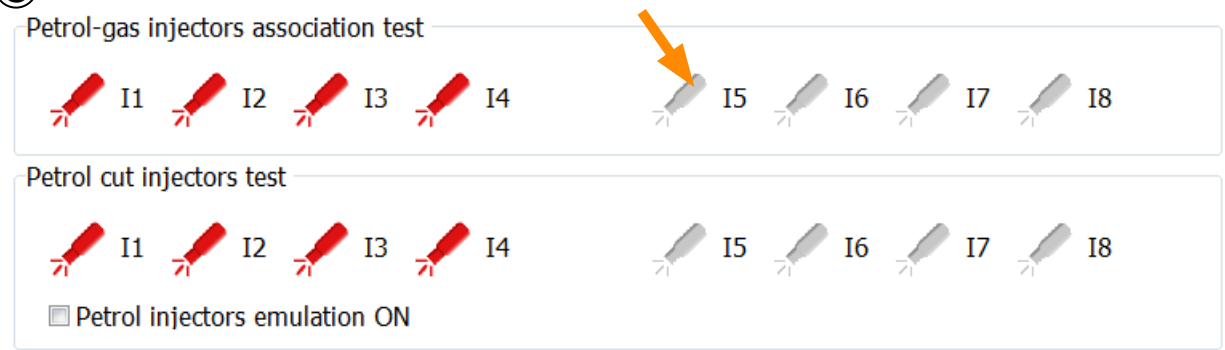
Ⓑ



Ⓑ **Operating times (hh:mm):** separately counts the time the engine has been running on gas and on petrol. The times are displayed in multiples of 20 minutes.

NOTE: the times saved will be reset if the ECU is reprogrammed with new firmware or with a new programming file.

Ⓒ



Ⓒ **Petrol-gas injector association test:** this lets you test that the gas injectors are working properly and that they are correctly associated with the petrol injectors. Click on the gas injector you want to test (while running on gas), the symbol will change colour and the corresponding cylinder will be fuelled with petrol. This function allows you to carry out various checks:

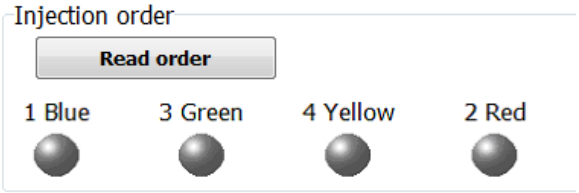
- to check the right sequence of petrol injector cut-off/gas injector connection.
- to identify any defects on injectors without having to manually check injector/inlet manifold piping.

to identify which injector might be creating the problem, press the injector symbol in sequence. In this fashion, the cylinder corresponding with the deactivated injector will be fuelled with petrol thus letting you identify the defective gas injector.

NOTE: When you exit the Diagnosis menu, all the injectors will be fuelled by gas.

