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BRC GAS EQUIPMENT

Just

- handbook for the installer -
chapter 4

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INDEX

4. MANAGING INTERFACE OF THE SYSTEM FROM COMPUTER

4. MANAGING INTERFACE OF THE SYSTEM FROM COMPUTER

After having analysed the Just system configuration and starting up based on the changeover switch and Diagnostic Box (Chapter 3), this Chapter is dedicated to the detailed description of the second setting up possibility, through an interface programme on computer. Before starting the system setting and adjusting phase, **in this case too it is necessary to carry out the preliminary controls listed in the paragraph 3.2.**

4.1. THE PERSONAL COMPUTER (PC)

The PC supplied to the installer is a portable computer whose features are expounded in the attached handbooks. It is supplied with two feeding cables, for the connection both to the electrical network and to the car lighter.

Its mouse consists of a pointing system to move the arrow and of two or three buttons to "click" on the pointed items. The mouse buttons can be placed either horizontally (left, right) or vertically (upper, lower). The generally used button is the left (upper) one. In the case of the Toshiba series, the pointing is carried out through the green pin in the middle of the keyboard.

The connection of the PC to the Just ECU is performed on the computer serial door through the interface cable that is already used for the BRC Flying Injection system too. A small adapter is actually available; it can be connected on one end to this cable and on the other end to a special 4-way connector placed on the Just ECU board (see the "C" Appendix for the attendant codes). To make this connection it is necessary to open the ECU body (fig. 8 par. 2.3.2).

4.2. PROGRAMME STARTING

After having installed the programme, to start the application it is sufficient to click twice on the icon depicting the symbol of the Just ECU present on the PC starting screen (desktop).

Shouldn't the programme be installed yet, a self-installing software is available: it is sufficient to follow the steps proposed by the software to complete the programme installation successfully (which leads to the creation of the Just icon on the desktop).

4.3. PROGRAMME STRUCTURE

After having started the programme, the main screen of the fig. 1 is visualised.

The programme is structured with menus and quick choice icons depicting the functions are associated to the main functions of each menu, in order to make their choice easier.

You will find herebelow the structure of the different menus, which will be resumed and illustrated in detail in the next paragraphs.

The underlined letters represent the quick choice buttons: by pressing at the same time the buttons "Alt" + "underlined letter" (for the items of the main menu) or the button corresponding to the only underlined letter (for the items of the submenus), it is possible to immediately activate the attendant function, without using the mouse.

The possibility of a quick choice for a certain menu or submenu item through combinations of the F1÷F12 buttons is indicated beside the attendant item.

List of the programme menus and submenus

File
- **Storage start**
- **Storage end**
- **Quit**

EEPROM
- **Save on file MAIUSC+F12**

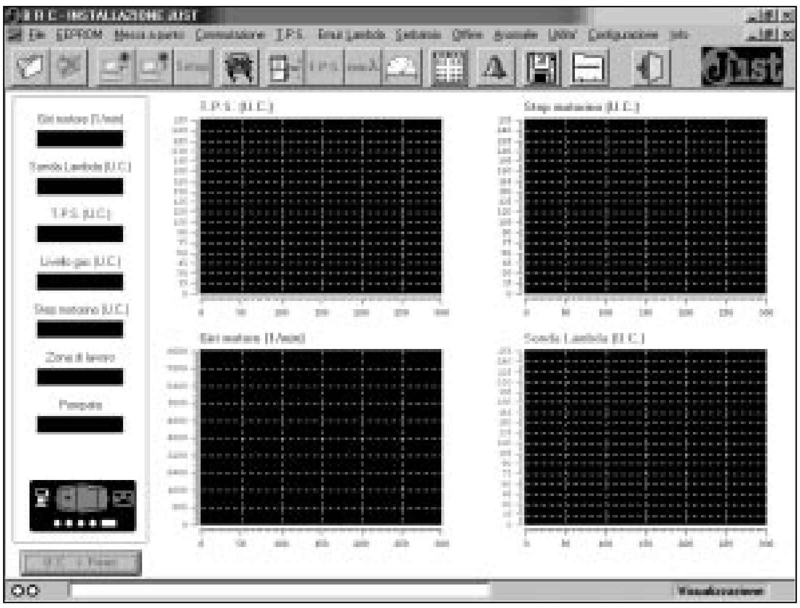

Fig. 1 (Main screen, visualising 4 opened graphs)

- Programming
  - Personalised setting up MAIUSC+F1
  - BRC setting up MAIUSC+F2
  - Clear EEPROM file
  - Setup

- Setting up
  - Lambda control in normal load F1
  - Cut-off F2
  - Idle speed F3
  - Full load F4
  - Pumping F5
  - Out-of-the-revs threshold conditions F6

- Changing over

- T.P.S.

- Lambda emul.

- Tank

- Offline
  - First acquisition
  - Manual settings

- Defects

- Utilities
  - Save data
  - Data reset
  - Consultation of diagrams

- Configuration
  - Language
  - Serial

- Info

4.4. FIRST ACQUISITION AND SELF-CONFIGURATION

After having connected the Just ECU to the PC with the serial changing over cable and having carried out all the preliminary controls described in the paragraph 3.2, **it is necessary to perform, as in the case of the setting from the changeover switch and Diagnostic Box, the first acquisition and self-configuration procedure. Therefore refer to the paragraphs 3.3. and 3.4. of this handbook, just illustrating the different phases of the first acquisition and self-configuration procedure.**

The advantage offered by the interface programme on PC during such a procedure is that, besides the still standing changeover switch and Diagnostic Box visualisations, you can have the complete control on what happens in the different acquisition phases, thanks to the screens automatically appearing on the PC and carrying graphs and values of the signals used and acquired during the procedure.

4.4.1. PRELIMINARY OPERATIONS

Before starting the first acquisition and self-configuration procedure, follow the paragraph 3.4 carefully.

4.4.2. ACQUISITION AND SELF-CONFIGURATION OF THE TPS SIGNAL

The passages of the acquisition and self-configuration phase of the TPS signal are indicated in the paragraph 3.4.1.

The fig. 2 depicts the screen automatically appearing on the PC during this phase. Besides the values of the TPS signal (current value, minimum value, maximum value and type), the associated graph carries the signal course during the whole phase of first acquisition and highlights the course of the three accelerations necessary to complete the procedure.

The interface programme on PC also accompanies the installer during this acquisition phase, by pointing out the operations he has to perform.

4.4.3. ACQUISITION AND SELF-CONFIGURATION OF THE R.P.M. SIGNAL

The passages of the acquisition and self-configuration phase of the r.p.m. signal are indicated in the paragraph 3.4.2.

The fig. 3 depicts the screen automatically appearing on the PC during this phase. Besides the values of the r.p.m. signal (current value and minimum acquired value), the associated graph carries the signal course during the whole phase of first acquisition. **The inter-**

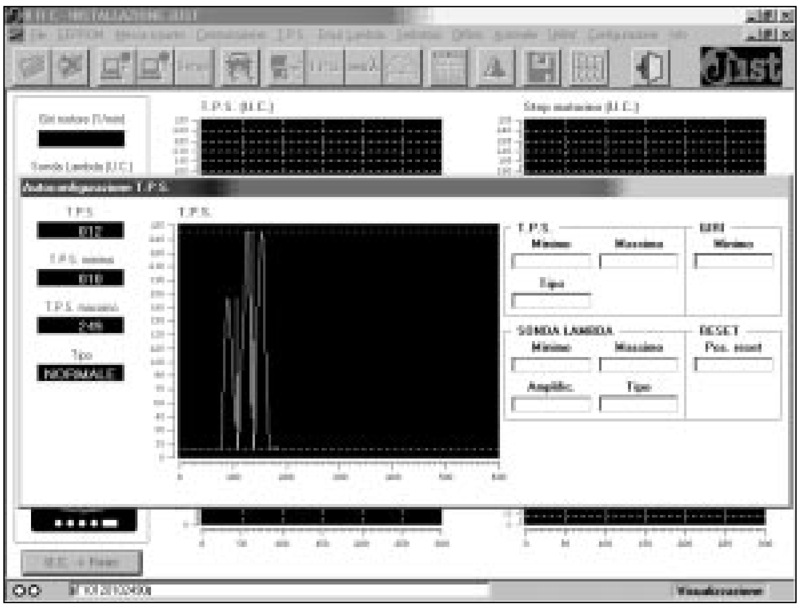

Fig. 2 (Screen visualising the TPS signal first acquisition)

face programme on PC also accompanies the installer during this acquisition phase, by pointing out the operations he has to perform.

4.4.4. ACQUISITION AND SELF-CONFIGURATION OF THE LAMBDA OXYGEN SENSOR SIGNAL

The passages of the acquisition and self-configuration phase of the lambda oxygen sensor signal are indicated in the paragraph 3.4.3.

The fig. 4 depicts the screen automatically appearing on the PC during this phase. Besides the values related to the lambda oxygen sensor (current value, minimum value, maximum value, amplification and type), the associated graph carries the signal course during the whole phase of first acquisition.

The interface programme on PC also accompanies the installer during this acquisition phase, by pointing out the operations he has to perform.

4.4.5. ACQUISITION OF THE STEP ACTUATOR RESET POSITION

The passages of the phase of the STEP actuator reset position acquisition are indicated in the paragraph 3.4.4.

The fig. 5 depicts the screen automatically appearing on the PC during this phase. Besides the values related to the current position of the STEP actuator and to the acquired reset position, on the associated graph it is possible to follow the course of the actuator position during the whole phase of the reset acquisition.

The interface programme on PC also accompanies the installer during this acquisition phase, by pointing out the operations he has to perform.

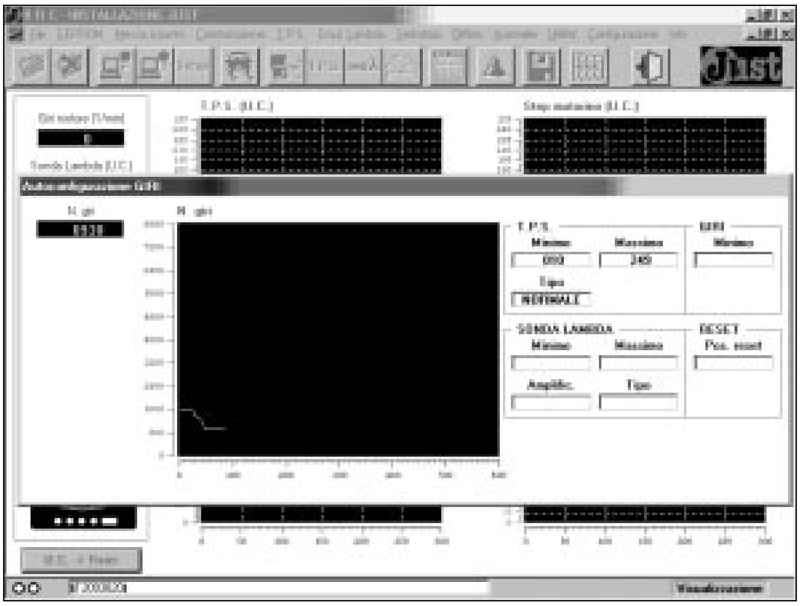

Fig. 3 (Screen visualising the r.p.m. signal first acquisition)

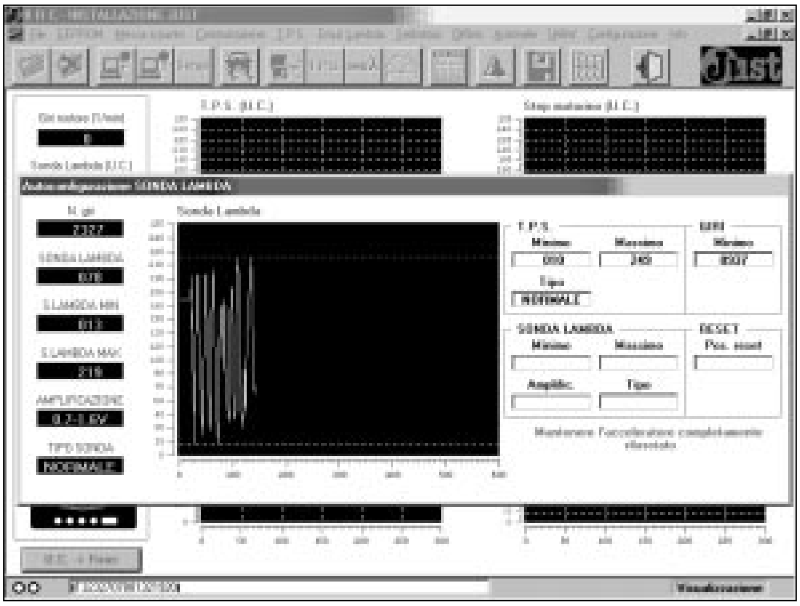

Fig. 4 (Screen visualising the Lambda oxygen sensor signal first acquisition)

