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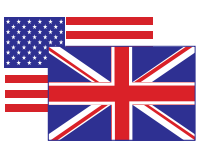
BRC GAS EQUIPMENT

Just HEAVY

PROVISORY VERSION 2.1

- handbook for the installer -



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“D” - PROBLEMI CON IL PERSONAL COMPUTER?
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“F” - ORGANIZZAZIONE COMMERCIALE BRC IN ITALIA

1. INTRODUCTION

1.1OVERVIEW

The Just Heavy system, meant to feed automotive explosion engines on gas (CNG or LPG), is an innovative evolution of the Just system.

It has been devised to widen the application field and better its performances.

Just Heavy keeps basically unchanged the essential characteristics of the Just system: simplicity of installation, parallel configuration, with possible Lambda oxygen sensor cutting and emulation, self-learning, self-adapting, personalised set-up by an interface software on PC. Furthermore it offers relevant mechanical and electronical improvements:

- no mixer, with a very low loss of power
- single stage reducer-vaporiser, with small dimensions and a more flexible installation
- new actuator-distributor, still based on a single step motor. It meters the gas and inserts it directly into each single duct of the manifold (near the original petrol injectors), thus avoiding backfires;
- ECU's microcontroller with increased potentialities and calculus abilities compared to the Just system. This enables to manage the new actuator and develop sophisticated carburation control strategies and advanced self-learning and self-diagnosis procedures.

The main target of Just Heavy is to obtain high level performances by simple installations and rapid set-ups.

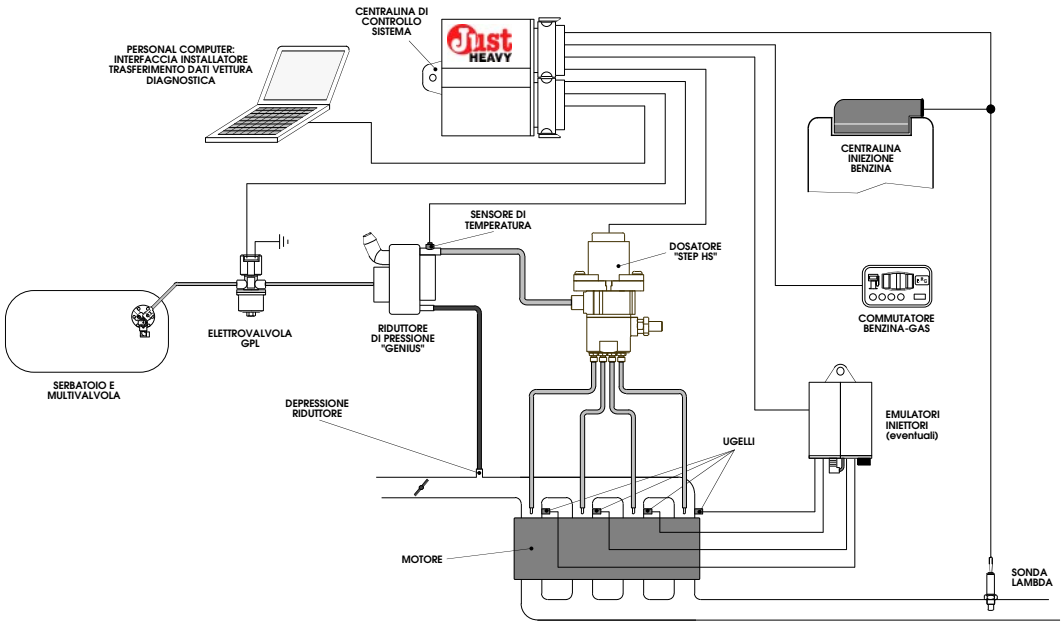
In the emission approval tests the results prove its high quality of the carburation control system.

The R67-01 approval tests and the Electromagnetic Compatibility (EMC) ones, brilliantly passed, exalted its strength to electromagnetic noises and confirmed the validity of the project and realisation of this device.

1.2. GENERAL LAYOUT OF THE EQUIPMENT

Just Heavy is applied on any type of engine converted to gas with traditional BRC equipment (either LPG or CNG).

The ECU, with a microcontroller, manages the control of the whole gas equipment and adjusts the fuel quantity in feedback by the step motor, in order to obtain optimum mixtures, both in respect of pollution and consumption and of drivability, regardless of outside conditions (temperature, etc.) and the fuel



Pic. 1
General layout of the equipment

composition.

The system setting and starting, widely based on self-learning and self-adapting procedures, are carried out by an interface software on PC, to dialogue in real-time with the ECU. This allows a precise management of the system and a handy, detailed and dedicated set-up.

Picture 1 shows the whole layout of the system, where you can notice:

- the GENIUS-HS single stage reducer;
- the STEP HS gas flow control actuator, with its hoses and nozzles for the distribution of gas into the manifold ducts;
- the absence of the mixer;
- the Just Heavy ECU;
- the change-over switch with the level indicator;
- the Lambda oxygen sensor, on which the carburation control strategies are based;
- any possible Modular elements for cutting and emulation of the petrol injectors;
- the connection to a BRC laptop PC, the only set-up tool.

This picture only shows a general layout of the equipment. Many details can vary from vehicle to vehicle and must be analysed during the installation of the system.

1.3. FUNCTIONS OF THE SYSTEM

1.3.1. CHANGEOVER FUNCTION

The changeover switch is the most immediate interface of the system with the user: by it you can select the system function mode and the driver gets the necessary information and the diagnostic on possible working anomalies (see Appendix A).

The changeover switch has three positions allowing three types of working.

1.3.1.1. Working on 'forced petrol'

With the changeover switch button pressed on 'petrol', the two-colour rectangular LED turns red, the injectors are working, the gas solenoid valves are shut, the gas flow control system is off.

The car runs on petrol, as if the gas equipment were not in.

1.3.1.2. Working with petrol-gas automatic changeover

With the changeover switch button in the central position and the ignition key on, the two-colour LED is blinking red (central position without revs). The car starts on petrol (two-colour LED is fixed red) and then it automatically changes over to gas (two-colour LED is fixed green), according to a changeover strategy based on the r.p.m. The threshold to enable the changing over is adjustable via software (Chapter 5). An orange shade of the two-colour LED marks out that the changing over threshold (2,000 r.p.m. default) has been got over, with the car still running on petrol. In such conditions, a deceleration (200 r.p.m.) determines the changeover to gas.

The actual possibility to changeover to gas also depends on other parameters configurable via software by the interface programme on PC (see chapter 5), like a changeover inhibition time immediately after the car ignition and a temperature threshold, measured by the temperature sensor on the GENIUS HS reducer.

Obviously, while running on gas the injectors are off, because the outside cutting device and the possible emulation of the injectors are on, the gas solenoid valves are open, the gas flow actuator is controlled and any possible further devices are on.

This is the recommended position to run on gas.

The system automatically changes over to petrol in case of failed start or accidental stop (safety car) and this condition is signalled on the LED bar by a shifting lighting of a LED at a time from left to right and back.

In a similar way, it automatically changes over to petrol (two-colour LED is fixed red) in case of runaway speed rate, with a subsequent automatic change over to gas when returning to normal conditions (par. 1.3.2).

1.3.1.3. Working on 'forced gas'

With the button pressed on gas and the ignition key on, the priming is immediately carried out (timed opening of the gas solenoid valve, to allow the car starting).

The two-colour LED turns green (blinking without revs and fixed in case of priming or engine running) and the car runs exclusively on gas.

In this case, too, the system automatically changes over to petrol again in case of failed start or accidental stop (safety car) and of runaway speed rate.

This function is to be considered as an emergency solution, to be used solely in case of failure of the petrol feeding system and with the most care to prevent the pump from running dry, with empty tank.

It is convenient to always keep a petrol quantity of 1/3 or 1/4 of the tank and to renew it often so it does not alter.

1.3.2. Runaway speed rate condition management

In case the engine falls into a runaway speed rate condition while running on gas, the system automatically changes over to petrol, allowing to use the revs limiting strategies implemented in the petrol injection ECU.

Back to acceptable working conditions, the ECU automatically enables the changing over to gas again. This is carried out as soon as the suitable conditions take place (par. 1.3.1).

Both thresholds – runaway speed rate and acceptable working conditions – are configurable via software by the interface programme on PC (chapter 5).

1.3.3. Level gauge management

Inside the changeover switch there is a level gauge consisting of a LED bar with four GREEN LED's. The low fuel warning is showed by the first LED blinking. To make it work, connect one of the BRC resistive level sensors (see chapter 3 for installation, appendix F for the part numbers).

The level gauge is preset, but the indication can be improved or corrected via software (see chapter 5).

1.3.4. Injector emulation and fuel overlapping

The Just Heavy ECU has neither the injector cutting function nor the injector emulator function.

It is therefore necessary to install an outside module (emulator, disconnector, etc.) available in different versions according to the injection type and the car specific requirments.

By connecting the outside emulator power supply to the white/green wire of the Just Heavy ECU (see chapter 4), you get the fuel overlapping function.

The fuel overlapping time is programmable via software (see chapter 5).

1.3.5. Lambda oxygen sensor signal emulation

The Just Heavy ECU incorporates a configurable lambda oxygen sensor signal emulator which performs the functions of fixed emulation and emulation at variable richness.

The choice is associated to the setting-up of the NP – NC1/NC2 relay contact (par. 1.3.6), that is to say the emulation at a variable richness is associated to the NP setting-up, whereas the fixed emulation is associated to the NC1/NC2 setting-up.

In case of emulation of the lambda oxygen sensor signal at a variable richness, it is possible to programme the duty cycle of the lambda signal emulated with a 1% resolution (see chapter 5).

1.3.6. Petrol ECU memory management and signal cutting relay contact

The white and white/orange wires can have a double function, configurable via software (see chapter 5):

- memory reset function of the petrol injection ECU (NP);
- relay contact function to cut signals (NC1/NC2).

The NP function of the white and white/orange wires is usually used on cars where it is necessary to reset the memory of the petrol injection ECU.

Refer to the specific diagrams of each car to use the NC1/NC2 function (corresponding to the relay contact to cut signals).

1.3.7. Vehicle signal self-learning

Just Heavy is able to self-learn the sundry types of vehicle signals (automatic acquisition of any type of MAP signals, revs signals, TPS signals and lambda oxygen sensor signals). This makes the ECU set-up considerably easier and avoids any installer's error (see chapter 5).

1.3.8. Control of the gas quantity

The system acts as a 'closed loop', taking the place of the petrol injection system (parallel system). It corrects in real time the air/gas mixture strength according to the information coming from the lambda oxygen sensor. The latter produces a voltage signal depending on the oxygen present in the exhaust gas and therefore supplies an indirect measure of the mixture strength (lean, stoichiometric, rich). It enables the ECU to act on the gas flow control actuator, through a power stage.

The correction in real time of the mixture strength is made both according to the information coming from the lambda oxygen sensor and by the analysis of the different driving conditions of the car (maps based on the engine load).

Appropriate and sophisticated strategies for the management of the engine different working conditions (idle, regular load, cut off, full load, etc.), transient and release conditions, all this completes the lambda control, whose main aim is the drivability and the optimisation of emissions.

The Just Heavy ECU has been conceived only for the management of the patented BRC STEP HS actuator, involved in the system itself and not com-

patible with different actuators.

1.3.9. A SELF-ADAPTING SYSTEM

Self-adapting strategies have been further enhanced according to the varying conditions and the vehicle working characteristics, to assure a constant and permanent optimisation of the control potentialities.

The properties and characteristics of these strategies are summarised in two main aspects:

- constant control and updating of the signals used by the system, with possible corrections to the configurations made in the first set-up;

- dynamism and continuous updating of the engine load maps. They can self-adapt to the changing characteristics of the vehicle and to the different driving conditions.

Particularly, the self-learning ability has a double aim:

- optimise the carburation control in every situation, assure a bigger stability of the system in regular load and a high quickness in the transients;

- optimise rapidly its engine load mappings, if values not corresponding to the working ones have been acquired during the first acquisition. In this case, the engine load map meets the optimal one while driving on road.

1.3.10. CHECK-UP OF THE SYSTEM

Each time the board cuts out, the ECU carries out a check-up of all its parameters and of the condition of all Just Heavy components.

This condition is pointed out by the changeover switch through a shifting lighting of pairs of LED's from the centre outwards and back.

(NOTE: it is however possible to break off the check-up and start again if necessary).

1.3.11. DIAGNOSTIC

The system is able to carry out a diagnostic of its working in real time.

Possible errors or troubles are stored by the ECU and showed through a special encoding on the changeover switch LED's whenever they occur.

They are also stored and retrievable in the interface programme on PC.

The clearance of the stored errors is automatic when the car stops: if their cause is removed, they won't occur at the next starting, otherwise they will reappear.

1.3.12. DIALOGUE WITH THE BRC LAPTOP

As we wrote before, the only interface and system set-up of Just Heavy is a PC, by which, with a valid and powerful interface programme, it is possible to communicate with the ECU and get to its memories and central unit in real time.

The interface on PC is thus the tool by which the installer interacts with the whole Just Heavy system. Through it, he can 'model' the gas equipment and adapt it to the characteristics of the vehicle in the various driving conditions.

An orderly data collection of the different installations the installer made can form a very useful file to keep under control the evolution of the installations and to be the starting point of new similar or critical installations.

Chapter 5 is entirely dedicated to the interface programme.

1.4. ADVANTAGES OF THE JUST HEAVY SYSTEM

We have already mentioned the most interesting features of Just Heavy.

In this paragraph we will sum up the main advantages and the most relevant targets we aimed to while planning, developing and realising this system.

1) The absence of the mixer means:

- no loss of power while running on petrol;

- higher power on gas, compared to the traditional systems with mixer;

- injection near the aspiration valves, avoiding backfires.

2) The new STEP HS actuator-distributor, based on a single step motor, means:

- small dimensions;

- high mounting flexibility.

3) The new single stage GENIUS HS reducer means:

- a new working strategy, which optimises and simplifies the control of the actuator-disributor;

- small dimensions and compactedness;

- easy installation, dues to its different orientation ways.

4) The system parallel architecture means:

- easy installation;

- few electrical connections.

5) The use of the PC as the only set-up tool allowed the development of very simple and duly assisted procedures of first acquisition and configuration, thus avoiding any possible error.

6) The use of control strategies based on generally valid self-mappings and on advanced self-learning procedures aims at the universality of the system, instead of at dedicated developments.

7) The performance/cost ratio is certainly very interesting.

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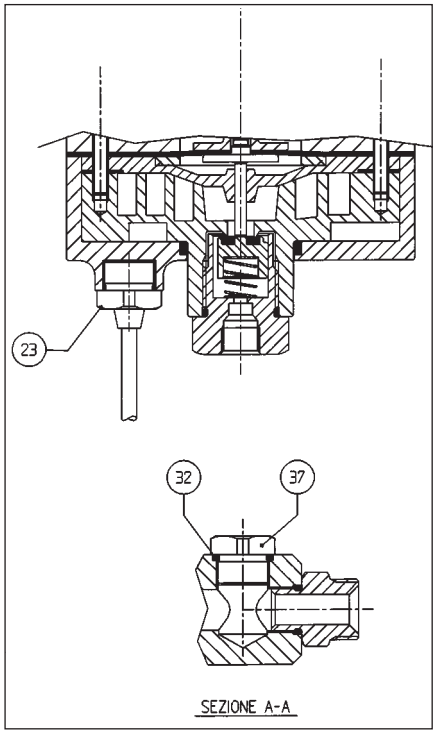
2. COMPONENT DETAILED DESCRIPTION

Pic. 2
GENIUS HS reducer

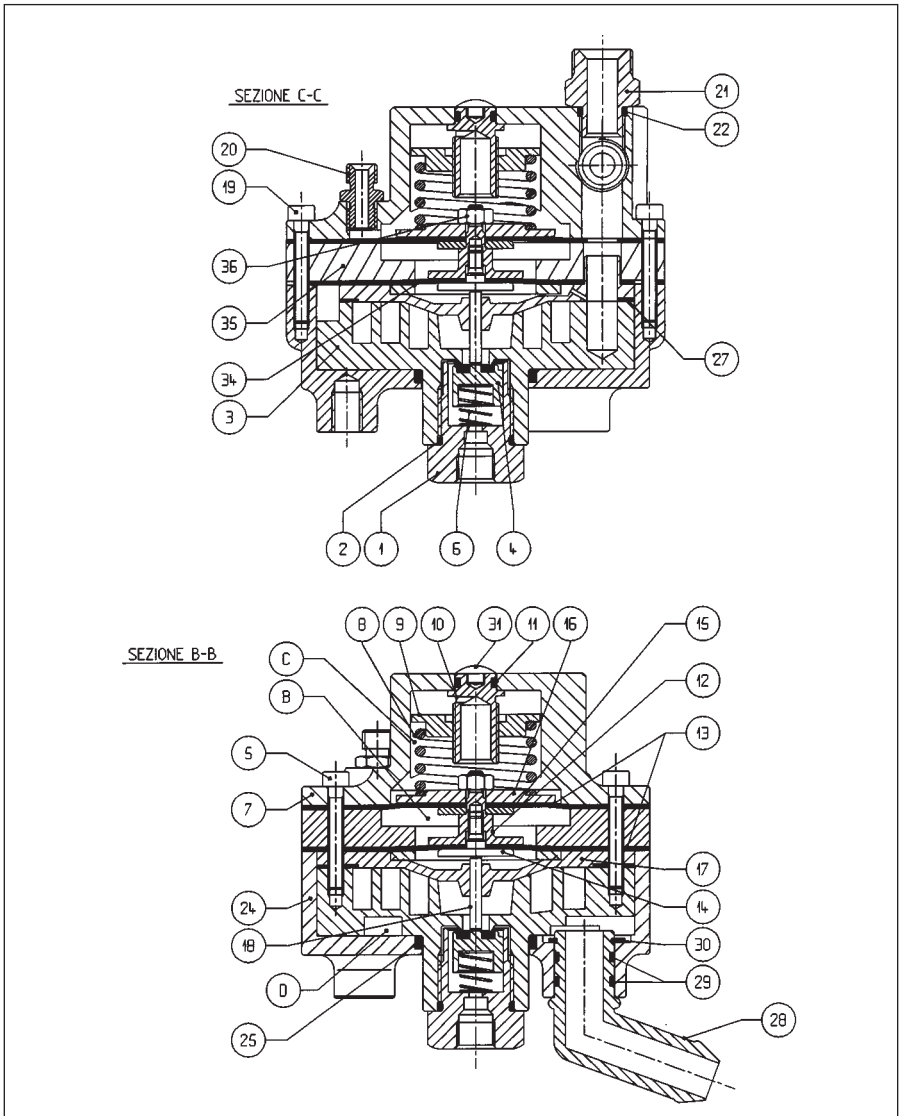
2.1. GENIUS HS REDUCER (LPG VERSION)

In the LPG version, the Genius reducer (pic.2) is made up of one stage only, with an outlet pressure nearly proportionate to the pressure of the aspiration manifold and with a value of about 1.2 bar (throttle valve completely open).

As showed in the views (pic. 3 and 3A), the reducer has got two diaphragms, linked together and subjected to the action of a spring. The diaphragms determinate the opening of a shutter and adjust the gas outlet pressure. In particular, both diaphragms from one side face an atmospheric



Pic. 3 and 3A
View of GENIUS HS and its details



01 RACC.ENTRATA GAS
02 ANELLO TEN.OR2062 VIT.V. 70SH 15,6X1,7
03 CORPO RIDUTT.GENIUS
04 OTTURATORE VULCANIZZ.
05 VITE TC.E.I. M4X30 CL.8.8 Z.B UNI5931
06 MOLLA F=0,5 DE=8,6 L=13,5 ACC.CL.B
07 COPERCHIO LATO GAS
08 MOLLA F=2,3 DE=31,9 L=44 ACC.CL.D
09 VITE DI REGISTRO
11 ANELLO TEN.OR2031 VIT.V. 70SH 7,66X1,7
12 PROLUNGA PIATTELLO
13 MEMBRANA
14 PIATT.SUPP.MEMBR.
15 PIATTELLO LATO COLLETTORE
16 PIATTELLO LATO COLLETTORE
17 PIASTRA INTERM.
18 ASTINA MEMBRANA-OTTURAT.
19 VITE TC.E.I. M4X25 CL.8.8 Z.B UNI5931
20 RACCORDO UNIVERS.M8X1
21 ATTACCO USCITA GAS
22 ANELLO TEN.OR2037 NBR 9,25X1,
23 SENS.TEMP.H2O C/TERMIST.C/CONN.AMP 3 V
24 COPERCHIO LATO ACQUA
25 ANELLO TEN.OR3112 NBR 28,25X2,62
27 GUARNIZIONE GAS-ACQUA
28 CURVA ACQUA
29 ANELLO TEN.OR2050 VIT.V. 70SH 12,42X1, 4
30 SEEGER A 16 UNI3653-7435
31 INSERTO TRATTIENI TARGHETTA
32 ANELLO TEN.METR.OR 11X2 NBR
33 TARGHETTA PVC GENIUS "G" BRC
34 ANELLO DI RIDUZIONE
35 FLANGIA INTERMEDIA
36 DADO M 4 Z.B. UNI5588-65
37 TAPPO M14X1

pressure environment, while at the opposite side one diaphragm is subject to the gas pressure and the other to the manifold pressure. The difference of the working surfaces of the two diaphragms allow the reducer to deliver the gas at an increasing pressure differential when the pressure inside the aspiration manifold increases. For instance, in idle conditions there will be an absolute pressure of 0.3 bar in the manifold and a gas adjusted absolute pressure of 0.8 bar (Δ pressure = 0.5 bar); in a condition of full load for a non-supercharged engine there will be an absolute pressure of 1 bar in the manifold and a gas adjusted absolute pressure of 2.2 bar (Δ pressure = 1.2 bar). In the environment after the shutter the LPG evaporates due to the thermal exchange with the coolant, as in an ordinary reducer.

Despite its compact dimensions, the reducer assures high gas flows to satisfy powers up to 140 kW. Having but one stage, it doesn't need any drainage.

A temperature sensor is screwed on the reducer, on the water side (pic. 4). The changeover strategies performed by the ECU are based on this information.

Pic. 4
Temperature sensor of GENIUS HS

Pic. 5
GENIUS.M HS reducer

2.2. GENIUS.M HS REDUCER (CNG VERSION)

In the CNG version the reducer (pic. 5), called Genius.M HS is made up of two reduction stages.

The tasks of this pressure reducer are therefore the following:

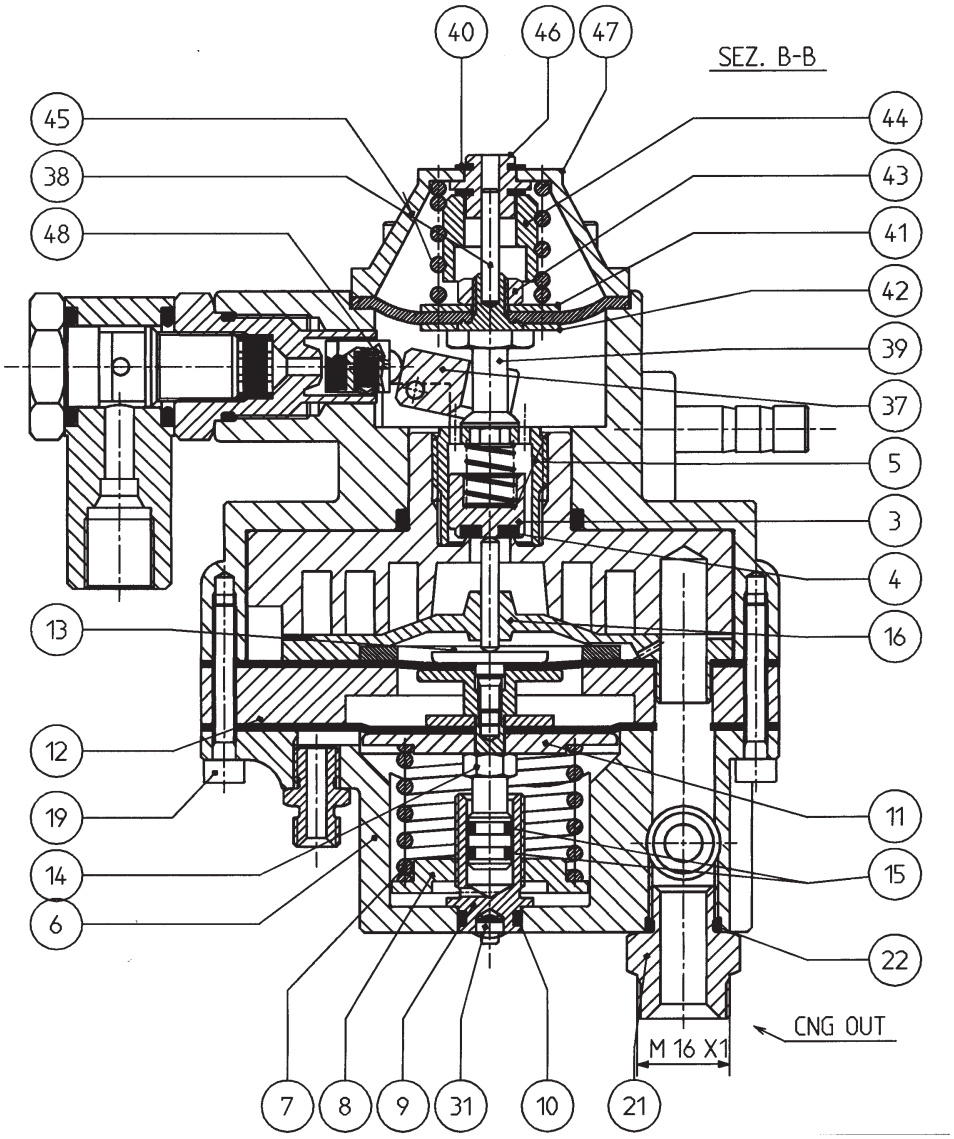
- face any pressure level of the CNG coming from the tank, up to a maximum charge pressure (approx. 200 bar);
- reduce the CNG pressure to an intermediate pressure of 5-6 bar in a first stage;
- bring the necessary heat to avoid an excessive cooling of the fuel due to the sudden expansion;
- further reduce the CNG pressure at a desired pressure of 1.6 bar, useful to feed the injection system.

This outlet pressure value depends on the aspiration manifold pressure signal, the same as for the LPG reducer. It is to be noticed (pic.6) that the second stage of the CNG Genius.M HS reducer is very similar to the first and only stage of the LPG Genius HS reducer.

2.3. GENIUS HS TEMPERATURE SENSOR

As we wrote in par. 2.1, on the GENIUS HS pressure reducer, water side, there is a temperature sensor. The sensor (pic. 4) is a resistive and two-wire one, based on an NTC thermistor. The latter implies an easier diagnostic of the good working: you just need to check through a multimeter that at both ends of the sensor there is a reasonable resistance value.

All the changeover strategies of the system are based on the temperature sensed by this device.



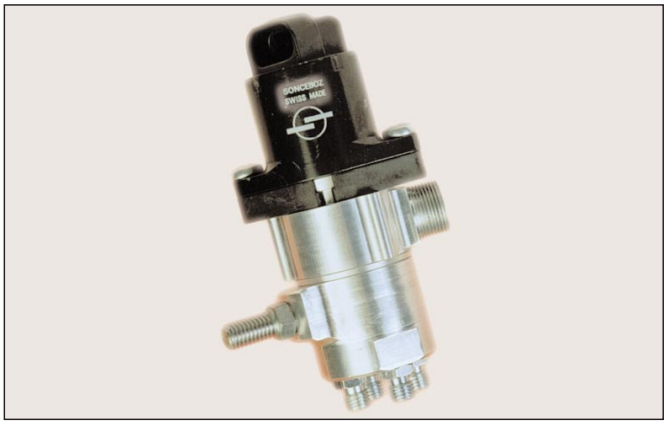
03 CURSORE
04 OTTURATORE VULCANIZZATO
05 RACCORDO COLLEGAMENTO 1°/2° STADIO
06 COPERCHIO LATO GAS
07 MOLLA PRINCIPALE
08 PIATTELLO SUPPORTO MOLLA
09 VITE DI REGISTRO
10 ANELLO DI TENUTA OR
11 PIATTELLO LATO COLLETTORE
12 FLANGIA INTERMEDIA
13 PIATTELLO SUPPORTO MEMBRANA
14 PISTONCINO
15 ANELLO DI TENUTA
16 PIASTRA INTERMEDIA
19 VITE TCEI M4x25
21 ATTACCO USCITA GAS
22 ANELLO DI TENUTA
31 INSERTO TRATTIENI TARGHETTA
37 LEVA 1° STADIO
38 SPINA CILINDRICA 3x20
39 PERNO AGGANCIO LEVA 1° STADIO
40 SEEGER RSM DIAM.6
41 PIATTELLO SUPPORTO MEMBRANA 1° STADIO
42 PIATTELLO MEMBRANA 1° STADIO
43 DADO M6
44 ANTIVIBRANTE
45 MOLLA
46 BOCCOLA IN TEFLON
47 COPERCHIO 1° STADIO
48 BARILOTTO

Pic. 6
View of GENIUS.M HS and its details

2.4. STEP HS METER-DISTRIBUTOR

The STEP HS meter-distributor (pic. 7) is based on a single step motor. Its double function is to meter the gas flow towards the engine and cut completely its flow when the engine stops or while running on petrol.

The precise metering of the



Pic. 7
STEP HS meterer distributor

gas is got by the step motor which places a shutter with a particular geometry (pic. 8). This ensures a refined adjustment for low fuel flows, as in idle conditions, as well as a high maximum flow.

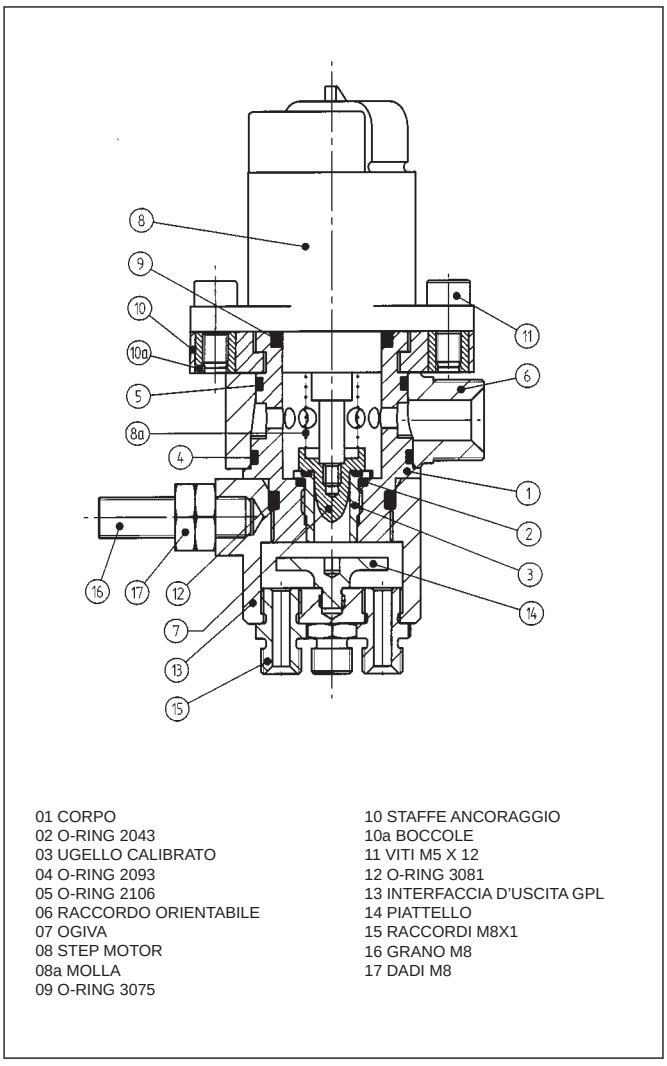
As you see in pic. 9 the characteristic of the flow through STEP HS as a function of the opening steps of the motor is such that the higher the flow is, the bigger the flow variation is with one step more.

STEP HS, together with GENIUS HS, can feed engines with powers up to 140 kW.

The watertight closing of the shutter is ensured by the contact of its ring and the elastomeric gasket directly vulcanised on the calibrated nozzle. Also note that the gas pressure causes anyway a closing pressure onto the shutter.

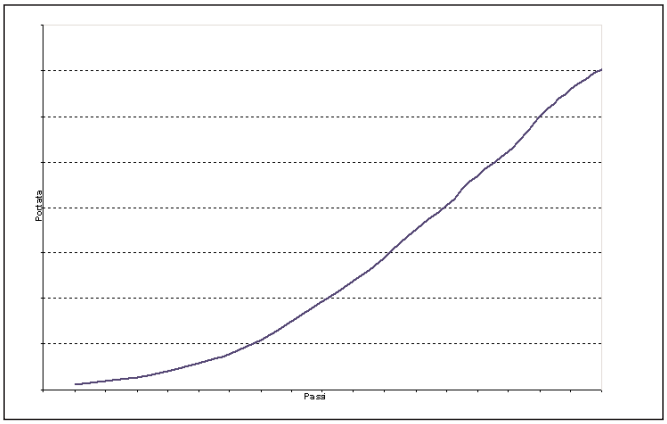
STEP HS is simple to fit up, due to the orientability of the gas inlet and of the step motor, to its compactness and to its possibility to install it in whatever direction.

Its simple construction assures a high reliability and an easy maintenance in extreme cases.



01 CORPO
02 O-RING 2043
03 UGELLO CALIBRATO
04 O-RING 2093
05 O-RING 2106
06 RACCORDO ORIENTABILE
07 OGIVA
08 STEP MOTOR
08a MOLLA
09 O-RING 3075
10 STAFFE ANCORAGGIO
10a BOCCOLE
11 VITI M5 X 12
12 O-RING 3081
13 INTERFACCIA D'USCITA GPL
14 PIATTELLO
15 RACCORDI M8X1
16 GRANO M8
17 DADI M8

Pic. 8
View of STEP HS



Pic. 9
Flow-opening characteristic of STEP HS

2.5. MANIFOLD VACUUM SENSOR (MAP)

This device (pic.10) gives the Just Heavy ECU the information on the vacuum inside the aspiration manifold. If this signal is already provided by the car, the Just Heavy ECU can read it, so the manifold vacuum sensor is not installed. Otherwise install the BRC MAP by connecting the pressure inlet to a manifold vacuum reading point.

Pic. 10
Manifold vacuum sensor (MAP)

2.6. “ET98” LPG SOLENOID VALVE

The LPG solenoid valve used in the Just Heavy system is the already tested BRC ET98 LPG solenoid valve.

Considering the features of the meter-distributor, it is usually not necessary to adopt the Flying Injection ‘ET 98 F.I.’ solenoid valve.

Pic. 11
“ET98” LPG solenoid valve

2.7. “BRC VM A3/E” CNG CHARGE SOLENOID VALVE

The “BRC A3” CNG charge solenoid valve used in the Just Heavy system is the same which is normally marketed by BRC (pic. 12). The solenoid valve to be installed normally inside the engine compartment, along the pipes which connect the CNG cylinder/s to the reducer, allows the refuelling and, at the same time, the free passage of the feeding flow.

The solenoid valve is equipped with a special device to determine the CNG remainder inside the cylinder/s, when the refuelling is carried out at a distributor without this function.

The use of this type of solenoid valves, in the Just Heavy system, is significant since the solenoid valve is controlled and operated by the electronic control system.

It opens while starting and closes in case of engine stop, even if the driver has not taken the ignition key again in the closing position (as it may happen, for example, in case of accidents).

Pic. 12
“BRC VM A3/E” CNG fuelling solenoid valve

Pic. 13
Just Heavy ECU

2.8. JUST HEAVY ECU

The Just Heavy ECU (pic.13) is the operative unit of the whole gas equipment. Its body is the same as for the Just ECU, it is waterproof and very small, compared to its functions and performances.

Through the special harness preset to easily reach the car different parts concerned, and due to the inlet and outlet stages dimensioned not to alter or damage the car normal running on petrol in time, it is able to manage the whole Just Heavy system in the course of its duty.

The ECU has got two 24-way connectors for the system harness, the same as that already used in the Just system.

A thorough and detailed description of the ECU’s features and functions could not be possible and would be out of context. In summary, the ECU is entirely manufactured with automotive components, so it resists the engine compartment temperatures. However, do not install it near hot devices like the exhaust manifold.

The ECU is in accordance with the norms on the electro-

magnetic compatibility. Inside it there are recently devised components (16 bit Motorola microprocessor, HC12 type), with a process speed higher than the Just ECU's. The memory is permanent: once it is programmed, the Just Heavy ECU may be disconnected from the battery without any loss of data. It may be reprogrammed many times without any problem and, for instance, it may be transferred from one car to another and reprogrammed.

2.9. CHANGEOVER SWITCH WITH LEVEL INDICATOR

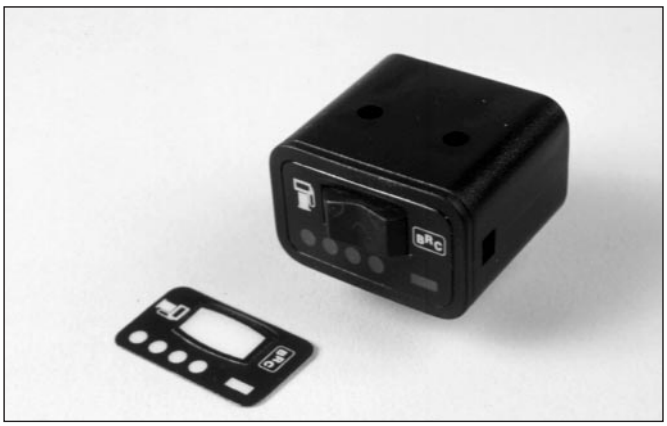
Full compatibility with the whole series of changeover switches, devised for the different BRC systems. The changeover switch (pic.14), as we wrote in chapter 1, performs the changeover (par. 1.3.1), gas level indicator (par. 1.3.3) and diagnostic (par.1.3.11) functions.

2.10. LEVEL GAUGE

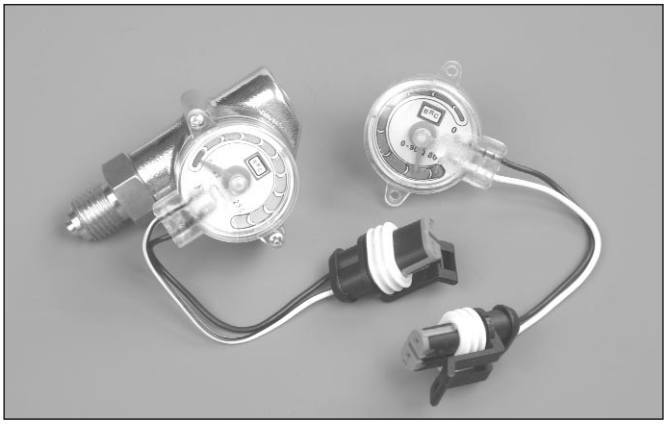
The Just Heavy ECU manages the gas level indication through the GREEN LED's on the changeover switch. To carry out this function, the ECU takes the signal coming from the BRC resistive level gauge (pic.15) on the tank multivalve (LPG equipment) or from the BRC resistive pressure gauge (CNG equipment). The lighting thresholds of the LED's are programmable via PC (see chapter 5), to get a precise indication of the gas level in the tanks.