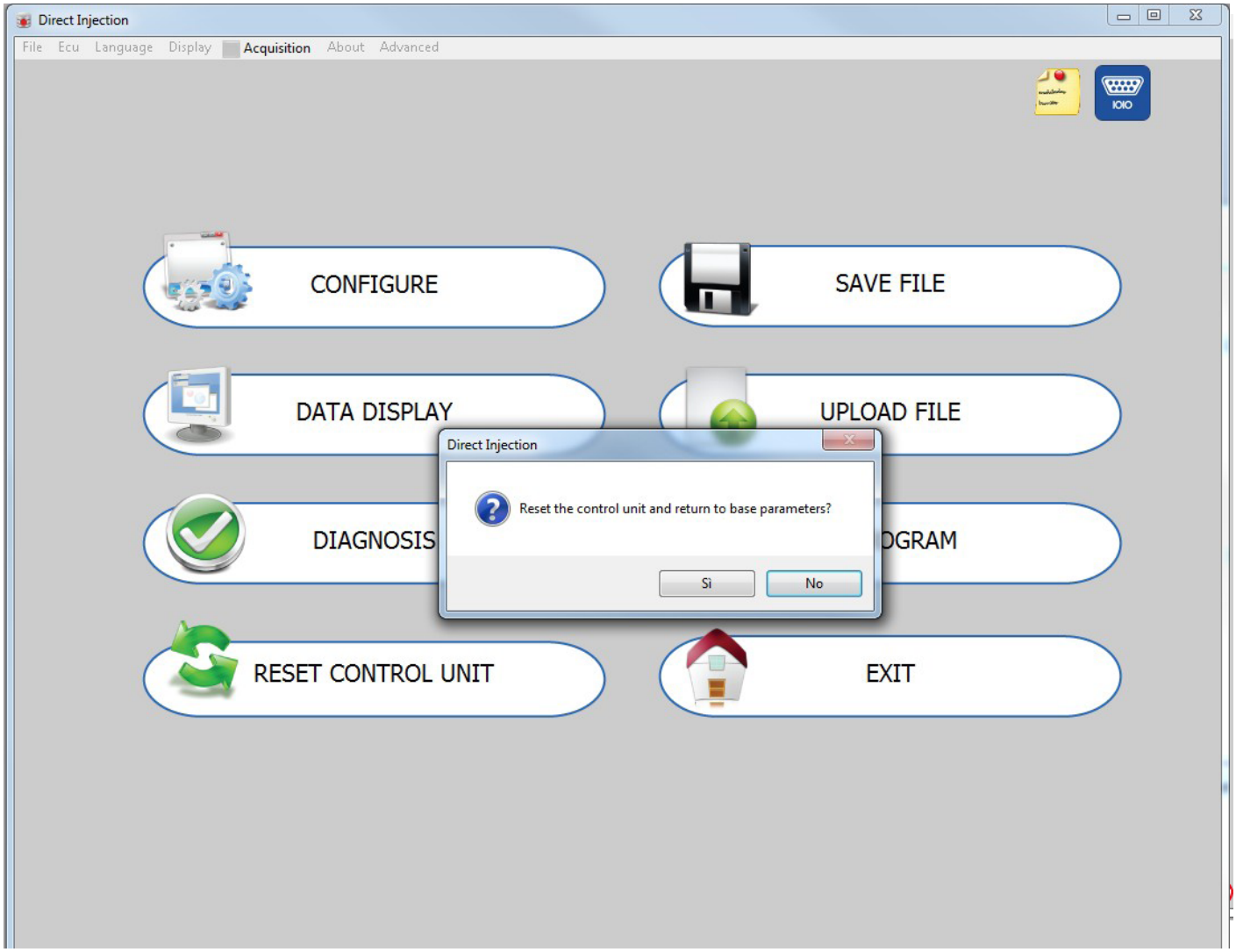
Petrol injector disconnection test: lets you carry out diagnostic tests on the connection of petrol injector and on the operation of the petrol injector disconnection phase. Click on the petrol injector you want to test (only when the engine is running on petrol), the symbol will change colour and power to the injector will be cut off in one of the following two ways (depending on the “Petrol injector emulation active” option):

- **Petrol injector cut-off without emulation.** In this case, an electrical or generic error is expected on the cut off injector (e.g. P0201 = injector on cylinder 1). If no error message appears, there has presumably been an inversion of the striped/non striped wire and for that reason the injector cut-off phase is not working.
- **Petrol injector cut-off with emulation.** In this case, a combustion error is expected on the cut off injector (e.g. P0301 = Misfire on cylinder 1).