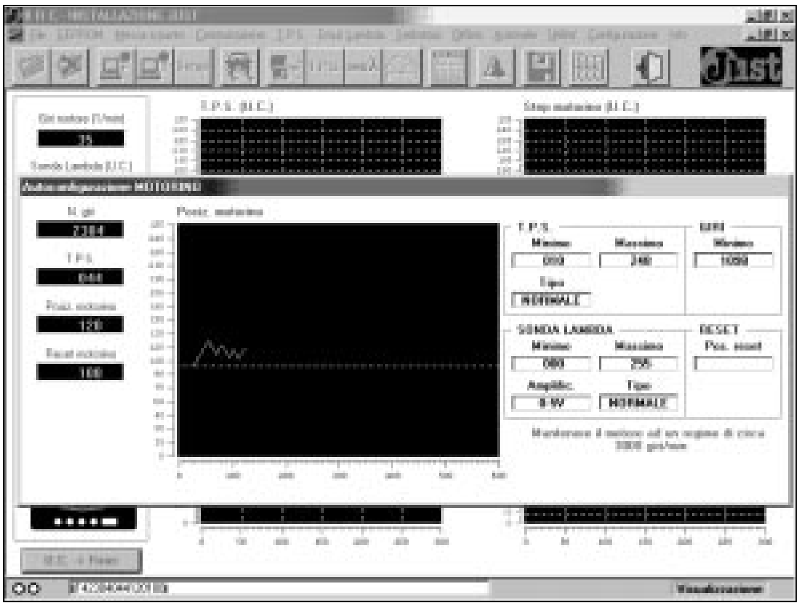

Fig. 5 (Screen visualising the STEP actuator reset position acquisition)

4.5. DATA LOADING AND GRAPHS VISUALISATION

After the first acquisition procedure, at every next ignition of the Just ECU (feeding of the system with the positive after contact), the programme loads the data from the EEPROM of the ECU and the fig. 6 is visualised.

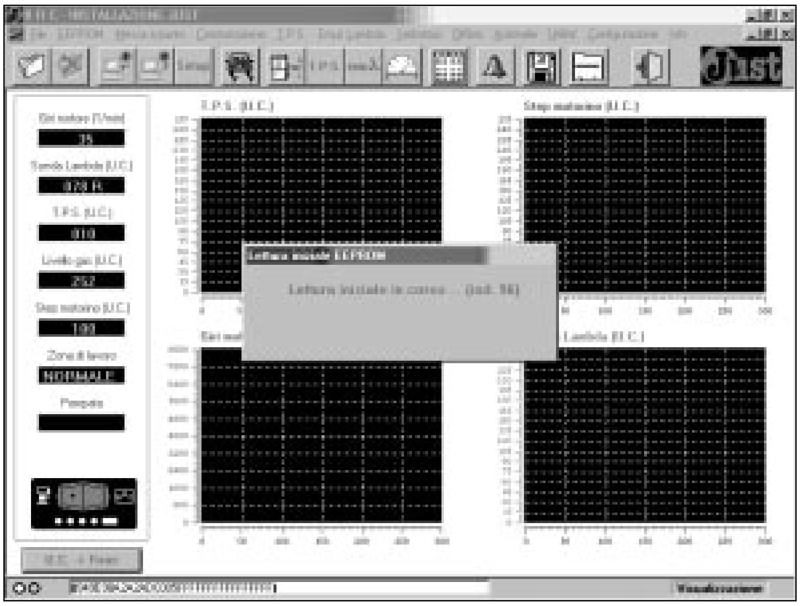

Fig. 6 (Screen for reading data from EEPROM)

The data related to the signals managed by the system (numeric fields on the left) and the graphs of the signals are also updated in real time.

It is possible to choose the measure unit between the physical (for example volt or seconds) and the converter ones (representation of the quantities inside the microcontroller: usually from 0 to 255) by simply clicking on the corresponding conversion button with the mouse ("C.U. > Physical" or "Physical > C.U.").

It is also possible to visualise from one to four graphs at the same time: to visualise a graph or to eliminate the visualisation of an existing graph, it is sufficient to click once on the corresponding numeric field.

4.6. ADDITIONAL CONFIGURATIONS

After the first acquisition and self-configuration phase, the system is already able to run on gas at the next ignition.

Before running the vehicle on gas, it is necessary to complete the setting-up phase with a series of additional configurations, some of which are essential (such as the adjustment of the level gauge, the NP - NC1/NC2 relay configuration and the analogic TPS - ON/OFF setting), **others are optional** (such as the changeover threshold and the fuel overlapping time).

These configurations, corresponding to the manual additional settings from changeover switch described in the paragraph 3.5, can be carried out by the four menus illustrated in the next four paragraphs.

The screen of each menu visualises the configurable parameters in proper numeric fields.

The default values of such parameters are established during the first acquisition and self-configuration procedure.

The four buttons present at the bottom of each screen (fig. 7, 8, 9 and 10) have the following functions:

Store

By clicking on this button with the mouse, any values modified in the numeric fields of the parameters contained in the screen are stored.

As the modifications are stored in the EEPROM of the microcontroller, it is necessary to disconnect the key and to reconnect it to make the new stored values active in the system.

Reset

With this button it is possible to reset the values of the parameters prior to the last modification.

Default reset

With this button it is possible to reset the values of the parameters reckoned during the first acquisition and self-configuration procedure.

Quit

With this button it is possible to quit the current screen.

4.6.1. CHANGING OVER

The fig. 7 depicts the screen corresponding to the **"Changing over"** menu and containing all the parameters related to the passage petrol > gas and vice versa.

TPS threshold

It is the TPS value below which the changing over to gas is activated (to change over actually it is also necessary that the r.p.m. value is above the r.p.m. threshold).

R.p.m. threshold

It is the r.p.m. value above which the changing over to gas is activated (to change over actually it is also necessary that the TPS value is below the TPS threshold).

Fuel overlapping time

It is the time interval, while changing over to gas, when both the petrol and the gas feeding remain active at the same time, to improve the phase of the passage from petrol to gas.

Reset waiting time after changing over

It allows to set the time interval, after changing over to gas, when the STEP actuator stands still in the reset position, apart from the lambda oxygen sensor signal.

This can be useful to prevent the actuator from following a fake lambda signal, due to the bad work of the lambda oxygen sensor at low temperatures.

Actually the lambda oxygen sensor generally starts working correctly only when a certain temperature is attained.

Changing over inhibiting time

It shows for how much time, starting from the car ignition, the passage to gas is not allowed.

This inhibiting time allows to avoid any undesired changing over during the engine ignition phase (undesired flicker of the r.p.m. signal and of other signals used by the system).

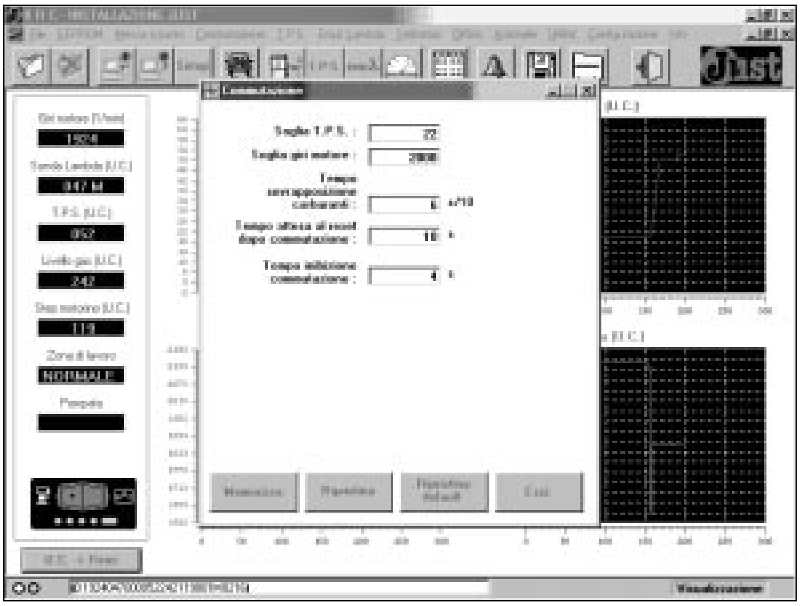

Fig. 7 (Changing over screen)

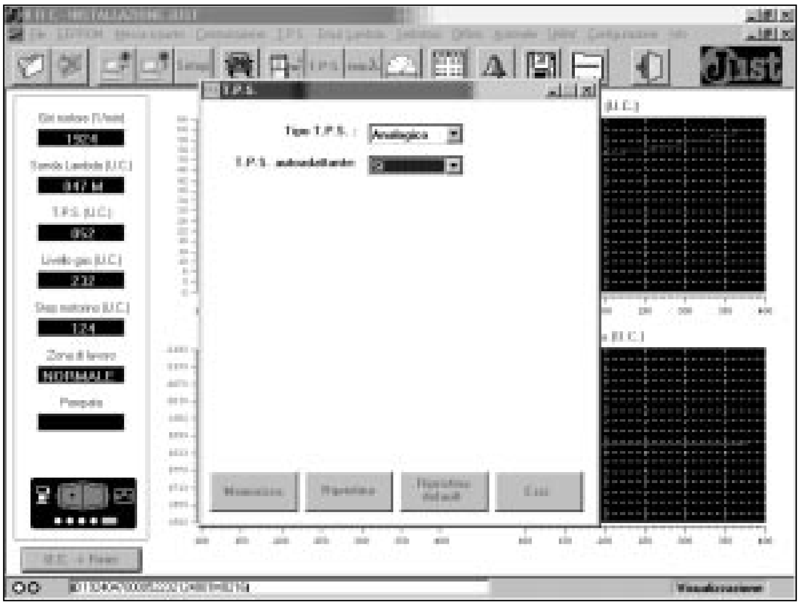

Fig. 8 (TPS screen)

4.6.2. T.P.S.

The fig. 8 depicts the screen related to the **"TPS"** menu containing the configuration parameters of the TPS signal.

TPS type

It is the type of TPS signal (analogic or ON/OFF) present on the vehicle. The first acquisition and self-configuration procedure is not able to interpret the TPS type present on the vehicle, that's why it is necessary to set it.

The system anyhow starts from a default configuration by assuming a TPS of the analogic type.

Self-adapting TPS

It allows to choose between two possibilities:

- If you set the self-adapting TPS **(YES)**, the Just system automatically update the control strategies (in particular cut-off and the full load), modifying their working thresholds, while the minimum TPS value varies (vehicle aging, variation in the battery charge level, etc…).

- If you set the non self-adapting TPS **(NO)**, the Just system uses TPS fixed thresholds for the control strategies (cut-off and full load). Such thresholds are calculated during the first acquisition procedure and can be modified during the setting-up phase (par.4.7).

The default configuration for this parameter is **YES** (self-adapting TPS).

4.6.3. Lambda emulation

The fig. 9 depicts the screen related to the **"Lambda emul."** menu containing all the parameters that pertain to the lambda oxygen sensor signal cut and emulation.

Relay configuration

This field is used to configurate the contact of the relay coming out on the White and White/Orange wires.

The possible functions are of the "no-problem" **(NP)** device for setting to zero the petrol injection ECU memory, and of relay contact for signal cut **(NC1/NC2)**.

Attention: the setting of the NP – NC1/NC2 relay ought to correspond to the configuration adopted in the ECU harness connections (see par. 2.3.3.9).

Emulated lambda signal duty cycle

The Just ECU, as already expounded in the Chapter 1, includes a configurable lambda oxygen sensor signal emulator which can carry out the functions of fixed emulation and variable richness emulation.