2.11. INJECTOR EMULATOR

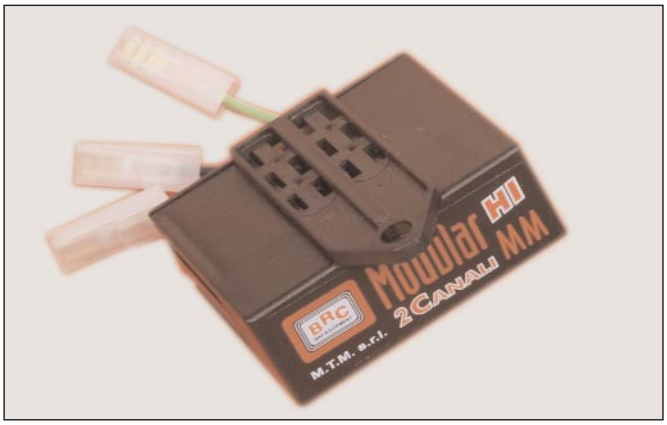
As explained in chapter 1, the Just Heavy ECU does not performs the injector cutting and emulation itself. Therefore we recommend the use of the Modular series (pic.16) to be connected to the ECU outlet, specific for the feeding of the Modular devices with overlapping time (white/green wire). For further details, refer to the instruction sheets.



Pic. 14
Changeover switch with level indicator



Pic. 15
Resistive level gauge



Pic. 16
Injector emulator (Modular)

2.12.EXTERNAL EOBD LAMBDA EMULATOR (IF NEEDED)

We wrote in chapter 1 that the Just Heavy ECU incorporates a configurable lambda oxygen sensor signal emulator which can perform the functions of fixed emulation and emulation at variable richness, as it is in the Just system.

In case the lambda emulation inside the ECU is not sufficient (as on certain Euro 3 or Euro 4 vehicles), you can adopt an external EOBD emulator (BRC Memory family).

For further details, refer to the specific instructions.

2.13. ELECTRICAL HARNESS

The Just Heavy system harness is made up of two parts: a main harness (pic.17) and a harness for the additional signals and the communication with the PC (pic.18).

The main harness (containing most of the signals used by the system) is the very same harness used with the Just ECU. The Just Heavy connection to the sundry elements of the system can be through either main harness – with STARTEND connection or with STARTEND and RESET connection), as already used with the Just device. You must add a further harness for the additional signals, namely MAP and temperature sensor and for the communication with the PC.

From the electrical point of view, you can replace the Just system by the Just Heavy one without any further modification, but the installation of the additional signal harness.

A specific insertion key on the connectors of the two harnesses avoids any misplacement and consequent damages due to a wrong connection to the ECU.

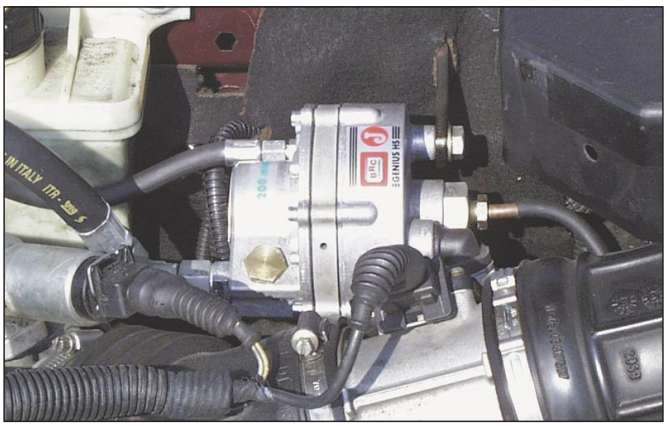
Refer to chapter 5 for a detailed description of wire connections and cable connectors.

NOTE: should you use a Just harness produced before January 2002 as the main harness, you must turn the 24-way female connector plug and lock slide of the very harness. This way you can plug the connector in the correct way (not used by the additional harness) into the ECU front.

Pic. 17
Main electric harness, the same for Just and Just Heavy

Pic. 18
Electric harness specific for Just Heavy

3. MECHANICAL PART FITTING UP



Pic. 19
Fitting up position, with diaphragm parallel to the vehicle riding direction

3.1. PRELIMINARY OPERATIONS

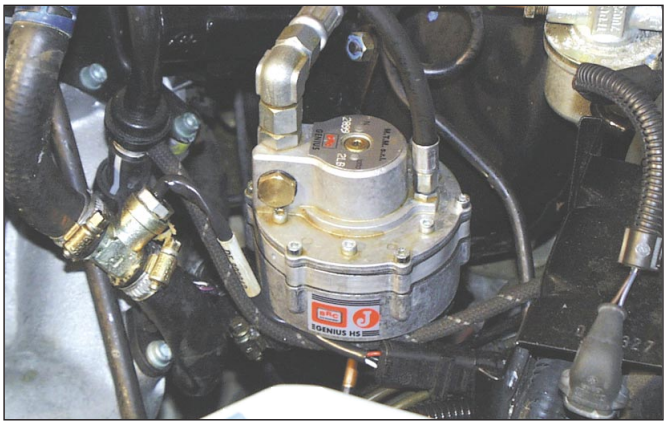
Before installing the components of the Just Heavy system, as before any other installation, it is a good rule to check the petrol working of the car.

In particular, it is necessary to carefully check the conditions of the ignition electric equipment, the air filter, the catalyst and check, by a multimeter or by BRC diagnosis implements, the correct working of the different signals concerning the system: positive after contact, r.p.m., lambda oxygen sensor, TPS, petrol ECU storage power supply, injector positive. It is also important to check that the earth power of the different signals is stable and coincides with that of the place where you want to connect the Just Heavy ECU earth (the acceptable change can be of some 10 mV).

Another very important warning is to carefully follow the instructions enclosed to the BRC products, obviously after having checked the car model to be converted, its production year, engine number, injection and ignition types and all useful data for the conversion realisation.

These are simple actions taking a few minutes, but this can avoid future inconveniences, complaints and waste of time.

Pic. 20
Fitting up position, with diaphragm perpendicular to the vehicle riding direction



Pic. 21
Different fitting up position

3.2. GENIUS HS REDUCER

The following installation rules are applicable to either LPG or CNG GENIUS HS.

The reducer must be firmly fixed to the bodywork, so that it is not subjected to vibrations while working. With the engine under stress it must not hit any other device. We recommend the use of specific BRC brackets.

GENIUS HS may be installed with any orientation (pictures 19, 20 and 21). It is not relevant that the diaphragm is parallel to the riding direction, but make sure that the distance between the reducer and the meter-distributor is not excessive. The connection hose should not be longer than 400-600 mm.

If you need to tighten or loosen the inlet fitting or any other fitting, we recommend the use of two spanners to hold tight the component screwed on the reducer body.

The usual criteria concerning a correct installation of the hoses

must be followed. There ought not to be movements while running that may produce rubbing, wearing or contacts against sharp edges or driving belts, etc. The gas hoses (pic. 22) and the engine coolant pipes should not be too tight, nor should they have ripples or folds.

The temperature sensor wire should not be too tight, nor twisted, nor should it make sudden folds at the outlet of the very sensor.

The copper pipe going from the solenoid valve to GENIUS HS must not pass through highly hot areas of the engine compartment.

Since no adjustment is contemplated on GENIUS HS, it is not relevant that it is fitted up in an easily accessible place. However the installer should avoid uneasy places, in order to get to it in case of repairs.

Pic. 22
ø 17 hose for GENIUS HS

Pic. 23
Fitting up of STEP HS

3.3. STEP HS METER-DISTRIBUTOR

The STEP HS actuator meters the gas coming from the GENIUS HS reducer and distribute it uniformly on the different branches of the aspiration manifold. It is connected to the GENIUS HS reducer by a 10x17 fitted hose at its inlet side.

Its outlet is connected to the nozzles installed on the manifold by 4 x 10 fitted hoses.

The step motor orientation is adjustable by loosing the screws which fix it on the tongues. This allows to fit it to the piloting harness coming-in direction.

Also the inlet fitting is orientable for an easier installation according to the GENIUS HS position.

The STEP HS actuator has a threaded pin to fix it to a special bracket.

This device can be fixed either to the bodywork or to the engine (pic.23). Its orientation is not relevant.

It is important to fix it steadily and find a position allowing to use the shortest possible hoses to get to the drilling points of the aspiration manifold.

All the hoses, both the inlet (10x17) ones and the outlet (4 x 10) ones are fitted at one end. The installer must cut them of the correct length and install the missing fitting by the provided click clamp. Be careful that no gum chip remains inside while cutting the hose and that the clamp assures the proper seal.

Please, consider that the hoses must have all the same length and be straight in order not to cause narrow folds which deform the internal section of the hose or may deform it later.

The hose length between STEP HS and the aspiration manifold must not be over 300 – 400 mm.

STEP HS must be placed far away from the exhaust manifold.

Remember the criteria for a good installation of hoses and wires already explained in paragraph 3.2 (GENIUS HS).

STEP HS is available in different versions, with different numbers of outlets to fit engines with various numbers of cylinders (3, 4, 5, 6 etc.).

3.4. MANIFOLD VACUUM SENSOR (MAP)

It must be installed not too far from the manifold, the connection hose must not be longer than 400 – 700 mm.

Remember that in general the sensor must perceive the average vacuum rather than the pulses generated near the aspiration valves.

The manifold vacuum sensor is fixed to the very bodywork or to fixed walls inside the engine compartment (pic. 24).

Avoid places subject to high radiation. About hoses and electrical wires, refer to the recommendations above mentioned.

3.5. HOSES

The hoses (pic. 25) of the Just Heavy system are the same used by Flying Injection. They are made by BRC and equipped with easy connecting fittings. Do not use different hoses and fit them up using high quality and good condition spanners, in order not to damage the hexagons.

Any time you need to remove a fitting, use two spanners to keep tight the part not to unscrew. The fittings are tight on conical-spherical surfaces. Avoid excessive torque wrenches in order not to damage the fittings.

No sealing products are needed.

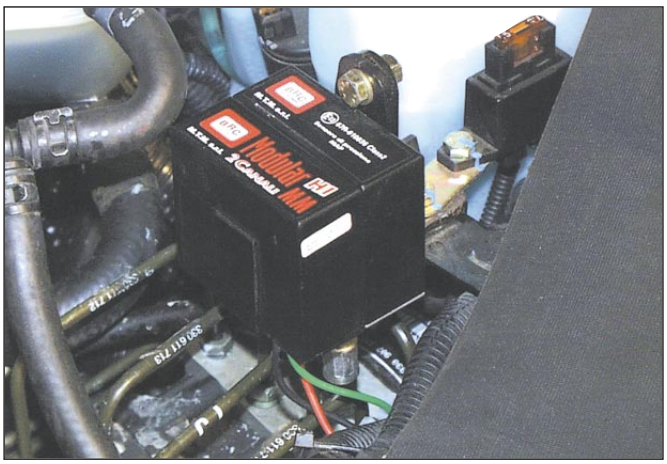
3.6. NOZZLES

The installation of the nozzles is one of the most important features of the work.

Clearly spot all the points of the manifold to pierce, before drilling commences.

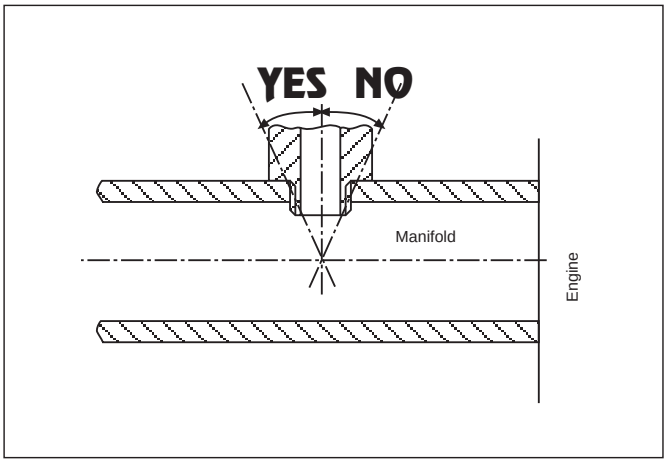
Use the specific tools included in the tool case 90AV99004028.

Follow precisely the instructions relative to the car model. In any case, drill near the engine head, ensuring the same distance on every branch of the manifold and the same orientation of the nozzles. Each nozzle must be perpendicular to the axis of the aspiration duct or, at least, it must make an angle to direct the flow towards the engine, not towards the throttle body (pic. 26A and 26B).

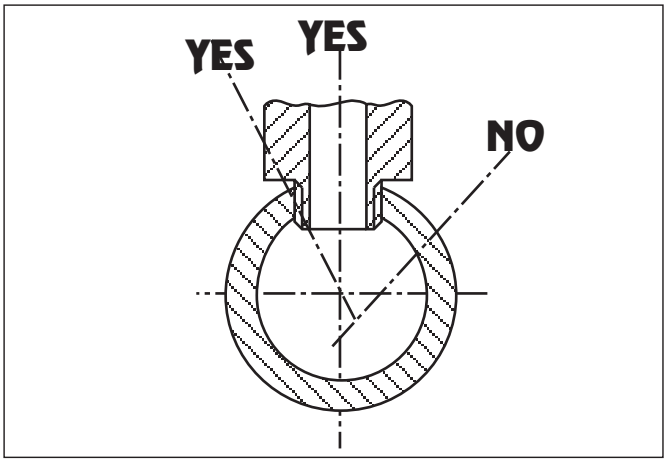


Pic. 24
Fitting up of the vacuum sensor (MAP)

Pic. 25
ø 10 hoses



Pic. 26A
Manifold tilting and piercing



Pic. 26B
Hole orientation on manifolds

On plastic manifolds, find the thickest place on the wall.

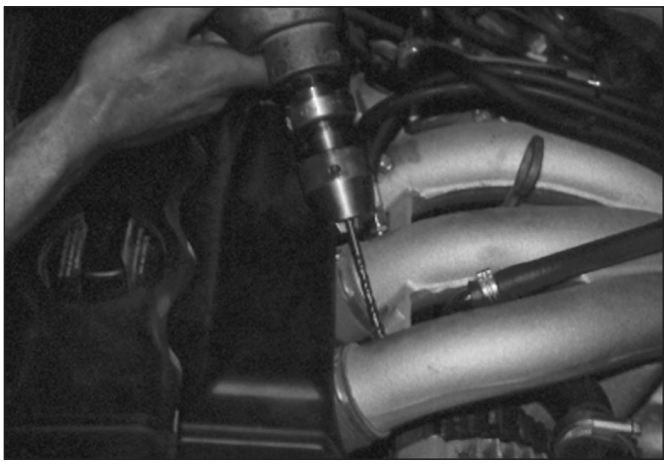
Mark the drilling points with a felt pen and, before drilling, check with a twist drill that there is no obstruction to hamper a correct drilling of all the branches in the desired directions. Chase the surface and drill it (pic. 27).

Use a 5 mm well sharpened twist drill, then thread M6 (pic. 29).

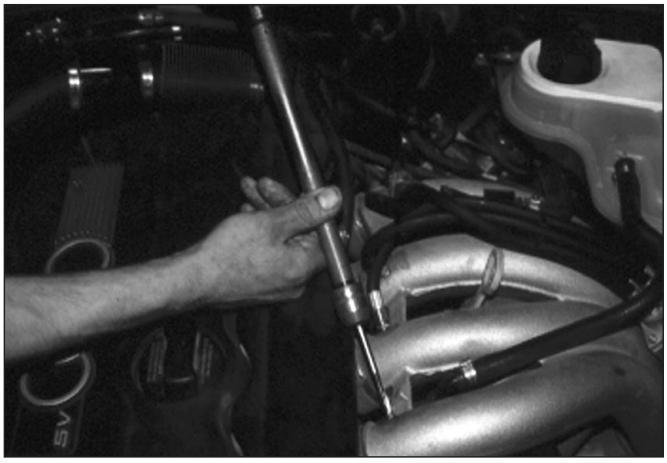
While drilling and threading be careful to avoid swarfs going into the manifold. Remove often the swarfs while drilling and grease the drill during the last phase of the wall breaking, so that the swarfs stick to the drill. Be careful in breaking the last part of the wall, when the swarfs are very thin and stick to the drill. Also during the M6 threading, grease the tap thread and clean it frequently.

Screw the nozzles using the lock sealer included in the tool case 90AV99004028 (pic. 29 and 30). Assure correct fitting and avoid excessive tightening in order not to damage the nozzles. Screw the piping directly to the STEP HS meter-distributor. While tightening them always use two spanners to keep tight the part screwed on the manifold (pic.31). Do not modify for any reason the internal diameter of the nozzles, nor their external shape.

NOTE: with small diameter aspiration manifolds you may need special nozzles, shorter than the standard ones. In this case, contact BRC after sales assistance.

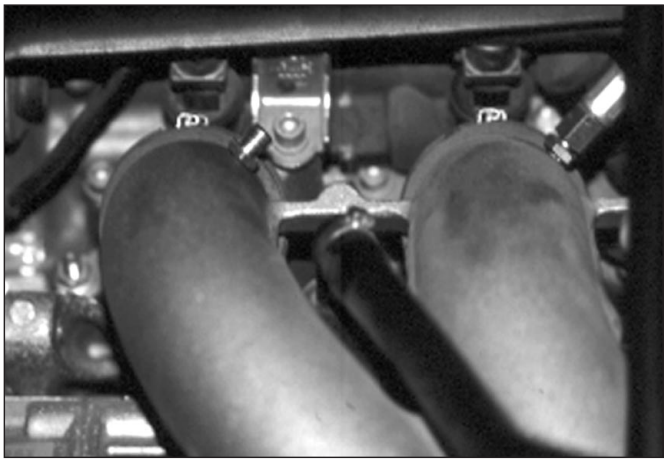


Pic. 27
Manifold piercing



Pic. 28
Manifold threading

Pic. 29
Locking thread



Pic. 30
Nozzle screwed on manifold

3.7. ECU

The Just Heavy ECU is proposed with a case (though already used and tested with BRC Blitz and Just ECU's) con-

sisting of a plastic body and a robust, small and watertight aluminium front and it can be installed directly inside the engine compartment (pic. 32).

The automotive type 24-way double connector assures a perfect tightness and a handy coupling system.

For a correct installation it is anyway necessary to carefully follow the directions below:

- do not fix the ECU in sight of the exhaust manifold: the radiative heat propagating could damage it even at a considerable distance; it is therefore sufficient to have some walls between the exhaust manifold and the ECU to avoid a direct radiation;

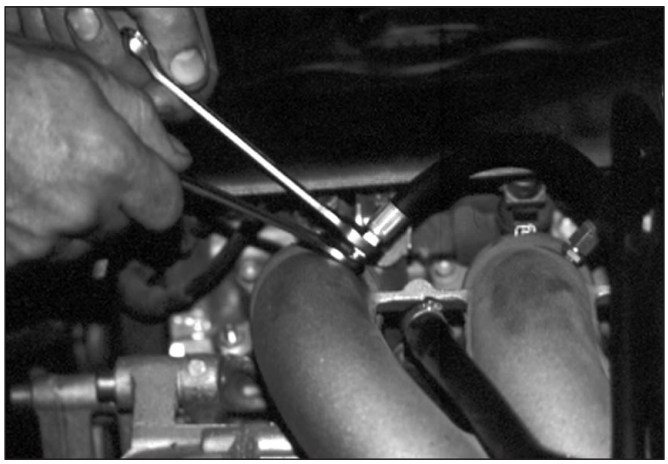
- it is anyway necessary to install the ECU in a place of the engine compartment the most protected way from water; in particular, it is necessary to fix it so as the harness has its sheaths turned downwards and prevent humidity from filtering inside the connector by dripping on the sheaths (pic. 33);

- do not install the ECU near the spark plug cables or the coil high voltage cable.

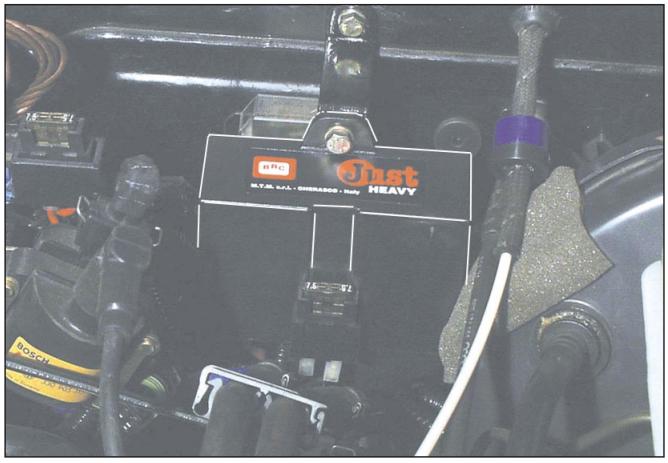
The solution to fix the ECU, wherever possible, inside the driver compartment is anyway always possible. Only avoid non airy places, e.g. among felts, carpets, etc.

Use the special body tongue for fixing and prevent other systems from deforming the case; finally check there are no vibrations.

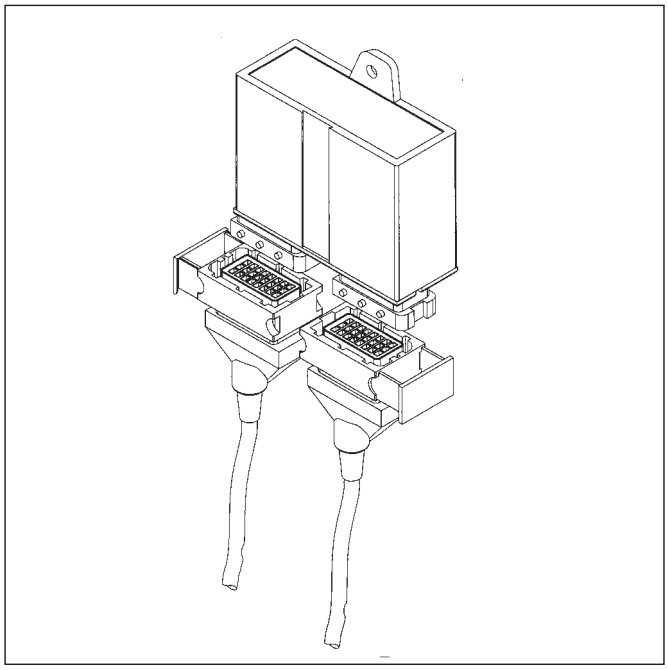
No adjustment is needed on the ECU, therefore it is not necessary to install it an easily accessible place. It is however important that the cable coming from the ECU and goes to the PC is located in an accessible area protected from possible water seepage.



Pic. 31
Nozzle – fitting clamping



Pic. 32
Fitting up of ECU in the engine compartment



Pic. 33
Correct position of Just Heavy ECU

3.8. CHANGEOVER SWITCH WITH LEVEL INDICATOR

Choose a well accessible and visible position to the driver and fix the device using the screws

supplied. You can install it either horizontally or vertically by replacing the sticker. The changeover switch can be also boxed in the car dashboard (use the piercing tool 90AV99000043).

Dedicated changeover switches are available, to be boxed into the dashboards instead of the original switch covering plates. See the list of the available models in the BRC price list.

3.9. GAS LEVEL GAUGE

Follow the instructions enclosed to the chosen transducer. See chapter 5 for its adjustment and the level indication parameter input.

3.10. INJECTOR EMULATOR

Follow the usual installation instructions.

3.11. EXTERNAL EOBD LAMBDA EMULATOR (IF NEEDED)

If an external EOBD lambda oxygen sensor emulator is necessary, refer to their list or contact the BRC after sales assistance to adopt the most suitable type.

Then follow carefully its installation instructions.

3.12. ELECTRICAL HARNESS

The Just Heavy harness (pic. 17 and 18) is specially devised to allow the correct transmission of all input and output signals of the ECU. From a mechanical point of view, we recommend a careful installation, avoiding to force on the connections (never pull on the wires to let a connector pass through a hole or to disconnect it!).

Keep wires as straight as possible and avoid frictions with moving parts, etc. When the engine is under stress wires must be flexible. Clip the electrical wires near the connectors to avoid excessive movement and disconnection. Avoid contact with sharp edges (burr the edges of the holes and install grammets).Avoid placing the wires of the Just Heavy system near the spark plug leads or other parts subjected to high voltage. Every connector is polarised for an easier connection.

Important: all non-precabled connection must be soft soldered and adequately insulated. Be careful that the soldering is not ‘cold’ and is permanent. Harness wires not used must be shortened and insulated. Never use the welders connected to the battery of the same car, nor rapid welders.

4. ELECTRICAL CONNECTIONS

As we wrote in chapter 3, the connection of the Just Heavy ECU to the various elements of the system must be carried out by the two 24-pole connector harnesses, the main of which has already been used for the Just system (see appendix ‘f’ for part numbers).

Most wires of the harnesses end on pre-cabled connectors, thus making the connection to the ECU easier.

All the connections of the harness wires unprovided with connectors ought to be carried out through well done and insulated soft soldering. Do not twist the wires, nor use unreliable terminals.

The following instructions have a general validity and are indispensable to understand the system.

The colours used in these harnesses are the same used in the other BRC systems. The wires are moreover divided into several sheaths in order to make the installation as easy as possible.

4.1. 24-POLE MAIN HARNESS

The two types of 24-pole harness (see Appendix ‘F’ for part numbers) have on one end a main 24-way connector which gather all the secondary connectors and the different wires, whose description you will find in the following paragraphs.

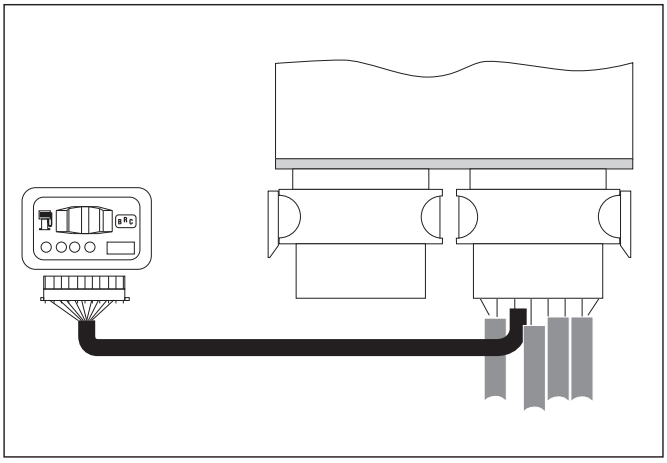
4.1.1. 10-WAY CONNECTOR FOR THE CHANGEOVER SWITCH

The 9-pole multipolar cable inside the harness, ended on a 10-way connector, is used for the changeover switch connection (pic.34). It connects the ECU to the changeover switch placed in the driver compartment; in order to make its passage through the wall openings easier, bend the connector of 90° on one side to make it parallel with the wires.

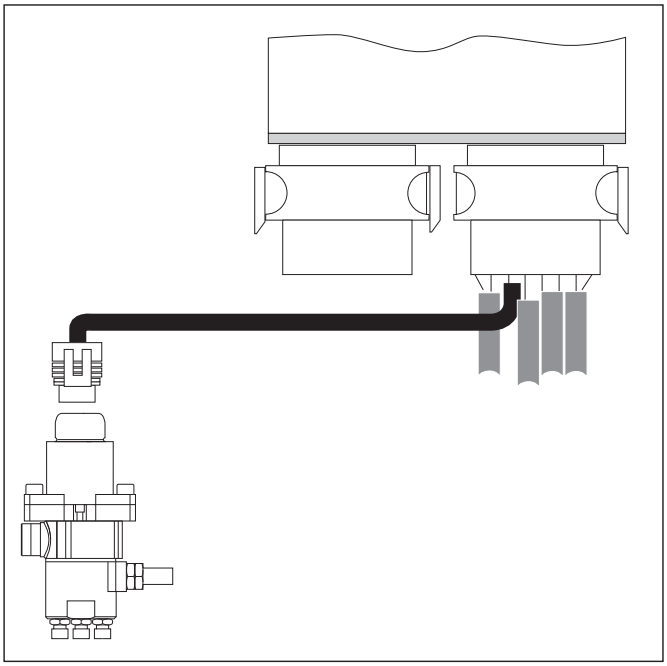
The boxed changeover switch is the same used in the other BRC systems (see Appendix ‘C’ for part numbers).

4.1.2. 4-WAY CONNECTOR FOR THE STEP HS CONTROL ACTUATOR

The 4-pole multipolar cable ended on the 4-way connector (pic.35) connects the ECU to the step by step engine which is aimed at controlling the gas flow (par. 2.4).



Pic. 34
Changeover switch connection



Pic. 35
STEP HS meter-distributor connection

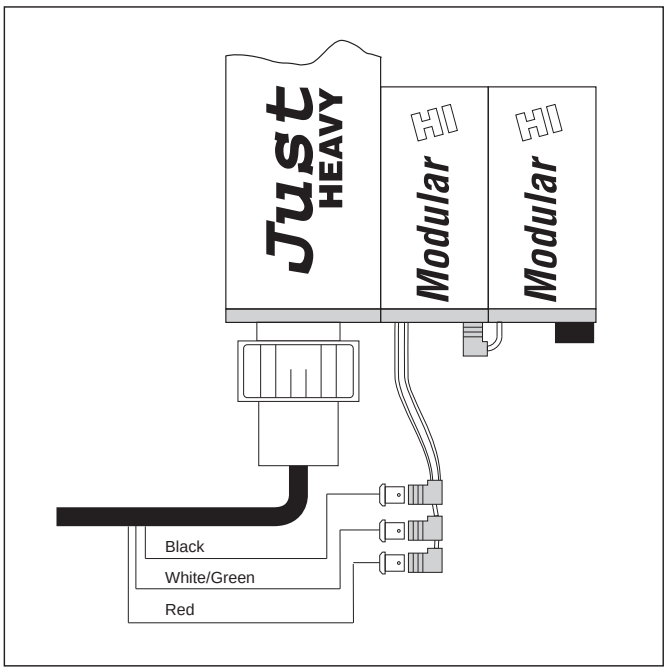
4.1.3. STARTEND CONNECTOR

It is present on all versions of the 24-pole harness of the Just and Just Heavy systems and consists of 3 white/green, black, red wires, ended on a male fast-on with its cover.

These connections ought to be used for linking any device of the Modular family, employed for cutting and/or injector emulation functions (pic.36).

The devices of the Modular family can be fixed through the special “dovetail” on the ECU body.

Do not feed any emulators with the green wire feeding the gas solenoid valves, since that way it shouldn’t be possible to use the fuel overlapping function precisely managed by the Just Heavy ECU through the white/green wire.



Pic. 36
Startend connector and installation of Modular devices

4.1.4. RESET CONNECTOR

It is present on a version of the 24-pole harness (see Appendix ‘C’ for part numbers) and consists of a 4-way fuse-holder box (pic.37) which gathers the following pairs of cables:

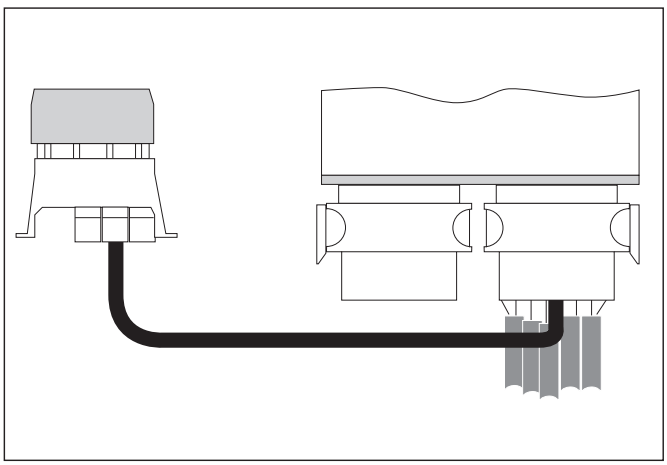
- yellow + light blue
  = (lambda oxygen sensor),
- white + white/orange
  = (memories),
- red + red

The fuse on the red wire ought to be always correctly inserted as it protects the whole equipment.

The fuses for the two other pairs of cables are housed inside the reset connector and ought to be inserted in case of serious failure of the gas equipment.

By inserting the fuses and positioning the changeover switch on the forced petrol position, the car regularly runs on petrol even if the Just Heavy ECU is removed.

The installer ought to give the suitable directions to the car owner on the use of this function.



Pic. 37 – Reset connectorV

4.1.5. "A" SHEATH

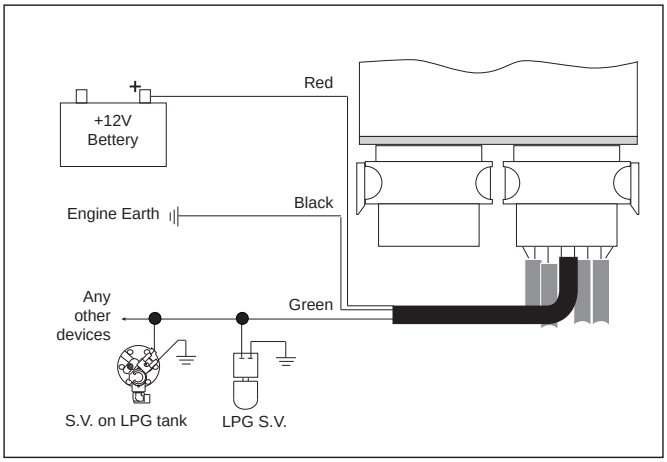
Colour	type (*)	description
Black	in	engine earth
Red	in	battery positive(**)
Green	out	LPG solenoid valve
		safety solenoid valve on LPG tank
		(any) other devices

It is important that the BLACK wire is connected to the engine earth, not to the battery negative or to other bodywork parts. Since from one side of the car earth to another the potential can change by some tenths of volt, by getting the negative in unfavourable points, you risk interpreting the lambda oxygen sensor signal wrongly.

(*) The "type" shows whether the attendant signal is an inlet (in) or an outlet (out).

(**) The RED wire ought to be protected by a 7,5 A fuse, should a harness unprovided with a reset connector be used.

The loads on the GREEN wire are to be connected in parallel one another.

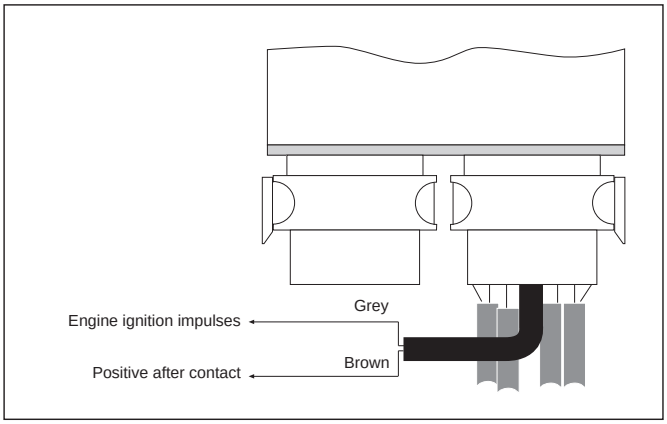


Pic. 38
'A' sheath

4.1.6. "B" SHEATH

Colour	type	description
Brown	in	positive after contact
Grey	in	engine ignition impulses

The connection of the BROWN wire absorbs very little current, so that any positive after contact can be chosen. What is important is to check that it is not a point of the electric equipment subject to strong losses of voltage. For instance, on some cars it is necessary not to use the ignition coil positive or the injectors positive because they are preceded by resistances lowering the potential by some volt.



Pic. 39
'B' sheath

The GREY wire ought to be connected to a frequence impulsive signal proportional to the r.p.m. It can be:

- a square wave signal findable on the injection ECU or on the ignition one, provided that its amplitude is sufficient. The suitable wires could be: the wire going to the revolution counter or the wire connecting the above ECU's with the ignition power module;

- a signal coming from the "ignition coil negative".

When it is possible, we advise to always give preference to the square wave signals and choose the connection to the "ignition coil negative" only as extreme possibility.

Do not twist the grey wire as an antenna on the high voltage cables.

4.1.7. "C" SHEATH

Colour	type	description
Yellow	in	lambda oxygen sensor signal
Light blue	out	emulated lambda signal

The lambda oxygen sensor usually supplies a signal ranging from 0 and 1 V; on some types of cars it is possible to find oxygen sensors with signals ranging between 0,7 and 1,5 V or between 0 and 5 V; the Just Heavy ECU, with the self-learning procedure, is able to adjust itself to all these lambda signal amplitudes as well as to lambda oxygen sensors with absorption or resistive pull-up.

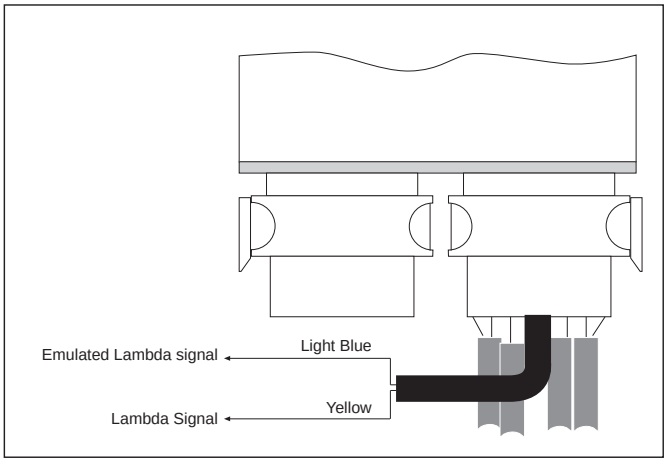
The connection of the YELLOW and LIGHT BLUE wires can be carried out directly on the injection ECU, or on the oxygen sensor connector.

If it is necessary to emulate the lambda oxygen sensor signal, the wiring diagram is the one of pic.40.A If it isn't, refer to pic.40.B.

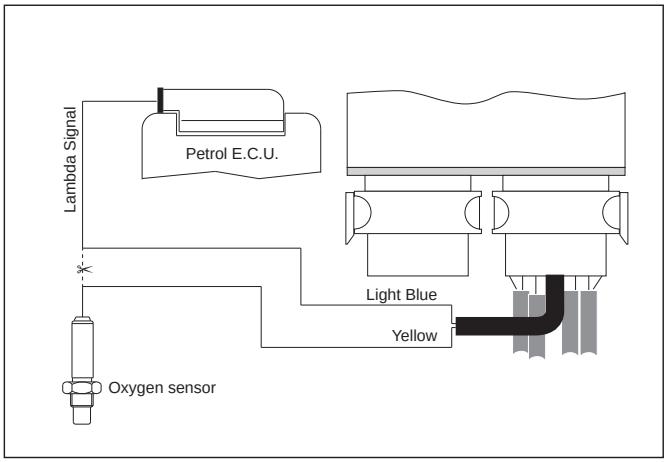
Important: do not short-circuit the oxygen sensor wire either towards the earth or towards the positive.

Do not apply any load.

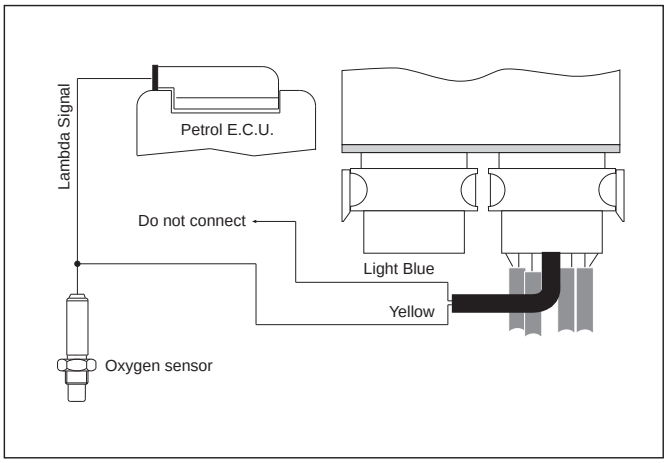
When in doubt, the wire of the lambda oxygen sensor signal can be easily located through the "Jolly" device, part number 06LB00001086.