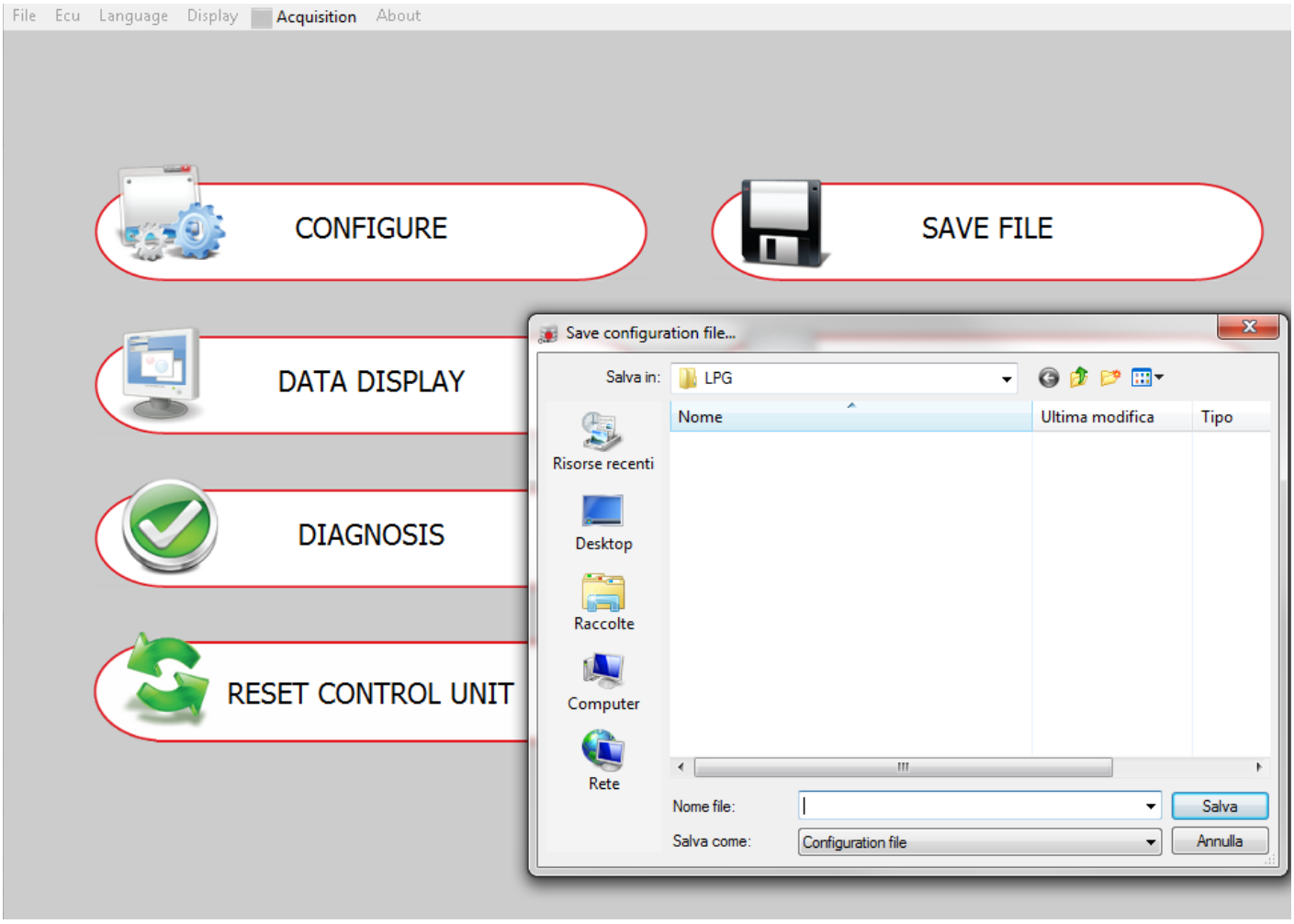
Injection order: if you press “Read order” you can acquire the order of injection: the colours of the wires are displayed in order from left to right (the first in order, i.e. the furthest to the left, is always the blue wire). The number shown beside the colour is the row in the injector association table.

NOTE: Every time the injector association table is changed or change the number of injectors, you need to switch the engine off then restart it to reacquire the order.



Reset ECU

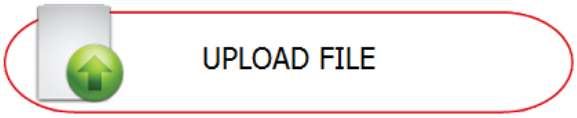
Before you reset the ECU, you will be asked to confirm the action.
This is a quick way to cancel all the parameters and make the ECU "neutral".
It is not always possible to cancel all the parameters if you load a calibration file created with a SW version that differs from the previous version as, if in the new file, one or more parameters have not been set (because they weren't needed), the ECU may save the values from the previous calibration file.