The choice is associated to the NP – NC1/NC2 relay contact setting, that is to say that the variable richness emulation is associated to the NP setting in the "Relay configuration" field, whereas the fixed emulation is associated to the NC1/NC2 setting.

In case the **NP** is set in the previous field, it is feasible to programme the duty cycle of the lambda signal emulated in this field (from 0 to 100%). The default value for such parameter is **46**.

4.6.4. Tank level

The fig. 10 depicts the screen related to the **"Tank"** menu containing all the parameters that pertain to the management of the gas level gauging on the GREEN LEDs of the built-in changeover switch.

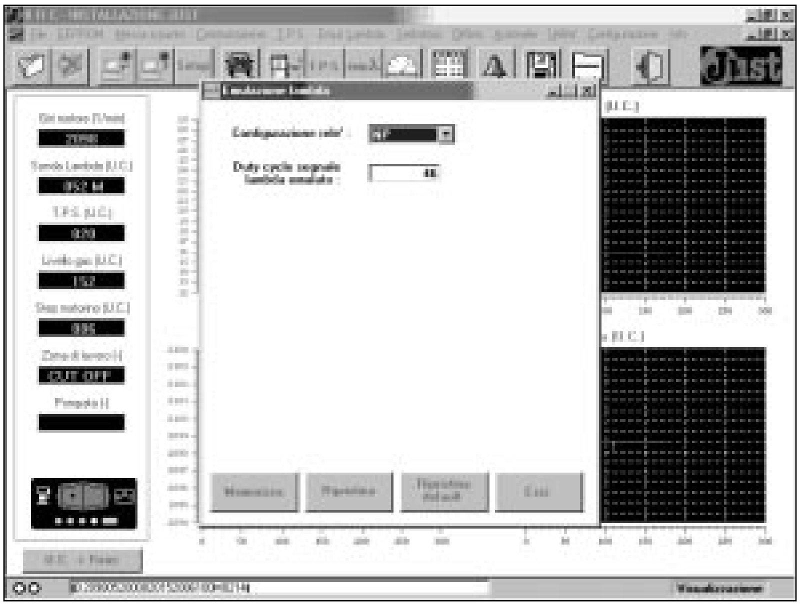

Fig. 9 (Lambda Emulation Screen)

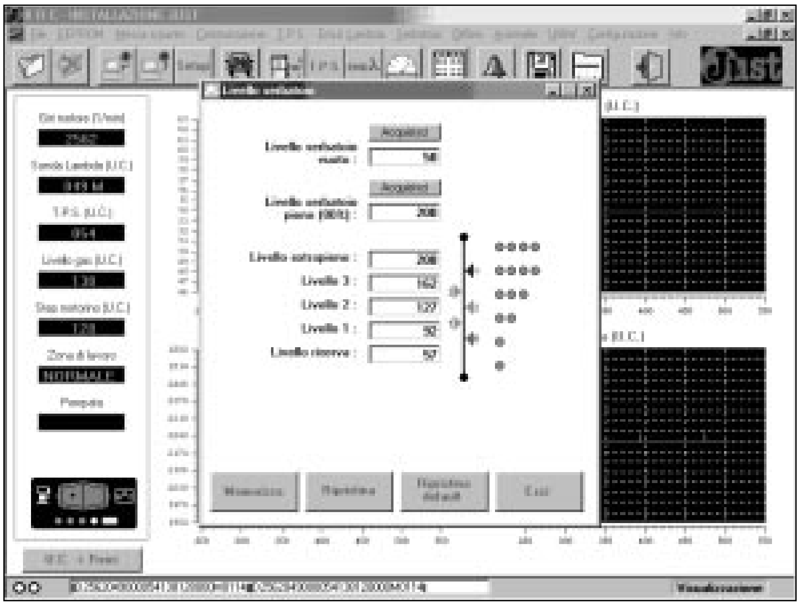

Fig. 10 (Tank level screen)

Empty tank level

It is the value read by the level gauge when the tank is empty and after the first acquisition phase it is fixed at an estimated default value which is very likely to be re-adjusted.

Full tank level (80%)

It is the value read by the level gauge when the tank is full at 80% and after the first acquisition phase it is fixed at an estimated default value which is very likely to be re-adjusted.

Extra-full level

It is the value determining the threshold above which the four blinking GREEN LEDs light up, to show the tank filling condition exceeding the 80% (extra-full).

Level 3

It is the value determining the threshold above which the four fixed GREEN LEDs light up.

Level 2

It is the value determining the threshold above which the first three fixed GREEN LEDs light up.

Level 1

It is the value determining the threshold above which the first two fixed GREEN LEDs light up.

Low fuel level

It is the value determining the threshold above which the first fixed GREEN LED lights up and below which the low fuel condition is indicated with the first blinking GREEN LED on.

Initially, after the first acquisition procedure, with two default values of the empty tank level and of the full tank level (80%), the values of the last five fields (really used for the level visualisation) are reckoned and stored according to proper proportionality factors.

By modifying one of the first two values or both, (by entering the datum really read by the system in the empty and full conditions) and confirming the modification through the **"acquisition"** button, the five values the level visualisation is based on are automatically recknoed again.

On the other end, it is possible to modify only the distribution of the values of the last five fields, by directly entering the desired value, or by simply dragging the corresponding arrow on the level bar with the mouse pointer and the left (upper) button pressed.

In this case the unmodified values are not reckoned again.

4.7. SETTING-UP

After the additional configurations, the system is ready to run on gas in all intents and purposes.

One of the advantages of the interface programme from PC (that you cannot have with the only setting-up from the changeover switch and the Diagnostic Box) is to allow a further possibility to set-up the control strategies in detail.

For this purpose the **"Setting up"** menu has been contemplated (fig. 11), consisting of six environments dedicated to as many working areas used in the lambda control strategy based on the STEP actuator.

The working areas, the following paragraphs are dedicated to, are determined according to the values of the r.p.m. signal and the TPS signal and are:

- Lambda control in normal load
- Cut-off
- Idle speed
- Full load
- Pumping
- Out-of-the-revs threshold conditions

In the screen dedicated to each environment the configurable parameters appear in proper numeric fields. The different environments have been conceived in order to allow an easy and dynamic setting-up. Two fields are associated to each parameter: one carries the parameter initial value (**"initial value"** column), the other one carries a possible modification value (**"modification value"** column). At the opening of every environment, the initial and the modification values are like each other and correspond to the ECU current working value.

It is possible to personalise the system by entering modified values in the parameters, applying the modifications and assessing their effect through the graphs of the main screen. If you want to compare the modification effect with the initial values of the parameters, you can re-apply the initial values. The column of the currently active values is highlighted by a red background under **"modification value"** or **"initial value"**. Once the best values are determined, it is possible to store them definitively in the ECU.

The four buttons at the bottom of every screen (fig. 12, 13, 14, 15, 16 and 17) therefore have the following functions:

Apply the modification value

By clicking on this button with the mouse it is possible to apply

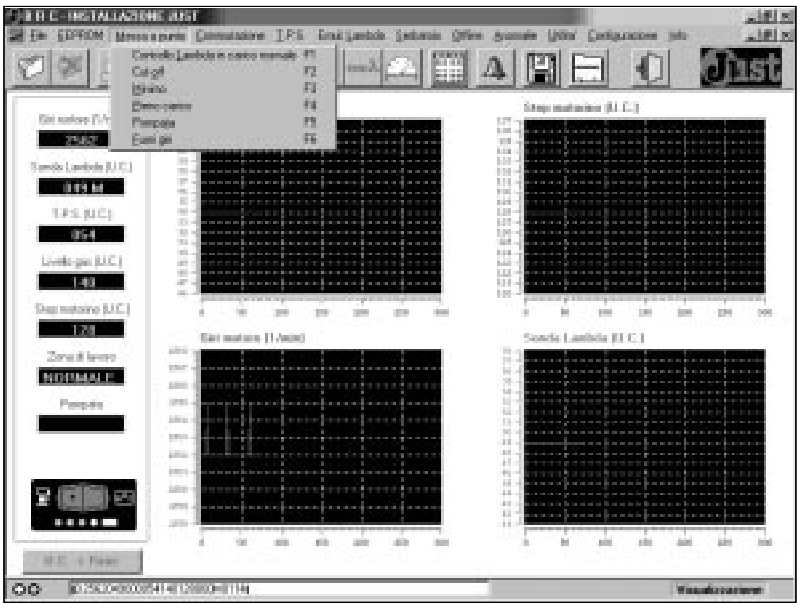

Fig. 11 (Setting up menu screen)

the values of the parameters present in the **"modification value"** column. When the active values in the system are these ones, a red background appears under **"modification value"**.

Apply the initial value

With this button it is possible to re-apply the values of the parameters present in the **"initial values"** column (prior to a possible modification). When the active values in the system are these ones, a red background appears under **"initial value"**.

Memory programme

With this button you store the values present in the **"modification value"** column in the ECU in a definitive and permanent way (EEPROM).

At the next access to the screen, the stored values will be presented as initial values.

Quit

With this button you can quit the current screen. If any modification values have been entered and you quit without storing them (a notice appears asking whether you are sure you want to quit), such values are lost.

4.7.1. Lambda control in normal load

The fig. 12 depicts the screen related to the **"Lambda control in normal load"** menu containing all the parameters that pertain to the lambda control managing strategy in normal load conditions by the STEP actuator.

Lower threshold (lean Lambda in normal load)

It is the value of the lambda oxygen sensor signal below which the mixture is considered lean (in the normal load conditions).

If the oxygen sensor signal goes below such value, the STEP actuator reacts by opening.

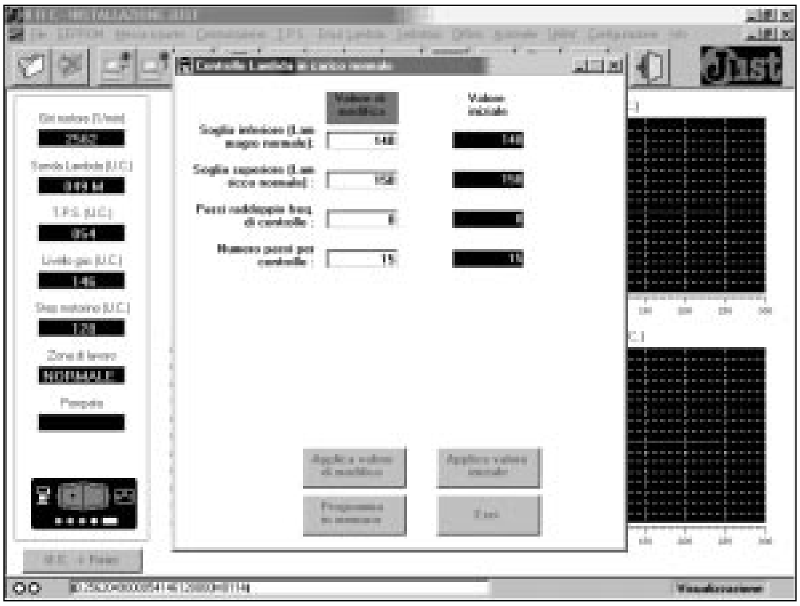

Fig. 12 (Screen of lambda control in normal load)

Upper threshold (rich Lambda in normal load)

It is the value of the lambda oxygen sensor signal above which the mixture is considered rich (in the normal load conditions). If the oxygen sensor signal goes above such value, the STEP actuator reacts by closing.

The rich lambda value ought obviously to be always higher than or at most the same as the lean lambda value.

The mixture is considered stoichiometric for lambda signal values included between the lean and the rich thresholds.

Control frequency-doubling steps

In case of rich or lean oxygen sensor signal, the STEP actuator tries to correct the mixture respectively by closing or opening by a step each time, with a certain frequency.

If, after having closed or opened by a number of steps like the one contained in this parameter, the lambda oxygen sensor signal does not react, the actuator starts correcting in the same direction with a double frequency as to the basic one.

Number of steps for control

This field establishes the quantity of steps the STEP actuator can move, in normal load conditions, as to the current reset position.

For example, if the current reset position is **90** and in this parameter the programmed value is **15** (default value), the STEP actuator can move, in normal load conditions, in the interval ranging from 75 to 105 steps.