Pic. 40
'C' sheath



Pic. 40A
Lambda oxygen sensor read with emulation



Pic. 40B
Lambda oxygen sensor read without emulation

4.1.8. "D" SHEATH

Colour	type	description
White	in	ECU memories wire (battery side)
White/Orange	out	ECU memories wire (ECU side)

The WHITE and WHITE/ORANGE wires can have a double function, configurable via software (see chapters 3 and 4):

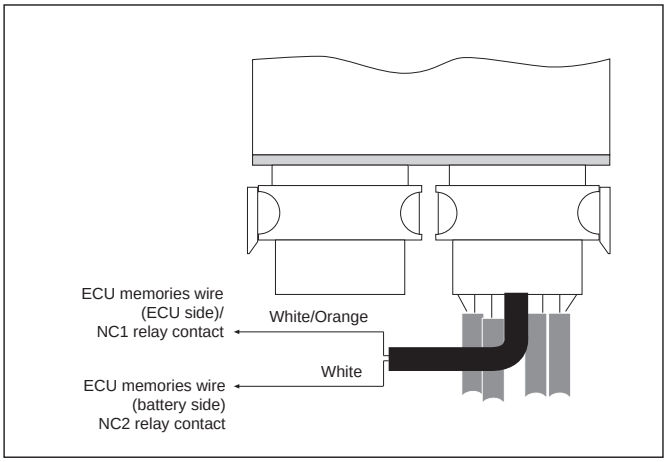
- Resetting function of the petrol injection ECU memory (NP);
- NC relay contact function for (NC1/NC2) signal cutting.

The NP function of the White and White/Orange wires is usually only used on cars where it is necessary to reset the petrol injection ECU memory. Such a memory is normally maintained through a wire connecting directly the injection ECU with the battery (see BRC specific diagrams). This wire is generally recognisable because its voltage is always 12V, with the ignition key off, with the ignition key on and with the engine running (pic. 41 A).

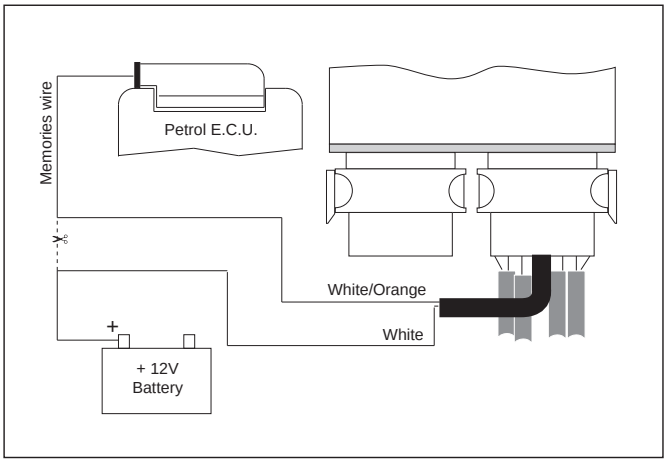
Thanks to these connections, it is possible to interrupt it in time, by also preserving determined functions as the self-cleaning of the hot wire, taking place some seconds after the engine stops.

To use the NC1/NC2 function (corresponding to the signal cutting relay contact), refer to the specific diagrams of each car (pic. 41.B)

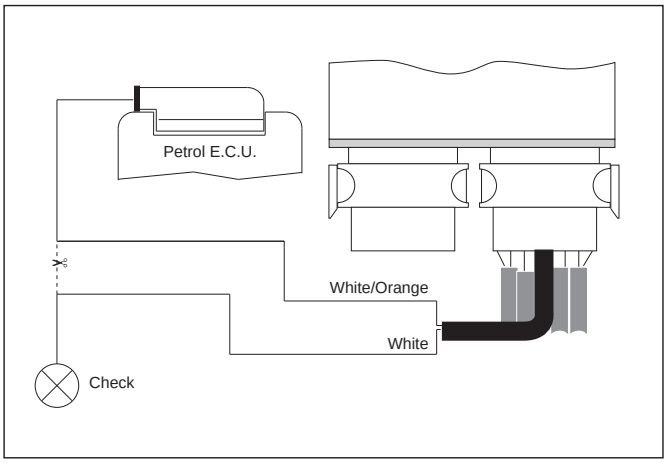
Be careful with the connection polarity: in any case the white/orange wire ought to be always connected to the one coming from the petrol injection ECU side.



Pic. 41
'D' sheath



Pic. 41A
Memory management (NP function)



Pic. 41B
Check relay (NC1/NC2 function)

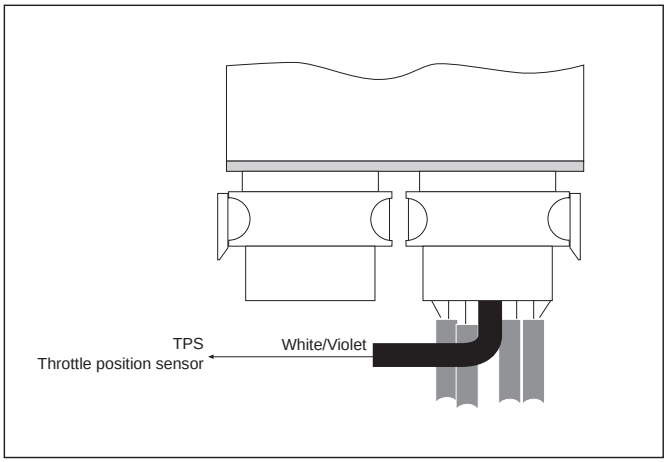
4.1.9. "E" SHEATH

Colour	type	description
White/Violet	in	TPS (potentiometer integral with the throttle body)

The WHITE/VIOLET is to be connected to the potentiometer proportional to the throttle body position (TPS signal).

The TPS signal can be direct (voltage signal increasing while the throttle opening increases), or inverted (voltage signal decreasing while the throttle opening increases). It can also be analogic (continuously varying while the throttle position varies) or of the ON/OFF type (only assuming a minimum and a maximum value).

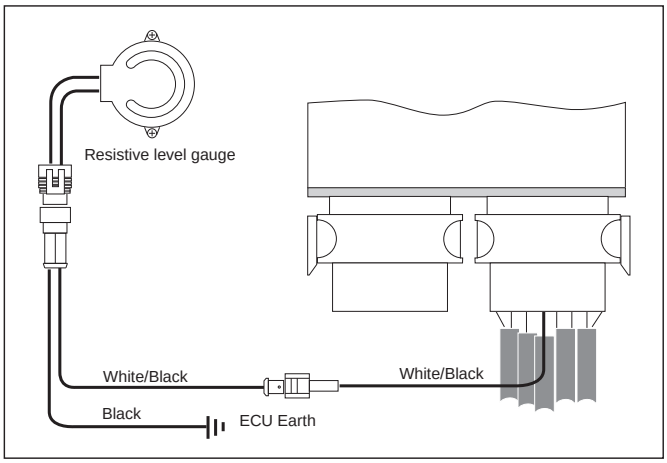
The information on the TPS type must be input at the beginning of the set-up by the interface on PC (see chapter 5).



Pic. 42
'E' sheath

4.1.10. CONNECTION OF THE GAS LEVEL SENSOR

The connecting cable for the sensors of the resistive type belongs to the 24-pole harness and is White/Black, ended with a female faston provided with a faston cover. The connection between the ECU and the sensor can be carried out through the special extension cable (see Appendix 'F' for part numbers) ended on the specific connector of the resistive level gauge for the Europa multivalve (pic.43).



Pic. 43
Gas level gauge connection

4.2. SECONDARY HARNESS

The secondary harness with 24-pole connector contains the additional signals of the Just Heavy system as to the Just one and the PC connection cable, with a Flying Injection-type diagnosis tap.

All the wires on the secondary harness end on pre-cabled connectors.

4.2.1. 4-WAY CONNECTOR FOR THE MANIFOLD VACUUM SENSOR (MAP)

In case of use of a BRC MAP, the pre-cabled 4-way female connector on the secondary harness can be directly plugged into the relative male connector on the sensor (pic.44A).

If you use the vehicle original MAP signal, you must cut the pre-cabled 4-way connector on the secondary harness, insulate separately the red and the green wires and weld the white wire on the original sensor wire (pic.44B).

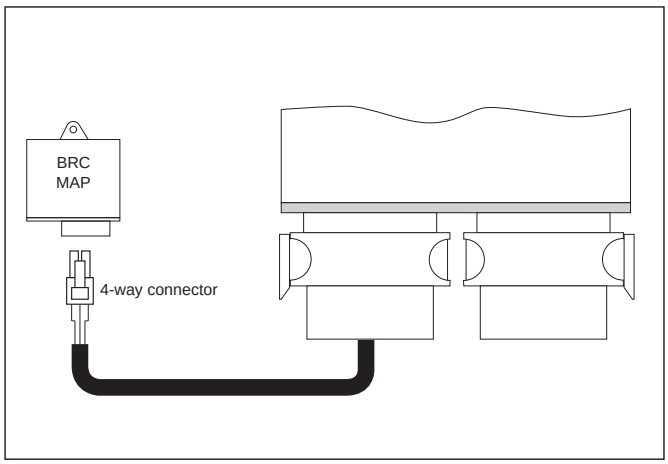
4.2.2. 3-WAY CONNECTOR FOR THE GENIUS HS' TEMPERATURE SENSOR

The 3-way connector on the secondary harness connects the GENIUS HS' temperature sensor. The only usable sensor is the specific BRC Just Heavy one (see Appendix 'F' for part numbers), so the connection is univocal without any possible error (pic.45).

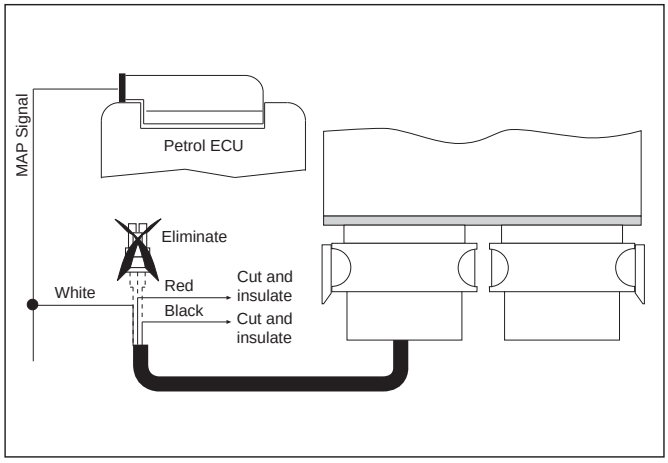
See paragraph 2.3. for a correct working of the sensor.

4.2.3. 6-WAY CONNECTOR TO DIALOGUE WITH THE PC

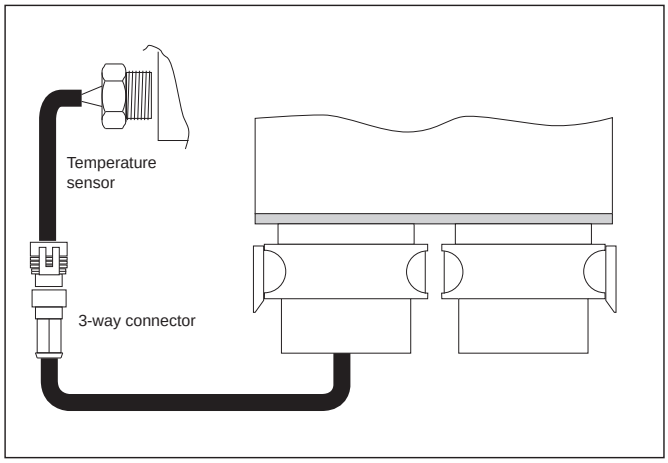
The connection of the PC to the Just Heavy ECU is made on



Pic. 44A
BRC MAP sensor connection



Pic. 44B
Vehicle original MAP sensor connection

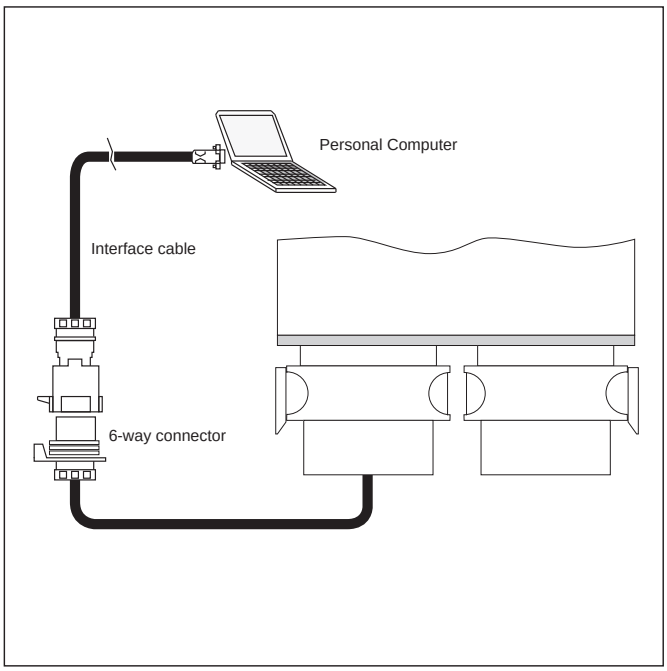


Pic. 45
Temperature sensor connection

a diagnosis tap coming out directly on the secondary harness. It is the same diagnosis tap with a 6-way connector and protection cap used in the Flying Injection system.

For the connection you can use the PC-Fly Gas standard interface cable (pic.46), without using the Just adapter cable.

See Appendix 'F' for part numbers.



Pic. 46
Connection to the PC

5. MANAGING INTERFACE OF THE SYSTEM FROM COMPUTER

5.1. PRELIMINARY CONTROLS

After the installation phase according to chapter 2, in order to start and adjust the car running on gas, it is necessary to configurate and set the system.

The first, indispensable step to avoid serious failures and dangerous situations is a careful control of the installation of the mechanical parts (tank, reducer, STEP HS actuator, connection hoses, etc.) with empty tank. The following step is to introduce 4 or 5 litres of gas (no more) in the tank to check that there is no leakage. Some more gas is necessary to the first acquisition and self-configuration (par. 5.4), whose last phase is performed while the vehicle is running on gas.

5.2. THE PERSONAL COMPUTER (PC)

The PC supplied to the installer is a portable computer with the characteristics explained in the enclosed handbooks. It has two feeding cables for the connection both to the electrical network and to the car lighter intake.

The mouse consists of a pointing system to move the arrow and of two or three keys to "click" on the pointed headings. The mouse buttons may be placed horizontally (left, right) or vertically (upper, lower). The most used button is the left (upper) one.

In Toshiba PC's, the pointing is realised by the coloured pin in the middle of the keyboard (mouse point).

The connection of the PC to the Just Heavy ECU is made on the serial port of the PC by the interface cable already in use for Flying Injection and Just (without the adapter). This cable has a connector for the serial port of the PC and, at the other end, it has a 6-way male connector to fit the female connector of the secondary harness.

5.3. PROGRAMME STARTING

After having installed the programme, to start the application click twice on the icon with the Just Heavy ECU symbol on the PC desktop.

Shouldn't the programme be installed yet, a self-installing software is available: 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).

5.4. FIRST ACQUISITION AND SELF-CONFIGURATION

To use the gas ECU it is necessary to carry out the first acquisition and the self-configuration procedure. Before starting the procedure, take the changeover switch to the petrol position, start the vehicle and warm the engine up well.

With the changeover switch in the petrol position, the GREEN LED's are off and the TWO-COLOURED LED is fixed red (see Appendix A). The vehicle normally runs on petrol.

If the engine has not been warmed up enough, the system controls it and stops the first acquisition procedure, signalling that the temperature is too low.

With the engine warmed up, take the changeover switch to the central position to start the self-configuration procedure, showed by the GREEN LED's blinking in pairs alternatively and by the TWO-COLOURED LED OFF (Appendix A).

The first acquisition and self-configuration procedure is made up of some phases, proposed in sequence by the interface programme, which leads the installer through a simple and quick set up, with an easy and guided path.

The next paragraphs describe thoroughly the various phases of the first acquisition and self-configuration procedure.

NOTE: It is possible to break off the first acquisition and self-configuration procedure at any moment and begin all over again by simply putting the changeover switch in the petrol position and getting back to the central position (if you haven't started the basic map acquisition on road, par. 5.4.7).

WARNING: should a working anomaly occur (TWO-COLOURED LED on, alternating green - yellow – red, Appendix A) at any moment of the first acquisition and self-configuration procedure, after trying to troubleshoot (par. 5.12), it is necessary to turn the vehicle off, disconnect the ignition key and begin all over again.

5.4.1. EEPROM PARAMETER LOADING

With the PC connected to the ECU and the interface programme started up, at the igni-

tion (without starting the car), the programme loads the data from the ECU EEPROM. This operation lasts a few seconds, during which you'll see the screen on page 47.

5.4.2. INPUT CONFIGURATION

If the ECU has never been set-up and the changeover switch is in the central position (GREEN LED's of the changeover switch blinking in pairs alternatively and TWO-COLOUR LED off, as described in par. 5.4), with the car stopped, the first acquisition procedure starts automatically.

5.4.2.1. TPS

The Just heavy ECU can recognise immediately if the TPS signal is right (highest value in tension corresponding to the accelerator fully stepped on) or reversed (highest value in tension corresponding to the accelerator fully released).

It is however necessary to input the following TPS signal configuration parameters:

TPS type

It indicates the type of the TPS sensor (analogic or ON/OFF) on the vehicle. The first acquisition procedure cannot interpret the TPS type on the vehicle, so it is necessary to input it (pic.49A).

The system anyway starts from a default configuration by assuming an analogic type TPS.

Self-adapting TPS

It allows to choose either possibility (pic.49B):

- if you select the self-adapting TPS (YES), the Just Heavy system updates automatically the inlet and outlet thresholds of the idle and cut-off working areas

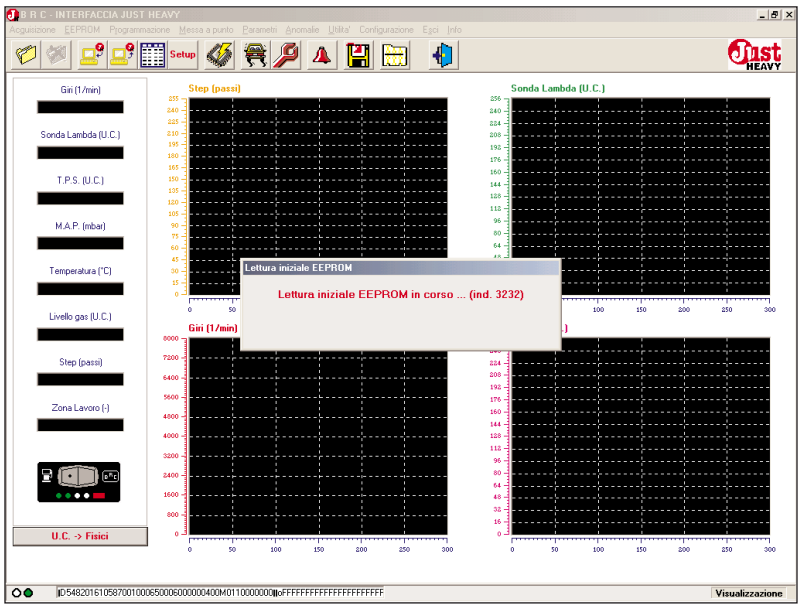


Fig. 47 – Lettura dei dati dall'EEPROM della centralina

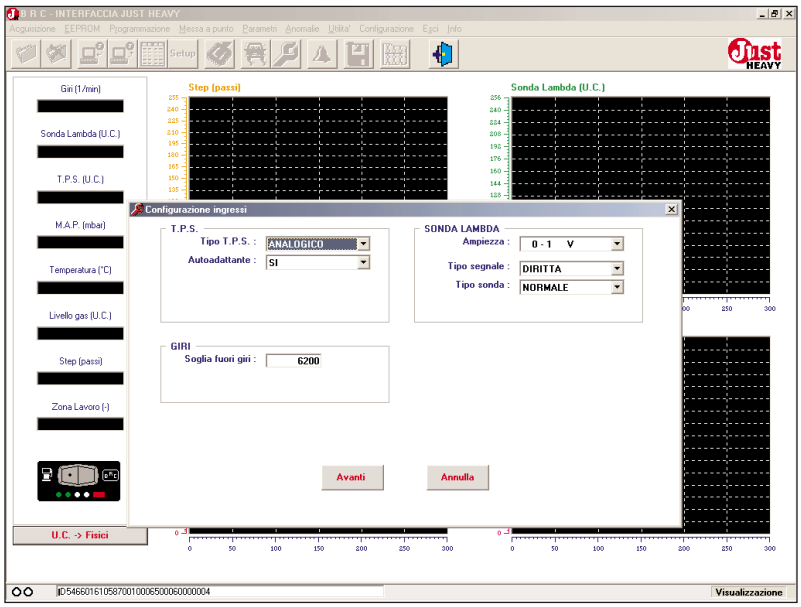


Fig. 48 – Prima acquisizione: configurazioni segnali di ingresso

(if they are configurated on TPS) according to the TPS idle value variation (vehicle ageing, charge level of the battery, etc.)

- if you select the non-self-adapting TPS (NO), the Just Heavy system uses fixed TPS thresholds for the idle and cut-off working areas. These thresholds are reckoned during the first acquisition procedure and can be modified during the setting-up phase (par.5.7).

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

5.4.2.2. R.P.M.

As we wrote in par.1.3.2., if the engine gets to the runaway speed rate while working on gas, the systems automatically changes over to petrol, thus allowing the use of the r.p.m. limitation strategies implemented in the petrol ECU.

Getting back to normal working conditions, the ECU enables again automatically the changeover to gas, as soon as the suitable conditions occur (par. 1.3.1).

The ECU proposes a default value for the runaway speed rate (and back to petrol) threshold. This value affects the vehicle basic map characteristics, so if you believe the default value is not adequate to the vehicle you are installing, you must modify it on this screen (pic.50).

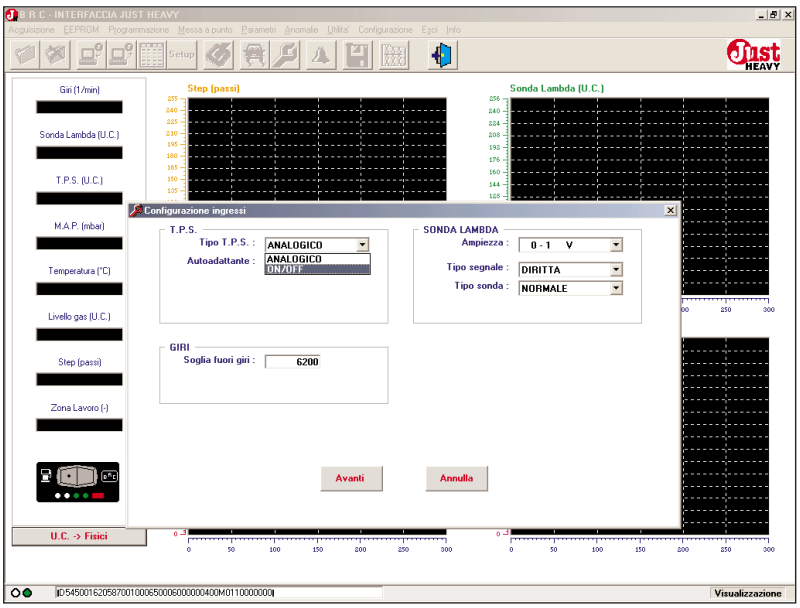


Fig. 49A – Prima acquisizione: scelta tipo TPS

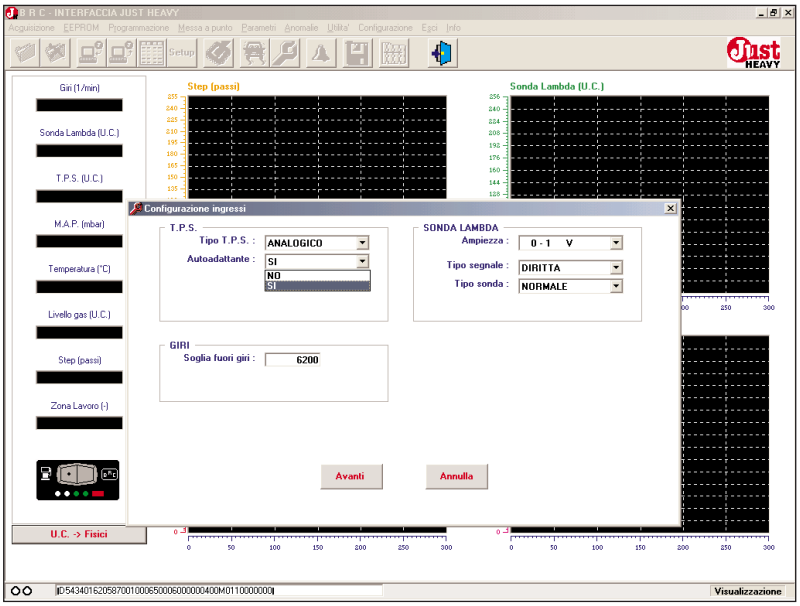


Fig. 49B – Prima acquisizione: scelta TPS autoadattante

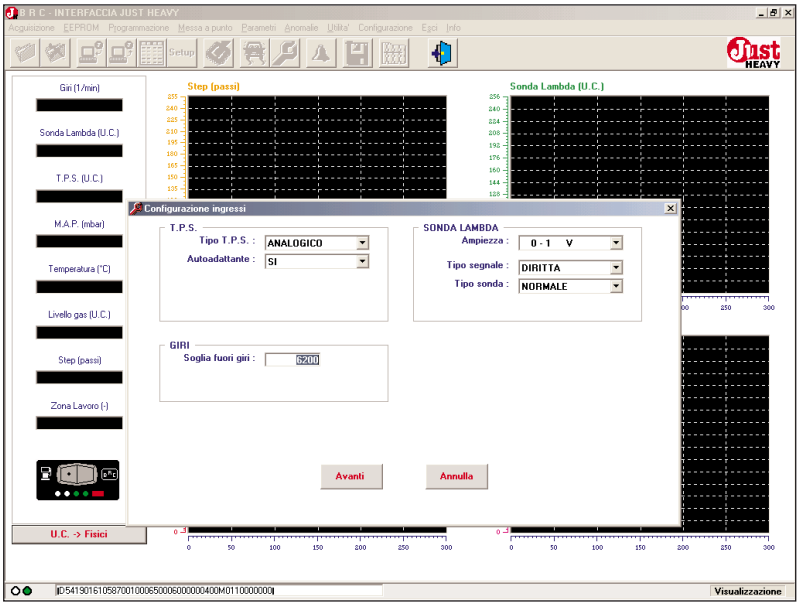


Fig. 50 – Prima acquisizione: impostazione della soglia di fuori giri

5.4.2.3. Lambda oxygen sensor

In the screen section of the input configuration for the lambda oxygen sensor, it is necessary to input the following parameters:

Amplitude

In this field it is necessary to set the amplitude (in Volts) of the vehicle lambda oxygen sensor's signal, choosing among three possibilities (pic.51A):

- 0÷1V
- 0.7÷1.5 V
- 0÷5 V

The ECU proposes as a default value the amplitude 0÷1V.

Signal type

Contrarily to what occurs with the TPS, it is not possible to recognise automatically whether the oxygen sensor is right (highest voltage value corresponding to the maximum richness of the oxygen sensor signal) or reversed (highest value in tension corresponding to the maximum leanness of the oxygen sensor signal).

It is therefore necessary to input this information in this field (pic.51B).

The ECU proposes the right oxygen sensor by default.

Oxygen sensor type

It is also necessary to indicate the electrical nature of the lambda oxygen sensor input, to characterise completely its signal. You can choose either configuration (pic.51C):

- normal (for the oxygen sensors that allow to take directly the input signal for the ECU);
- with absorption (for the oxygen sensors that need a resistive pull-up from the ECU, to give an input signal that the ECU can read).

The ECU proposes as a

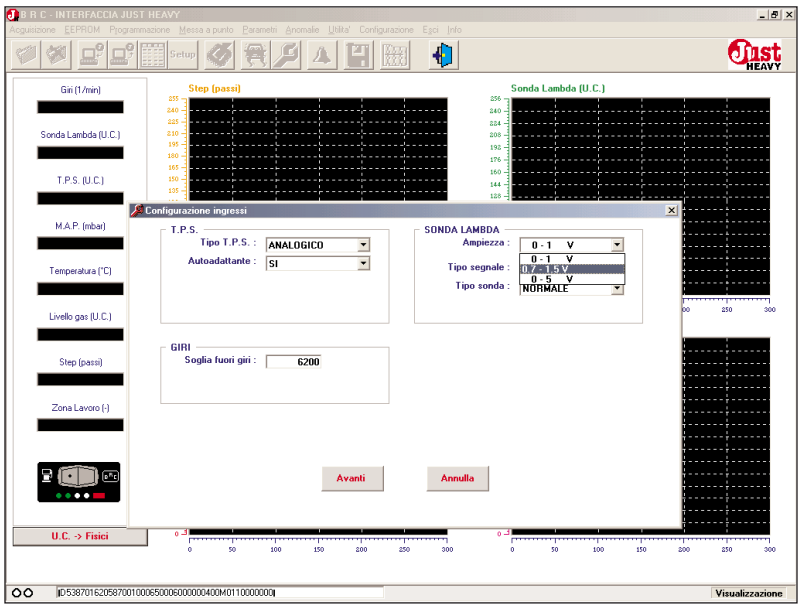


Fig. 51A – Prima acquisizione: scelta amplificazione sonda lambda

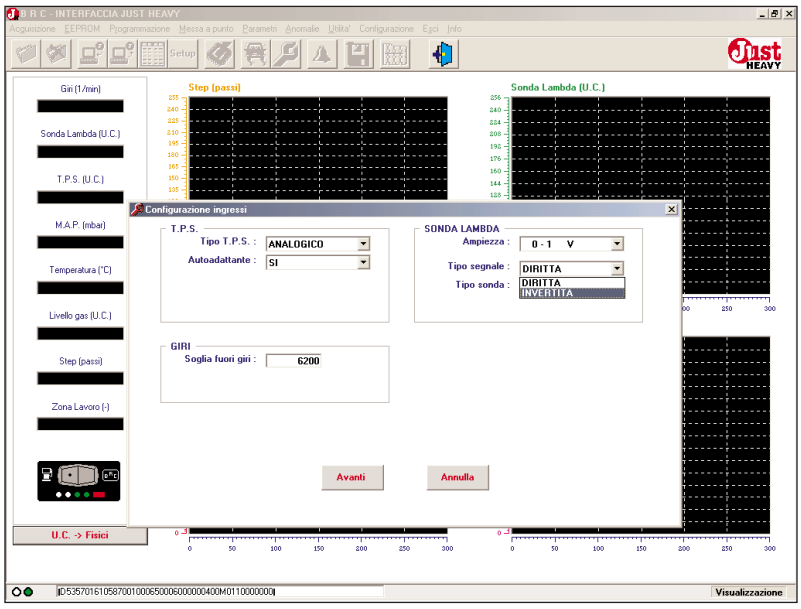


Fig. 51B – Prima acquisizione: scelta tipo di segnale lambda

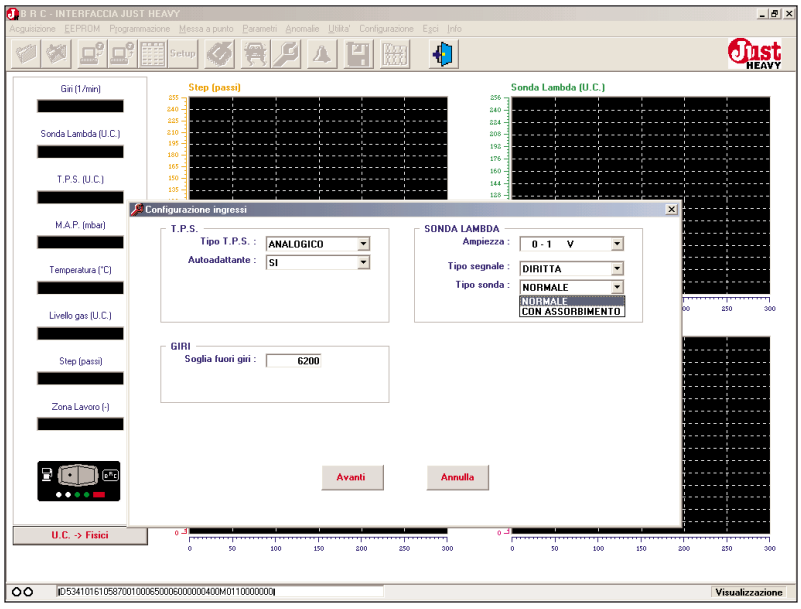


Fig. 51C – Prima acquisizione: scelta tipo di sonda lambda

default value the normal lambda oxygen sensor.

5.4.3. Acquisition of the MAP and r.p.m. signals

After having confirmed (and modified, if necessary) the data of the ECU input signals, the procedure of the first acquisition and self-learning continues with the system input signals.

The first acquired value of the ECU is the maximum MAP. On the PC there is the screen as in pic.52A, where you are reminded to keep the ignition on and the engine stopped. If you stay in these conditions, the graph of the MAP signal is updated (the MAP signal reaches it's maximum value with engine stopped). After 10 seconds, the MAP maximum value is determined and saved and it appears on the numerical fields on the right (pic.52B).

The acquisition of the MAP minimal value must be carried out with the engine started and on idle. Therefore, you will be required to start the engine and keep the accelerator completely released (pic.52C). The vehicle runs on petrol only.

Before acquiring the MAP minimal value, the r.p.m. signal configuration takes place. In a numerical field you will see the revs read by the ECU with the default conversion factor.

Since this factor might not be correct for all ignition systems, another numerical field is showed called "actual revs", where you must confirm the correct reading of the r.p.m. signal by the ECU (pic.52D).

If you note that the r.p.m. signal reading is not correct, input the correct value of the actual revs into the second field and

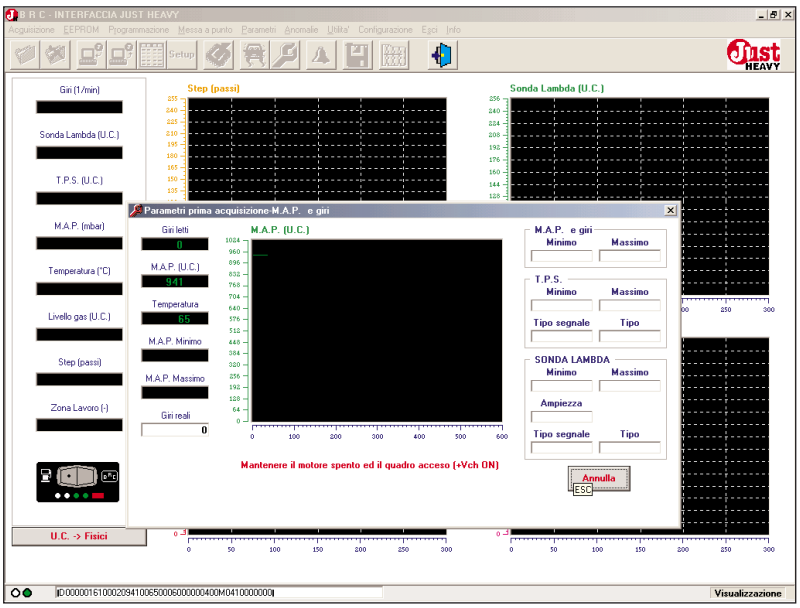


Fig. 52A – Prima acquisizione: acquisizione del MAP massimo

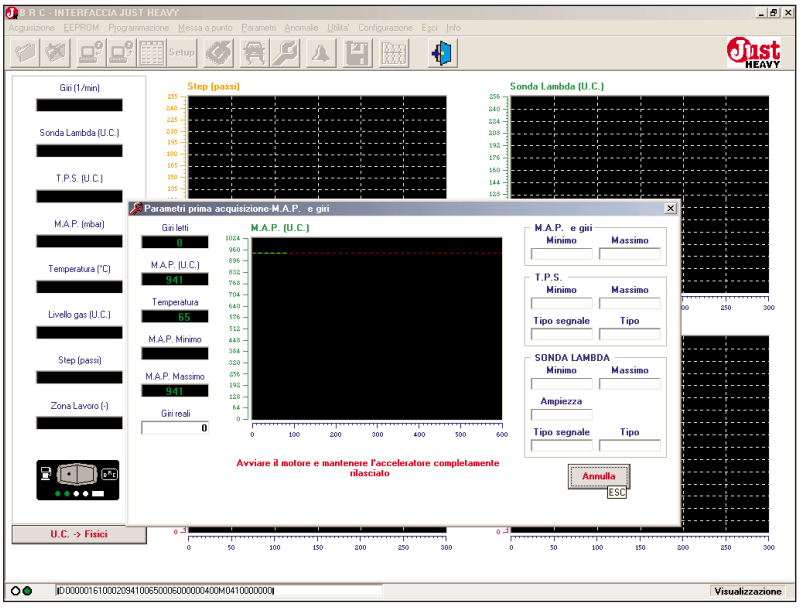


Fig. 52B – Prima acquisizione: memorizzazione del MAP massimo

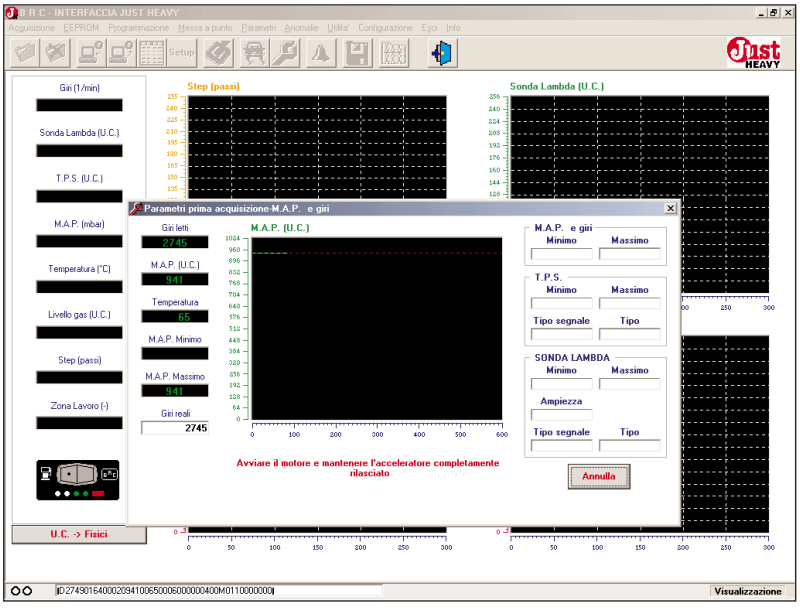


Fig. 52C - Prima acquisizione: accensione del motore per l'acquisizione del MAP minimo

confirm the datum. The ECU will reckon again automatically the new conversion factor and will correct the r.p.m. reading. The comparison between the read revs and the actual revs and the possible correction of the conversion factor are more precise and reliable if the r.p.m. is quite high. We recommend the possible correction of the actual revs at least 3,000 r.p.m.

After having confirmed the actual r.p.m. value and updated the r.p.m. signal conversion factor, the ECU processes the MAP minimal value acquisition. Keep the engine idling, with the accelerator completely released (pic.52E). After 10 seconds, the MAP minimum value is determined and the MAP signal acquisition phase terminates (pic.52F).