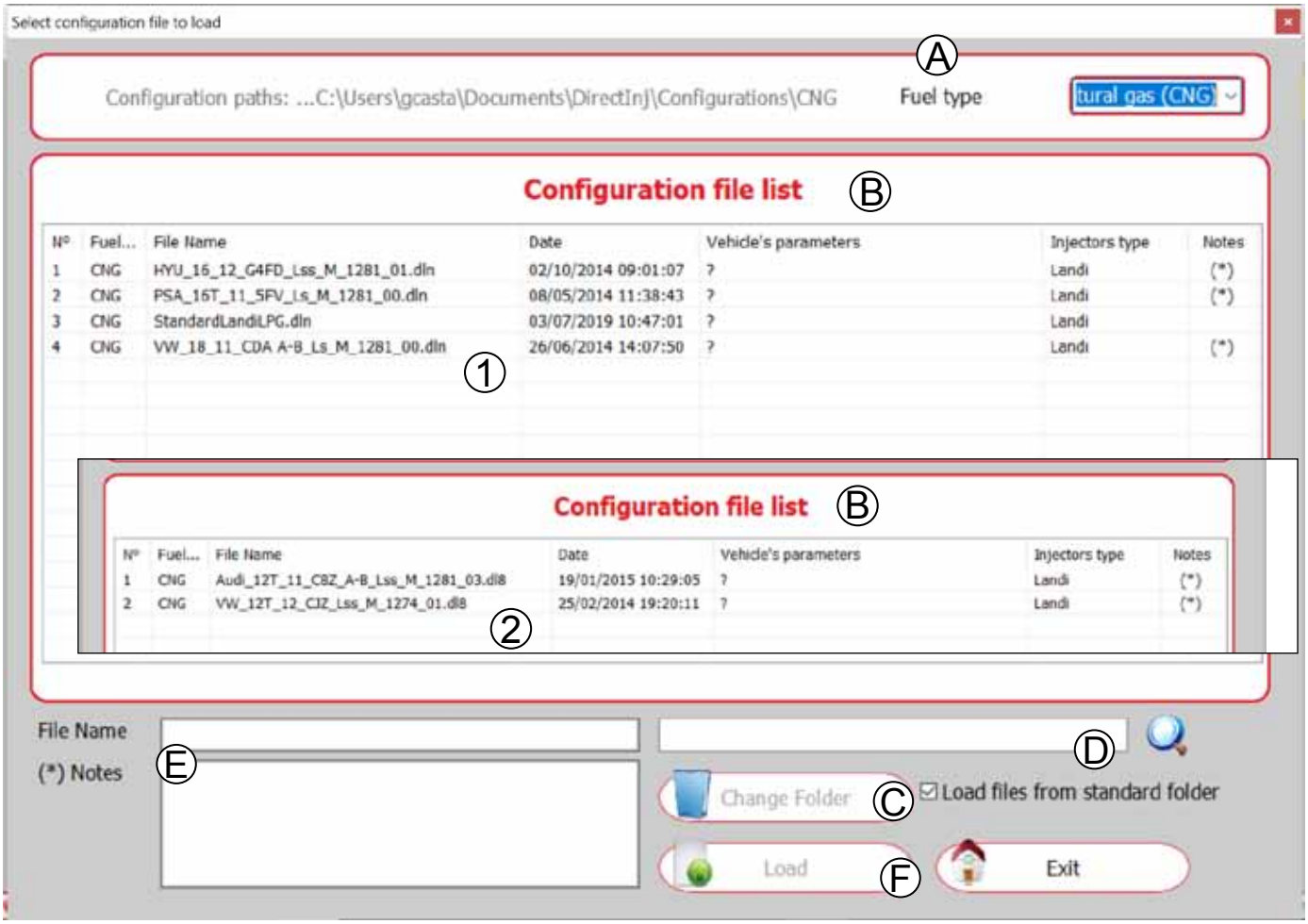


Save file

Accessing **SAVE FILE** lets you save configuration files to the computer. The program automatically opens the dialogue window.
Selecting the type of fuel CNG or LPG in “CONFIGURATION -VEHICLE F1” affects saving files in the relative folder.
IT is at the operator's discretion whether to save the file in a specific car manufacturer's folder or in a common fuel type folder. The name the file shows in the panel is the same as that which appears in the lower panel string "Configuration". The program automatically saves the file with the "**.dln**" extension for **3000B** UCUs and with "**.dl8**" for the DI108 and DI60.