4.7.2. Cut-off

The fig. 13 depicts the screen related to the **"Cut-off"** menu containing all the parameters that pertain to the cut-off condition managing strategy.

STEP position during cut-off

When the cut-off condition is determined (according to the parameters related to the r.p.m. signal and to the TPS signal entered in this screen), you can configurate the STEP actuator working type during the cut-off conditions, by choosing among four possibilities:

- the STEP actuator always positions at the cut-off reset value;

- the STEP actuator always stands still in the current position;
- the STEP actuator goes to the cut-off reset position only if it is in a more opened position and stands still where it is if it is already in a more closed position;
- the STEP actuator goes to the cut-off reset position only if it is in a more closed position and stands still where it is if it is already in a more opened position;

The default configuration is the first one.

% of cut-off as to the normal load reset

With this parameter it is possible to configurate the cut-off reset position, reckoned as normal load reset percentage.

The typical working drift in cut-off is a more closed reset position: with this parameter the desired closing can be set (the default value of such parameter is **85**%).

Cut-off activating r.p.m. threshold

It is the value of the r.p.m. signal above which the possibility of entering the cut-off condition is activated. To effectively enter, the TPS signal ought also to be below the cut-off entry threshold. The default value for this parameter is **2000** r.p.m..

R.p.m. threshold for exit from cut-off

It is the value of the r.p.m. signal below which the cut-off condition is left, apart from the TPS value. The exit from cut-off typically occurs at a r.p.m. lower than the entry one (hysteresis on the exit from cut-off). The default value for this parameter is **1500** r.p.m.

TPS threshold for entry in cut-off

It is the value of the TPS signal below which the possibility to enter the cut-off condition is activated.

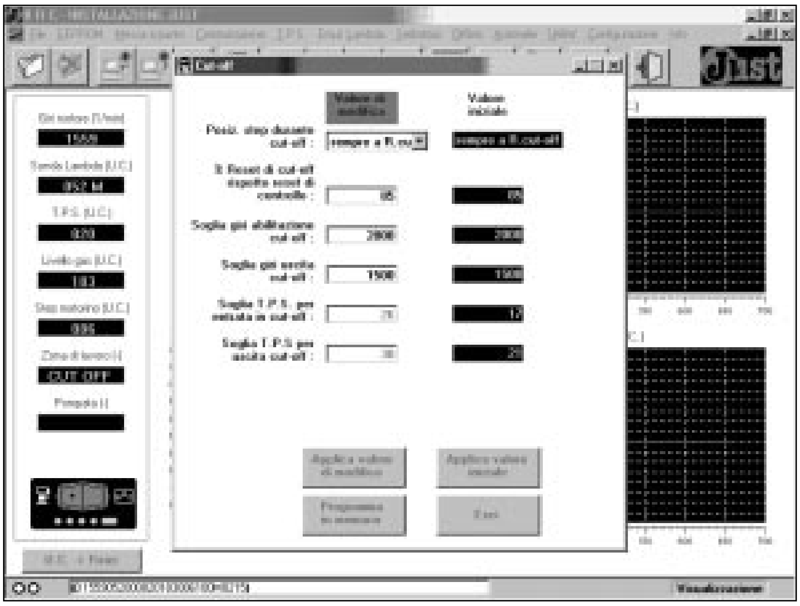

Fig. 13 (Cut-off screen)

To effectively enter, the r.p.m. signal ought also to be above the cut-off activating threshold.

In case you have set the self-adapting TPS (par. 4.6.2), such parameter is only for reading, cannot be modified and is constantly updated (in the **“modification value”** column) in case it is self-adapted.

TPS threshold for exit from cut-off

It is the value of the TPS signal above which the cut-off condition is left, apart from the r.p.m. signal value. The exit from cut-off typically occurs for a TPS value higher than the entry one (hysteresis on the exit from cut-off).

In case you have set the self-adapting TPS (par. 4.6.2), such parameter is only for reading, cannot be modified and is constantly updated (in the **“modification value”** column) in case it is self-adapted.

4.7.3. Idle speed

The fig. 14 depicts the screen related to the **“Idle speed”** menu containing all the parameters that pertain to the managing strategy of the idle speed condition.

R.p.m. threshold to enter the idle speed condition

It is the r.p.m. signal value below which the possibility to enter the idle speed condition is activated. To run effectively at the idle speed it is also necessary that the TPS signal is below the cut-off entry threshold. The default value for this parameter is **1000** r.p.m.

Lower threshold (lean Lambda at the idle speed)

It is the value of the lambda oxygen sensor signal below which the mixture is considered lean (in the idle speed conditions).

If the oxygen sensor signal goes below this value, the STEP actuator reacts by opening.

The default value for this threshold is the one of the lean lambda parameter in normal load multiplied by 1.1.

Upper threshold (rich Lambda at the idle speed)

It is the lambda oxygen sensor signal above which the mixture is considered rich (in the idle speed conditions).

If the oxygen sensor signal goes above such value, the STEP actuator reacts by closing.

The default value for this

threshold is the one of the normal load rich lambda parameter multiplied by 1.1.

The rich lambda value obviously ought to be always greater than or at most the same as the lean lambda value.

The mixture is considered stoichiometric for lambda signal values included between the lean and rich thresholds.

Control frequency at the idle speed

In case of rich or lean oxygen sensor signal, the STEP actuator tries to correct the mixture respectively by closing or opening by a step each time, with a typical control frequency at the idle speed.

The control frequency can be set in this parameter in a scale ranging from 1 to 10.

The value of the default control frequency is **5**.

Number of steps for control at idle speed

This field establishes the quantity of steps the STEP actuator can move, in idle speed conditions, as to the current reset position.

For example, if the current reset position is 90 and in this parameter the programmed value is **8** (default value), the STEP actuator can move, in idle speed conditions, in the interval ranging from 82 to 98 steps.

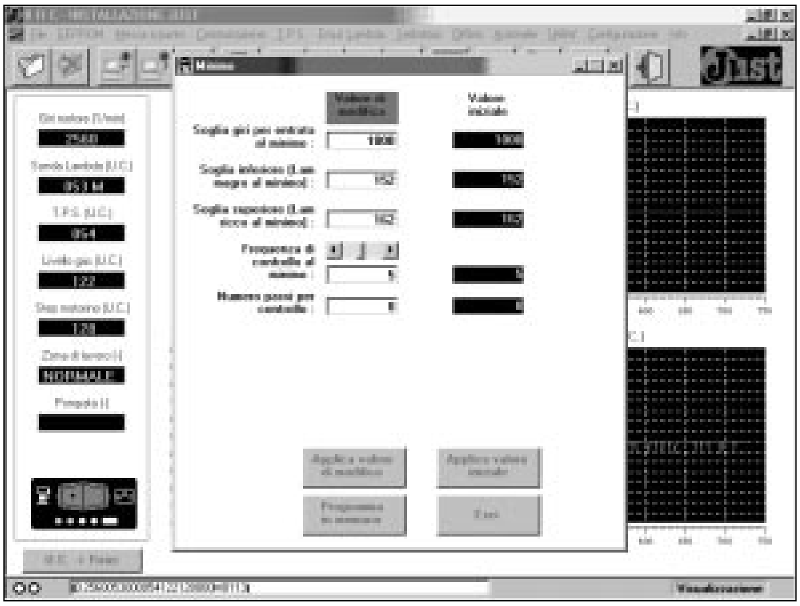

Fig. 14 (Idle speed screen)

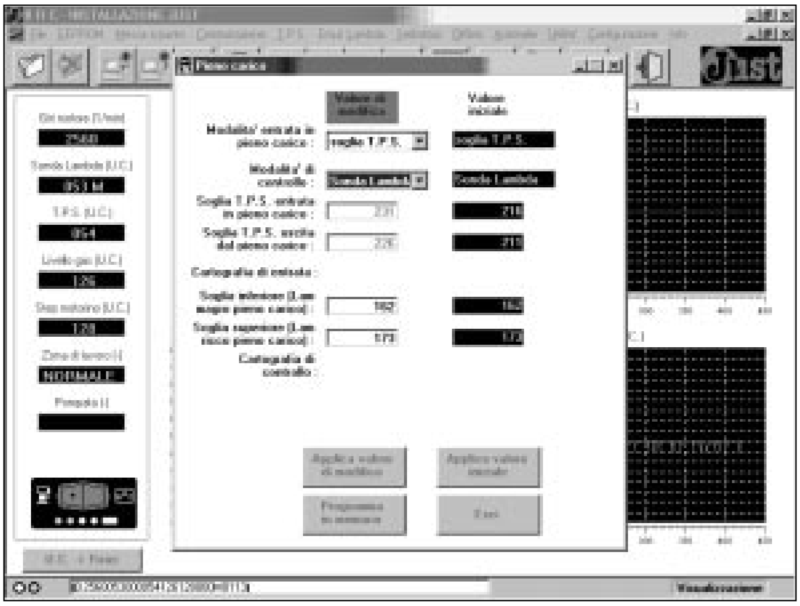

Fig. 15 (Full load screen)

4.7.4. Full load

The fig. 15 depicts the screen related to the **"Full load"** menu containing all the parameters that pertain to the managing strategy of the full load condition.

Full load entry mode

With this parameter it is possible to choose between two different modes for entering the full load condition:

- entry (and exit) according to the values of the TPS signal threshold (TPS threshold for entry and TPS threshold for exit);

- entry (and exit) according to a r.p.m. – TPS map.

The default configuration is the first one.

Full load control mode

Regarding the control strategy by the actuator in the full load condition, with this parameter it is possible to choose between two different control modes:

- control based on the lambda oxygen sensor (with the lean and rich lambda of full load);

- control based on the r.p.m. - STEP map.

The default configuration is the first one.

TPS threshold for entry in full load

This parameter is only active and configurable if the full load entry mode has been chosen according to the TPS signal threshold values.

In this case it represents the TPS signal value above which the full load condition is entered, apart from the r.p.m. signal value.

In case the self-adapting TPS is set (par. 4.6.2), such parameter is only for reading, cannot be modified and is constantly updated (in the **"modification value"** column) in case it is self-adapted.

TPS threshold for exit from full load

This parameter is only active and configurable in case the full load entry mode has been chosen according to the TPS signal threshold values.

In this case it represents the TPS signal value below which the full load condition is quitted, apart from the r.p.m. signal value.

The exit from the full load typically occurs for a TPS value lower than the entry one (hysteresis on the exit from the full load).

In case the self-adapting TPS is set (par. 4.6.2), this parameter is only for reading, cannot be modified and is constantly updated (in the **"modification value"** column) in case it is self-adapted.

R.p.m. - TPS full load entry map

Only in case the full load entry mode has been configurated on **r.p.m. – TPS map**, with this parameter it is possible to lay out a table consisting of eight couples of r.p.m. signal - TPS signal values which determine the different TPS thresholds in the full load entry (fig. 16), while the r.p.m. are changing.

The map can be used if an only TPS threshold in the full load entry for all the r.p.m. values is not sufficient for the mixture check.

Lower threshold (full load lean Lambda)

This parameter is only active and configurable in case the full load control mode has been chosen according to the lambda oxygen sensor.

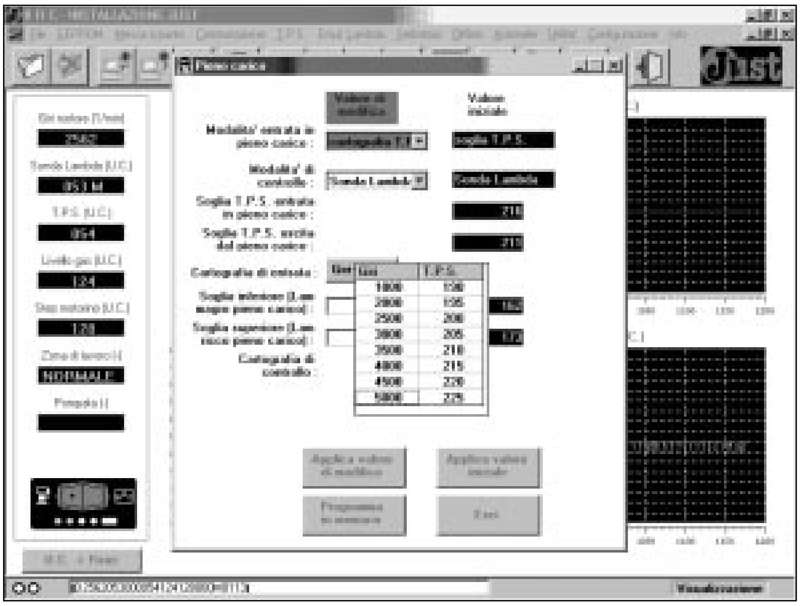

Fig. 16 (Screen visualising the map of entry into full load)

It is the lambda oxygen sensor signal value below which the mixture is considered lean (in the full load conditions).