5.4.4. Acquisition of the TPS signal

After having acquired the MAP maximum and minimum values, the next step is the acquisition of the TPS minimum and maximum values and the determination of the signal type (right or reversed).

Also with the engine running on petrol, after some waiting, you will be requested to accelerate deeply and uniformly.

In this case, too, the programme will guide the installer. A graph will show the signal flow during the first acquisition phase and the flow of the three accelerations necessary to complete the procedure, as well as the limit validity of the very accelerations and the minimum and maximum values continuously updated to the definitive ones.

As soon as three accelerations are valid, the TPS minimum

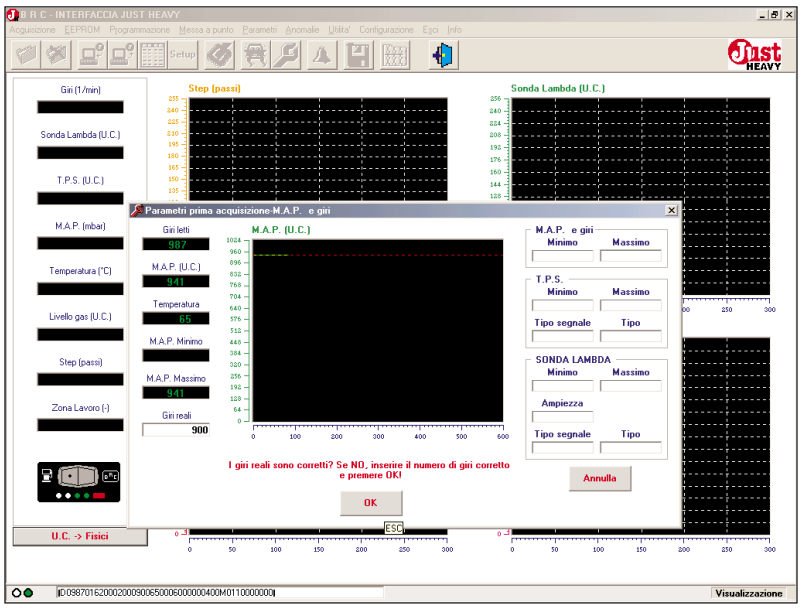


Fig. 52D - Prima acquisizione: richiesta di conferma del corretto fattore di conversione del segnale giri

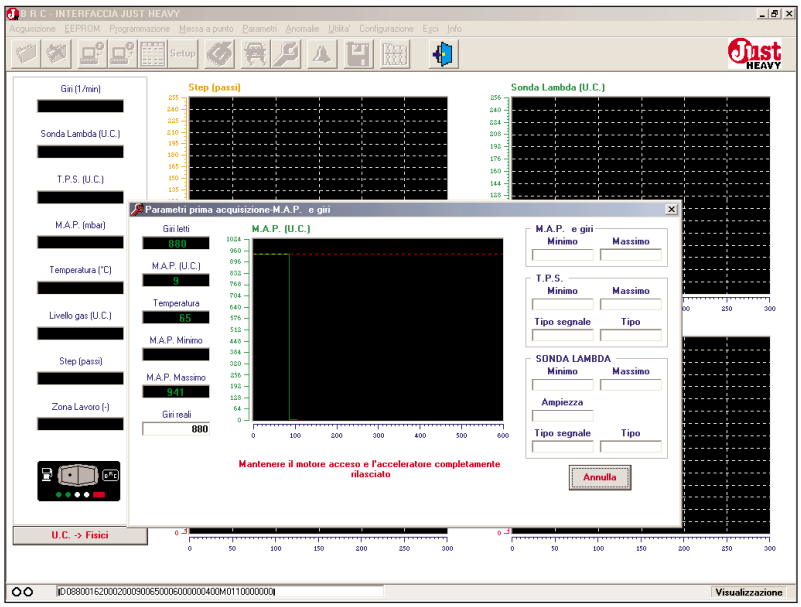


Fig. 52E - Prima acquisizione: aggiornamento fattore conversione segnale giri e acquisizione del MAP minimo

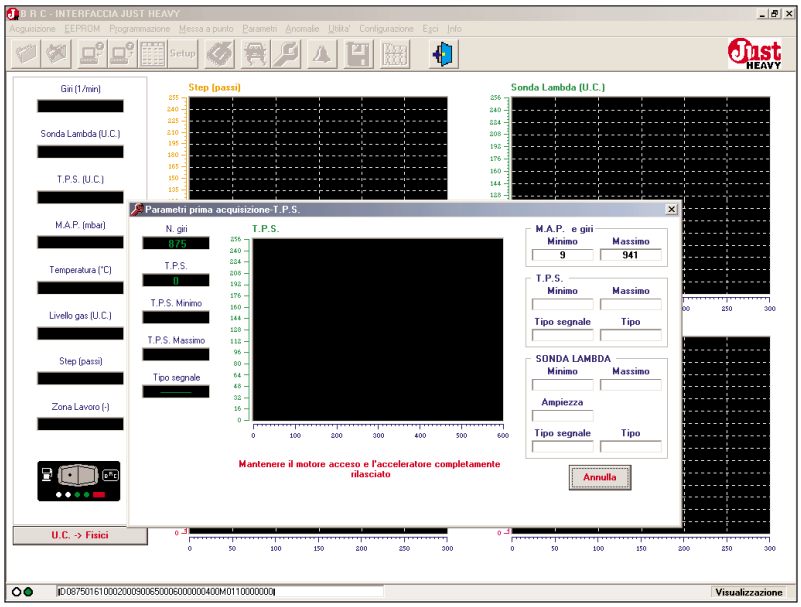


Fig. 52F – Prima acquisizione: memorizzazione del MAP minimo

and maximum values are acquired and displayed (pic.53).

5.4.5. Acquisition and self-configuration of the lambda oxygen sensor signal

After the TPS signal acquisition, the acquisition and the self-configuration phase of the lambda oxygen sensor starts.

During this phase the vehicle only runs on petrol.

In order to enter the acquisition domain of the lambda oxygen sensor, it is necessary to constantly keep the engine at 3000 r.p.m.

If the r.p.m. is kept on a correct value and the lambda oxygen sensor signal ranges between a lean value and a rich one (showed on the specific graphs), after some correct oscillations the ECU reckons and shows the minimal value and the maximum one of the lambda oxygen sensor (pic.54). This way, the input signal acquisition terminates.

5.4.6. Download of the basic map

Once the acquisition and self-learning phase of the input signals has been accomplished, the vehicle is ready for the following acquisition phase on road of the basic map running on gas.

Obviously, this phase must be carried out on gas only, therefore it is necessary to download in the ECU a basic map allowing to keep the engine running on gas and acquire the real map.

The interface software offers a choice among multiple maps (different on the basis of the car displacement), as showed in pic.55. Download it by clicking on “Go” (pic.56).

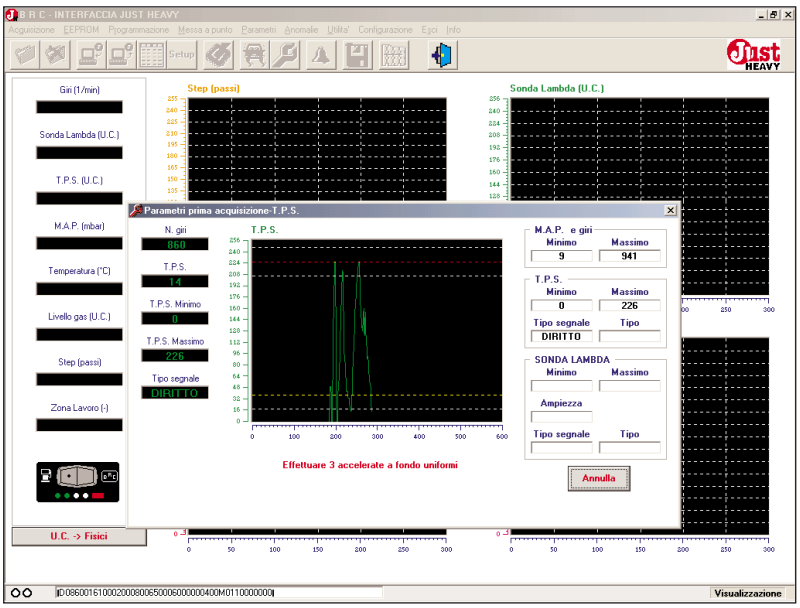


Fig. 53 – Prima acquisizione: acquisizione del TPS minimo e massimo

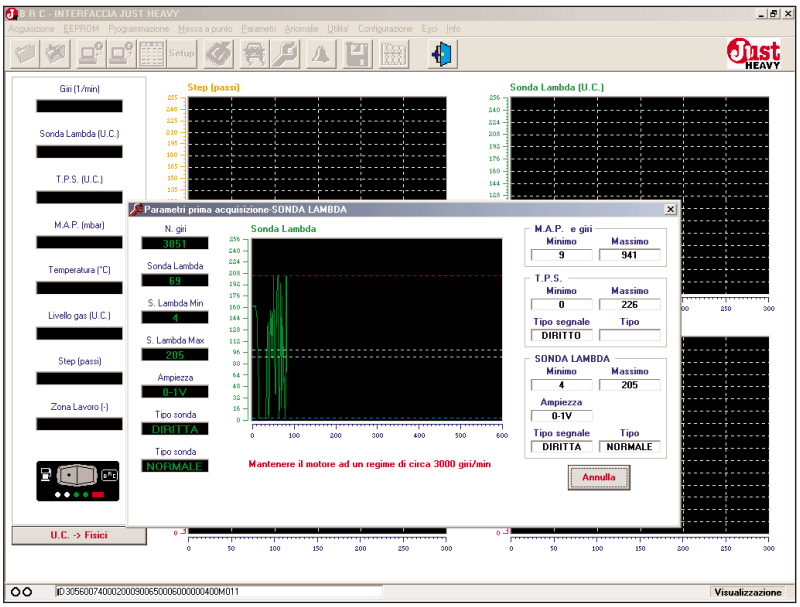


Fig. 54 – Prima acquisizione: acquisizione dei valori minimo e massimo della sonda lambda

5.4.7. ACQUISITION OF THE ACTUAL BASIC MAP ON ROAD

After having downloaded the map, this operation lasts a few seconds, you will see the screen as represented in pic.57. It will guide the installer during the whole phase of the acquisition of the actual map on road.

From now on the vehicle can run either on petrol or on gas: the changeover to gas occurs with the changeover switch button in the central position, over the 3,000 r.p.m. threshold (direct changeover in acceleration, only in this setting-up phase, to avoid that the engine stops). To changeover back to petrol take the changeover switch button to the petrol position.

On the screen depicted on page 57 you will see 7 red circular areas corresponding to 7 r.p.m. signal values. With the vehicle running on gas and on road, take the r.p.m. to the value of each area. When the r.p.m. value is maintained (with a certain threshold tolerance) near the value of one area, this turns yellow and an acoustic signal informs the installer that the driving conditions are suitable to acquire the basic map.

Keep the engine in these conditions until a second acoustic signal confirms the acquisition of the map value. The area corresponding to this acquisition turns green and the STEP HS acquired position in showed inside it.

The acquisition of the vehicle basic working map must be completed, always on road, by repeating this procedure for all the areas. A further acoustic signal informs that the acquisition has been completed.

It doesn't matter in which order you acquire the values, you can choose the r.p.m. to get

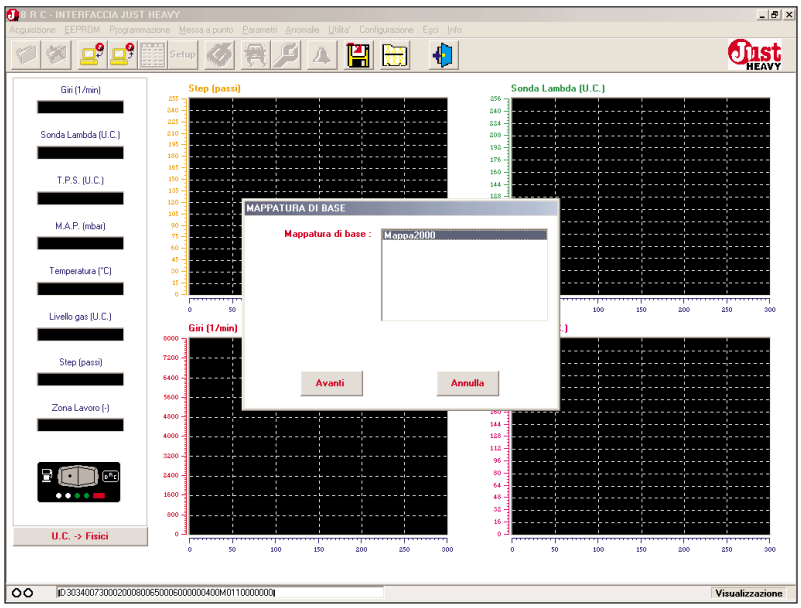


Fig. 55 – Prima acquisizione: scelta della mappa base per l'acquisizione su strada

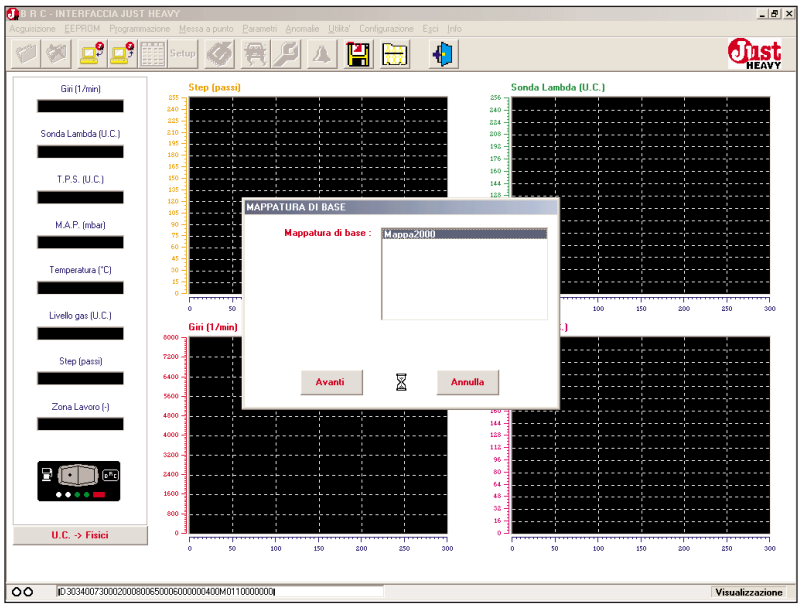


Fig. 56 – Prima acquisizione: scaricamento della mappa base per l'acquisizione su strada

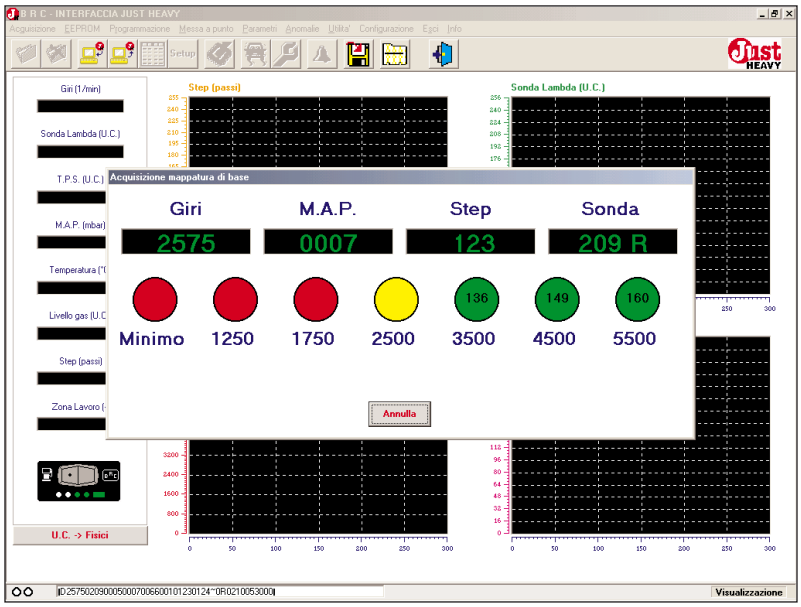


Fig. 57 – Prima acquisizione: acquisizione della mappa base su strada

according to the route your are running on, for example. It is however better to start with high r.p.m. and move progressively to the lower ones, in order to avoid engine stops.

The most difficult value to acquire is usually that corresponding to the idle and we suggest that you get it in idling, but not in neutral conditions, to avoid unexpected stops of the engine.

An important function is the possibility of changing over to petrol during the acquisition without losing the acquired values and getting back to gas whenever you wish to. This way you can easily acquire the whole map only on the most suitable routes.

During the basic map acquisition phase, avoid to force the engine in certain performances such as pickups, sudden accelerations or decelerations, etc, that the vehicle cannot give, since the downloaded basic map has the only aim to keep the engine on and allow the acquisition of the actual map running on road.

Should the runaway speed threshold proposed by the interface on the input signal configuration screen be lowered (pic.50), the number of the areas to acquire for the actual basic map on road might be less than 7. The programme proposes only those areas whose r.p.m. value is inferior to the runaway speed threshold.

5.4.8. CONFIGURATION OF THE CHANGEOVER PARAMETERS

After the acquisition of the actual basic map on road, the system gets back automatically to petrol and the interface programme proposes, in succession, three screens dedicated respectively to the changeover parameters, the gas level management and the lambda emulation.

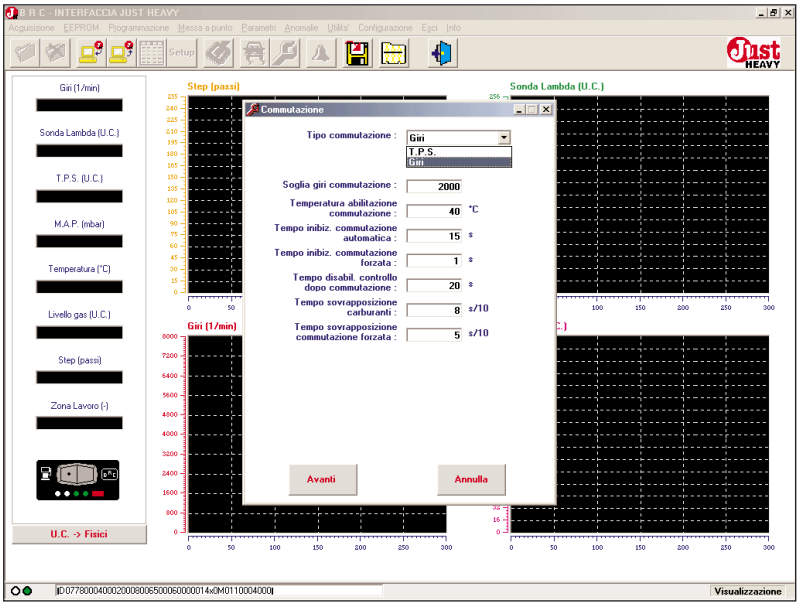


Fig. 58 – Prima acquisizione: parametri di commutazione

The screen on the changeover is depicted in pic.58 and contains all the parameters relative to the shift petrol>gas and back.

Changeover type

The Just Heavy system allows the choice between two types of changeover:

- with the option “revs”, the changeover takes place with a heavy deceleration in a short time, beyond a certain r.p.m. (field: “changeover r.p.m. threshold), and all the conditions required by the other parameters of the screen have occurred

- with the option “TPS”, the changeover takes place when the TPS signal gets lower than a fixed threshold (field: TPS threshold), beyond a certain r.p.m. (field: “changeover r.p.m. threshold), and all the conditions required by the other parameters of the screen have occurred.

The ECU proposes the revs changeover by default.

TPS threshold

- This parameter is in the field “Changeover type” only if you selected the option “TPS”. It is the TPS value below which the changing over to gas is activated (to change over it is also necessary that the r.p.m. value is above the r.p.m. threshold and that all the conditions required by the other parameters of the screen have occurred.

The ECU reckons automatically a suitable default value, which you can however modify.

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 all the conditions required by the other parameters of the screen have occurred).

The ECU proposes a suitable default value (2,000 r.p.m.), which is rarely better to modify.

Changeover actuation temperature

The changeover to gas is activated only if the temperature read by the sensor on the reducer is over the temperature indi-

cated in this field.

The ECU proposes a suitable default value, which is better not to modify, unless for valid needs.

Changeover inhibiting time

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

This inhibition time allows to avoid any undesired changeover during the engine ignition phase (undesired flicker of the r.p.m. signal and of other signals used by the system). It also avoids changeover with a cold oxygen sensor, that might cause malfunctions of the system.

The ECU proposes a default value, which is better not to decrease (at most it can be increased).

If the ECU recognises a good working of the oxygen sensor during this waiting time, it can activate automatically the changeover before the set time expires.

Forced changeover inhibiting time

It shows for how much time, starting from the car ignition, the passage to gas is not allowed, with the changeover switch button on the gas position (gas forced start).

This parameter has the same function of the previous one and also in this case the ECU proposes a default value, which is better not to modify.

Reset time after changing over

It allows to set the time interval, after changing over to gas, when the gas flow control does not follow the indications of the lambda oxygen sensor but is based on the gas working map only.

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 or immediately after the ignition.

The ECU proposes a default value, which is better not to decrease (at most it can be increased).

If the ECU recognises a good working of the oxygen sensor during this waiting time, it can activate automatically the changeover on the oxygen sensor before the set time expires.

Fuel overlapping time

It is the time interval, after the automatic changeover to gas, when both petrol and gas feeding remain active at the same time, to improve the phase of the passage from petrol to gas.

Fuel overlapping time – forced changeover

It is the time interval, after changing over with the switch button on the gas position, when both petrol and gas feeding remain active at the same time, to improve the phase of the passage from petrol to gas.

5.4.9. Configuration of the tank level management parameters

Pic.59 depicts the screen related to the tank level management and contains all the parameters pertaining to the management of the gas level gauging on the GREEN LED's of the built-in changeover switch.

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 for a more precise indication.

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 for a more precise indication.

Extra-full level

It is the value determining the threshold above which the four blinking GREEN LED's light up top show the tank filling condition

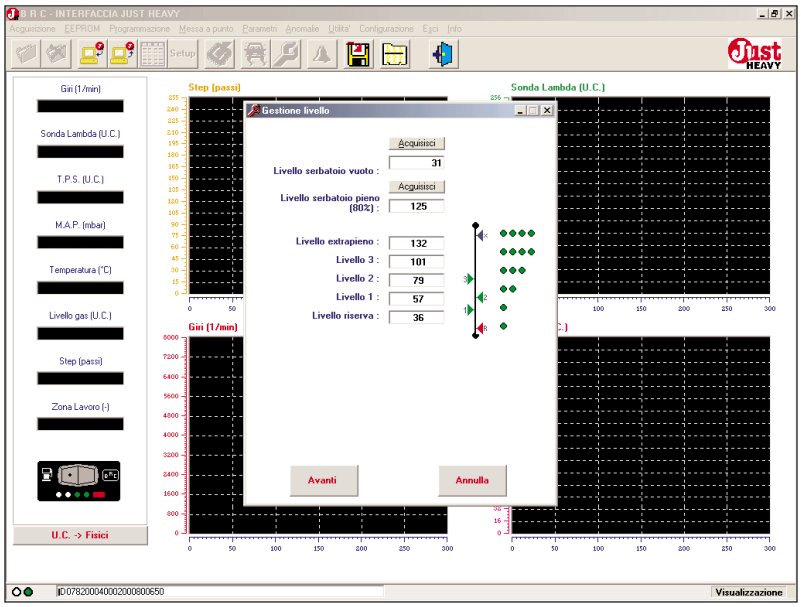


Fig. 59 – Prima acquisizione: parametri di gestione del livello

exceeding the 80% (extra-full).

Level 3

It is the value determining the threshold above which the four fixed GREEN LED's light up.

Level 2

It is the value determining the threshold above which the first three fixed GREEN LED's light up.

Level 1

It is the value determining the threshold above which the first two fixed GREEN LED's light up.

Low fuel level

It is the value determining the threshold above which the first GREEN LED light 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 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 "save" key, the five values the level visualisation is based on are automatically reckoned again.

On the contrary, by clicking on "acquisition", the present level value read by the ECU is replaced by the value reported in the field below the key "acquisition" (empty or full tank level) and the values of the five fields –which the level visualisation is based on - are reckoned and stored again.

On the other hand, 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.

5.4.10. Configuration of the lambda emulation parameters

Pic.60 depicts the screen related to the "Lambda emulation" menu and contains all the parameters pertaining to the lambda oxygen sensor signal cutting and possible 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 those of the "no-problem" (NP) device for setting to zero the petrol injection ECU memory, or of relay contact to signal cutting (NC1/NC2).

Warning: the setting of the NP-NC1/NC2 relay ought to correspond to the configuration adopted in the ECU harness connection (par.4.1).

Emulated lambda signal duty cycle

The Just Heavy, as explained in 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 this parameter is 46%.

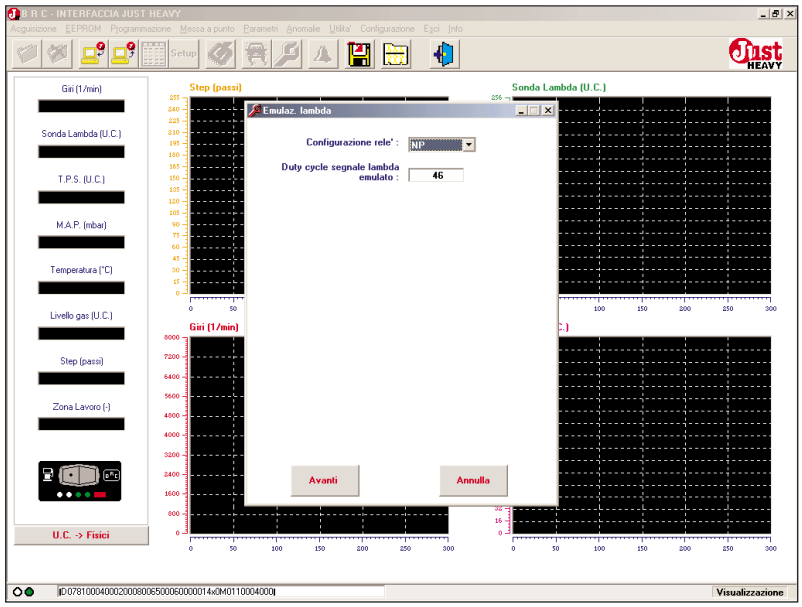


Fig. 60 – Prima acquisizione: parametri di emulazione lambda

5.4.11. DOWNLOAD OF THE FIRST ACQUISITION PARAMETERS

After the confirmation of the lambda emulation parameter setting, the first acquisition procedure is accomplished and you can download the acquired data, reckoned and saved in the ECU EEPROM memory.

The screen on page 61 proposes to proceed with the download of the first acquisition parameters. By clicking on the key “Programme”, the data writing starts and you will see the download stand by message as showed in pic.62.

Once the programming terminates correctly (pic.63), click on “Quit” to end the first acquisition and self-learning phase. The EEPROM parameter reading starts again (pic.47) and the vehicle is ready to run on gas on road.

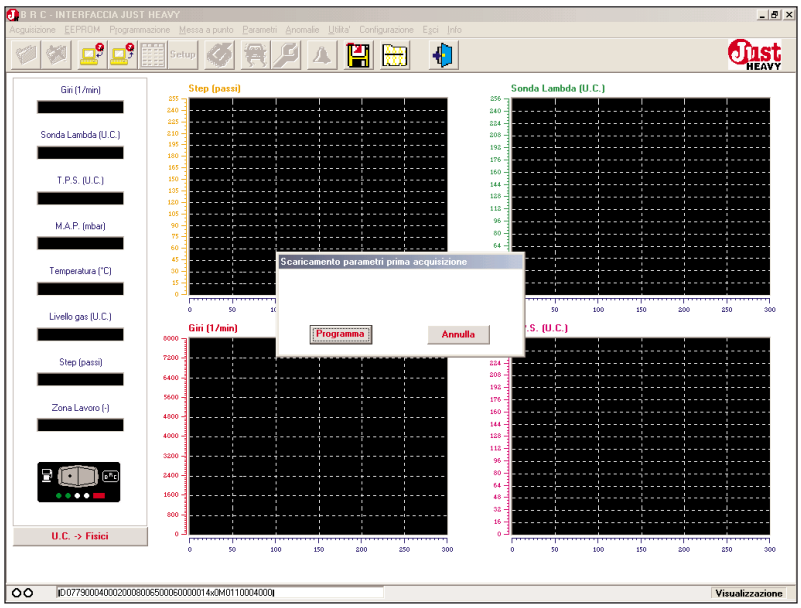


Fig. 61A – Prima acquisizione: avvio scaricamento parametri prima acquisizione

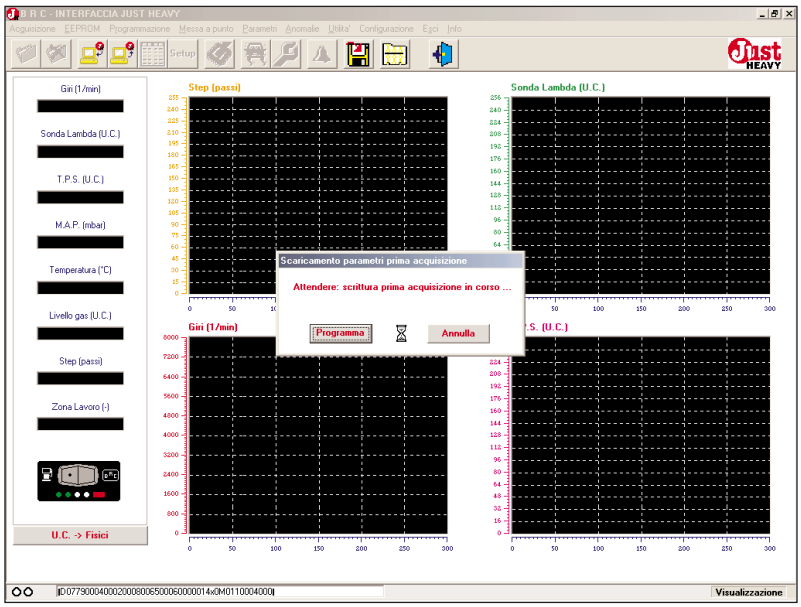


Fig. 61B – Prima acquisizione: scaricamento in corso parametri definitivi

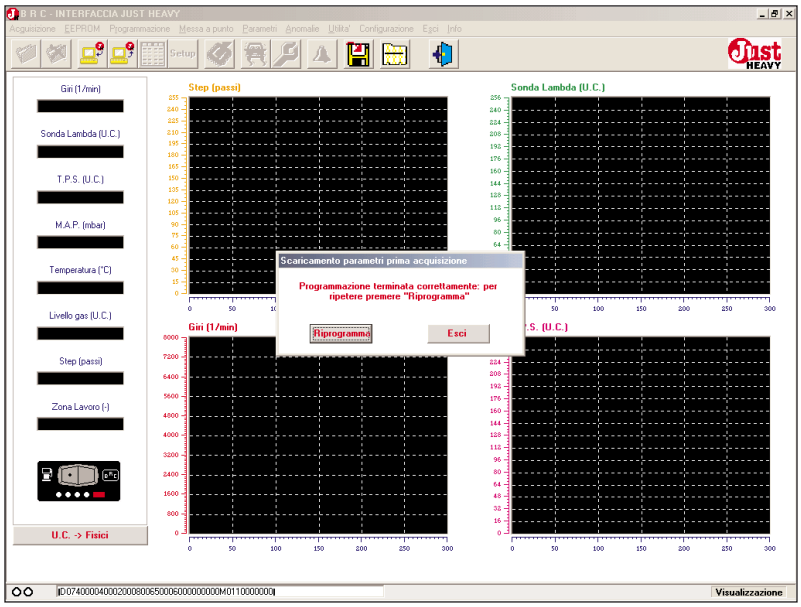


Fig. 61C – Prima acquisizione: procedura terminata correttamente

5.5. DATA LOADING AND GRAPH DISPLAY

After the first acquisition procedure, at every next ignition of the Just Heavy ECU (feeding of the system with the positive after contact), the programme loads the data from the EEPROM of the ECU and the screen on page 47 is displayed.

Moreover, the data related to the signals managed by the system (numerical fields on the left) and the relative graphs are updated in real time.

It is possible to choose the measure unit of the sundry signals (and the relative graphs) by clicking with the mouse on the corresponding conversion key ("U.C. > physical" or physical > U.C."). There are two options:

- physical units (i.e. Volts or seconds)

- sampled units (representation of the quantities inside the micro-controller, usually from 0 to 255).

The exceptions are represented by the temperature signal (in °C) and the MAP signal, for which the mBar is the sampled unit (according to a scale that associates 400 mBar to the minimum MAP and 1000 mBar to the maximum MAP) and the mV is the physical unit, voltage level of the MAP sensor entering the ECU.

On the contrary, for all set-up and parameter configuration screens, the measure unit adopted for all the system quantities is always the converter unit (mBar for the MAP), it is never the physical unit.

It is also possible to visualise from one to four graphs contemporarily: to display a graph or cancel a displayed graph click once on the numerical field corresponding to the signal visualised in the graph.

5.6. PROGRAMME STRUCTURE

After having started the programme and once the EEPROM reading has been accomplished, the main screen as in pic.62 is displayed.

The programme is organised with menus and a rapid selection icon is associated to the main function of each menu to make the selection easier.

You will see hereunder the structure of the various menus, which will be thoroughly described in the following paragraphs.

The underlined letter represent the rapid selection keys: by pressing contemporarily the keys "Alt" + "underlined letter" (for the headings in the main menu) or the key corresponding to the underlined letter only (in the submenus) you will actuate the relative function without using the mouse.

The possible rapid selection for a certain menu or submenu heading using function keys F1÷F12 is indicated beside the very heading.

Menu and submenu of the programme

Acquisition
- Storage start
- Storage end
- Clear acquisition file

EEPROM
- Save on file Shift+F12
- Programming
- Personalised set-up Shift+F1
- BRC set up Shift+F2
- Clear EEPROM file
- Display EEPROM file
- Setup

Programming
- Software download on ECU
- Software directory updating
- Software directory saving

Set up
- Lambda control in normal load F1
- Cut-off F2
- Idle F4
- Full load F5
- Runaway speed rate F6
- Transients F7
- Basic map F12

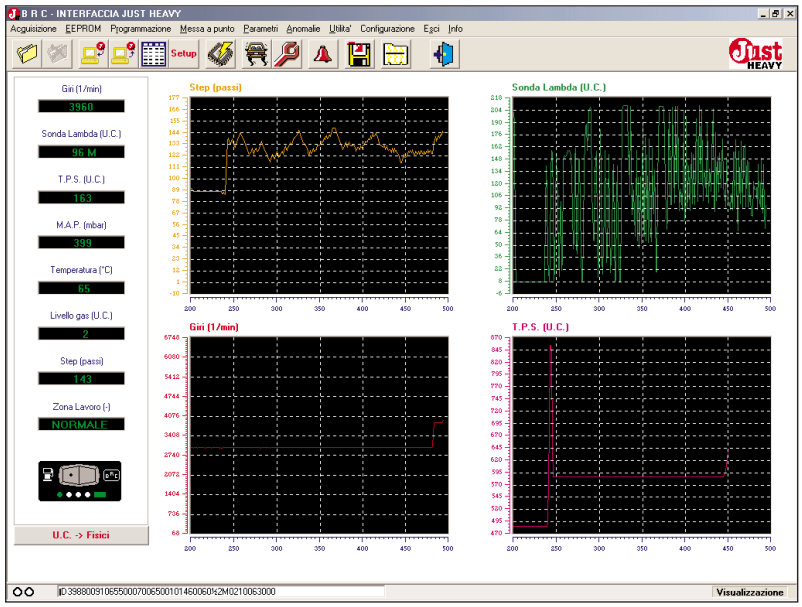


Fig. 62 – Videata principale del software di interfaccia

Parameters
- Entry configuration
- M.A.P. setting-up
- T.P.S. setting-up
- Lambda oxygen sensor setting-up
- Basic map acquisition
- Changeover
- Level management
- Lambda emulation
- Basic map configuration
- LED function
- ECU identifier

Defects

Utilities
- EEPROM saving
  - Total
  - Partial
- EEPROM reset
  - Total
  - Partial
- Acquisition saving
  - Total
  - Partial
- Acquisition reset
  - Total
  - Partial
- Directory total saving
- Directory total reset
- Basic map saving
  - Total
  - Partial
- Basic map reset
  - Total
  - Partial

Configuration
- Language
- Serial

Quit

Info

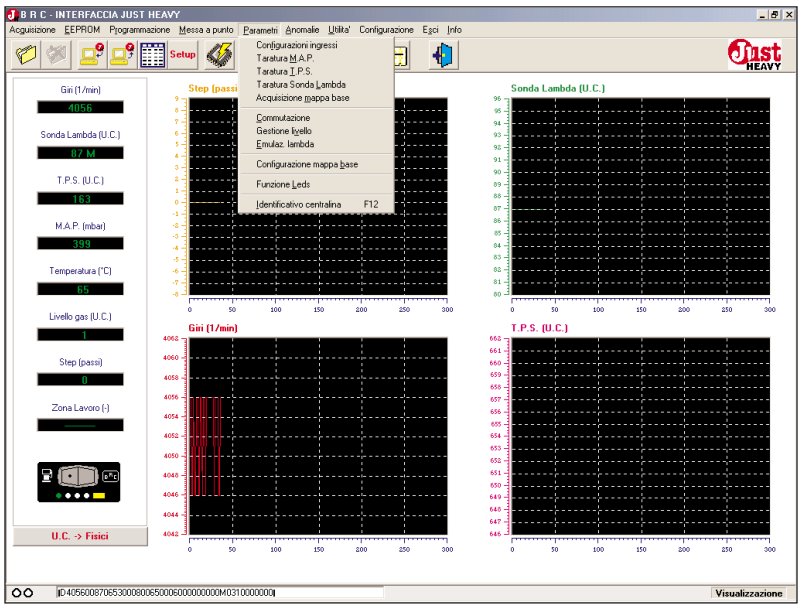


Fig. 63 – Menu “Parametri”

The following paragraphs describe in detail all the parameters in each submenu.

The description sequence does not correspond to the submenu’s, but it reflects a possible system set-up approach. It gives priority to the environments used to complete the vehicle setting at work, then it analyses (in the menu order) the general use environments, not strictly linked to the system parameter imposition.

5.7. SYSTEM CONFIGURATION PARAMETERS

With the Just Heavy system, even with the ECU has already been set, it is possible to acquire again or modify the first acquisition parameters, even partially. The new acquisitions or the modified parameters are included in the ECU configuration. All unmodified data remain unchanged.

This operation is very useful when you download a set-up file processed of a certain vehicle type to install one of a similar model (par.5.14). In this case all signals of the new vehicle, the real basic map or the configuration parameters might not be perfectly equal to the former vehicle’s, which we got the set-up file from. In such a situation it might be useful to acquire again, even some partial entries only, carry out the mapping on road or modify some configuration parameters.

These operations and others are included in the “Parameters” menu (pic.63). The characteristic common to all these parameters of this menu is the need to turn off and on again the ignition to get all the modifications activated (parameters variation in EEPROM).

5.7.1. ENTRY CONFIGURATION MODIFICATION

By selecting the heading “Entry configuration” from the “Parameters” menu, you will get the screen on page 64 (equal to the screen on page 48) dedicated to the system entry configuration parameters. For futher information on the meaning of the fields on this screen (TPS, lambda oxygen sensor and runaway speed rate) refer to par. 5.4.2.