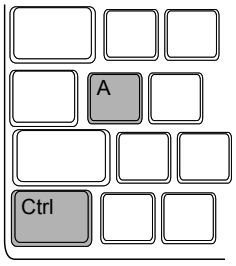
Any other car manufacturer folders not on the can be created on your computer.



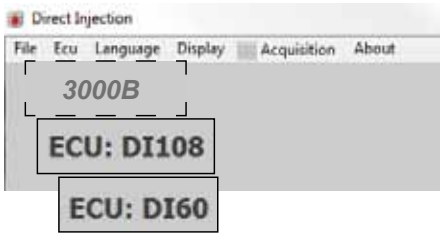


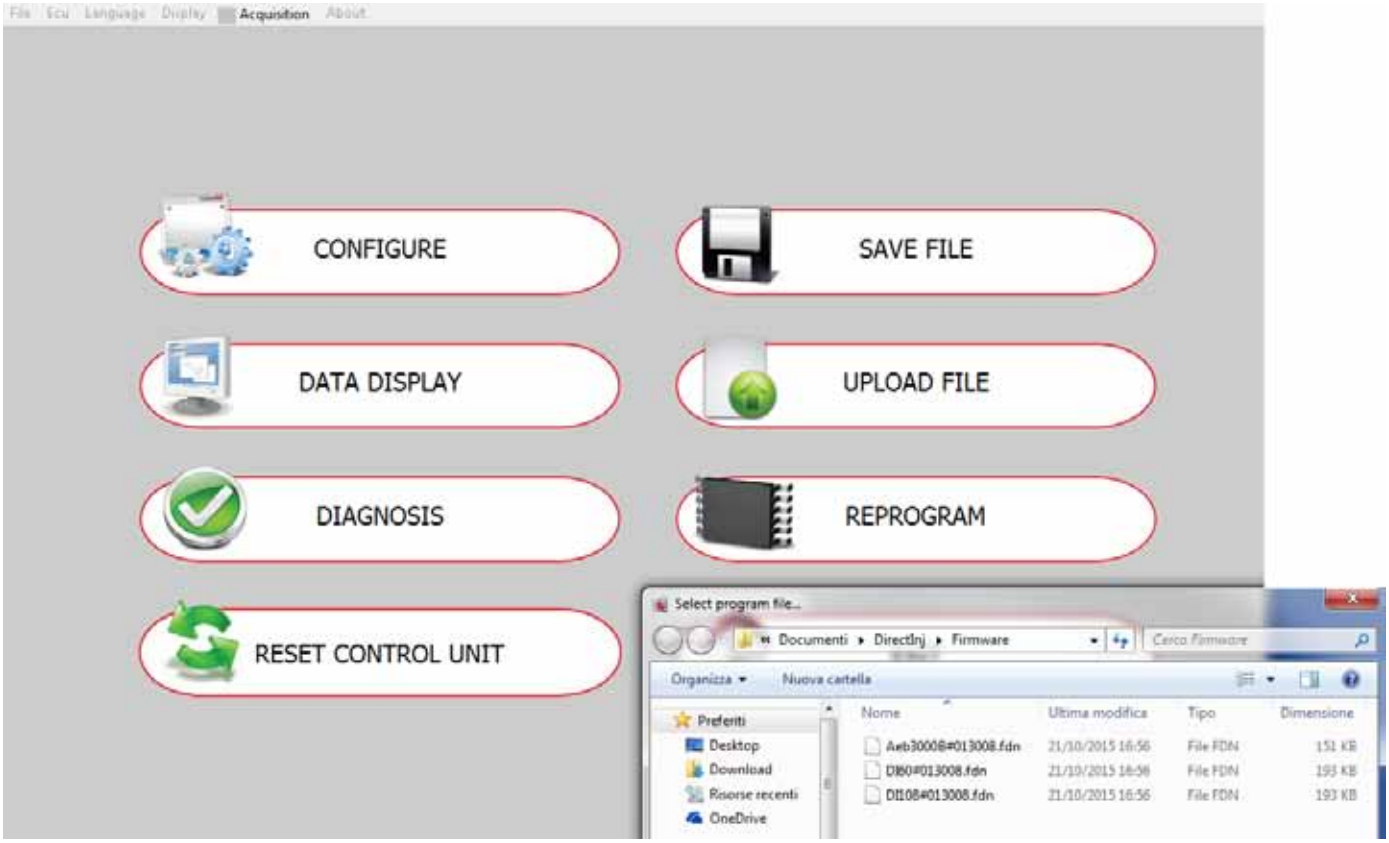
Load file

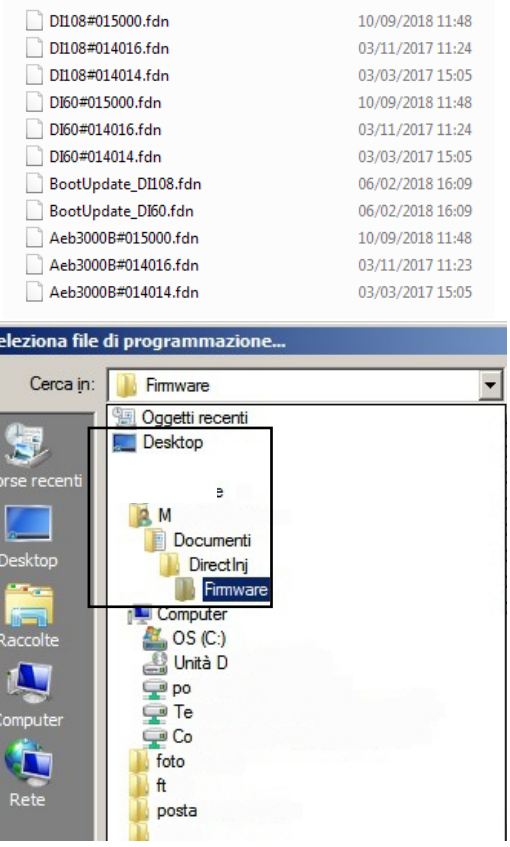
Accessing **Load file** lets you load archived maps.
Select "**Type of fuel**" Ⓐ as the first parameter. The system will automatically detect the type of ECO connected and display only the configuration files which can be loaded.
With no ECU connected, the program is set for the **3000B** ECU
To change the ECU setting, you have to go back to the program home page and change the setting with **Ctrl+A**. Default setting: **3000B** no reference; with the **DI108** and **DI60** ECUs, the respective models appear.



Going back to "Load file" the "**List of configuration files**" Ⓑwill only show appropriate maps with the "**.dln**" ① extension for **3000B ECUs** and with "**.dl8**" ② for the DI108 and DI60.
You can also tick the heading Ⓒ "**Load files from the standard folder**" or press "**Change folder**" and look in other folders.
By entering a key word or initials in the searchⒹ panel, you can reduce the search to a smaller number of files.
Once you have selected the map you want, the name of the file and other relevant notes will appear in the Ⓔ "**File name**" and **(*) Notes**" panels.
Pressing Ⓕ "**Load**" starts the ECU programming procedure.







Reprogramming

Every SW program always contains "**FIRMWARE**" (the management program present in the ECU) that has been updated for every model of ECU.
The first part of the description indicated the model of ECU, the number after the "#" indicates the number (always increasing) of the update .
Firmware updates between when a SW program was released and the next version are distributed by the usual LR communication channels (website, e-mail etc.).
To find the path you need to save programming files (Firmware) simply open the drop-down menu.
To load the FIRMWARE to the ECU, press **"REPROGRAM"**, select the update file and press "Open".

NOTE: Before updating any FIRMWARE, make sure that the ECU is connected to the computer.
Information about ECU connection status appears at the bottom left of the main menu screen.

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