If the oxygen sensor signal goes below such value, the STEP actuator reacts by opening.

The default value for this threshold is as the one of the normal load lean lambda parameter multiplied by 1.1.

Upper threshold (full load rich Lambda)

This parameter is only active and configurable in case the full load control mode has been chosen according to the lambda oxygen sensor.

It is the lambda oxygen sensor signal above which the mixture is considered rich (in the full load conditions).

If the oxygen sensor signal goes above such value, the STEP actuator reacts by closing.

The default value for this threshold is as the normal load rich lambda parameter multiplied by 1.1.

The rich lambda value ought obviously to be always higher or at most the same as the lean lambda value.

The mixture is considered stoichiometric for lambda signal values included between the lean and the rich threshold.

R.p.m. - STEP control map at full load

Only in case the control mode based on **r.p.m. – STEP map** has been configurated, with this parameter it is possible to set a table consisting of eight couples of r.p.m. signal - STEP actuator position which determine the fixed position where the STEP actuator places in full load conditions (fig. 17), while the r.p.m. are changing.

4.7.5. Pumping

The fig. 18 depicts the screen related to the **"Pumping"** menu containing all the parameters that pertain to the pumping managing strategy, where the term pumping means a sudden opening of the STEP actuator to supply in the shortest possible time a gas quantity allowing to optimise the mixture and the vehicle efficiency control during particular transient conditions.

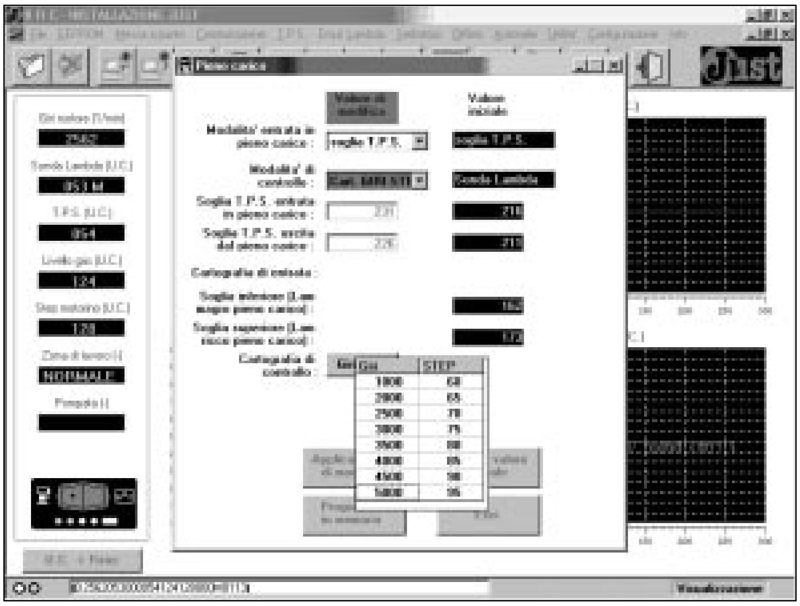

Fig. 17 (Screen visualising the control map at full load)

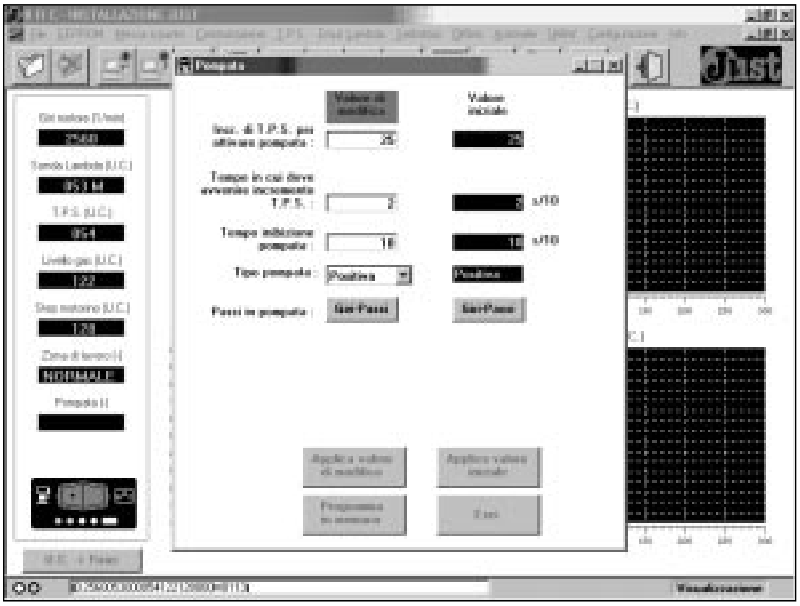

Fig. 18 (Pumping screen)

TPS increase to activate the pumping

The pumping is typically activated when a certain increase in the TPS signal in a certain interval is detected.

With this parameter it is possible to set the increase in the TPS signal activating the pumping. The pumping will be obviously really carried out only if such increase has occurred in the interval specified in the following parameter.

The default for this parameter is set at **25**.

Time for the TPS increase

As already expounded in the description of the previous parameter, in this parameter the interval for the TPS signal increase specified in the first field is set, to activate the pumping.

The default for this parameter is set at **2** tenths of second.

Pumping inhibiting time

Once a pumping is carried out, before being able to carry out another, an interval as the one specified in this parameter ought to pass.

The default for this parameter is set at 1 second (**10** tenths of second).

Pumping type

The pumping is usually the sudden opening of the STEP actuator and it is therefore a positive pumping.

For certain particular applications a closing of the STEP actuator, that is a negative pumping, could be useful, during a sudden increase of the TPS signal value.

This parameter just allows to choose between **positive** pumping (default value) and **negative** pumping.

Steps in pumping (r.p.m. - steps pumping map)

The Just system allows to set a pumping varying while the r.p.m. signal varies so that, according to the r.p.m., if the pumping activating conditions occur, it is possible to set a different number of pumping steps of the STEP actuator.

You have then a map consisting of six couples of pumping **r.p.m. - steps** signal values which determine the number of pumping steps the STEP actuator ought to carry out (fig. 19), while the r.p.m. changes.

It is necessary to specify that the resolution allowed on the r.p.m. signal values is 256 r.p.m., which is why you can only enter multiples of 256 in the table (the programme anyhow automatically approaches the entered values to the closest multiple of 256).

The r.p.m. signal value indicated in each couple of values means "up to the r.p.m. value indicated in the first field of the couple, the pumping steps for the STEP actuator are the ones indicated in the second field of the couple".

4.7.6. Out-of-the-revs

The fig. 20 depicts the screen related to the **"Out-of-the-revs threshold conditions"** menu containing all the parameters that pertain to the out-of-the-revs managing strategy while running on gas.

As already expounded in the paragraph 1.3.1.2, in case the engine is in the out-of-the-revs condition while running on gas, the system automatically changes over to petrol again and allows to use the r.p.m. limiting strategies implemented in the petrol injection ECU.

When you return to acceptable working conditions, the ECU automatically reactives the changing over to gas as soon as the suitable conditions exist (par. 1.3.1.1).

Petrol changing over threshold

This parameter shows the r.p.m. threshold above which the automatic rechanging over to petrol is activated while running on gas.

It is advisable that such value is lower than the r.p.m. limiting threshold managed by the petrol injection ECU, to entrust this one with a safe protection of the engine.

The default for this parameter is set at **6200**.

Gas rechanging over threshold

This parameter shows the r.p.m. threshold below which the changing over to gas is reactivated, after the automatic rechanging over to petrol in out-of-the-revs conditions. The actual changing over depends on the normal conditions necessary for changing over to gas (par. 1.3.1.1).

The default for this parameter is set at **5700**.

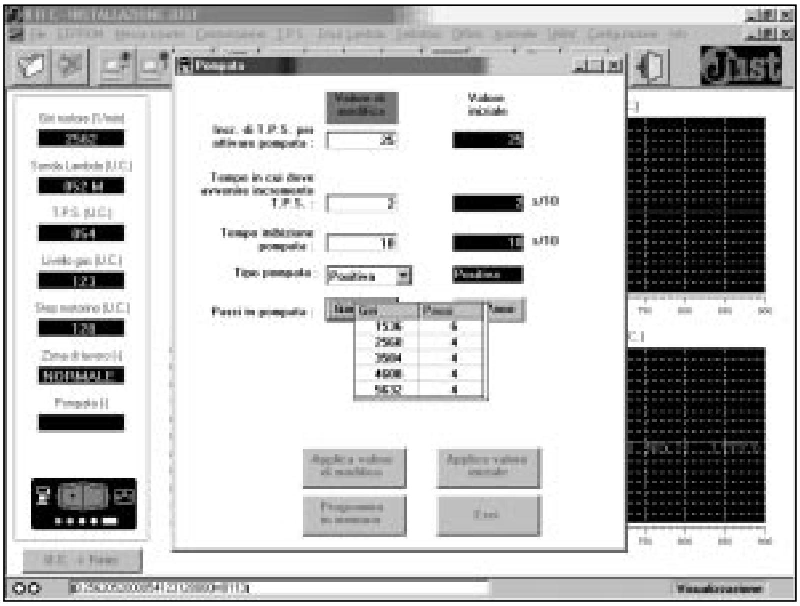

Fig. 19 (Screen visualising the pumping map)

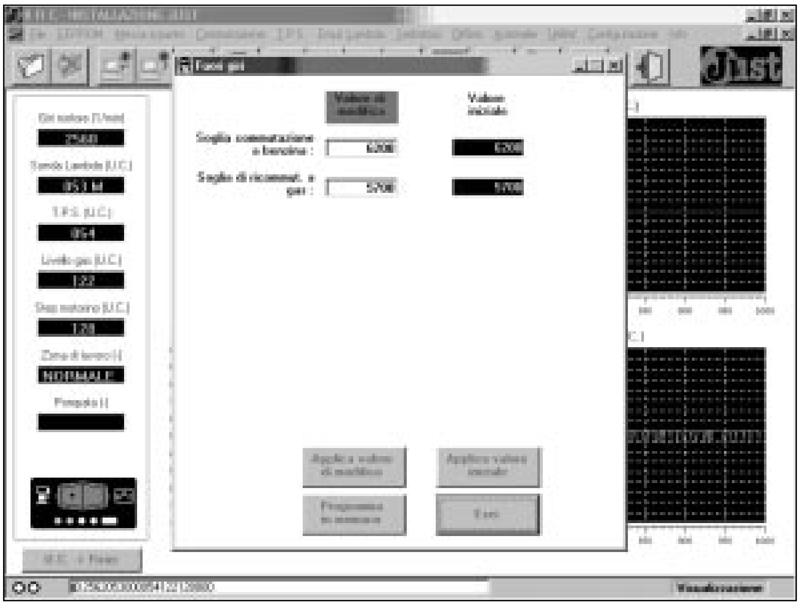

Fig. 20 (Out-of-the-revs screen)

4.8. OFFLINE VISUALISATIONS

On an adjusted ECU (completed first acquisition procedure and additional configurations), it is possible to rapidly see a summary of the main setting values of the system, by acceding to the **Offline** visualising menu (fig. 21).

4.8.1. First acquisition and self-configuration

By selecting **"First acquisition"** from the **"Offline"** menu, a screen appears summarising all the values acquired by the system during the first acquisition and self-configuration procedure.

4.8.2. Supplementary manual settings

By selecting **"Manual settings"** from the **"Offline"** menu, a screen appears summarising the main values of the additional configurations set in the system.

Such values coincide on the whole with the values of the additional manual settings which can be carried out by the changeover switch and by the Diagnostic Box (par.3.5).