After having modified possible values, click on “Confirm” to store them. These values will be activated only after having turned the ignition off and on again.

5.7.2. MAP AND R.P.M. SIGNAL RE-ACQUISITION

By selecting the heading "MAP set-up" from the "Parameters" menu, you will get again the screen pic. 52A. You can repeat the MAP maximum and minimum value acquisition and reset the conversion factor for the r.p.m. reading. See par. 5.4.3. for a detailed description of the various steps.

Once this phase is over, the interface asks to confirm the recently acquired values. A confirmation here cancels definitively the previously set values.

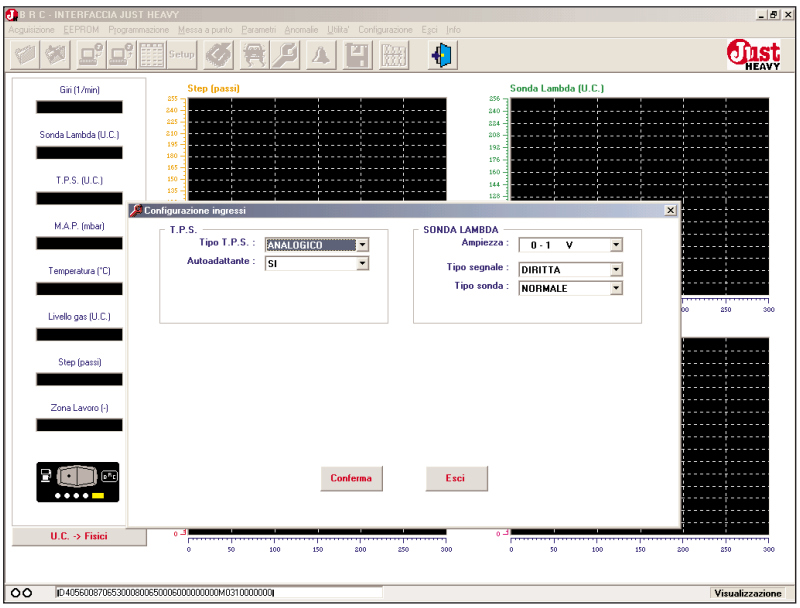


Fig. 64 – Parametri: modifica configurazioni segnali di ingresso

5.7.3. TPS SIGNAL RE-ACQUISITION

By selecting the heading "TPS set-up" from the "Parameters" menu, you will get again the screen pic. 53. You can repeat the TPS maximum and minimum value acquisition. See par. 5.4.4. for a detailed description of the various steps.

Once this phase is over, the interface asks to confirm the recently acquired values. A confirmation here cancels definitively the previously set values.

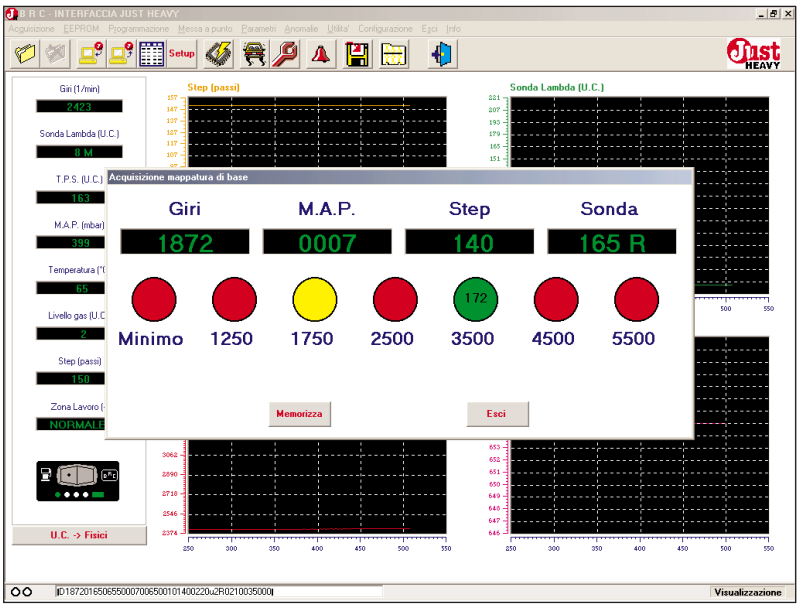


Fig. 65 – Parametri: riacquisizione della mappa base su strada

5.7.4. LAMBDA OXYGEN SENSOR SIGNAL RE-ACQUISITION

By selecting the heading "Lambda oxygen sensor set-up" from the "Parameters" menu, you will get again the screen pic. 54. You can repeat the lambda oxygen sensor maximum and minimum value acquisition. See par. 5.4.5. for a detailed description of the various steps.

Once this phase is over, the interface asks to confirm the recently acquired values. A confirmation here cancels definitively the previously set values.

5.7.5. BASIC MAP RE-ACQUISITION ON ROAD

By selecting the heading "Basic map acquisition" from the "Parameters" menu, you will get again the screen on page 57. You can repeat, even singularly or partially, the acquisition of the STEP HS actuator opening values, corresponding to the r.p.m. areas indicated on the screen.

Once this phase is over, the interface asks to confirm the recently acquired values. A confirmation here cancels definitively the previously set values.

This possibility can be used to re-acquire one or more points of the basic map on road, should a non-satisfying value have been stored during the first acquisition procedure (it might be very different from the near ones or inferior to a value got at lower r.p.m.).

By clicking on the key "Store", the real basic map is reckoned again completely and the recently acquired values replace the previously stored ones.

5.7.6. CHANGEOVER PARAMETER MODIFICATION

By selecting the heading "Changeover" from the "Parameters" menu, you will get again the screen pic.66 (the same as pic.58), where you can modify the changeover parameters. See par. 5.4.8. for a detailed description of the various fields.

The four keys at the bottom of this screen have the following functions:

Store

By clicking on this key with the mouse, any value modified in the numeric fields of the parameters contained in this screen is stored.

As the modifications are stored in the EEPROM of the microcontroller, it is necessary to turn off and on again the ignition to get all the modifications activated.

Reset

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

Default reset

With this key it is possible to reset the default values of the parameters (input directly by the ECU or reckoned during the first acquisition and self-learning procedure).

Quit

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

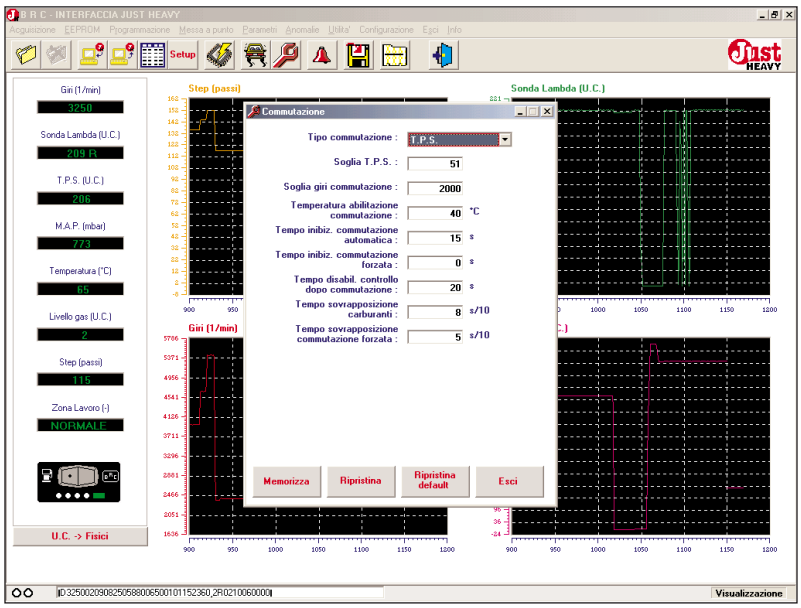


Fig. 66 – Parametri: modifica parametri di commutazione

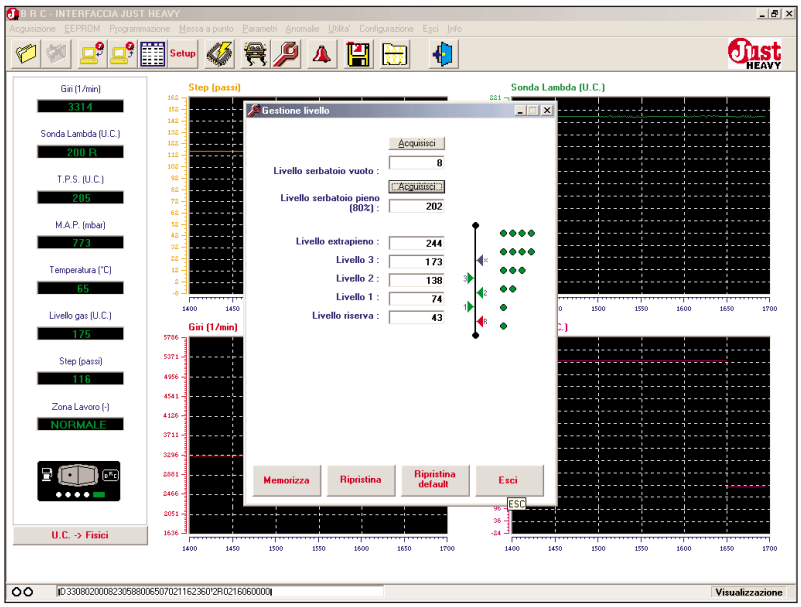


Fig. 67 – Parametri: modifica parametri di gestione del livello

5.7.7. MODIFICATION OF THE GAS LEVEL MANAGEMENT PARAMETERS

By selecting the heading "Level management" from the "Parameters" menu, you will get again the screen pic.67 (the same as pic.59), where you can modify the parameters related to the gas level indication by the GREEN LED's on the changeover switch. See par. 5.4.9. for a detailed description of the various fields.

The four keys at the bottom of this screen have the same functions as in the previous screen.

5.7.8. MODIFICATION OF THE LAMBDA EMULATION PARAMETERS

By selecting the heading "Lambda emulation" from the "Parameters" menu, you will get again the screen pic.68 (the same as pic.60), where you can modify the parameters related to the lambda emulation. See par. 5.4.10. for a detailed description of the various fields.

The four keys at the bottom of this screen have the same func-

tions as in the previous screen.

5.7.9. BASIC MAP CONFIGURATION

By selecting the heading “Basic map configuration” from the “Parameters” menu, you will get again the screen pic.69, where you can configurate some characteristics of the basic map, which some control strategies depend on. In particular, it is possible to decide the flattening of the basic map, as to the MAP variations.

Flat map

- by selecting “YES” in this field, the system considers the basic map constant in function of the MAP, on an opening value of the actuator corresponding to a suitable MAP value. This is valid only up to the r.p.m. threshold specified in the following field. The opening positions of the actuator according to the revs are anyhow variable (the higher the revs are, the higher the positions are);
- by selecting “NO”, the map is considered normally variable as per both the revs and the MAP. This is the default selection set by the ECU.

Flat map r.p.m. threshold

If you select the flat map in the previous field, the value expressed in this field specifies up to what threshold the ECU forces the flattening of the basic map as regard to the MAP. From this threshold on, the map is again considered distributed also as regard to the MAP variations.

5.7.10. FUNCTIONS OF THE CHANGEOVER LED’S

By selecting the heading “LED function” from the “Parameters” menu, you will get

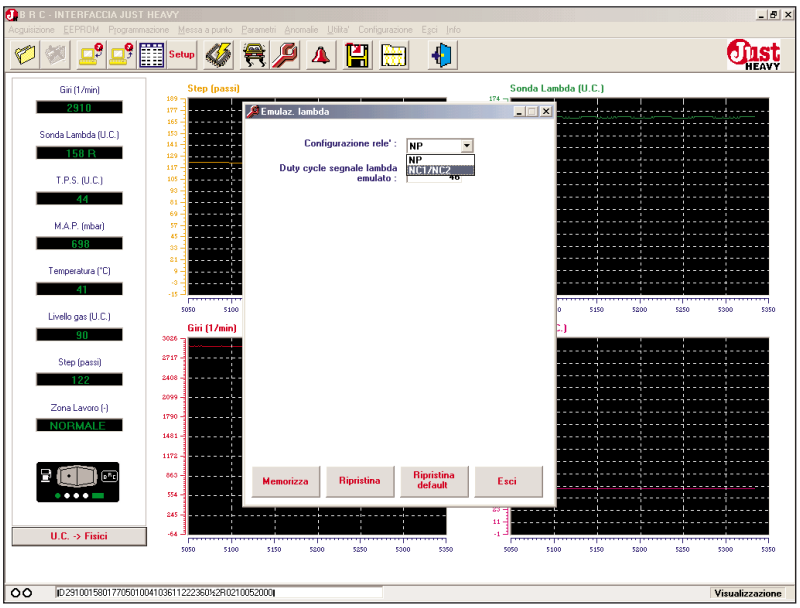


Fig. 68 – Parametri: modifica parametri di emulazione lambda

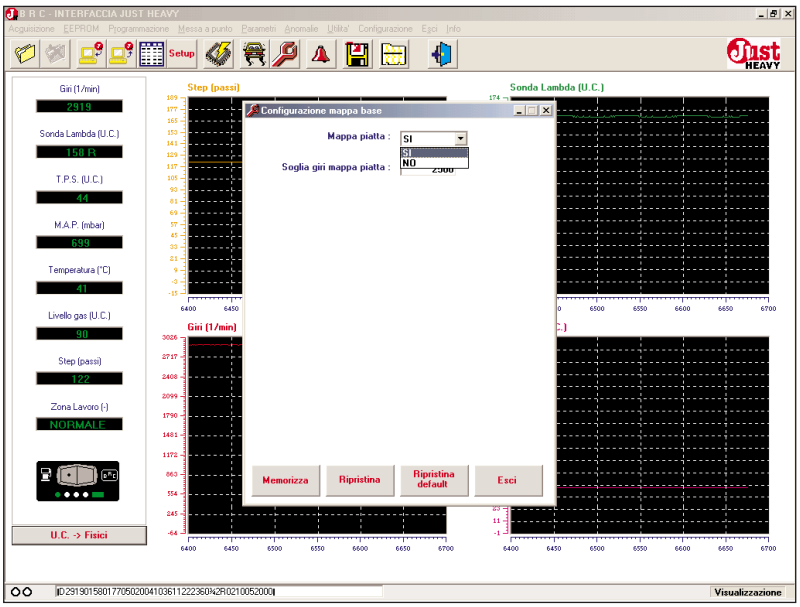


Fig. 69 – Parametri: configurazione mappa base

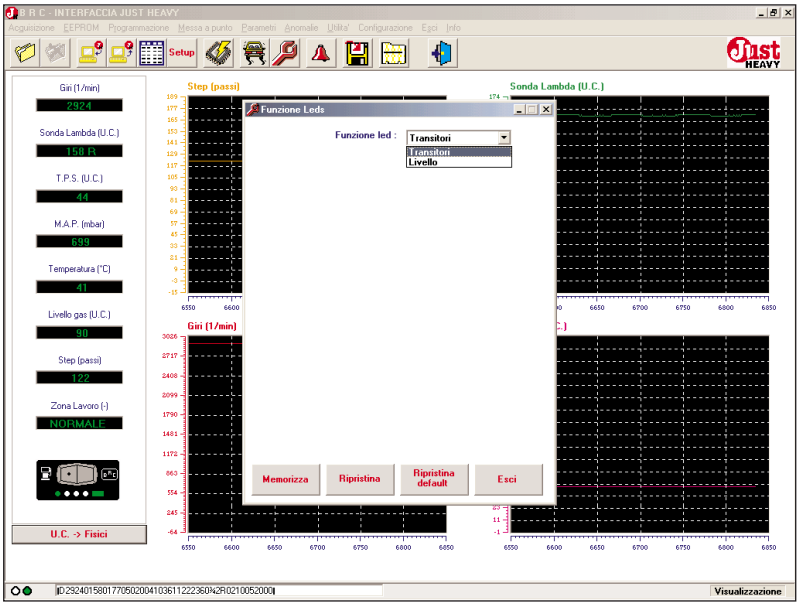


Fig. 70 – Parametri: impostazione funzione LED del commutatore

the screen pic.70, where you can set the type of display on the changeover GREEN LED's.

The changeover GREEN LED's, besides indicating the gas level in the tank (select "level"), can be very useful while setting the system up, as they display the status of the transient and release management strategies (select "transients").

If you select "transients", the first two GREEN LED's lit up (or all four LED's) when you accelerate indicate that a transient management strategy has been activated, while the two central LED's lit up when you release the accelerator indicate that a release management strategy has been activated.

Obviously, this display function ought to be used only while setting the system up and the level indication function ought to be restored before handing the vehicle to the owner.

5.7.11. ECU IDENTIFICATION

By selecting the heading "ECU identification" from the "Parameters" menu, you will get the screen pic. 71 which shows all the necessary information to identify completely the ECU, namely: the production data, the test data and the information on the hardware and the software.

On the screen there are, in order, the ECU registration number, the production batch, the part number, the hardware and software version, the possible EEPROM version (if necessary), the identification number of the operator who carried out the functional test and the test section number where the card has been validated.

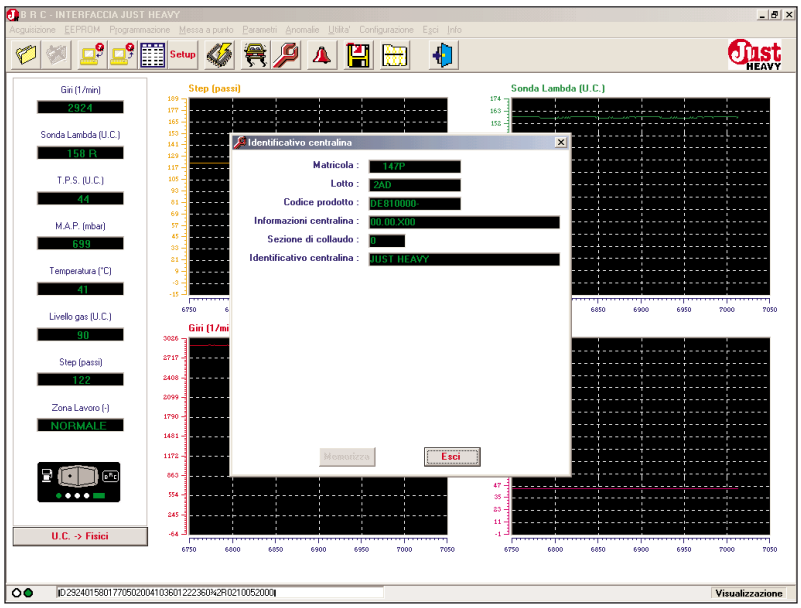


Fig. 71 – Parametri: identificativo centralina

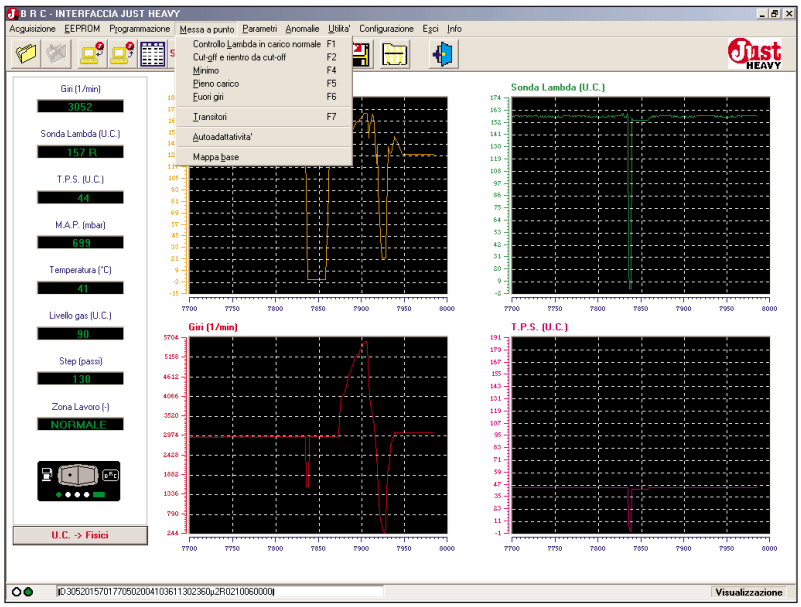


Fig. 72 – Menu "Messa a punto"

5.8. SET-UP

After the first acquisition procedure and any possible modification of the configurations in the "Parameters" menu (par.5.7), the system is ready to work on gas.

The vehicle should be ready to normally run on road and the self-adapting strategies wouldn't help but improve the performances in time, according to the driving conditions and the vehicle characteristics.

However, with more 'critical' vehicles or to satisfy more scrupolous installers or client's exigencies, you can apply a more detailed set-up phase of the system control strategies.

On this purpose, the "Set-up menu" (pic.72) has been devised. It is made up of 5 environments dedicated to the working areas used in the lambda control strategy based on the STEP HS actuator, an environment dedicated to the transient management and an environment dedicated to the personalised configuration of the working basic map.

5.8.1. WORKING AREAS

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**
- **Full load**
- **Runaway speed rate**

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 set-up. Two fields are associated to each parameter: one carries the parameter initial value ("initial value" column), the other carries a possible modification value ("modification value" column). At the opening of every environment the initial and the modification values are the same 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 it possible to store them definitively in the ECU.

The four keys at the bottom of every screen (pic. 73, 74, 75, 76 and 77) therefore have the following functions:

Apply the modification value

By clicking on this key with the mouse it is possible to apply 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 key it is possible to re-apply the values of the parameters present in the "initial value" column (prior to any modification). When the active values in the system are these ones, a red background appears under "initial value".

Memory programme

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

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

Quit

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

5.8.1.1. Lambda control in normal load

Pic. 73 depicts the screen related to the "Lambda control in normal load" menu and contains all the parameters pertaining to the lambda control managing strategy in normal load conditions by the STEP HS actuator.

Lower threshold (lean Lambda in normal load)

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

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

Upper threshold (rich Lambda in normal load)

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

The rich lambda value ought

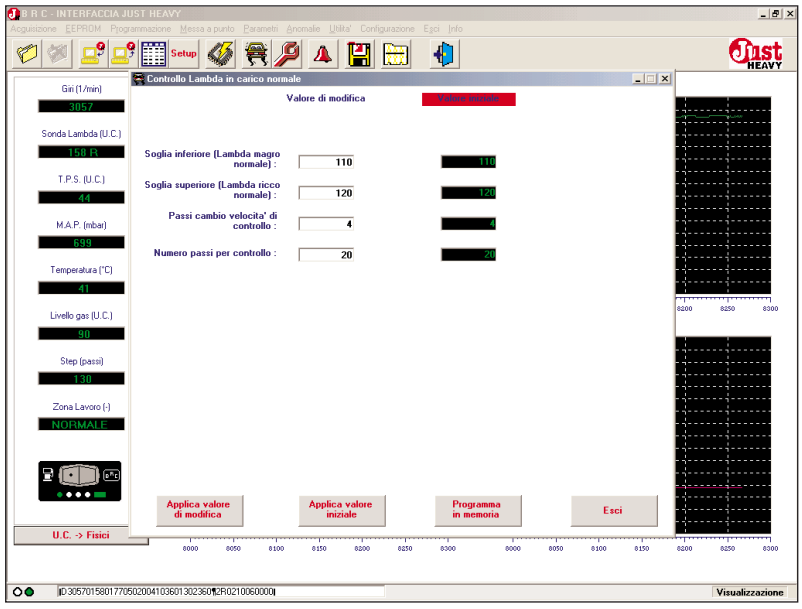


Fig. 73 – Messa a punto: controllo lambda in carico normale

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 between the lean and the rich thresholds.

Control frequency-doubling steps

In case of rich or lean oxygen sensor, the STEP HS actuator tries to correct the mixture respectively by closing or opening by a step at a time, with a certain frequency (normally 20 steps/second).

If, after having closed or opened by a number of steps like that contained in this parameter, the lambda oxygen sensor signal does not react (it does not change from rich to lean or the other way round), the actuator starts correcting in the same direction with a double frequency as to the basic one (normally 8 steps/second).

Number of steps for control

This field established the quantity of steps the STEP HS actuator can move as to the position reckoned by the working map, following the stoichiometry in normal load conditions.

For example, if the actuator position estimated by considering only the basic map is 100 and in this parameter the programmed value is 20 (default value), the STEP HS actuator can move in normal load conditions in the interval ranging from 80 to 120 steps.

First control speed

In case of a rich or lean oxygen sensor signal, the STEP HS actuator tries to correct the mixture by either closing or opening, a step at a time, starting to move at the speed indicated in this field (step/second).

Second control speed

In case of a rich or lean oxygen sensor signal, after having run the number of steps indicated in the “Control frequency-doubling steps” field at the first control speed, if the oxygen sensor signal remains rich or lean respectively, the STEP HS actuator keeps moving in the same direction and at the speed indicated in this field. Whenever the oxygen sensor changes its value, shifting from rich to lean or the other way round, the actuator gets again the first speed.

5.8.1.2. Cut-off

Pic. 74 depicts the screen related to the “Cut-off” menu and contains all the parameters pertaining to the cut-off condition management strategies.

Cut-off entry 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 (or the MAP one) ought also to be below the cut-off entry threshold. The default value for this parameter is 2,000 r.p.m.

Cut-off exit r.p.m. threshold

It is the value of the r.p.m. signal below which the cut-off position is left, regardless of the TPS (or MAP) value. The exit from cut-off typically occurs at an r.p.m. lower than the entry one (hysteresis on the exit from cut-off). The default value for this parameter is 1,500 r.p.m.

Entry threshold on:

It determines the type of signal taken into consideration to evaluate the cut-off entry and exit conditions. The choice can be set on either signals:

- if you choose “TPS” the entry and exit thresholds will be evaluated on the TPS signal values
- if you choose “MAP” the entry and exit thresholds will be evaluated on the MAP signal values

The ECU proposes as a default value the cut-off set on the TPS.

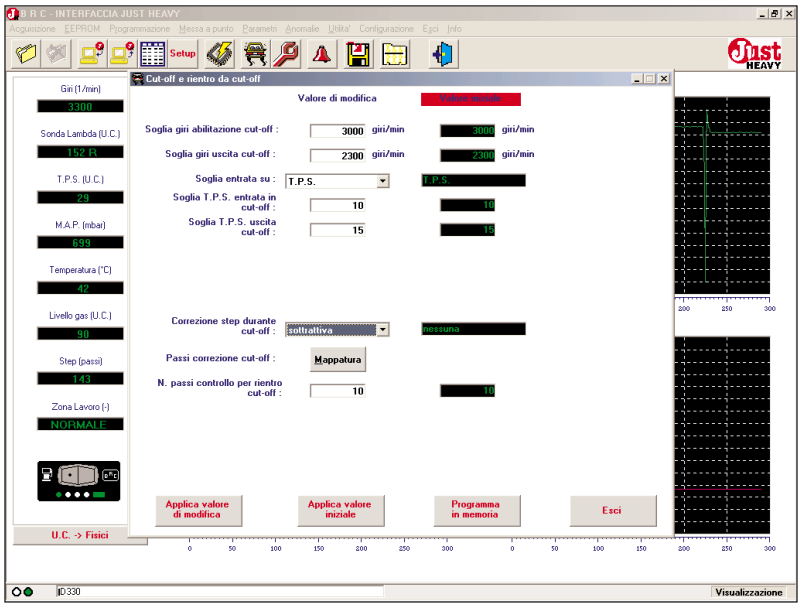


Fig. 74 – Messa a punto: cut-off e rientro da cut-off

Cut-off entry TPS (or MAP) threshold

It is the value of the TPS (or MAP, if you selected it) signal below which the possibility of entering the cut-off condition is activated. To effectively enter, the r.p.m. signal ought also to be above the cut-off entry threshold.

In case you set the self-learning TPS (par.5.4.2.1), this parameter can only be read, it cannot be modified and it is constantly updated (in the "modification value" column), if it self-adapts to the ECU.

Cut-off exit TPS (or MAP) threshold

It is the value of the TPS signal (or MAP, if you selected it) above which the cut-off position is left, regardless of the r.p.m. value. The exit from cut-off typically occurs at a TPS (or MAP) value higher than the entry one (hysteresis on the exit from cut-off).

In case you set the self-learning TPS (par.5.4.2.1), this parameter can only be read, it cannot be modified and it is constantly updated (in the "modification value" column), if it self-adapts to the ECU.

STEP correction in cut-off

Even though the Just Heavy ECU includes a self-learning strategy of the optimal cut-off conditions, you can nevertheless choose to start, when entering the cut-off, from closer basic map working positions, as regard to the normal load positions.

With the "subtractive" choice in this field, you can indicate the number of closing steps according to the revs, in the map which is showed in the following field.

The ECU proposes "subtractive" as a default value and adopts automatically the cut-off self-learning strategies.

Basic map correction step in cut-off

With the "subtractive" choice in the previous field, by clicking on the key "Mapping" of this field you can configurate the number of the closing steps, in cut-off entry conditions, as regard to the basic map in normal load conditions.

The chart that the interface presents allow to set more step values according to the r.p.m. signal value (revs-step mapping).

The ECU adopts a default subtractive correction of 10 steps, therefore the first time you get to the mapping, the correction step values in the chart will be equal to 10.

Number of the control steps to exit from the cut-off

This field establishes of how many step the STEP HS actuator can move, as regard to the position reckoned by the basic working map, following the stoichiometry in cut-off exit conditions.

For example, if the actuator position estimated by considering only the basic map is 80 and in this parameter the programmed value is 6 (default value), the STEP HS actuator can move in normal load conditions in the interval ranging from 74 to 86 steps.

Normally, in the cut-off exit phase (r.p.m. decrease after a cut-off, in release, to get to the idle conditions) it is better to restrict the actuator excursion on the lambda control.

5.8.1.3. Idle

Pic. 75 depicts the screen related to the "Idle" menu and contains all the parameters pertaining to the idle condition management strategies.

Idle entry r.p.m. threshold

It is the value of the r.p.m. signal below which the possibility of entering the idle condition is activated. To effectively enter, the TPS signal (or the MAP one) ought also to be below the idle entry threshold. The default value for this parameter is 1,000 r.p.m.

Entry threshold on:

It determines the type of signal taken into consideration to evaluate the idle entry and exit

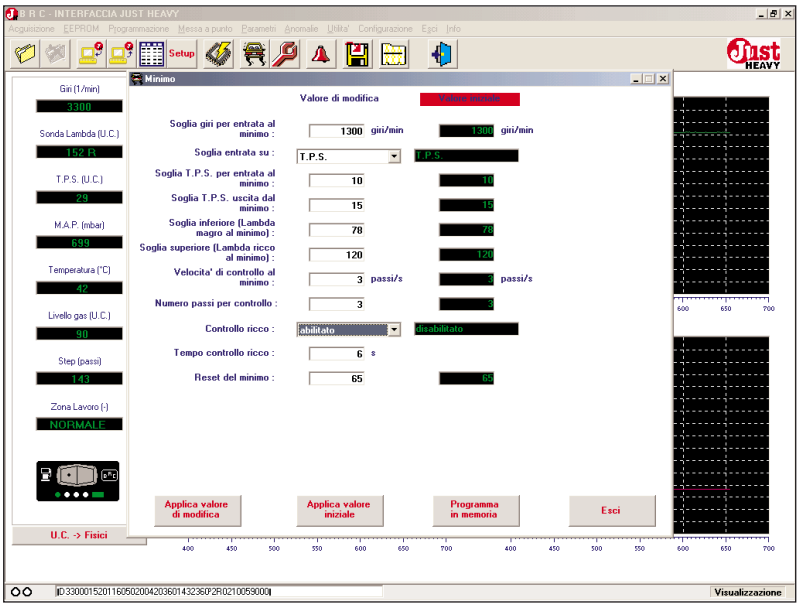


Fig. 75 – Messa a punto: minimo

conditions. The choice can be set on either signals:

- if you choose “TPS” the entry and exit thresholds will be evaluated on the TPS signal values

- if you choose “MAP” the entry and exit thresholds will be evaluated on the MAP signal values

The ECU proposes as a default value the cut-off set on the TPS.

Idle entry TPS (or MAP) threshold

It is the value of the TPS (or MAP, if you selected it) signal below which the possibility of entering the idle condition is activated. To effectively enter, the r.p.m. signa also ought to be below the idle entry threshold.

In case you set the self-learning TPS (par.5.4.2.1), this parameter can only be read, it cannot be modified and it is constantly updated (in the “modification value” column), if it self-adapts to the ECU.

Idle exit TPS (or MAP) threshold

It is the value of the TPS signal (or MAP, if you selected it) above which the cut-off position is left, regardless of the r.p.m. value. The exit from cut-off typically occurs at a TPS (or MAP) value higher than the entry one (hysteresis on the exit from idle).

In case you set the self-learning TPS (par.5.4.2.1), this parameter can only be read, it cannot be modified and it is constantly updated (in the “modification value” column), if it self-adapts to the ECU.

Lower threshold (lean Lambda in idle speed)

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

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

The default value for this threshold is equal to the normal load lean lambda parameter multiplied by 1.1.

Upper threshold (rich Lambda in idle speed)

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

The default value for this threshold is equal to the normal load lean lambda parameter multiplied by 1.1.

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 between the lean and the rich thresholds.

Idle control speed

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

Number of steps for control at idle speed

This field establishes the quantity of steps the STEP HS actuator can move as to the position reckoned by the working map, following the stoichiometry in idle conditions.

For example, if the actuator position estimated by considering only the basic map is 60 and in this parameter the programmed value is 10 (default value), the STEP HS actuator can move in idle conditions in the interval ranging from 50 to 70 steps.

Rich control

By this field you can activate a particular strategy for the rich control at idle speed:

- by selecting “off” no rich control strategy is activated at idle and the system working is the standard one;

- by selecting “on” a particular rich control strategy is activated at idle.

The ECU proposes the default value “off”.

Rich control timing

This field is displayed only if the “Rich control” is on and its value indicated the duration of the rich control strategy, from the time you enter the idle conditions. Once this time is over, the rich control strategy is off.

Idle reset

The idle reset is a value of the basic map corresponding to an opening position of the actuator to use as a referee when idle control strategies are carried out.

In particular, this value can bind, in certain conditions, the minimum and the maximum opening position of the actuator.

The most suitable value is reckoned automatically, but it can be modified directly in this field.

5.8.1.4. Full load

Pic.76 depicts the screen related to the “Full load” menu and contains all the parameters pertaining to the full load condition management strategies.

Full load entry r.p.m. threshold

It is the value of the r.p.m. signal above which the possibility of entering the full load condition is activated. To effectively enter, the MAP signal ought also to be above the full load entry threshold. The default value for this parameter is 2,000 r.p.m.

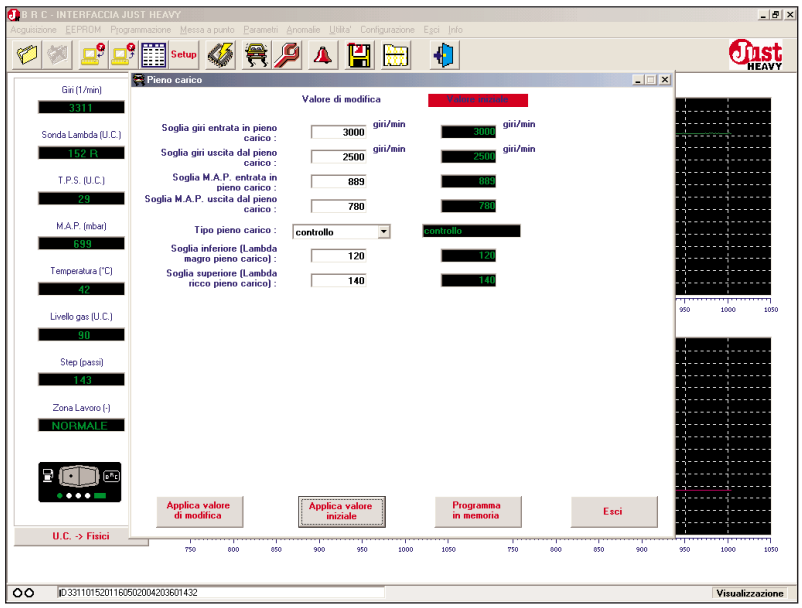


Fig. 76 – Messa a punto: pieno carico

Full load exit r.p.m. threshold

It is the value of the r.p.m. signal below which the full load position is left, regardless of the MAP value. The exit from the full load occurs at an r.p.m. lower than the entry one (hysteresis on the exit from full load). The default value for this parameter is 1,800 r.p.m.

Full load entry MAP threshold

It is the value of the MAP signal above which the possibility of entering the full load condition is activated. To effectively enter, the r.p.m. signal ought also to be below the full load entry threshold.

In case you set the self-learning TPS (par.5.4.2.1), this parameter can only be read, it cannot be modified and it is constantly updated (in the “modification value” column), if it self-adapts to the ECU.

Full load exit MAP threshold

It is the value of the MAP below which the full load position is left, regardless of the r.p.m. value. The exit from the full load occurs at a MAP value lower than the entry one (hysteresis on the exit from full load).

In case you set the self-learning TPS (par.5.4.2.1), this parameter can only be read, it cannot be modified and it is constantly updated (in the “modification value” column), if it self-adapts to the ECU.

Full load type

The Just Heavy ECU has different strategies to manage the full load. With this parameter you can choose either control conditions:

- by selecting “control” the full load is based on the lambda control with stoichiometric thresholds settable in the last two fields of the screen (they are usually enriched as regard to the normal load ones);

- by selecting “self-adapting” the ECU optimises the full load management, having as its target a well evaluated enrichment.

The ECU proposes as a default value the control based full load.

Lower threshold (lean Lambda in full load)

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

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

The default value for this threshold is equal to the normal load lean lambda parameter multiplied by 1.1.

Upper threshold (rich Lambda in full load)

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

The default value for this threshold is equal to the normal load lean lambda parameter multiplied by 1.1.

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 between the lean and the rich thresholds.

5.8.1.5. Runaway speed rate

Pic. 77depicts the screen related to the “Runaway speed rate” menu and contains all the parameters pertaining to the runaway speed rate condition management strategies while working on gas.

As we pointed out in par.1.3.2, if the engine gets to the runaway speed rate while working on gas, the system changes over to petrol automatically, thus allowing to use the r.p.m. limitation strategies implemented in the petrol injection ECU.

Back to acceptable working conditions, the ECU re-enables the changeover to gas, as soon as the suitable conditions occur (par.1.3.1).

Petrol changeover 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 the latter 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 runaway speed rate conditions. The actual changing over depends on the normal conditions necessary to changing over to gas (par. 1.3.1).

The default for this parameter is set at 5700.

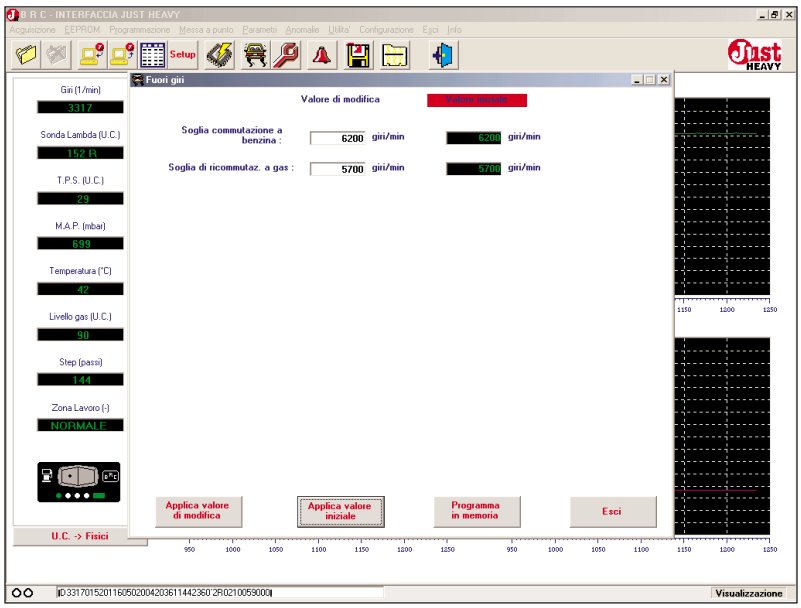


Fig. 77 – Messa a punto: fuori giri

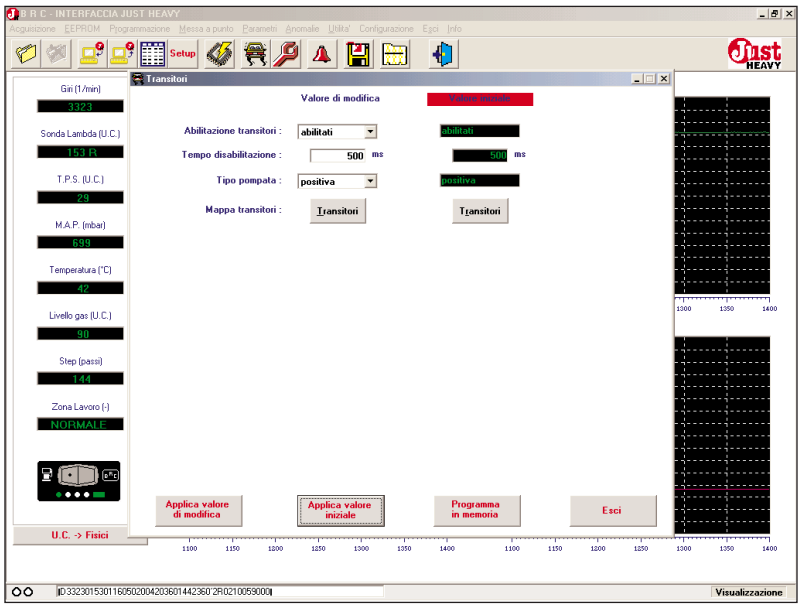


Fig. 78 – Messa a punto: transitori, parametri generali

5.8.2. TRANSIENTS

Pic.78 depicts the screen related to the “Transients” menu and contains all the parameters pertaining to the pumping managing strategy, where the term pumping means a sudden opening of the STEP HS actuator to supply in the shortest possible time a gas quantity allowing to optimise the mixture and the vehicle efficiency control during sudden positive variations of the TPS signal (hasty accelerations).

Transient activation

With this parameter you can activate or deactivate the transient management strategies:

- by selecting “activated” the transient management strategies are activated and you can configurate all the other parameters;
- by selecting “deactivated” the transient management strategies are not included and there is no other configuration parameter.

Deactivation time

After the first pumping, before carrying out another one, a lapse of time as indicated in this para-

meter must pass.

The default for this parameter is set at 500 ms (5 tenth 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.

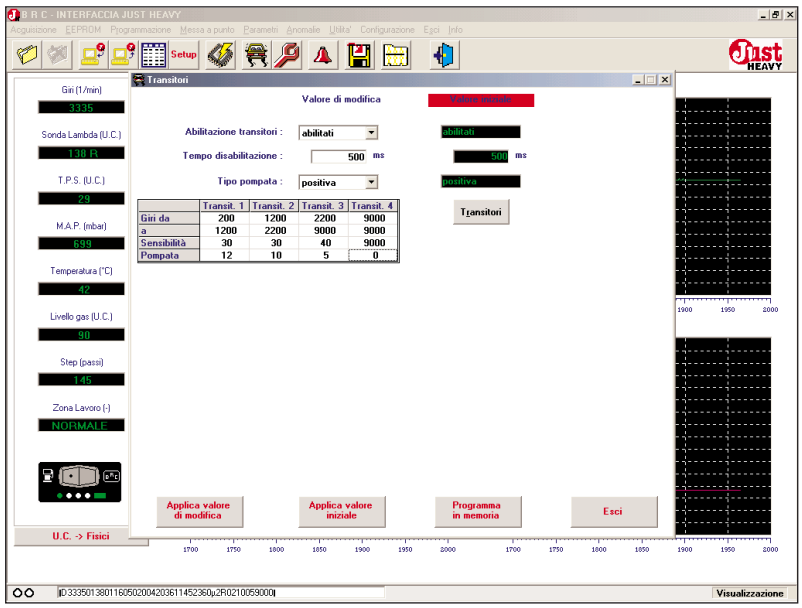


Fig. 79 – Messa a punto: transitori, configurazione

Transient map

With this field it is possible to configurate in a detailed way the transient management strategies. By clicking on the key “Transients” you will get a chart which allows to configurate up to 4 pumpings, according to the revs, different in terms of entry sensibility and opening step numbers (pic.79). The parameters you can set are the following:

- “Revs from” “to”: upper and lower thresholds of the r.p.m. area which identifies a certain pumping. If the r.p.m. signal value where the transient conditions are recognised (TPS signal increase achieved) is between the two thresholds, the pumping steps made by the STEP HS are expressed by the number in the same column of the chart.

- “Sensibility”: with this parameter is possible to calibrate the entity of the TPS variation where a transient is recognised. The lower the set value is, the easier the transients trigger. While setting up, the sensibility check of the transients can be carried out using the changeover switch GREEN LED display, as we wrote in par. 5.7.9.

- Pumping: number of opening steps (if positive) or closing steps (if negative) that the STEP HS actuator makes when a transient is activated with a r.p.m. signal between the thresholds indicated in the same column of the chart.

In the Just Heavy system there are also appropriate strategies that, on the basis of the set transient configuration, manage both the set pumping dissolving and the release conditions (sudden decelerations).

5.8.3. Self-adaptivity

In par. 3.9 we wrote that sophisticated self-adaptivity strategies have been developed in the Just Heavy system to assure a constant and continuous optimisation of the control features.

By selecting the “Self-adaptivity” heading in the “Set-up” menu, you will get the screen of pic.80. The “Self-adaptivity” field offers two possibilities:

- by selecting “activated” the self-adaptivity strategies are activated. The system will be able to modify the set-up configuration to always optimise the vehicle working;

- by selecting “deactivated” the self-adaptivity strategies are not activated. The system keeps all the set-up entries unchanged, in particular the working basic map.

5.8.4. Basic map

Besides the first acquisition of the gas working basic map on road and the following possibility to get it back (in total or partially) from the “Parameters” menu

(par. 5.7.5), by selecting the heading “Basic map” from the “Set-up” menu, you will get (pic.81) a detailed basic map with 16 columns corresponding to 16 r.p.m. signal values and 3 rows corresponding to 3 MAP signal values.

Should there be vehicles with a more critical set-up or should you want to optimise and improve the vehicle working on gas, you can personalise the working basic map, by modifying the values directly in the fields of this screen or, even better, by re-acquiring them on road, in suitable r.p.m. and MAP conditions.

To make the detailed working basic map set-up easier, the screen shows 5 reference quantities for the stoichiometry control:

- r.p.m.: in this field you will see the instantaneous r.p.m. signal

- MAP: in this field you will see the instantaneous absolute pressure of the manifold, in mbar

- Step: in this field you will see the opening position of the actuator-distributor, in steps

- Oxygen sensor: in this field you will see the instantaneous value of the lambda oxygen sensor, in sampled units, besides the information of the lean (L), stoichiometric (S) or rich (R) mixture.

- ContStec: this parameter is an index of the control stoichiometry measure and provides a valid information on how the working basic map is centred.

A positive ContStec value means that to get the stoichiometry, the actuator position has been increased, in terms of opening steps, as regard to the basic map value (that is, the map is lean).

A negative ContStec value means that to get the stoichiometry, the actuator position has been decreased, in terms of opening steps, as regard to the basic map value (that is, the map is rich).

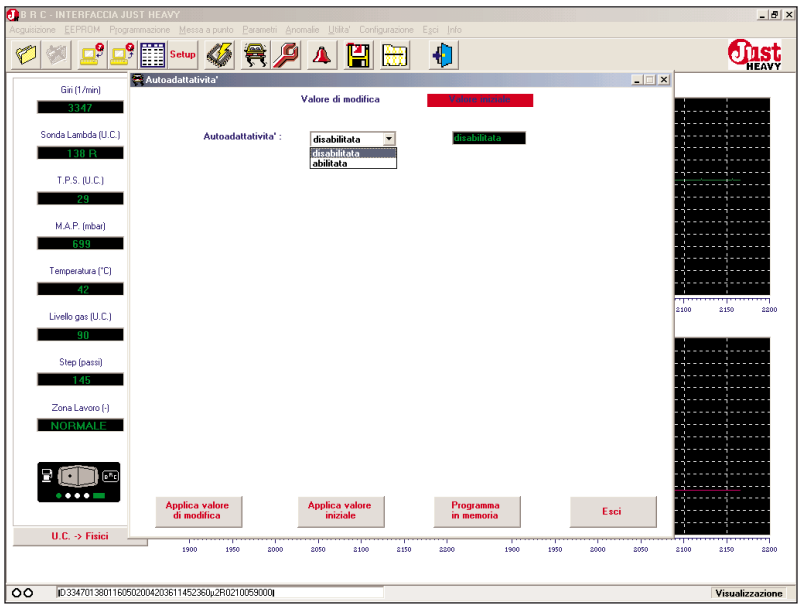


Fig. 80 – Messa a punto: autoadattatività

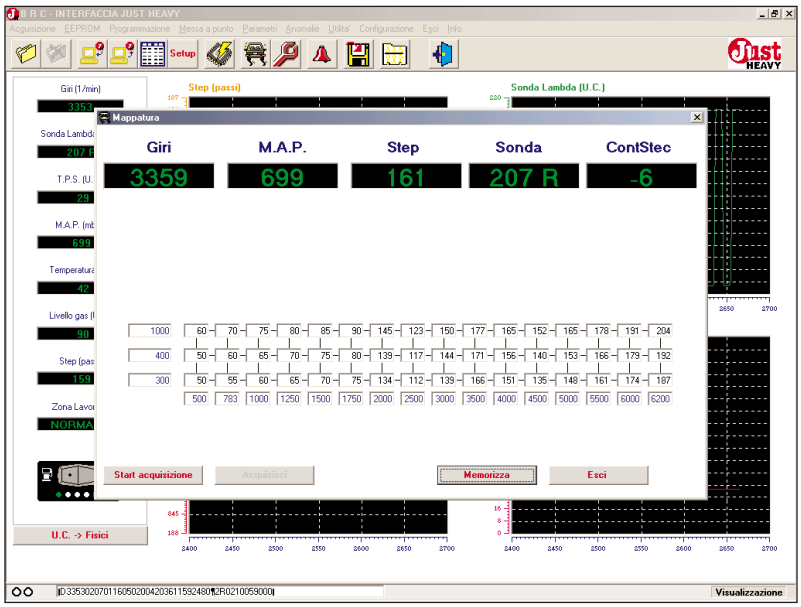


Fig. 81 – Messa a punto: mappa base

Another useful notice during the detailed working basic map set-up is the yellow highlighting of the STEP HS position value corresponding to the current engine load conditions on the r.p.m.-MAP map. In practice, the map tells each moment the current reference position that the ECU considers for the actuator.

5.8.4.1. Detailed acquisition of the basic map single values on road

For a detailed and scrupulous set-up, the Just Heavy system allows to acquire directly on road also the single values of the working basic map, previously acquired during the first acquisition (and possibly modified with a further acquisition from the “Parameters” menu).

To carry out this operation, you must follow this procedure:

- keep the vehicle running on gas, on road, with engine load;

- click on the key “Acquisition start” (the control conditions suitable for the basic map acquisition are forced, the transients and the working areas different from the normal load, etc. are eliminated);

- the key turns into “Acquisition stop”, to use to interrupt the detailed acquisition of the basic map and get back to the standard control conditions;

- spot the r.p.m.-MAP position corresponding to the value that you intend to acquire (the cell corresponding to the value is yellow-highlighted);

- keep the r.p.m.-MAP conditions stable enough (the cell must always be yellow-highlighted, otherwise it is not acquired);

- after having checked the Step (and the ContStec) stability around a certain value, click on the key “Acquire” (pic.82);

- the value of the yellow-highlighted cell is automatically modified with the acquisition of the new correct basic map value;

- the acquired cell turns green;

- repeat the operation for the highest number of the basic map cells, taking into consideration that usually you cannot acquire on road the values of the first column on the left and of the first bottom row (they are dedicated to particular control strategies, in load conditions different from the normal working areas);

- the ideal is to acquire all the values (except the first on the left) of the second and third rows of the basic map;

- in particular, it is important not to leave incomplete columns and always acquire both the second and the third value of each column (to acquire the third value corresponding to a high MAP you can possibly use the brake);

- once the acquisition is achieved, click on the key “Acquisition stop”;

- make the new acquired map active by clicking on the key “Store”;

- after the storage, all the cells turn white;

- it is possible to quit the screen by clicking on the key “Quit”.

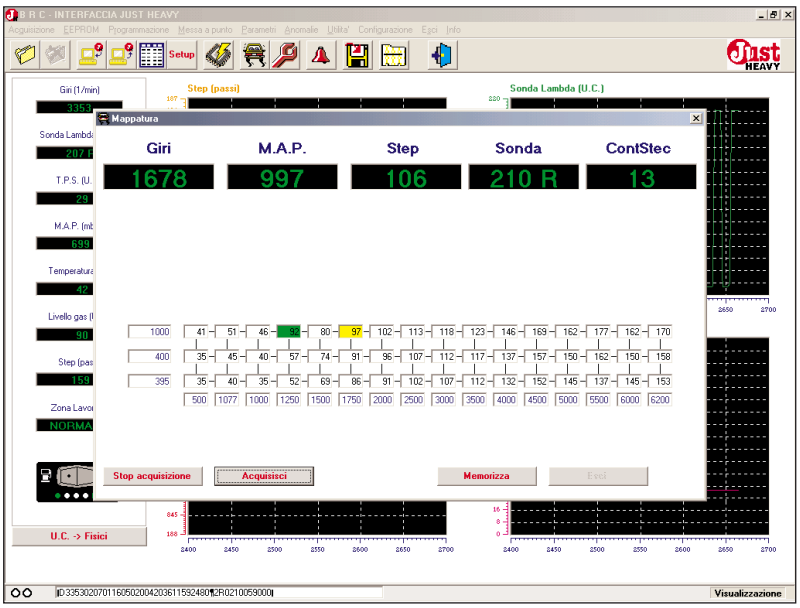


Fig. 82 – Messa a punto: mappa base, acquisizione dettagliata su strada dei singoli valori

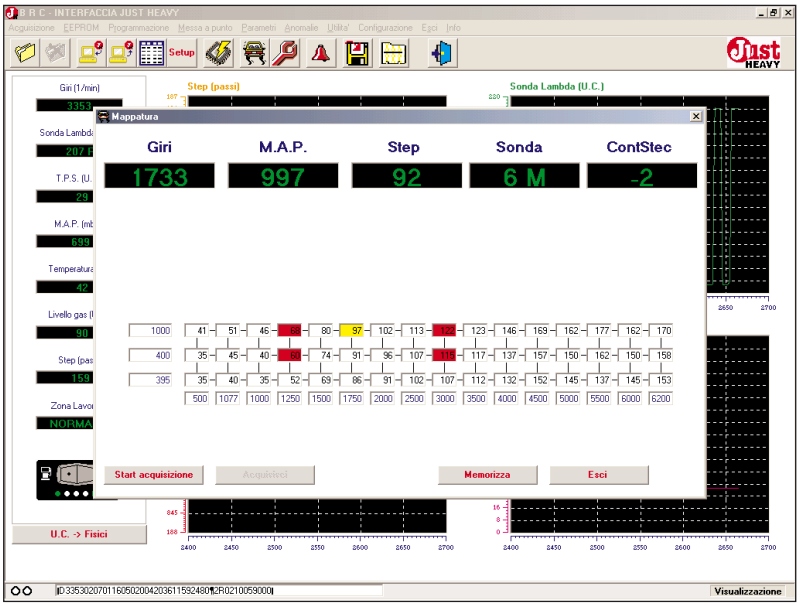


Fig. 83 – Messa a punto: mappa base, modifica diretta dei singoli valori

5.8.4.2. Direct modification of the basic map single values

It is possible to modify directly the single values of the reference basic map by clicking on the field that you intend to modify and inputting directly from the keyboard the actuator new opening value. The modified value is red-highlighted and becomes active in the system only after having clicked on the key “Store” (pic.83), by which all the values present in the basic map fields are downloaded in the ECU EEPROM. All the modified cells turn white.

We recommend to pay the utmost attention to the direct modifications to the map. The modifications must be made only when they are strictly necessary.

Usually, the correction of a value is meaningful if, in stationary conditions (r.p.m. and MAP with slight variations and valued of the map always yellow-highlighted) ContStec values are very high for long times. Here you can change the reference current opening value and increase it (if ContStec is positive) or decrease it (if ContStec is negative), of a value inferior or equal to the average value taken by the ContStec.

To avoid any serious trouble, this basic map correction procedure must be carried out only by very skilful and well trained installers. We however recommend to adopt the detailed acquisition of the single values on road, as described in the previous paragraph.

5.9. SYSTEM DATA ACQUISITION

During the set-up phase of the system, you can refer to the signal display fields and the relative graphs of the main screen (pic.62). Furthermore, you can store all the values read by the ECU in a data type directory. The environment for this purpose is selectable in the “Acquisition” menu (pic.84).

5.9.1. STORAGE START

To start the storage of all the data of the system, starting from a certain moment on, select the heading “Storage start” from the “File” menu (or click on the corresponding quick-choice icon); you will get the screen reported in pic.85, where it is possible to input the vehicle identification data while setting it up, together with some notes on the system conditions while storing the data. By selecting the key “Store”, the data storage on file starts.

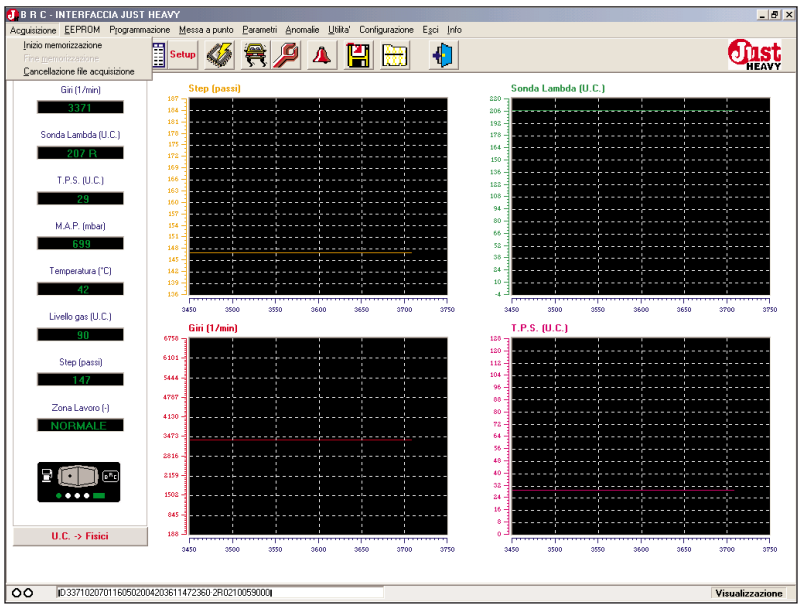


Fig. 84 – Acquisizione: menu principale

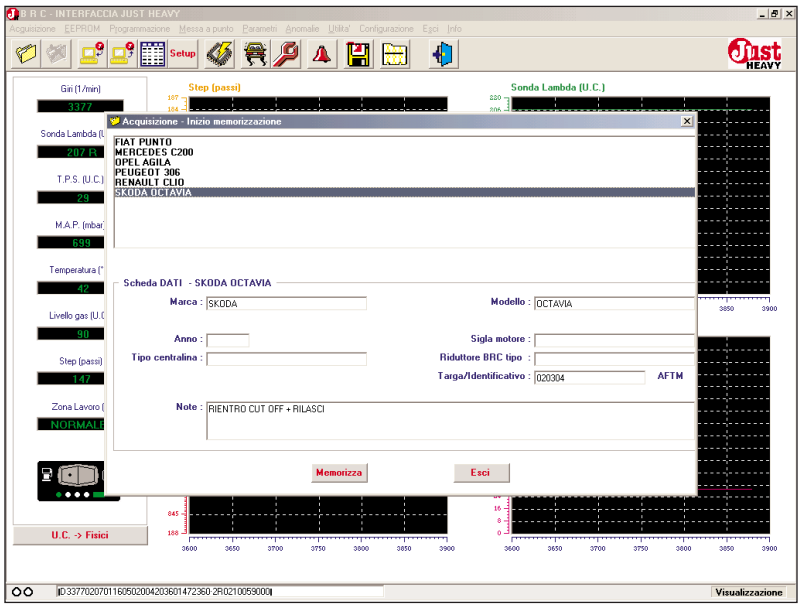


Fig. 85 – Acquisizione: inizio memorizzazione

5.9.2. STORAGE END

To interrupt the storage at any time, select the heading “Storage end” from the “File” menu (or click on the corresponding quick-choice icon). This way the file with the data recording is stored. This file can be used later on to study or document the set-up or to solve possible adjusting problems of the control strategies.

5.9.3. ACQUISITION FILE CLEARANCE

All the acquisition files (data files) are gathered in a directory that is opened any time you start a storage (5.9.1). It is possible to clear the acquisition file no more in use or those stored by mistake from the directory by selecting the heading “Acquisition file clearance” from the “Acquisition” menu. You will get the screen of pic.86A, where you can select the file you want to clear by clicking on the file name. Then click on the key “Clear” and confirm the choice in the window that will appear (pic.86B) and the file is removed from the directory (pic.86C).

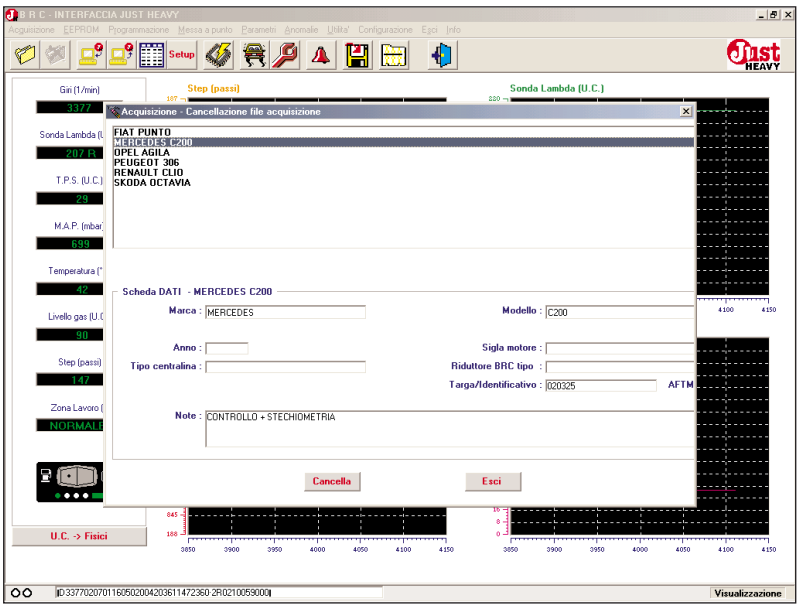


Fig. 86A – Acquisizione: cancellazione file di acquisizione

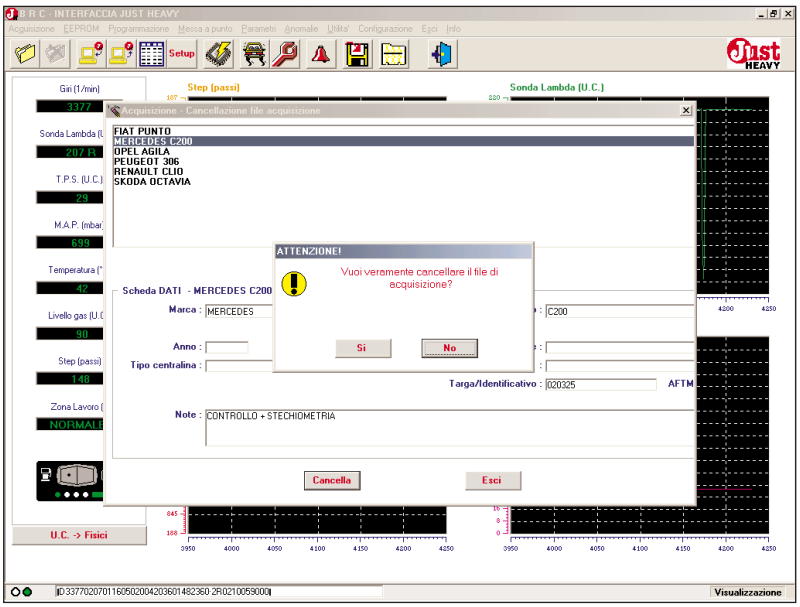


Fig. 86B – Acquisizione: conferma cancellazione file di acquisizione

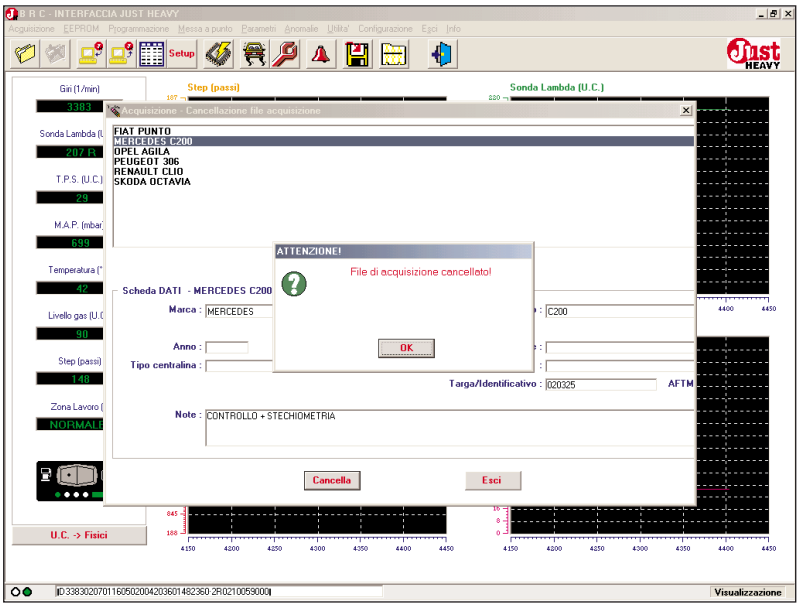


Fig. 86C – Acquisizione: avvenuta cancellazione file di acquisizione

5.10. EEPROM FILE MANAGEMENT

After the equipment set-up, the interface programme on PC allows to manage well-arranged files, each one storing the EEPROM content of a certain Just Heavy ECU (that is, all the vehicle set-up parameters).

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 installations (useful for future controls or adjustments on the installations);
- possible re-utilisation of an EEPROM file of a particular set-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 displayed in

pic.87.

5.10.1. EEPROM DATA SAVING ON FILE

By selecting the heading “Save on file” from the “EEPROM” menu (or clicking on the corresponding quick-choice icon), the screen as in pic.88 appears. It makes it possible to associate all the details necessary to determine a certain EEPROM file univocally, corresponding to a set-up carried out on a vehicle.

The compulsory descriptive fields for the creation and the storage of an EEPROM file are “Car made”, “Model” (vehicle model) and “Car plate/ Identification” (car plate of the vehicle or the name used to identify the file in the directory). 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 will see the list of the EEPROM files already stored in the PC. As you complete the data relative to the EEPROM file you want to save, the list focuses on the similar vehicles already saved.

5.10.2 EEPROM FILE DOWNLOADING

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

Obviously, to hope in a valid starting point to set-up a vehicle, it is necessary to use an EEPROM file of the same model 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 can-

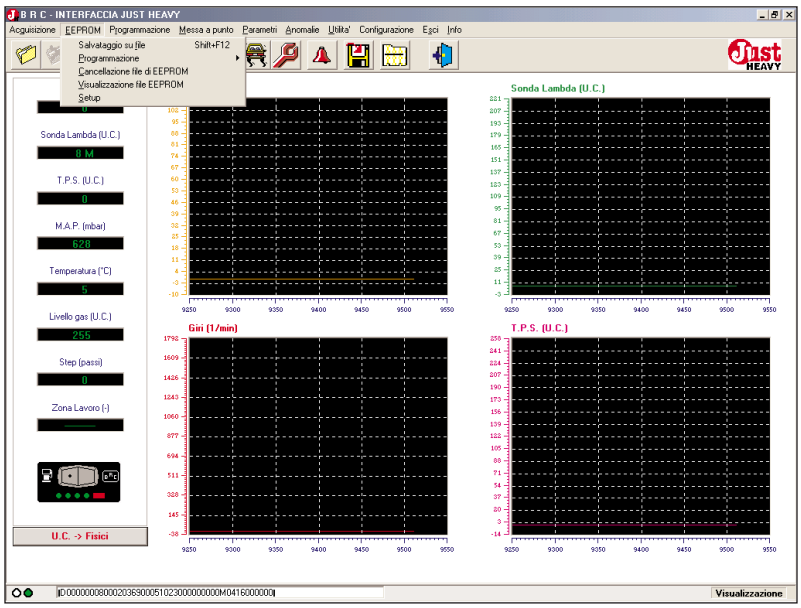


Fig. 87 – Gestione file EEPROM: menu principale

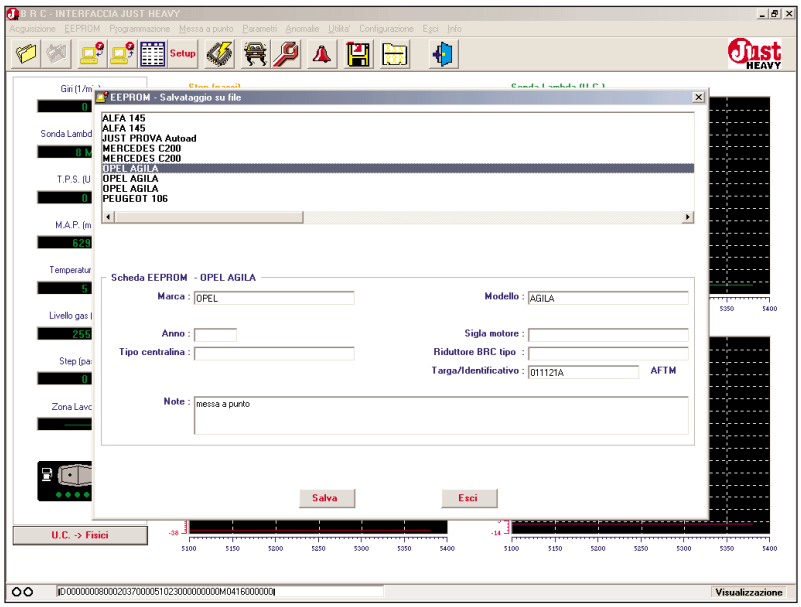


Fig. 88 – Gestione file EEPROM: salvataggio su file

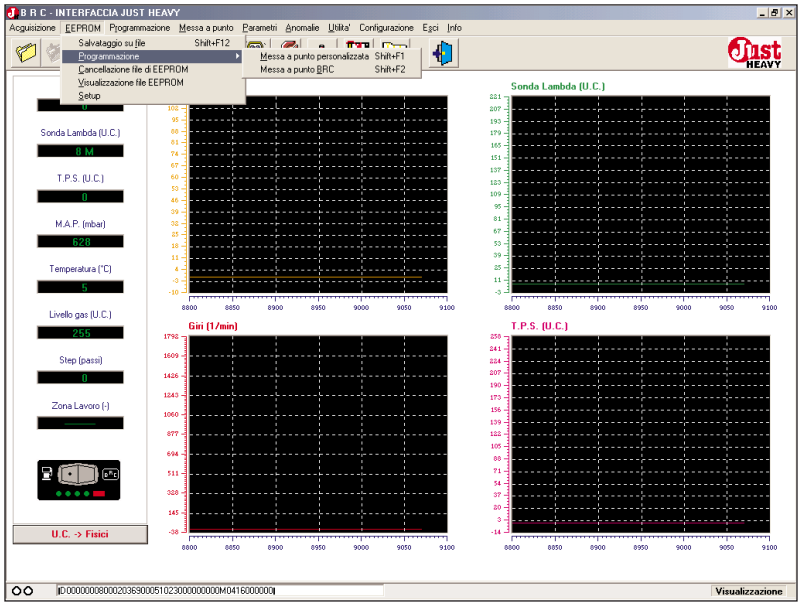


Fig. 89 – Gestione file EEPROM: sottomenu programmazione

not assure that further re-acquisitions (par.5.7) or changes in the adjustment aren't necessary for an optimum set-up.

By selecting the heading "Programming" from the "EEPROM" menu, the screen depicted in pic.89 appears and allows to select either programming of the new EEPROM, that based on an EEPROM file among those stored by the installer during his personalised set-ups or that based on EEPROM files of BRC's set-ups.

5.10.2.1 Personalised set-up

If you want to programme a new EEPROM with a file chosen among the stored ones during the personalised set-ups, select the menu heading "Personalised set-up". You will see the screen of pic.90A which allows to find, select and programme the desired EEPROM file, by choosing it among those previously filed.

To select the file you want to programme, click on the file name. Then click on the key "Programme" to start downloading it (pic.90B). Once the programming is over correctly, you will see the screen depicted in pic.90C.

5.10.2.2. BRC set-up

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

To do this select the menu heading "BRC set-up". A screen similar to that depicted in pic.90A appears. It allows to find, select and programme the desired EEPROM file, by choosing it in the file containing all the set-ups developed and provided by BRC.

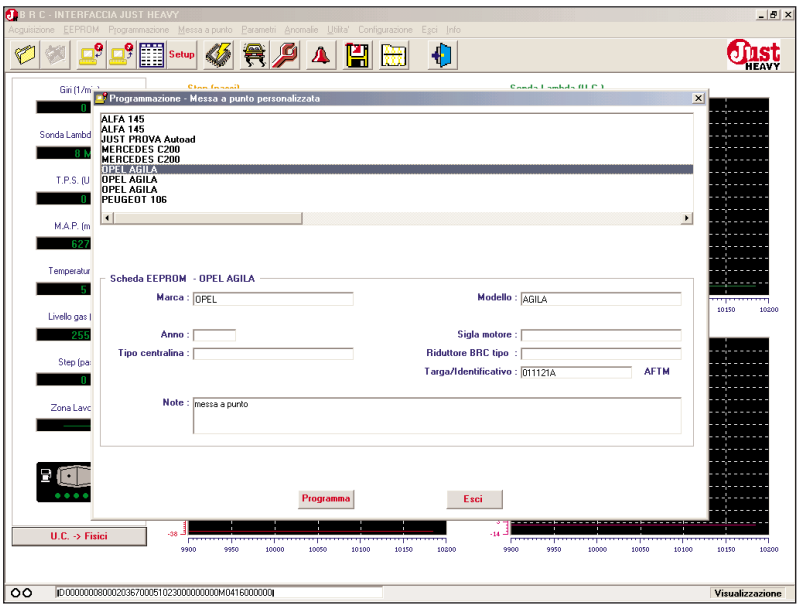


Fig. 90A – Gestione file EEPROM: selezione del file EEPROM da programmare

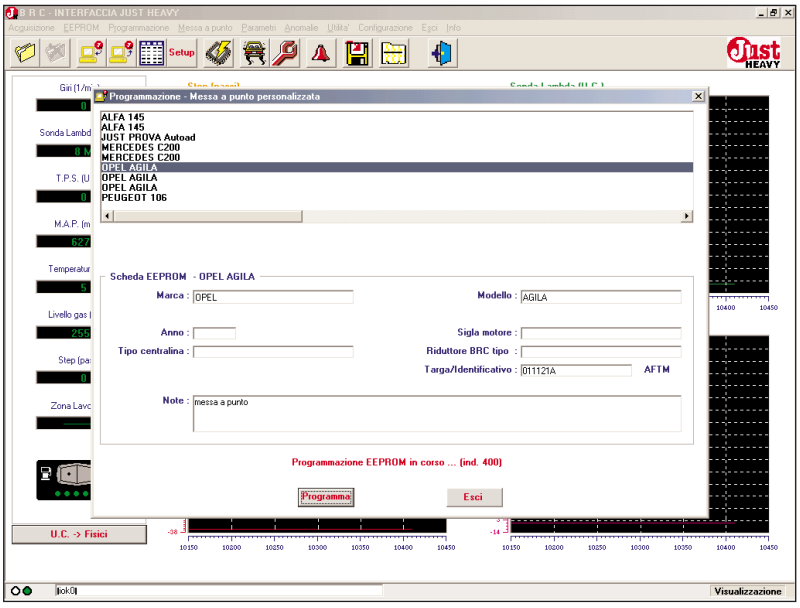


Fig. 90B – Gestione file EEPROM: programmazione in corso

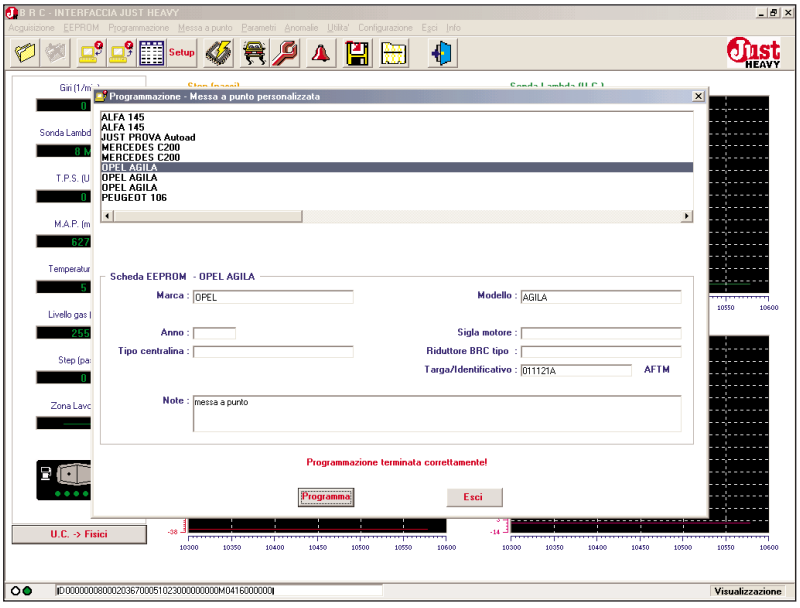


Fig. 90C – Gestione file EEPROM: programmazione terminata correttamente

5.10.3. EEPROM FILE CLEARANCE

To clear a certain EEPROM file previously stored, select the menu heading “Clear EEPROM file”. The screen depicted in pic.91 appears. It allows to find, select and clear the desired EEPROM file, by choosing it among the previously stored ones.

In this case, too, as we wrote on the data files, you can select the file you want to clear by clicking on the file name. Then click on the key “Clear” and confirm your choice in the window which will appear. The file is then removed.