If, even though you have the interface programme on PC, you carry out the additional manual settings from the changeover switch (according to the paragraph 3.5), a screen similar to the fig. 23 appears in the programme. It also presents a section dedicated to the representation of the online quantities that evolve by following and illustrating the settings carried out by the changeover switch.

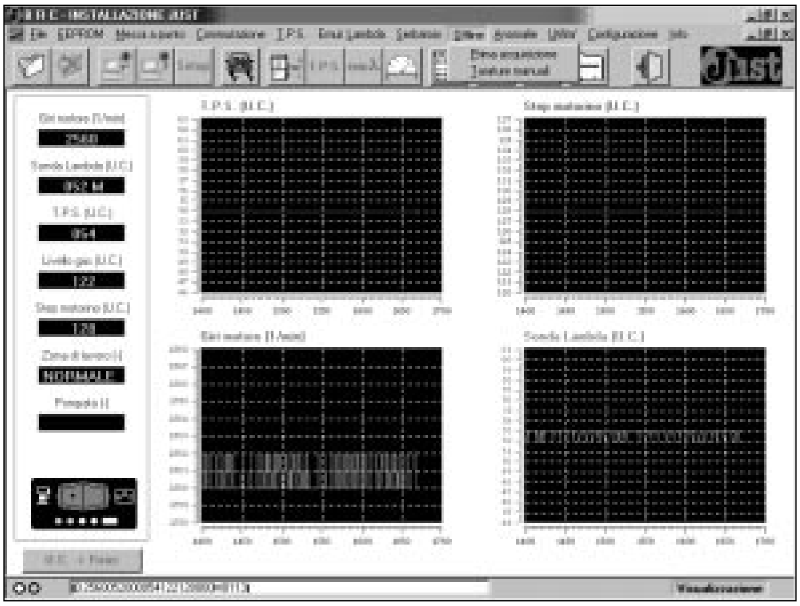

Fig. 21 (Offline visualising menu)

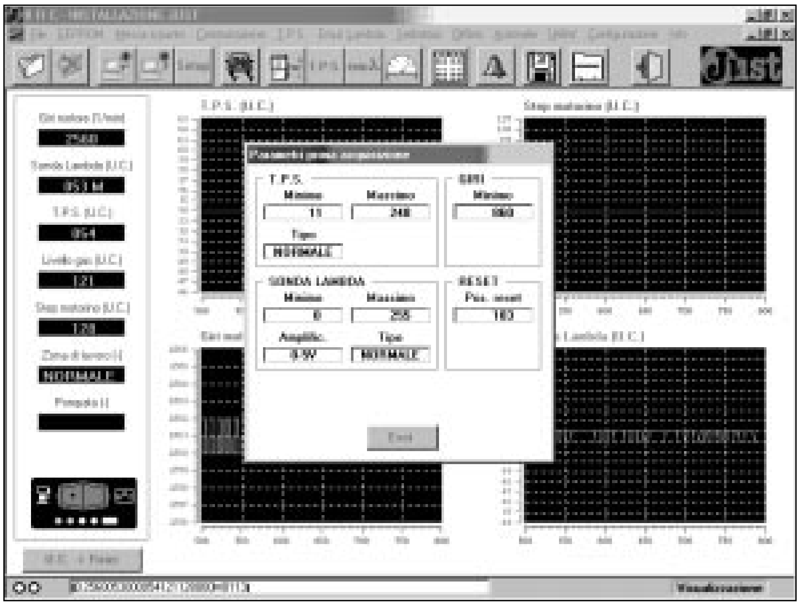

Fig. 22 (Screen of the Offline visualising – first acquisition menu)

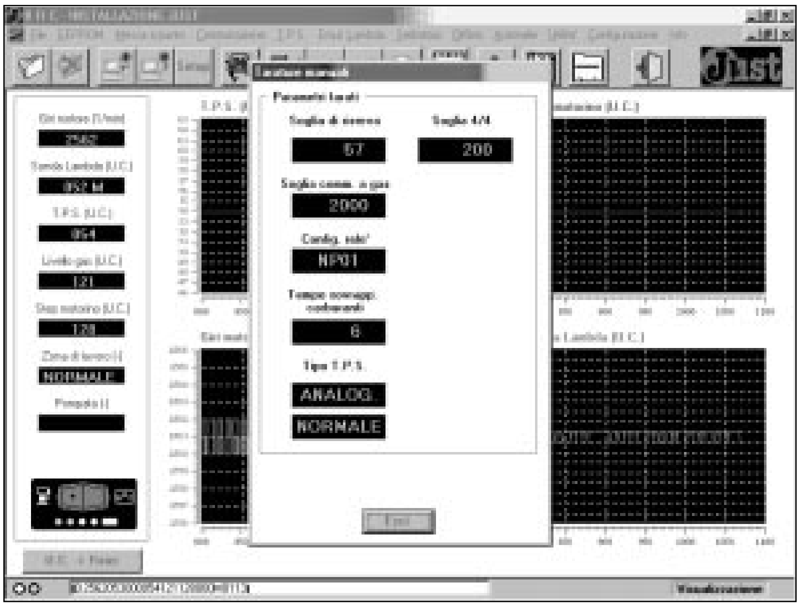

Fig. 23 (Screen of the Offline visualising – manual settings menu)

4.9. DEFECTS

As already expounded in the paragraph 3.9, the Just ECU is equipped with a self-diagnosing system which detects the working defects with a proper encoding on the built-in changeover switch LEDs.

The interface programme on PC also stores all the defects which have been occurring since their clearing has been carried out.

To see them it is sufficient to accede to the **“Defects”** menu opening the screen depicted in the fig. 24.

The clearing of the defects occurring in the system from the screen presented by the PC can be carried out with the special **“Clear”** button of the screen.

For the description of the defects and their management, refer to the paragraph 3.9 carefully.

4.10. SETTING-UP DATA MANAGEMENT

During the phase of the system setting-up, besides basing yourself on the support of the signal visualising fields and of the main screen attendant graphs (fig.1), it is also possible to store all the values read by the ECU in a proper file of data type. The environment destined to this purpose can be selected from the **“File”** menu (fig. 25).

To start storing all the system data from a certain moment onwards, it is sufficient to select the **“Storage start”** item from the **“File”** menu (or to click on the corresponding quick choice icon); the screen depicted in the fig. 26 will appear. The vehicle identifying data can be then entered during the setting-up phase, together with any comments on the system conditions while storing data. By

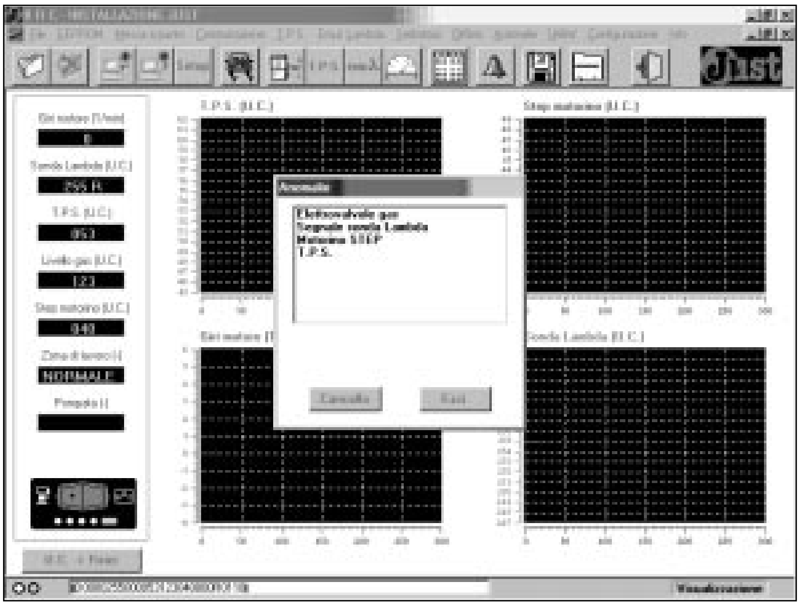

Fig. 24 (Screen visualising defects)

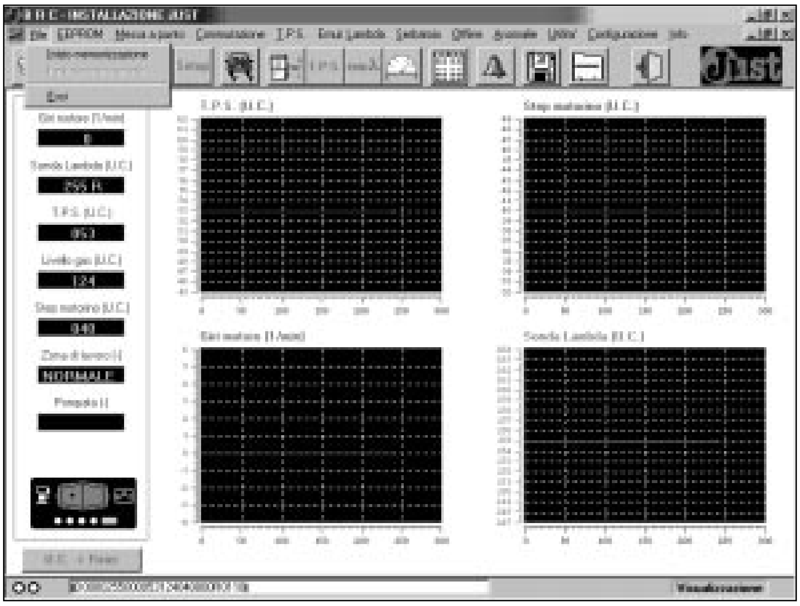

Fig. 25 (File Menu)

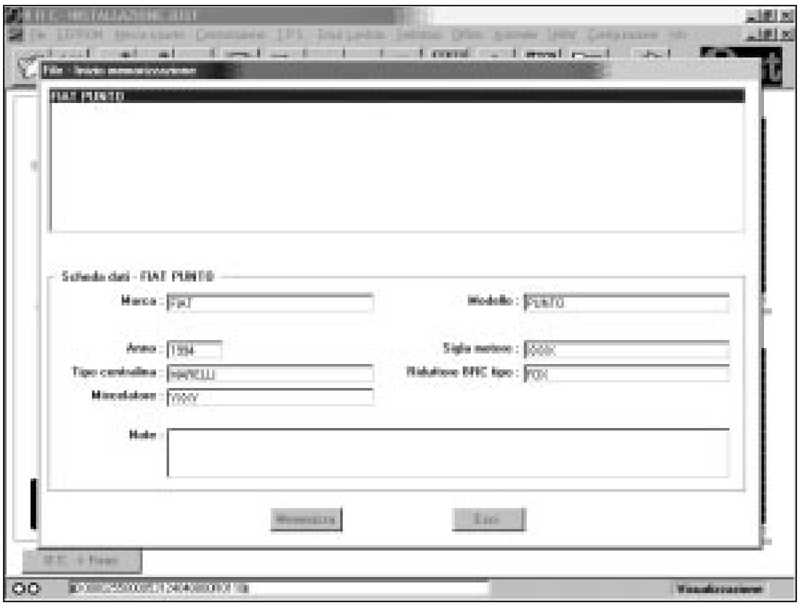

Fig. 26 (Screen visualising the storage start)

selecting the **"Store"** button, the phase of the data storage on file starts.

To quit storing in a certain while, it is sufficient to select the **"Storage end"** item from the **"File"** menu (or to click on the corresponding quick choice icon).

This way the file containing the data storage is filed; it will be used to study or document the setting-up, or to solve possible problems in adjusting the control strategies.

4.11. EEPROM FILES MANAGEMENT

After the equipment setting-up, the interface programme on PC allows to manage well-arranged files, each one storing the EEPROM contents of a certain Just ECU.

A detailed description can be associated to each EEPROM file; it is useful to associate the file to the vehicle in order to offer two advantages:

- creation of a well arranged historical file of all the installations (useful for future controls or adjustments on the installations);
- possible reutilization of an EEPROM file of a particular setting-up achieved on a vehicle, as reference for setting-up a vehicle of the same type.

The menu actually doesn't offer only the possibility to store EEPROM files of installations, but also to programme the EEPROM of a new equipment ECU with an already stored file.

The managing menu of the **EEPROM** files is visualised in the fig. 27.