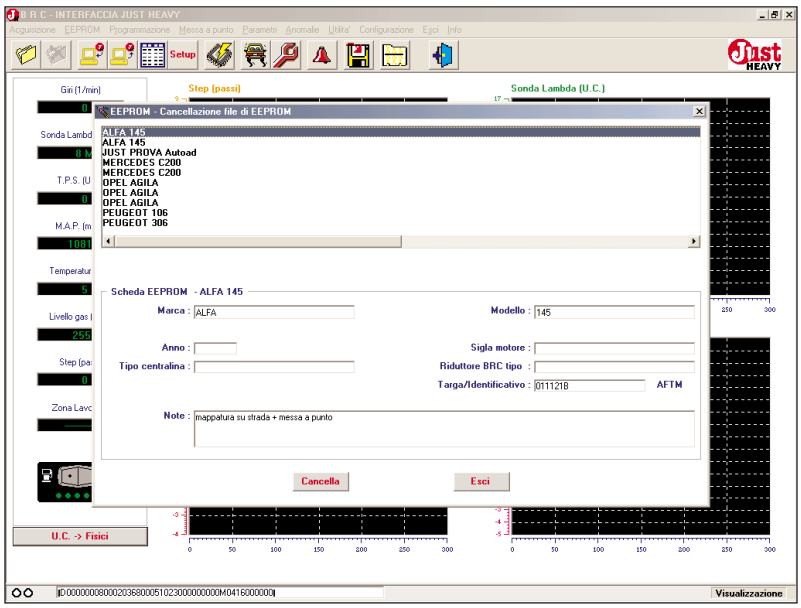


Fig. 91 – Gestione file EEPROM: cancellazione di un file

5.10.4. EEPROM FILE OFFLINE DISPLAY

A useful function of the interface for the analysis and the comparison of the set-up files is the possibility to display them, modify its descriptive card and parameters and print them, all this in an offline mode, that is to read them directly from those present in the directory, without keeping the ECU connected to the PC.

To display an EEPROM file in offline mode, select the menu heading “EEPROM file display”. The screen depicted in pic.92A appears. It allows to find, select and display the desired set-up file, by choosing it among those previously stored.

In this case, too, as we wrote on the data files, you can select the file you want to display by clicking on the file name. Then click on the key “Display” and the window of pic.92B will appear. There you can see and modify the set-up files. The keys that will appear at the bottom of the screen have the following use:

- “Save with name”: save the

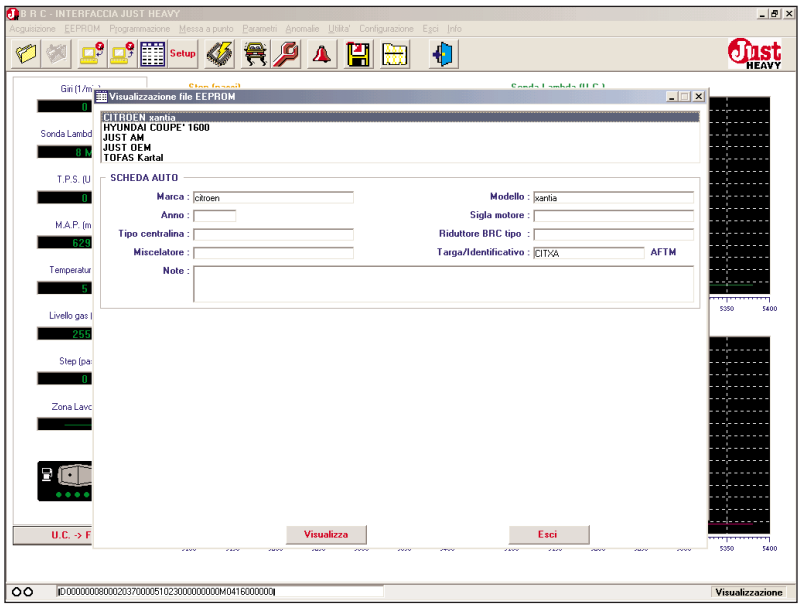


Fig. 92A – Gestione file EEPROM: scelta file EEPROM da visualizzare in modalità offline

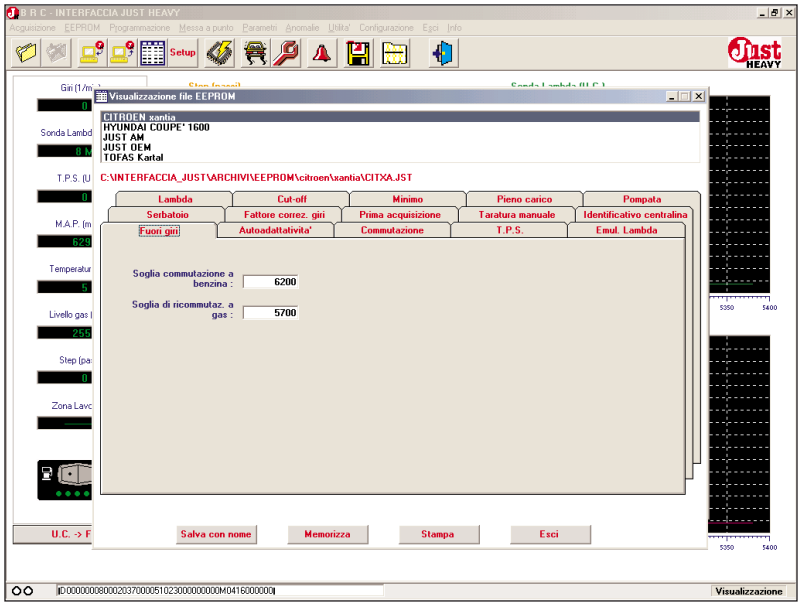


Fig. 92B – Gestione file EEPROM: visualizzazione e modifica file EEPROM in modalità offline

file after possible modifications to the parameters and the descriptive card, with a different name or the same name already in use;

- “Store”: store possible modifications to the parameters of the very file;
- “Print”: print the file with all its parameters;
- “Quit”: quit the screen.

5.10.5. Set up

The parameter set-up function 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 thoroughly adjust the ECU again, by repeating the first acquisition and self-learning procedure.

To set up select the heading “Set up” from the “EEPROM” menu (or click on the corresponding quick choice icon); the screen of pic.93 will appear.

By selecting the “Initialise” key and confirming the choice in a second screen requiring a further confirmation of the operation, the ECU is completely cleared.

Warning! Carry out this operation only if you are really convinced!

5.11. ECU SOFTWARE PROGRAMMING

The Just Heavy interface software allows to programme directly the microcontroller software. In case of need, you can thus update the ECU’s to the latest software version.

To get to the programming menu of the ECU software, select the heading “Programming” with the mouse, or click on the relative quick choice icon. You will get the screen of pic.94.

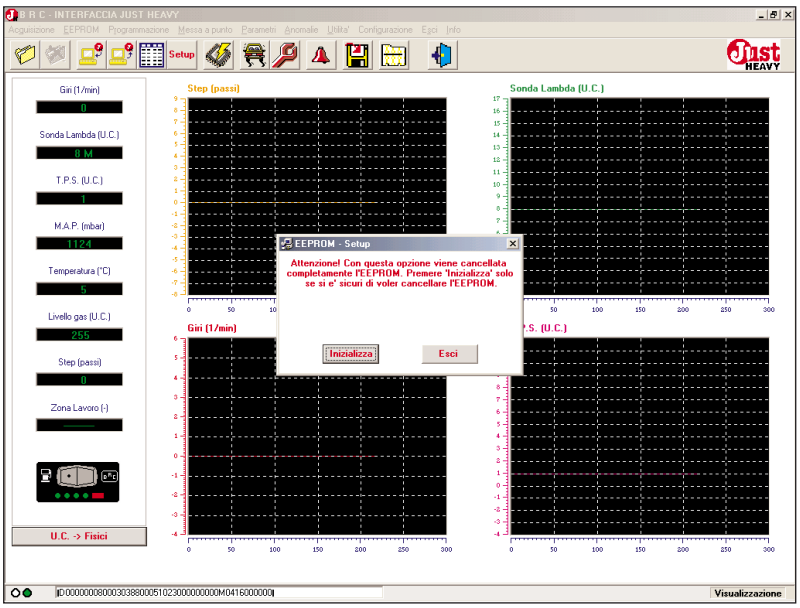


Fig. 93 – Gestione file EEPROM: setup parametri centralina

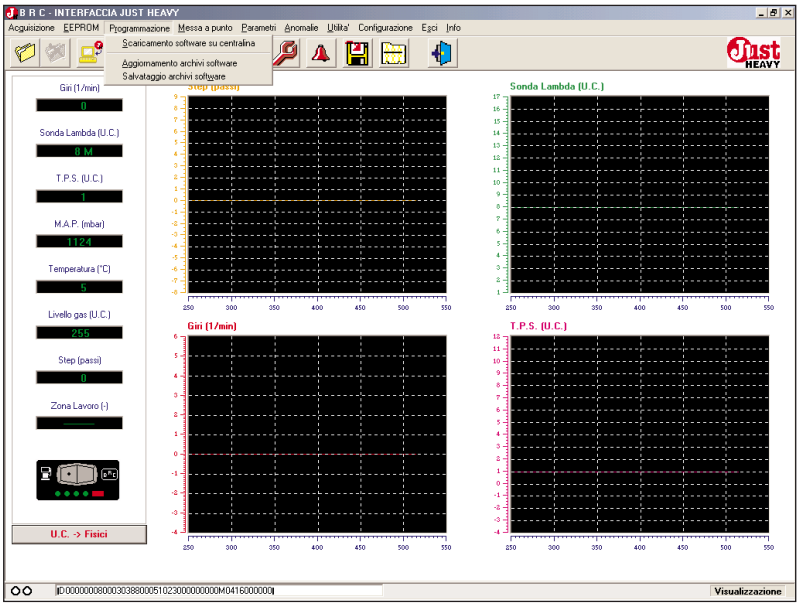


Fig. 94 – Programmazione software centralina: menu principale

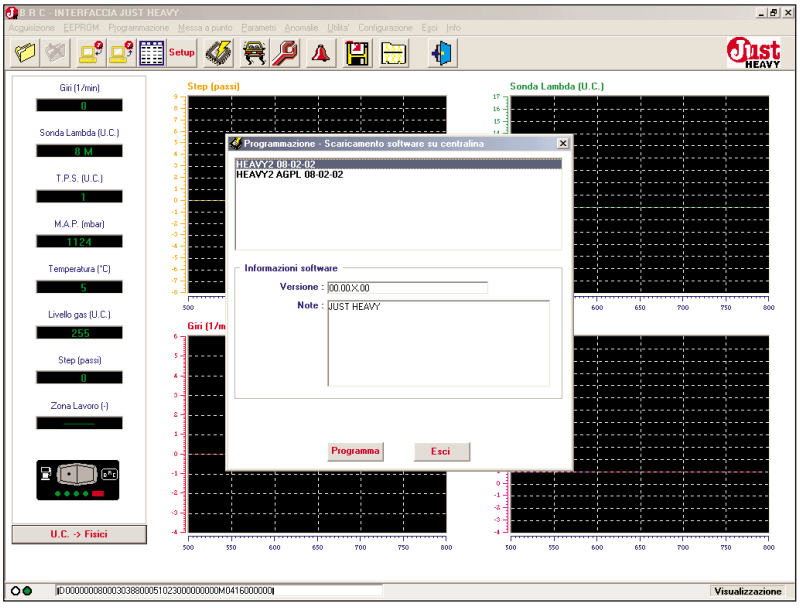


Fig. 95A – Programmazione software centralina: selezione del software da programmare

5.11.1. SOFTWARE DOWNLOAD ON ECU

By selecting the heading “Software download on ECU”, you will see the screen of pic.95A, which allows to select the software version you want to download into the ECU micro-controller.

To select the software you want to programme click on the software name. Then click on the “Programme” key to start down-loading (pic.95B). Once the pro-gramming is over correctly, you will see the screen depicted in pic.95C.

5.11.2. SOFTWARE DIRECTORY UPDATING

To download a new software version into the ECU microcon-troller, you must update con-stantly the software directories by the updating files provided by BRC (see BRC Internet site).

To update the software direc-tories you must have the updat-ing file (on floppy disk in driver A, on CD ROM in driver D, or directly on the hard disk C) and select the heading “Software directory updating” from the “Programming” menu. You will see the screen depicted in pic.96A.

On the screens “Software updating from” select the driver (A, C or D) and the folder con-taining the software updating file. The software contained in the updating will appear in a further window.

To select the software you want to update in your own direc-tories click on the little square beside the name. In the window “Software information” you will see the main characteristics of the selected software. After hav-ing selected all the software you intend to update (pic.96B), click

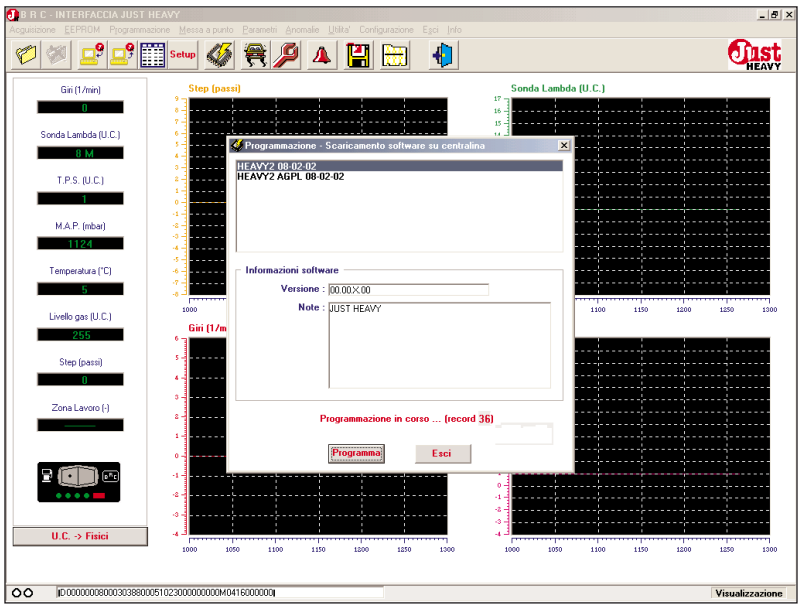


Fig. 95B – Programmazione software centralina: programmazione in corso

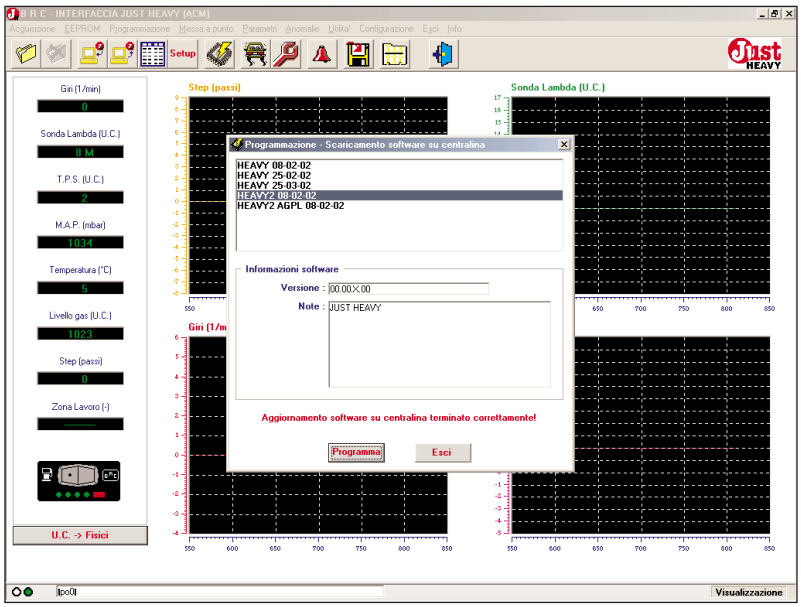


Fig. 95C – Programmazione software centralina: programmazione terminata correttamente

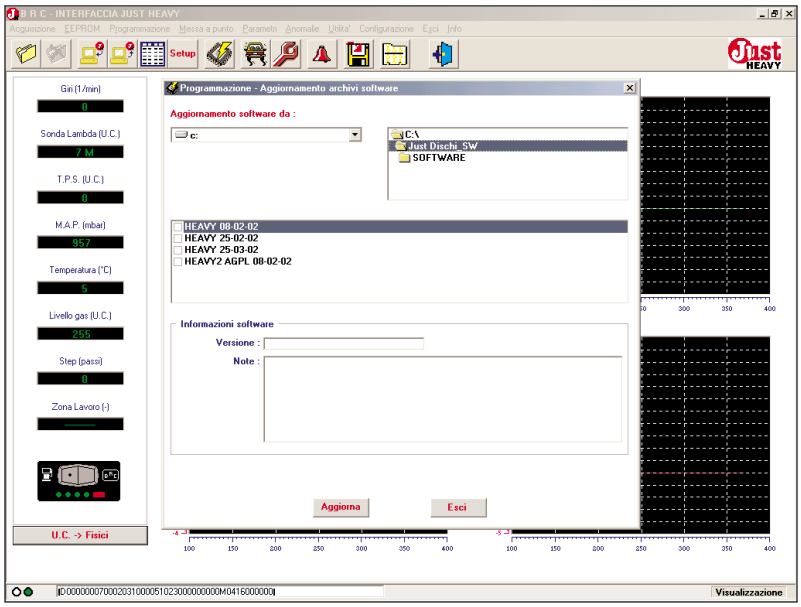


Fig. 96A – Programmazione software centralina: aggiornamento archivi software

on the key “Update” to insert them in your own directories in a format enabling to download it. Once the updating is over, the screen of pic.96C will appear.

5.11.3. Software directory saving

Besides updating the software directories, you can save all the software versions present in your directories. This operation is useful to create a backup copy of your software directories or to transfer your ECU programming files from one PC to another.

To carry out the saving, select the heading “Software directory saving” in the “Programming” menu. You will get the screen depicted in pic.97A.

In the window “Software saving in” select the driver (A, C or D) and the folder where you want to save it.

In the first top window select the software you want to include in the saving file.

To select the software you want to save in the specified folder, click on the little square beside the name. In the “Software information” window you will see the main characteristics of the selected software. After having selected all the software you want to save (pic.97B) click on “Save” to include them in the saving. Once the saving is over, you will see the screen as in pic.97C.

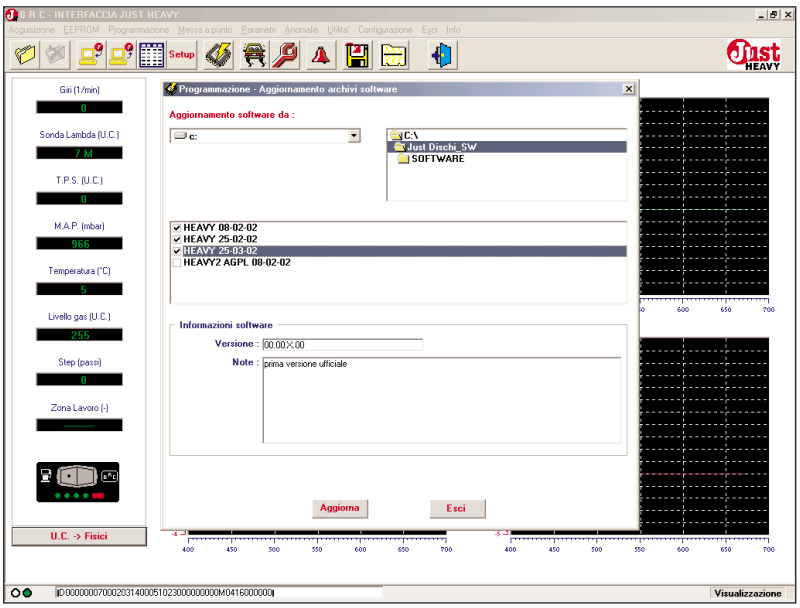


Fig. 96B – Programmazione software centralina: selezione software da aggiornaremente

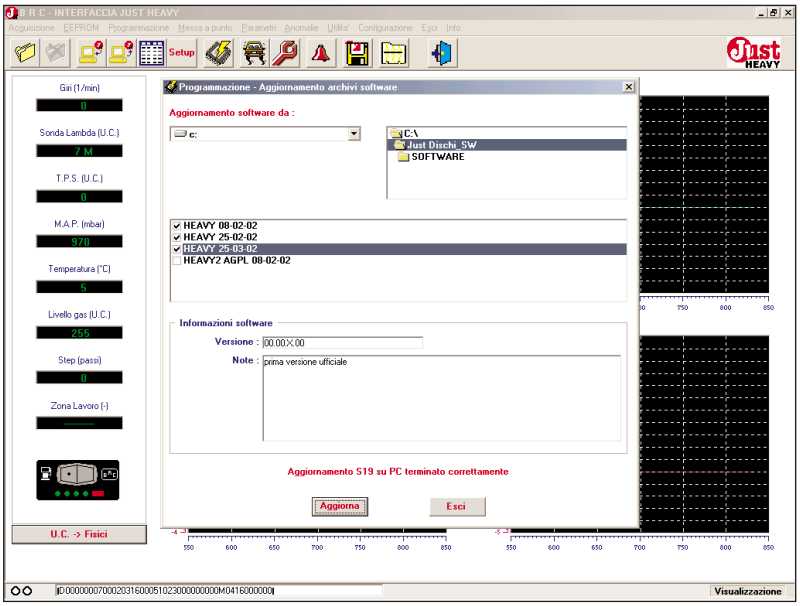


Fig. 96C – Programmazione software centralina: aggiornamento archivi software completato

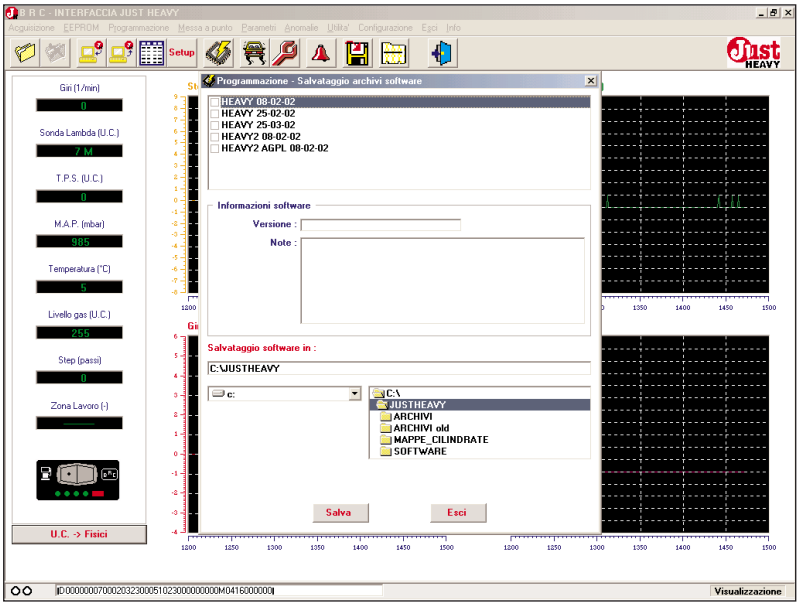


Fig. 97A – Programmazione software centralina: salvataggio archivi software

5.12. DEFECTS

As already explained in par.1.3.11, the Just Heavy ECU is equipped with a self-diagnosis system which detects the working defects with a proper encoding on the built-in changeover switch LED's (Appendix A) and as a historical interface software, that is to say that the interface software on PC stores all the defects occurred since the previous clearance of the defects.

To see them get to the "Defects" menu which opens the screen in pic.98.

The clearance of the defects occurred in the system from the screen displayed by the PC can be made with the "Clear" key on the same screen. You must switch the system off (take the ignition key out as well) and switch it on again.

If the defect cause has actually been removed, at the following start the system works correctly again.

If the cause has not been detected or removed, at the following start it is likely that the defect is showed again.

The description of the anomalies and their management is reported directly in the relative interface screen. See Appendix A for a further detailed description.

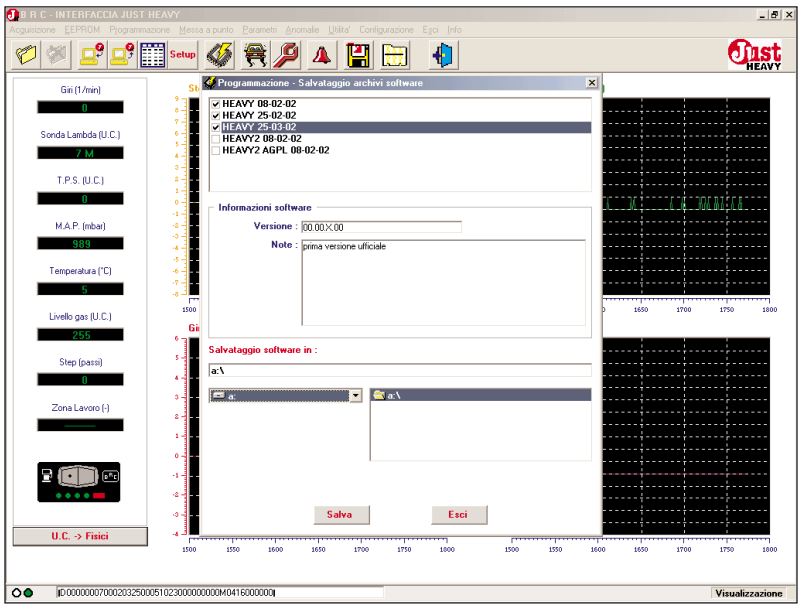


Fig. 97B – Programmazione software centralina: selezione software da salvare

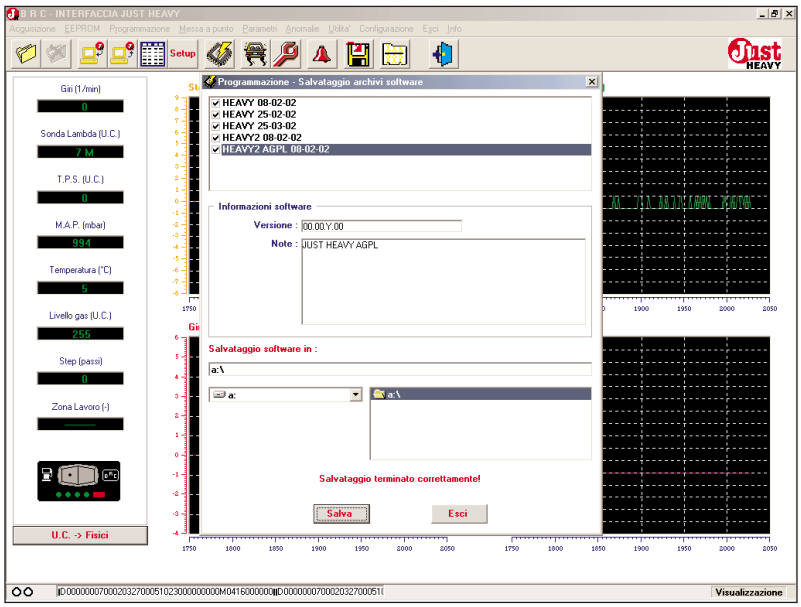


Fig. 97C – Programmazione software centralina: salvataggio archivi software completato

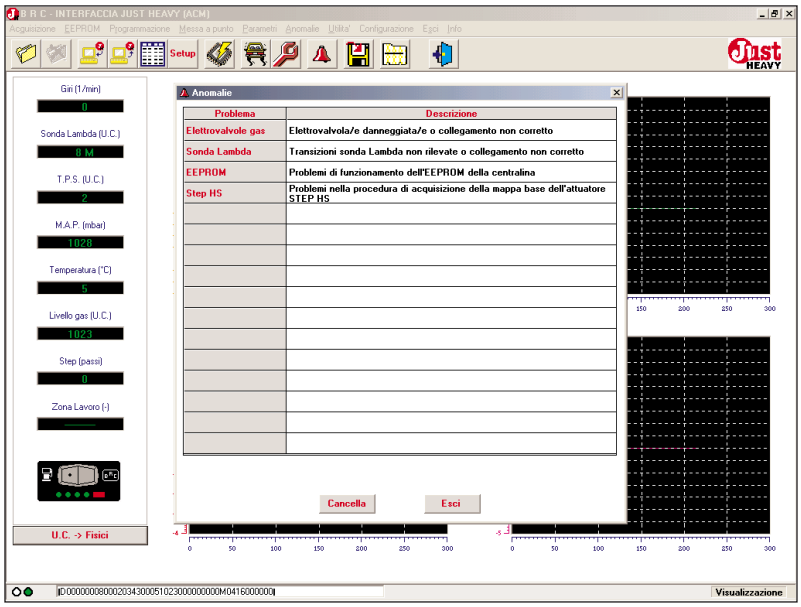


Fig. 98 – Anomalie: visualizzazione storico anomalie verificatesi nel sistema

5.13. UTILITIES

The “Utilities” menu (pic.99) offers other useful functions such as the possibility to file and reset the whole collection of EEPROM files stored on the PC.

In particular, it allows the management (saving and total or partial reset) of the 3 file types used by the system:

- data files (acquisition);
- EEPROM files (set-up);
- Files dedicated to the basic mappings (those downloaded during the first acquisition to continue with the acquisition of the basic map on road).

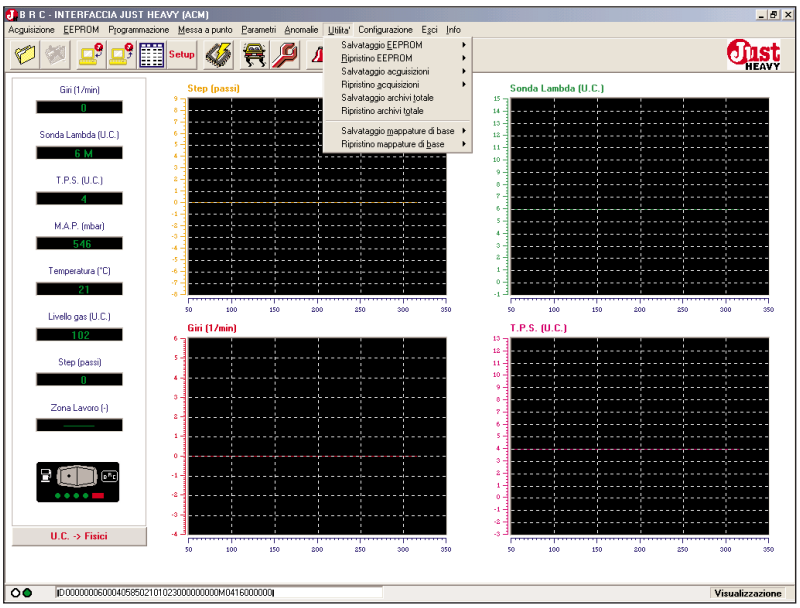


Fig. 99 – Utilità: menu principale

5.13.1. EEPROM SAVING

By selecting the heading “EEPROM saving” (pic.100) from the “Utilities” menu you can make a total or partial backup copy of the set-up files contained in your own directories. This operation is useful both to make a safety copy of these files and to transfer them from a PC to another.

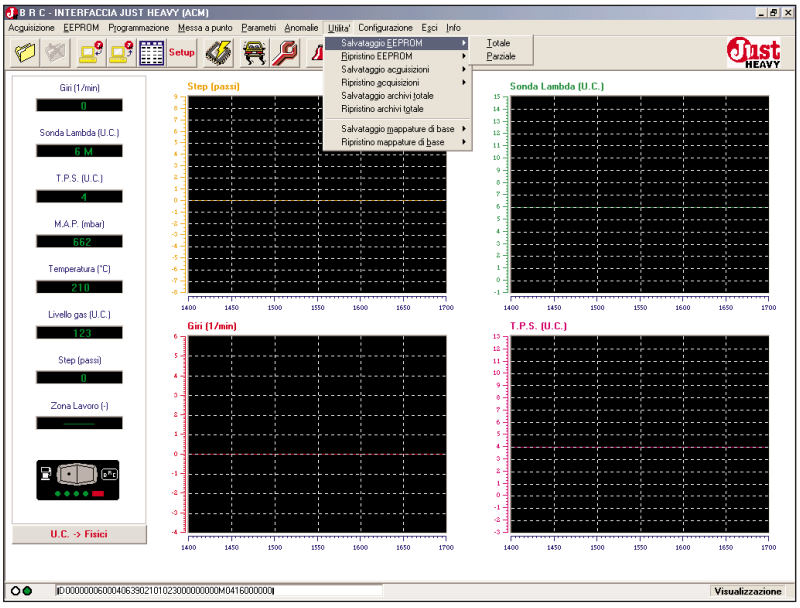


Fig. 100 – Utilità: sottomenu salvataggio EEPROM

5.13.1.1. Total

To save all the set-up files stored in your own directories, select the heading “Total” from the “EEPROM saving” submenu (pic.100). You will see the screen as in pic.101A.

In the window “Save in” select the driver (A, C or D) and the folder where you want to save it. Click on the “Save” key and the saving operation starts. Once it is over, you will see the screen depicted in pic.101B.

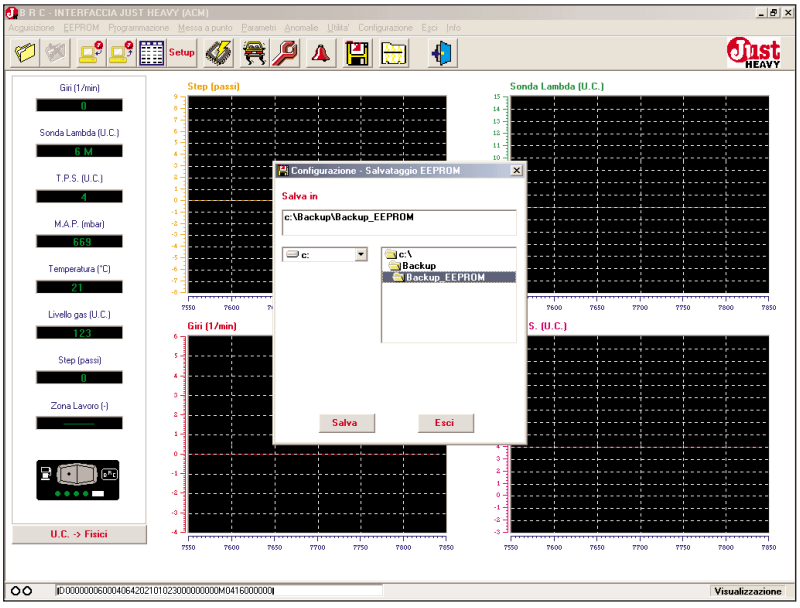


Fig. 101A – Utilità: scelta della cartella di salvataggio totale EEPROM

5.13.1.2. Partial

To make a partial saving of one or more set-up files stored in your own directories, select the heading “Partial” from the “EEP-

ROM saving" submenu (pic.100). You will see the screen as in pic.102A.

In the window "Save in" select the driver (A, C or D) and the folder where you want to save it.

To select the set-up files you want to save in the specified folder, click on the little square beside the file name in the "directory saving" window. In the "CAR CARD" window you will see the main characteristics of the chosen file.

After having selected all the files you want to save, click on the "Save" key and the saving operation starts. Once it is over, you will see the screen depicted in pic.102B.

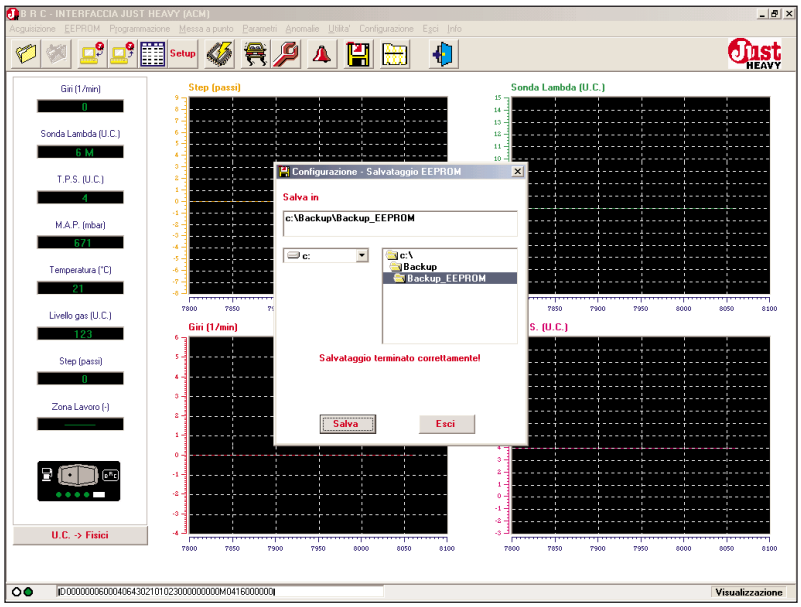


Fig. 101B – Utilità: salvataggio totale EEPROM terminato

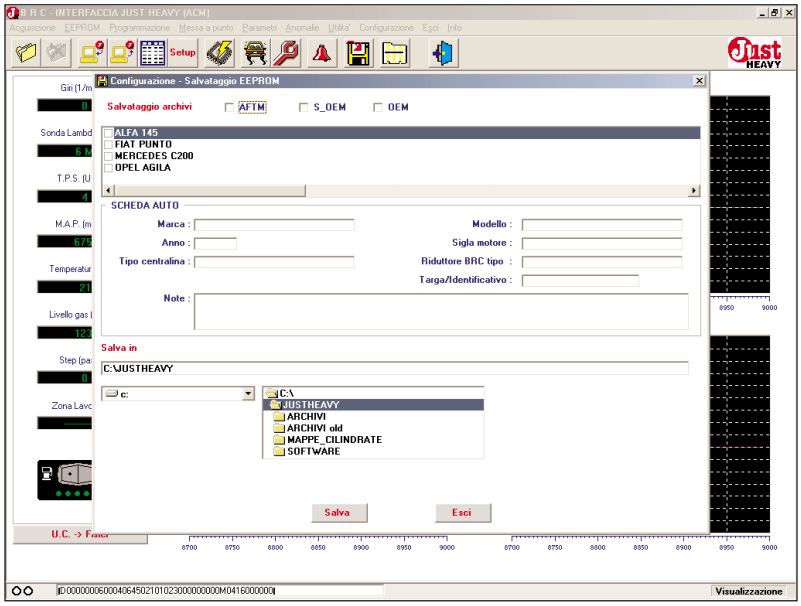


Fig. 102A – Utilità: scelta cartella e file di salvataggio parziale EEPROM

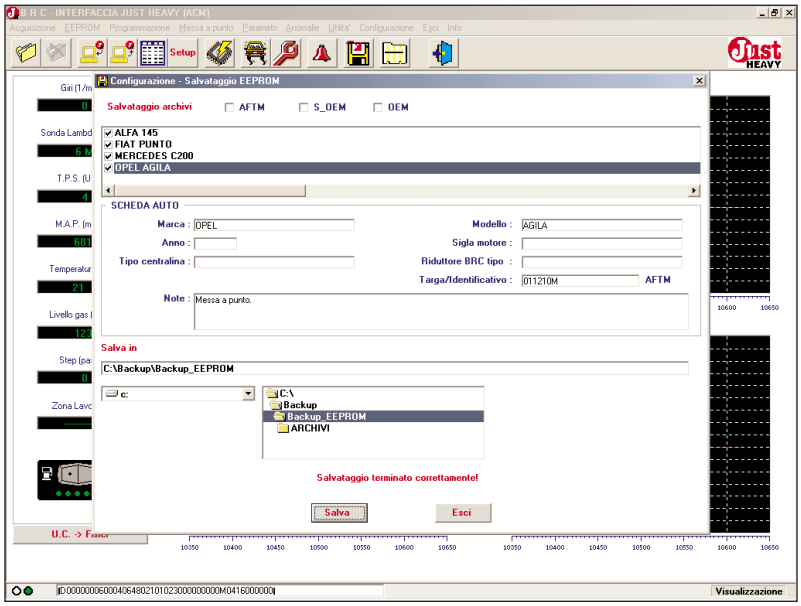


Fig. 102B – Utilità: salvataggio parziale EEPROM terminato

5.13.2. EEPROM RESET

Select the heading “EEPROM reset” (pic. 103) from the “Utilities” menu to update the set-up files, by making a total or partial transfer of EEPROM files from a backup copy. This operation is useful to insert one or more files from another PC or directly from BRC in your own set-up directories.