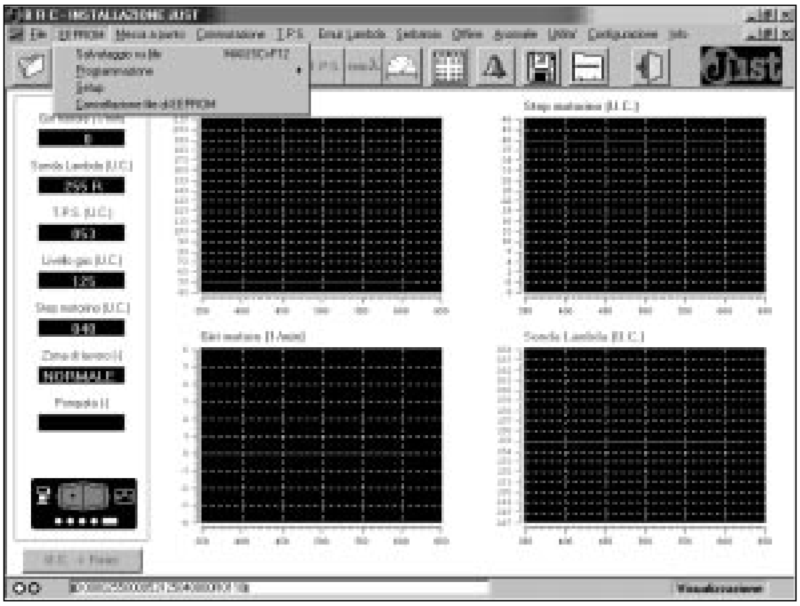

Fig. 27 (EEPROM Menu)

Fig. 28 (Screen visualising the EEPROM data saving on file)

4.11.1. EEPROM DATA SAVING ON FILE

By selecting **"Save on file"** from the **"EEPROM"** menu (or clicking on the corresponding quick choice icon), the screen depicted in the fig. 28 appears. It makes it possible to associate all the details necessary to determine a certain EEPROM file univocally.

The descriptive fields compulsory for creating and saving an EEPROM file are **Car make** and **Model**; it is anyhow obvious that the more details are entered, the easier and safer it is to distinguish a set-up vehicle from another.

In the upper window of the screen you can see the list of the EEPROM files already stored on the PC; while you are completing the data related to the EEPROM file to save, the list focalises on already saved files of similar vehicles.

4.11.2. EEPROM FILE DOWNLOADING

It is possible to reuse an EEPROM file of a particular setting-up achieved on a vehicle, as reference for setting-up a vehicle of the same type.

Obviously, to hope in a valid starting point for setting-up a vehicle, it is necessary to use an EEPROM file of the same model of vehicle, equipped with the same elements of the gas equipment and with a possibly identical assembly of the equipment parts.

But in this case too, we cannot assure that further changes in the adjustment aren't necessary, for an optimum setting-up.

By selecting **"Programming"** from the **"EEPROM"** menu, the screen depicted in the fig. 29 appears. It allows to choose between the programming of the new EEPROM based on an EEPROM file belonging to those stored by the installer during his personalised setting-up or based on EEPROM files directly coming from settings-up carried out by BRC.

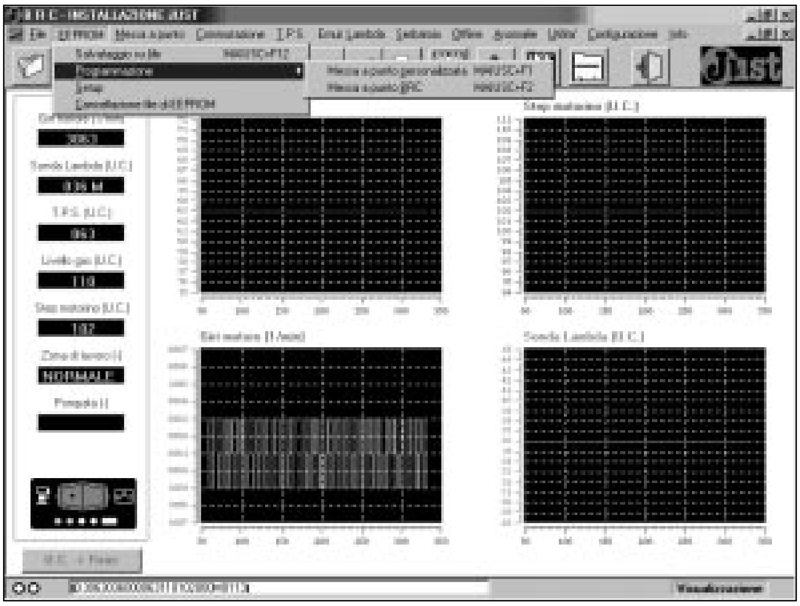

Fig. 29 (Programming Menu)

4.11.2.1. Personalised files

If you want to programme a new EEPROM with a file chosen among the stored ones during the personalised setting-up, it is sufficient to select the **"Personalised setting up"** item menu. The screen depicted in the fig. 30 then appears, allowing to find, select and programme the wanted EEPROM file, by choosing it among those that have been previously filed.

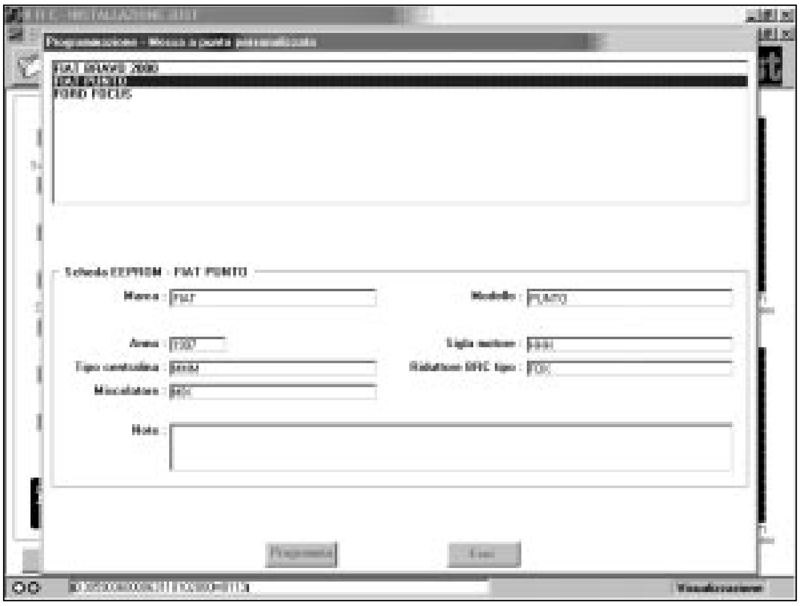

Fig. 30 (Screen visualising the personalised setting up)

4.11.2.2. BRC files

A second option consists in using a file chosen among those supplied by BRC to programme a new EEPROM.

To do this, it is sufficient to select the **"BRC setting up"** menu item. A screen similar to the one depicted in the fig. 30 appears. It allows to find, select and programme the wanted EEPROM file, by choosing it in the file supplied by BRC through the interface programme or directly on the Internet site.

4.11.3. EEPROM FILE CLEARING

To clear a certain EEPROM file previously stored, it is sufficient to select the **"Clear EEPROM file"** menu item. The screen depicted in the fig. 31 then appears. It allows to find, select and clear the wanted EEPROM file, by choosing it among all those that have been previously filed.

4.11.4. SETUP

The parameter set-up function, as already expounded in the paragraph 3.5.8, is used to completely clear all the adjustments carried out on the ECU.

After this operation, it is necessary to turn the vehicle off and to thoroughly adjust the ECU again, by repeating the first acquisition and self-configuration procedure too.

To set up it is sufficient to select **"Setup"** from the **"EEPROM"** menu (or to click on the corresponding quick choice icon); the screen of the fig. 32 will appear.

By selecting the **"Initialise"** button and confirming the choice in a second screen requiring a further confirmation of the operation, the ECU is completely cleared.

Warning! Only carry out the operation if you are really convinced!

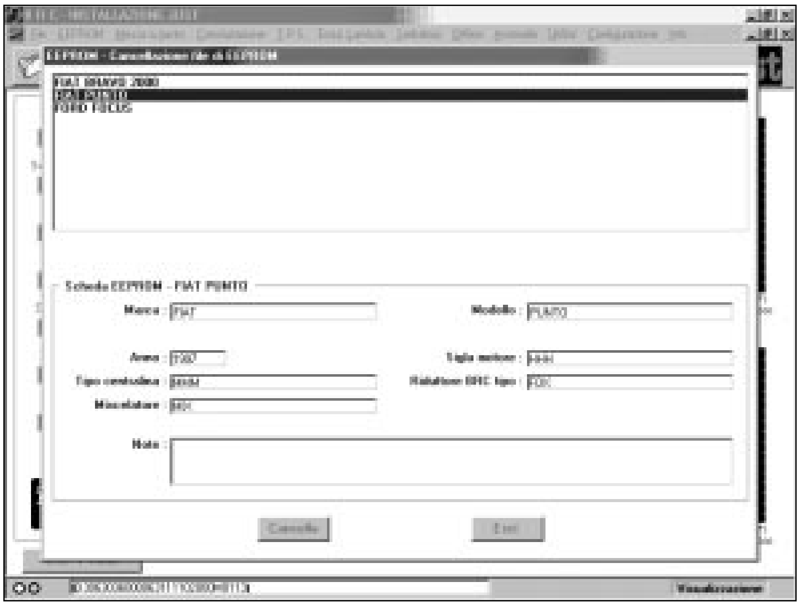

Fig. 31 (Screen visualising the EEPROM file clearing)

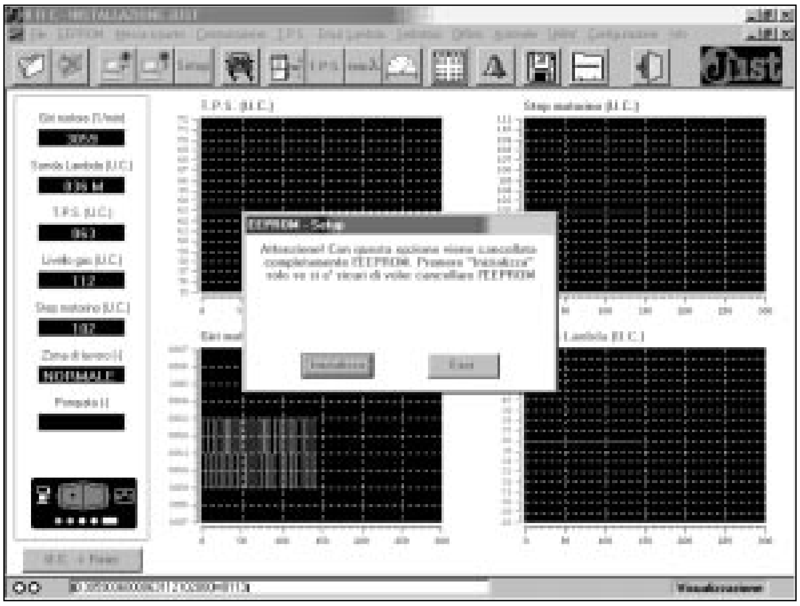

Fig. 32 (Setup screen)

4.12. UTILITIES

The **"Utilities"** menu offers other useful functions such as the possibility to file and reset the whole collection of EEPROM files stored on the PC during the setting-up of the equipped vehicles and the possibility to consult the assembly diagrams supplied by BRC.

The menu with its options is depicted in the fig. 33.

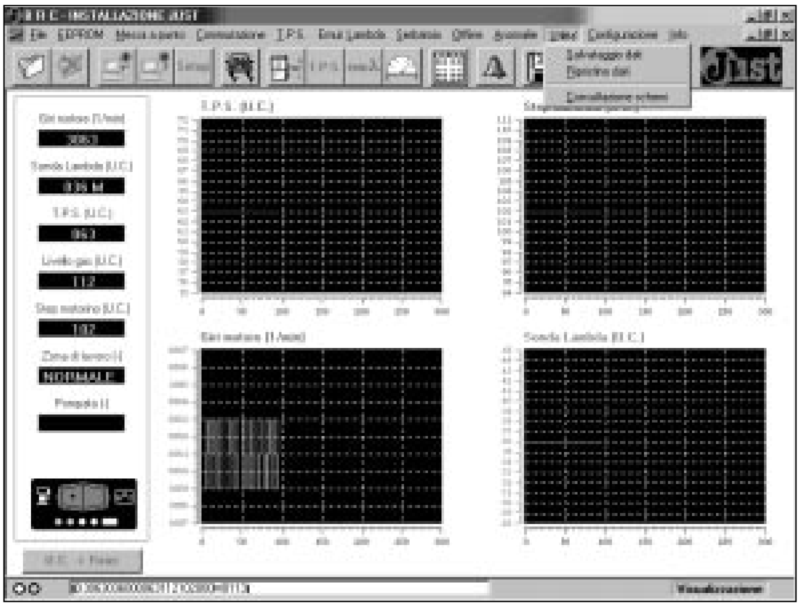

Fig. 33 (Utilities Menu)

4.12.1. Data saving and reset

By selecting **“Save data”** the screen of the fig. 34 appears; it is then possible to create the backup of all the files stored in the special directories of the interface programme on PC during the different settings-up.

The reset of the files of a possible backup in the attendant directories of the interface programme can be carried out by selecting **“Data reset”**, which makes the screen of the fig. 35 appear.

4.12.2. Diagram consultation

Another interesting function contemplated by the interface programme consists in the possibility to consult the Just system assembly diagrams on several types of vehicles from a file inside the programme that can be updated via Internet or with a direct access to the BRC web site.

4.13. CONFIGURATION

The fig. 36 depicts the **“Configuration”** menu that allows the functions for choosing the programme language and the PC serial door setting for a correct communication with the Just ECU.

4.13.1. Choice of the language

By selecting **“Language”** the screen of the fig. 37 appears. It is then possible to choose among four languages by simply clicking on the icon corresponding to the

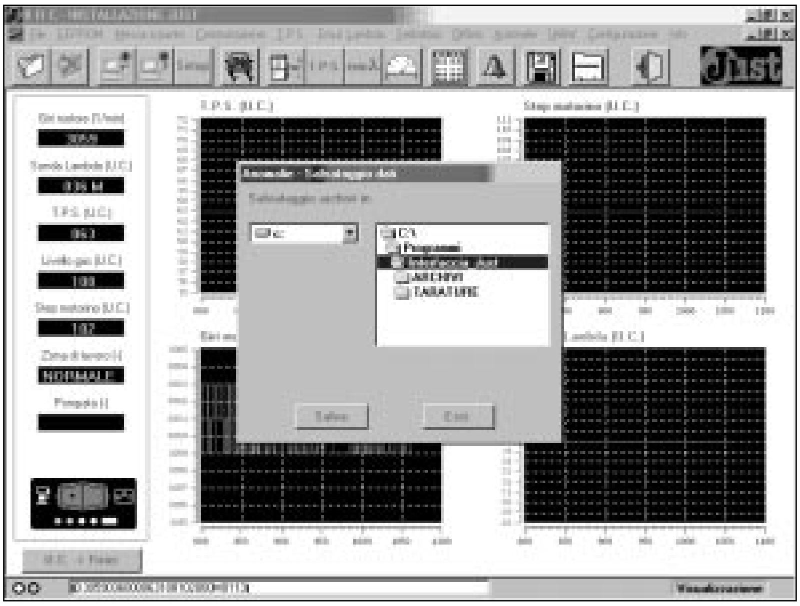

Fig. 34 (Screen visualising the data saving)

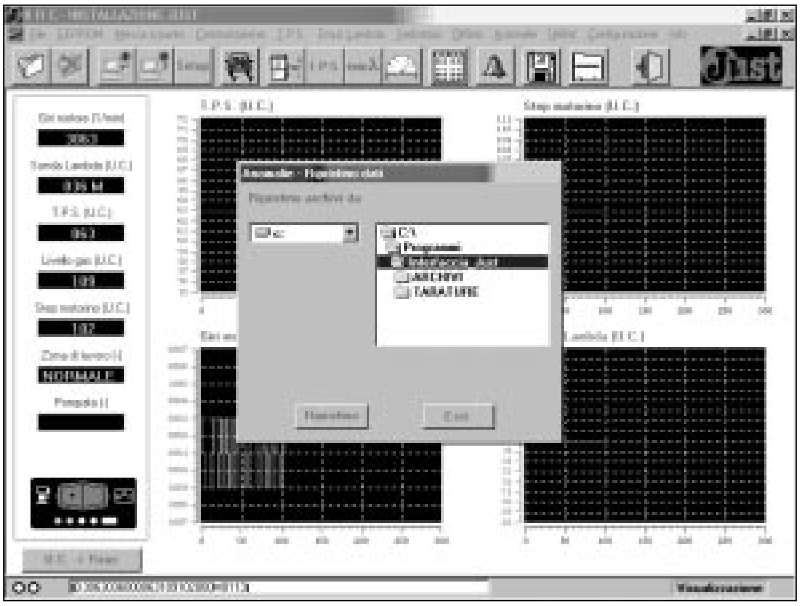

Fig. 35 (Screen visualising the data reset)

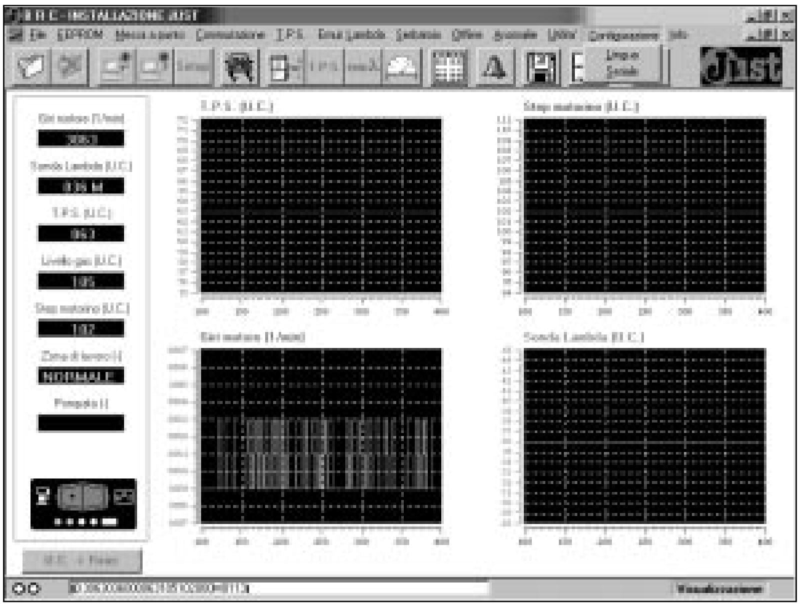

Fig. 36 (Configuration Menu)

chosen language and on the "**Save**" button.

4.13.2. SERIAL DOOR CONFIGURATION

By selecting **"Serial"** the screen of the fig. 38 appears. It is then possible to configurate the PC serial door to communicate correctly with the Just ECU micro-controller. The default parameters are usually already set in order to assure a correct data exchange; should you have any communication troubles with the ECU, you are highly recommended to apply to the BRC Servicing.

4.14. SOFTWARE VERSION

By selecting the **"Info"** menu item, the screen of the fig. 39 appears. The current version of the interface programme software is specified together with further information.

4.15. PROGRAMME EXIT

It is possible to quit the Just interface programme by selecting **"Quit"** from the **"File"** menu (fig. 25), or by clicking on the corresponding quick choice icon (last icon on the right).

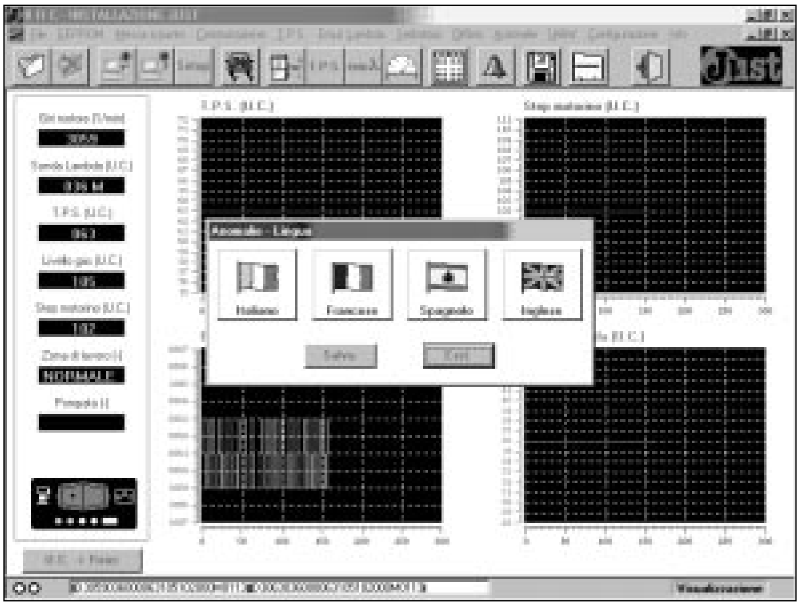

Fig. 37 (Language choice screen)

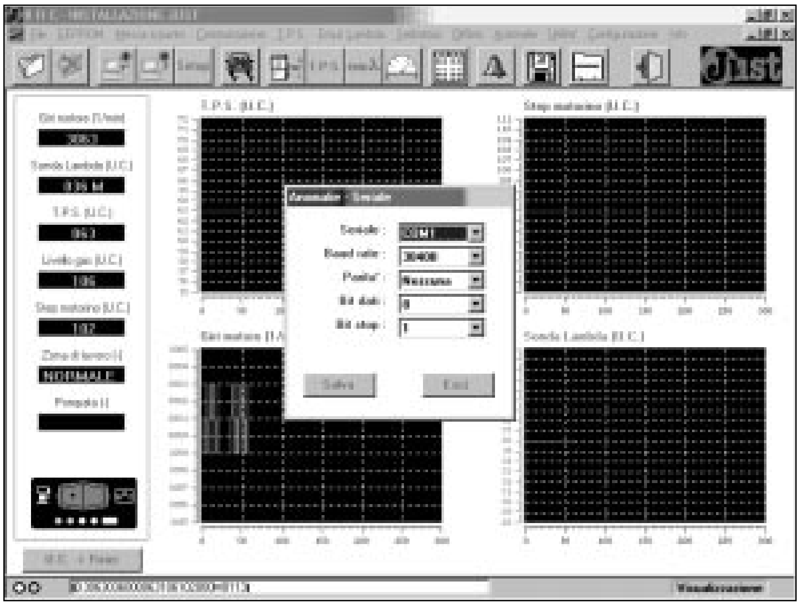

Fig. 38 (Serial door screen)

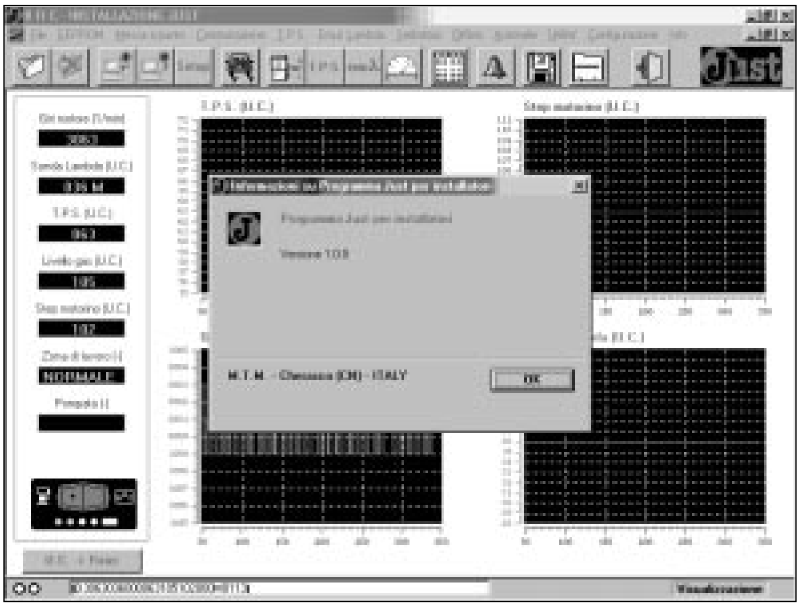

Fig. 39 (Software version screen)

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