5.13.2.1. Total

To reset all the set-up files stored in backup copy (file created from a previous saving), select the heading “Total” from the “EEPROM reset” submenu (pic.103). You will see the screen as in pic.104A.

In the window “Reset directories from” select the driver (A, C or D) and the folder where you want to take the set-up files from. Click on the “Reset” key and the reset operation starts. In the “CAR CARD” window you will see the characteristics of the transferred files. Once it is over, you will see the screen depicted in pic.104B.

If an EEPROM file you want to reset is already present in the directory, you can replace it, not replace it or save it with another name (pic.104C).

5.13.2.2. Partial

To make a partial reset of one or more set-up files contained in a backup copy (file created during a previous saving), select the heading “Partial” from the “EEPROM reset” submenu (pic.103). You will see the screen as in pic.105A.

In the window “Reset directories from” select the driver (A, C or D) and the folder where you want to take the set-up files from.

To select the set-up files you

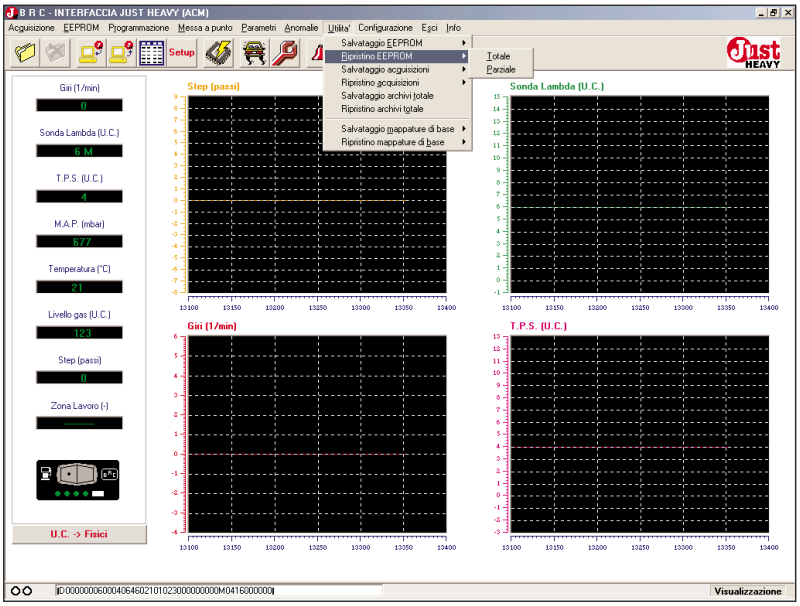


Fig. 103 – Utilità: sottomenu ripristino EEPROM

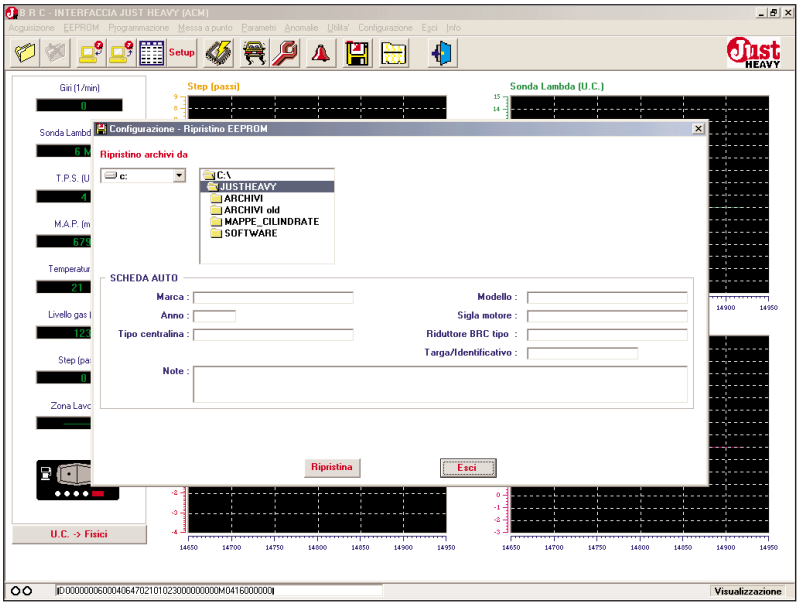


Fig. 104A – Utilità: ripristino totale EEPROM

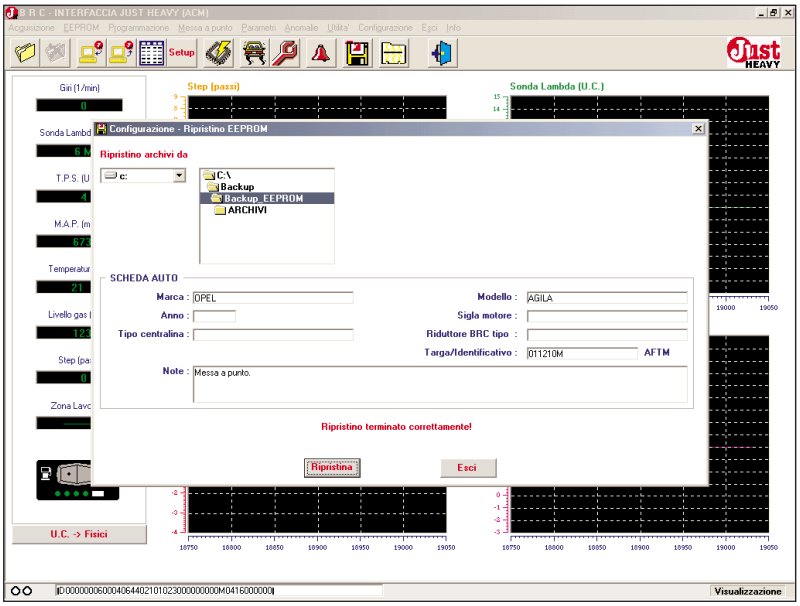


Fig. 104B – Utilità: ripristino totale EEPROM terminato

want to copy in your own directories, click on the little square beside the file name in the “directory reset” window. In the “CAR CARD” window you will see the main characteristics of the chosen file.

After having selected all the files you want to transfer, click on the “Reset” key to copy them in your directories. Once it is over, you will see the screen depicted in pic.105B.

If an EEPROM file you want to reset is already present in the directory, you can replace it, not replace it or save it with another name (pic.104C).

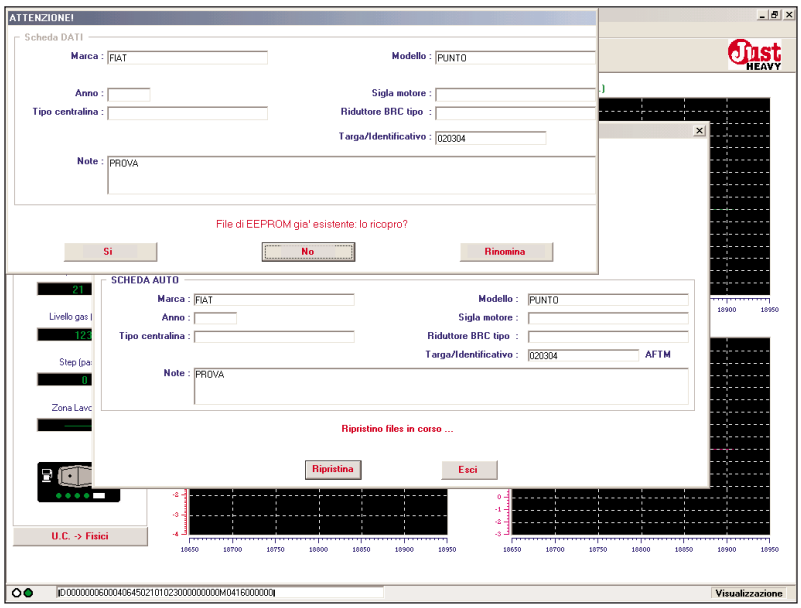


Fig. 104C – Utilità: file EEPROM da ripristinare già presente in archivio

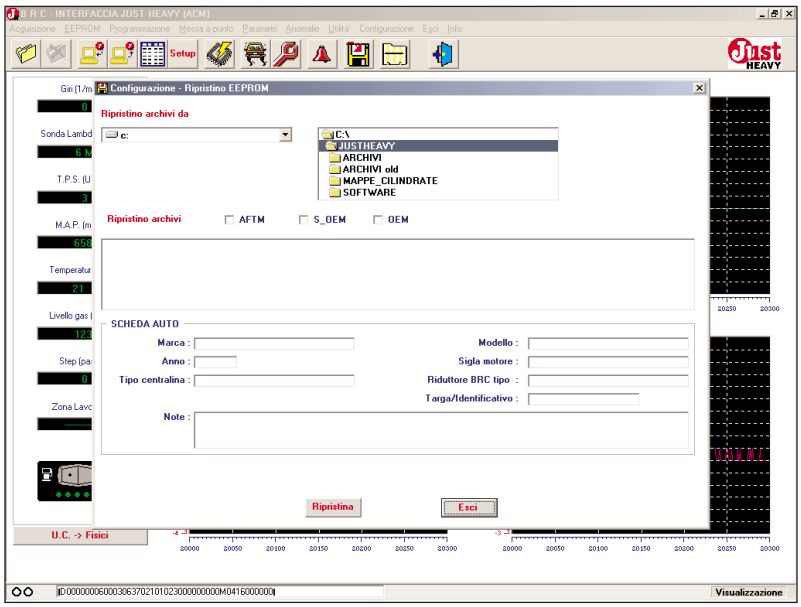


Fig. 105A – Utilità: scelta cartella e file ripristino parziale EEPROM

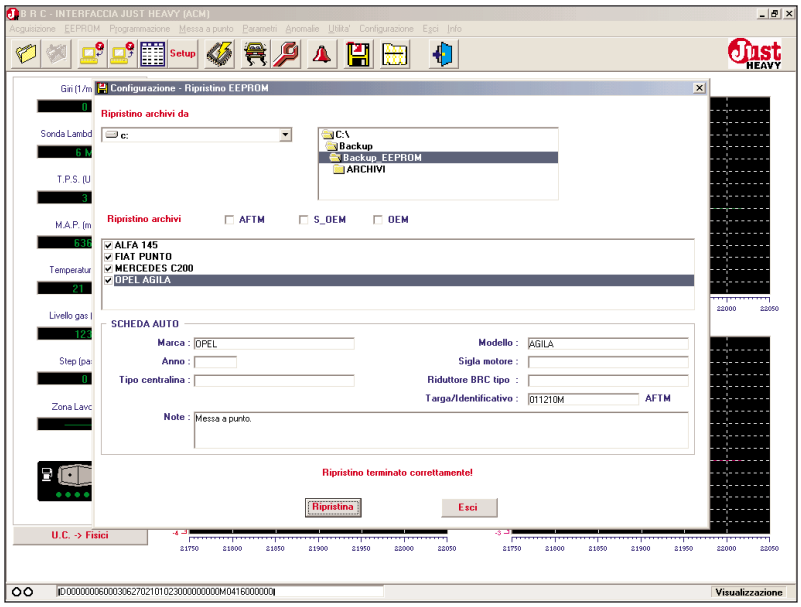


Fig. 105B – Utilità: ripristino parziale EEPROM terminato

5.13.3. ACQUISITION SAVING

By selecting the heading “Acquisition saving” (pic.106) from the “Utilities” menu you can make a total or partial backup copy of the acquisition files (data files) contained in your own directories. This operation is useful both to make a safety copy of these files and to transfer them from a PC to another.

5.13.3.1. Total

To save all the acquisition files stored in your own directories, select the heading “Total” from the “Acquisition saving” submenu (pic.106). You will see the screen as in pic.107A.

In the window “Save in” select the driver (A, C or D) and the folder where you want to save it. Click on “Save” and the saving operation starts. Once it is over, you will see the screen depicted in pic.107B.

5.13.3.2. Partial

To make a partial saving of one or more acquisition files stored in your own directories, select the heading “Partial” from the “Acquisition saving” submenu (pic.106). You will see the screen as in pic.108A.

In the window “Save in” select the driver (A, C or D) and the folder where you want to save it.

To select the acquisition files you want to save in the specified folder, click on the little square beside the file name in the “directory saving” window. In the “CAR CARD” window you will see the main characteristics of the chosen file.

After having selected all the files you want to save, click on e “Save” and the saving operation starts. Once it is over, you will see the screen depicted in

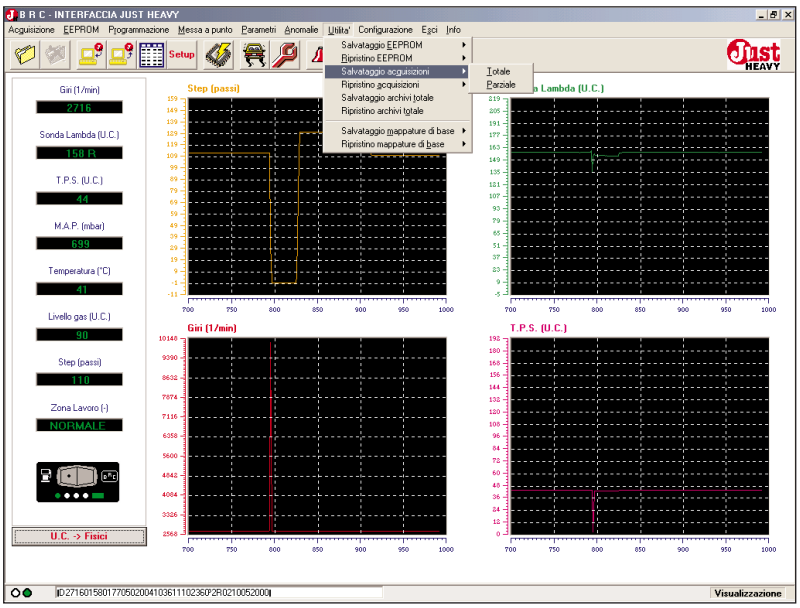


Fig. 106 – Utilità: sottomenu salvataggio Acquisizioni

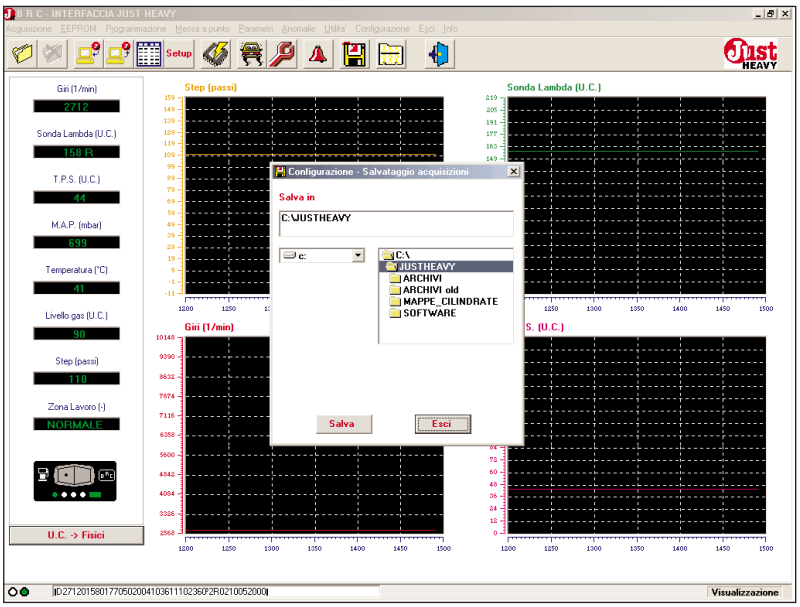


Fig. 107A – Utilità: scelta della cartella di salvataggio totale Acquisizioni

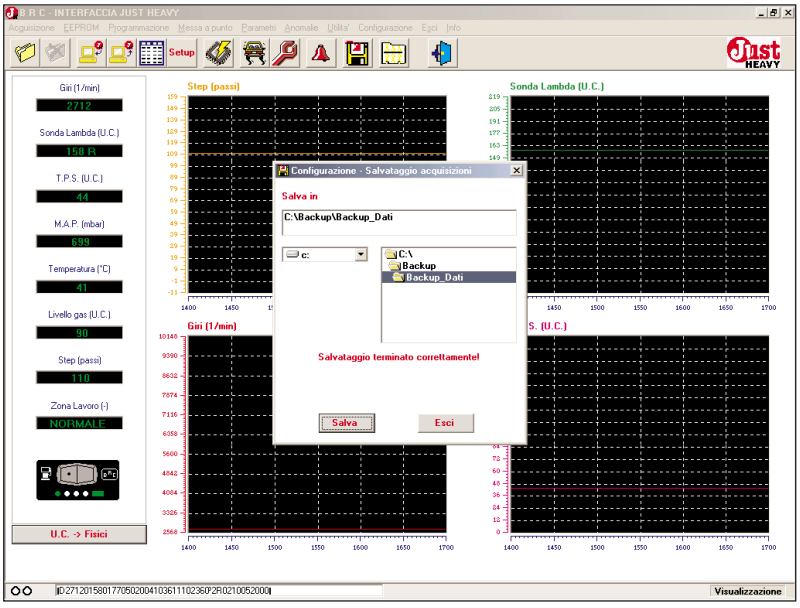


Fig. 107B – Utilità: salvataggio totale Acquisizioni terminato

pic.108B.

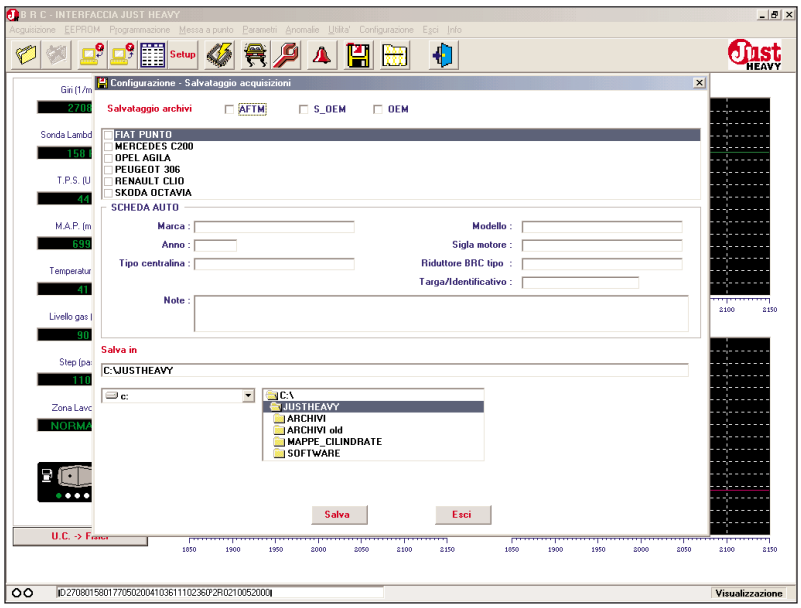


Fig. 108A – Utilità: scelta cartella e file di salvataggio parziale Acquisizioni

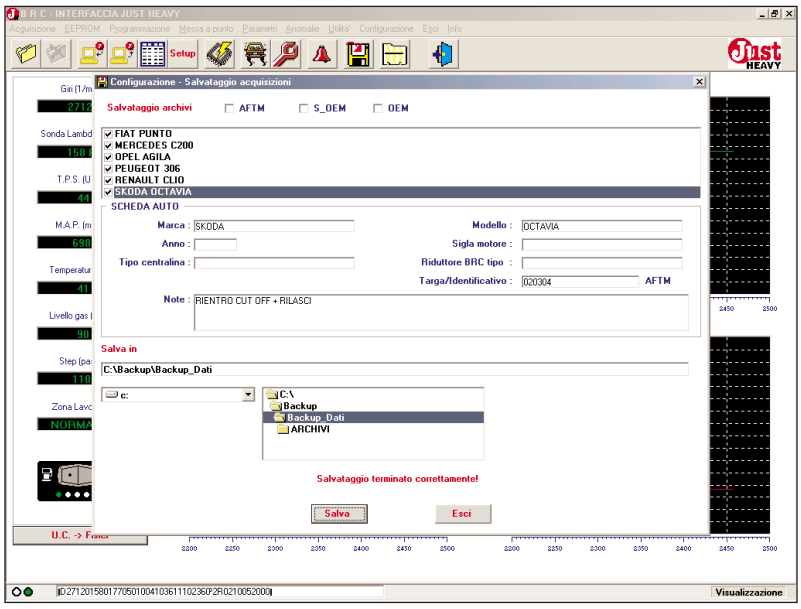


Fig. 108B – Utilità: salvataggio parziale Acquisizioni terminato

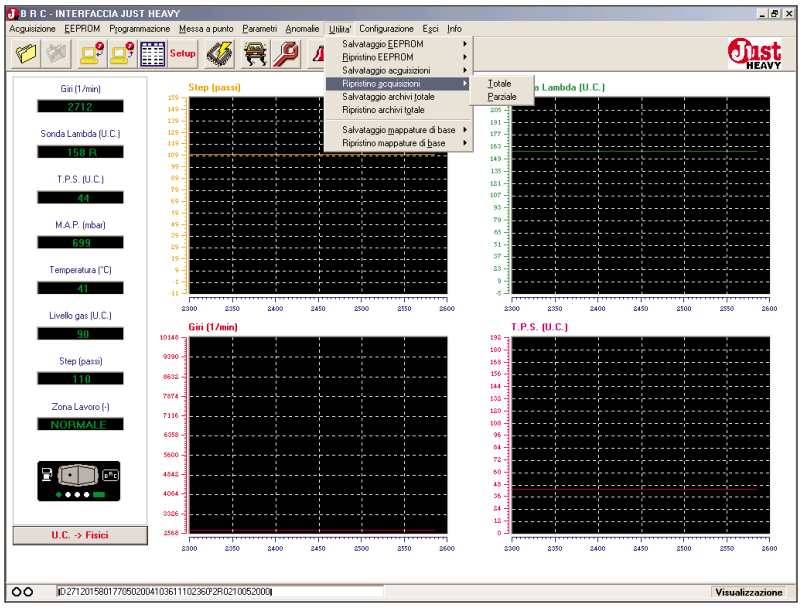


Fig. 109 – Utilità: sottomenu ripristino Acquisizioni

5.13.4. ACQUISITION RESET

Select the heading "Acquisition reset" (pic. 109) from the "Utilities" menu to update the acquisition files, by making a total or partial transfer of data files from a backup copy. This operation is useful to insert one or more files from another PC.

5.13.4.1. Total

To reset all the acquisition files stored in backup copy (file created from a previous saving), select the heading "Total" from the "Acquisition reset" submenu (pic.109). You will see the screen as in pic.110A.

In the window "Reset directories from" select the driver (A, C or D) and the folder where you want to take the acquisition files from. Click on "Reset" and the reset operation starts. In the "CAR CARD" window you will see the characteristics of the transferred files. Once it is over, you will see the screen depicted in pic.110B.

If an acquisition file you want to reset is already present in the directory, you can replace it, not replace it or save it with another name (pic.110C).

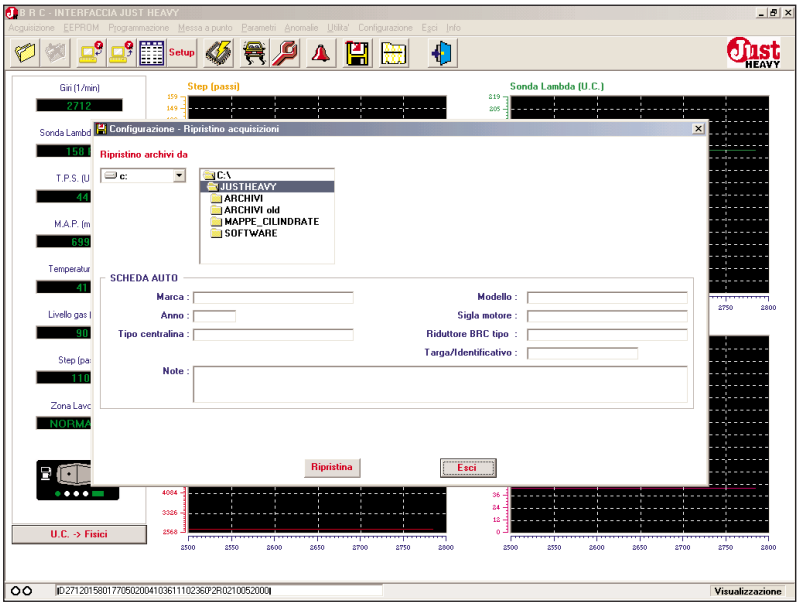


Fig. 110A – Utilità: ripristino totale Acquisizioni

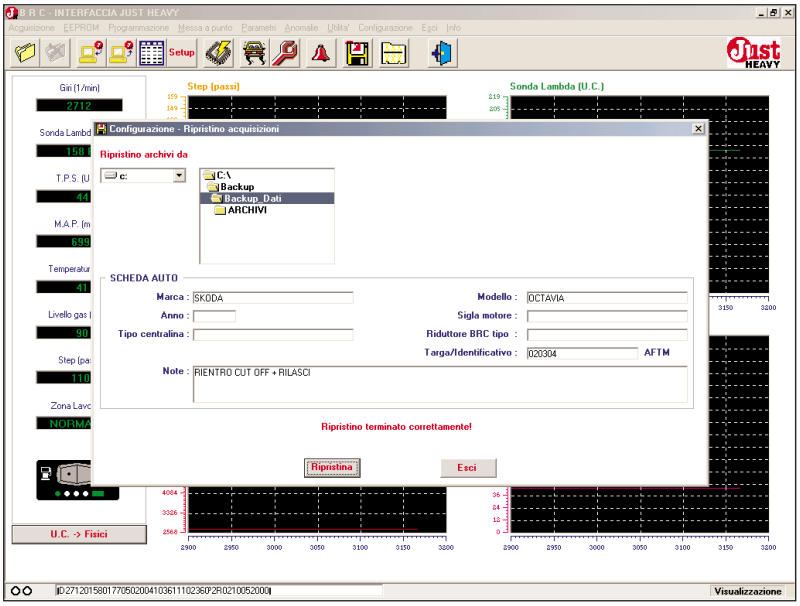


Fig. 110B – Utilità: ripristino totale Acquisizioni terminato

5.13.4.2. Partial

To make a partial reset of one or more acquisition files contained in a backup copy (file created during a previous saving), select the heading "Partial" from the "Acquisition reset" submenu (pic.109). You will see the screen as in pic.111A.

In the window "Reset directories from" select the driver (A, C or D) and the folder where you want to take the acquisition files from.

To select the acquisition files you want to copy in your own

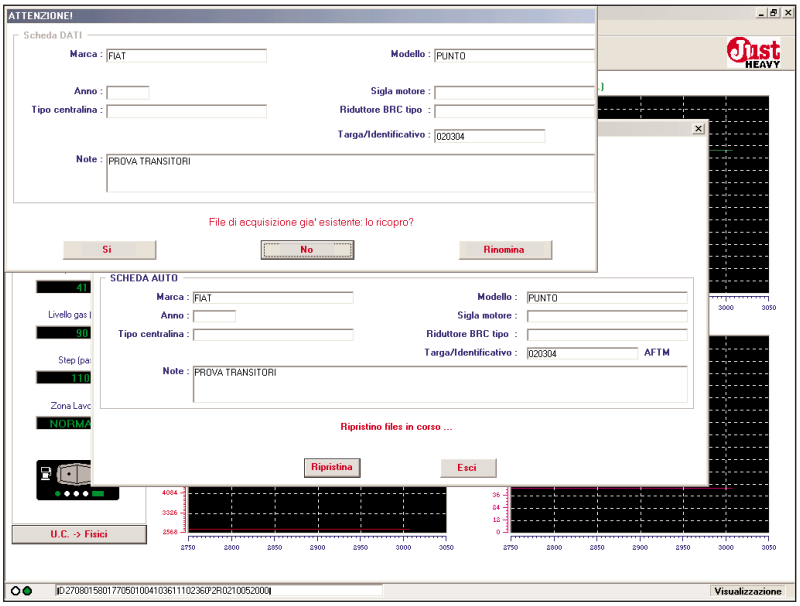


Fig. 110C – Utilità: file Acquisizioni da ripristinare già presente in archivio

directories, click on the little square beside the file name in the “directory reset” window. In the “CAR CARD” window you will see the main characteristics of the chosen file.

After having selected all the files you want to transfer, click on “Reset” to copy them in your directories. Once it is over, you will see the screen depicted in pic.111B.

If an acquisition file you want to reset is already present in the directory, you can replace it, not replace it or save it with another name (pic.110C).

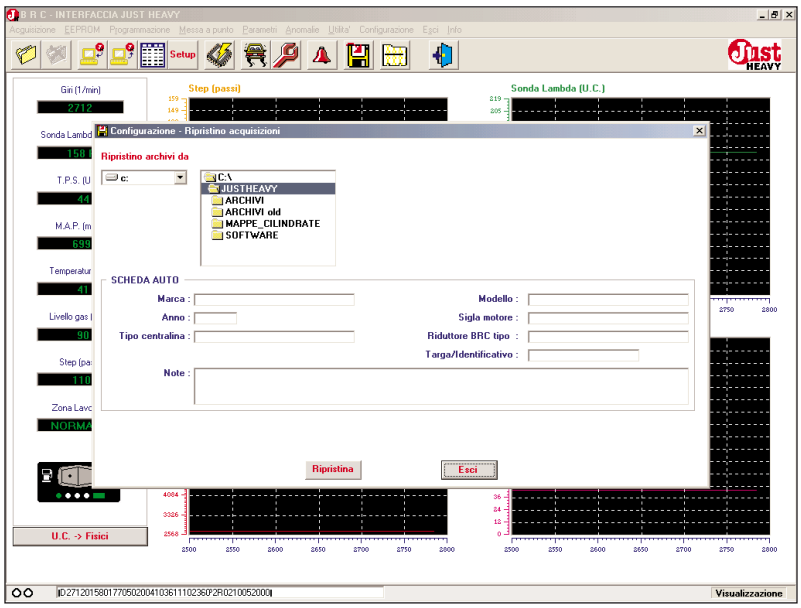


Fig. 111A – Utilità: scelta cartella e file ripristino parziale Acquisizioni

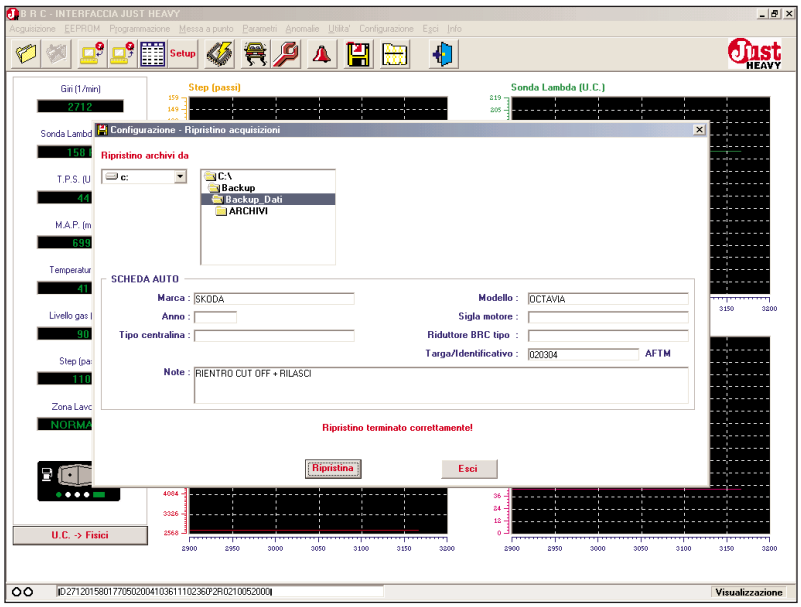


Fig. 111B – Utilità: ripristino parziale Acquisizioni terminato

5.13.5. DIRECTORY TOTAL SAVING

To save all the directories related to the set-up and acquisition files, select the heading “Directory total saving” from the “Utilities” (pic.99) menu. The screen as in pic.112A will be displayed.

In the window “Save in” select the driver (A, C or D) and the folder where you want to save it. Click on the “Save” key and the saving operation starts. Once it is over, you will see the screen depicted in pic.112B.

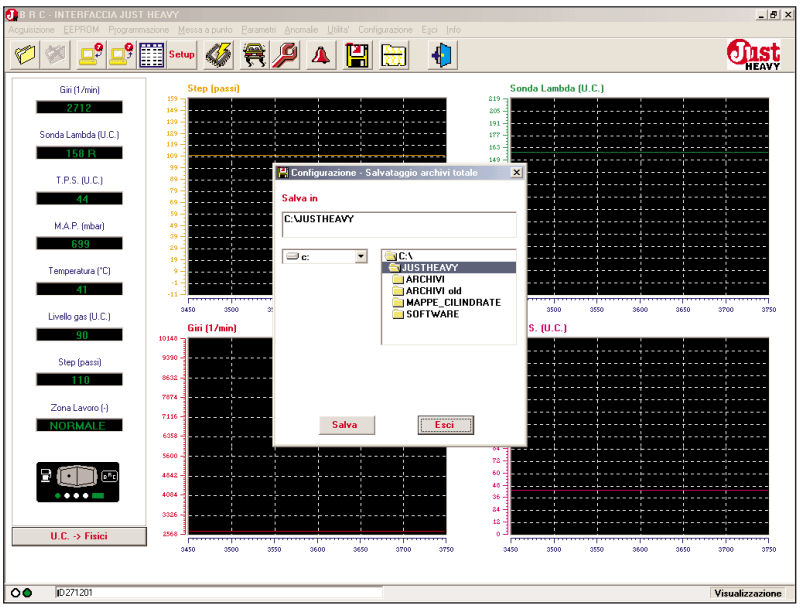


Fig. 112A – Utilità: scelta della cartella di salvataggio totale Archivi

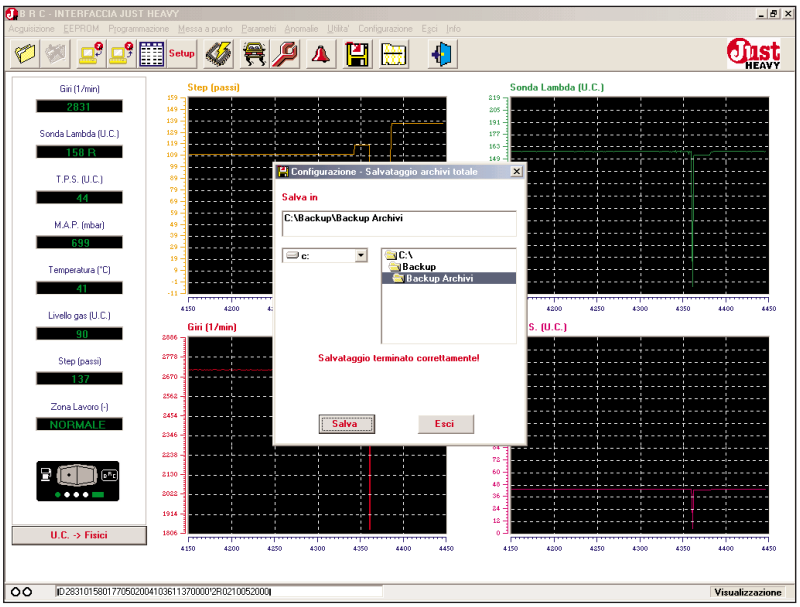


Fig. 112B – Utilità: salvataggio totale Archivi terminato

5.13.6. DIRECTORY TOTAL RESET

To reset all the directory related to the set-up and acquisition stored in backup copy (file created from a previous saving), select the heading “Directory total reset” from the “Utilities” menu (pic.99). You will see the screen as in pic.113A.

In the window “Reset directories from” select the driver (A, C or D) and the folder where you want to take the set-up files from. Click on “Reset” and the reset operation starts. In the “CAR CARD” window you will see the characteristics of the transferred files. Once it is over, you will see the screen depicted in pic.113B.

If an EEPROM or data file you want to reset is already present in the directory, you can replace it, not replace it or save it with another name (pic.104C and 110C).

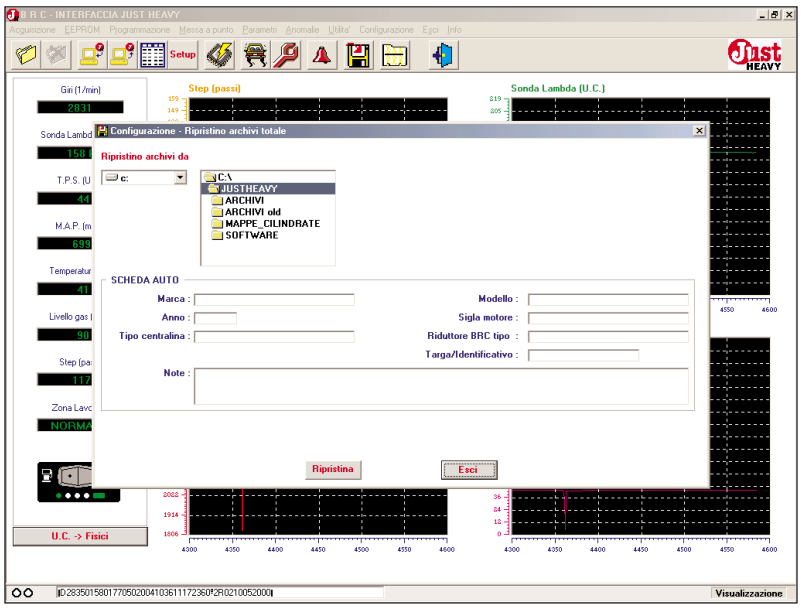


Fig. 113A – Utilità: ripristino totale Archivi

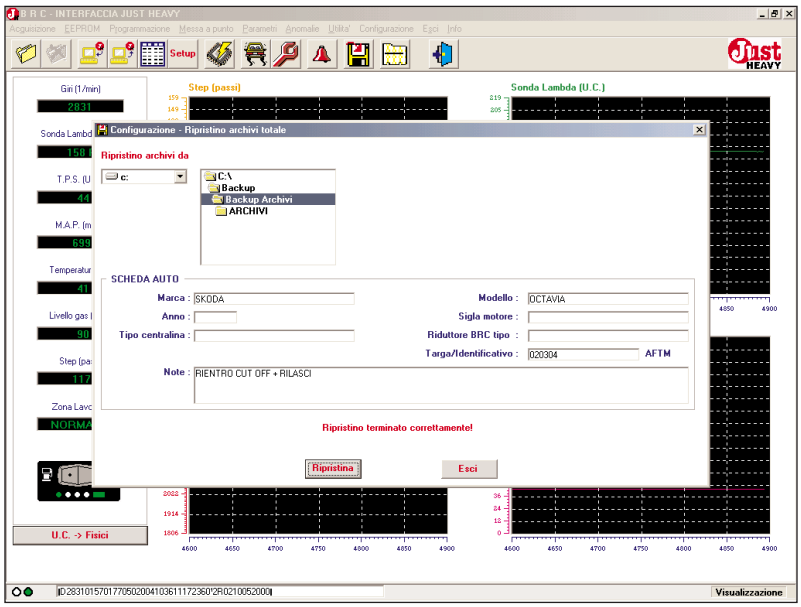


Fig. 113B – Utilità: ripristino totale Archivi terminato

5.13.7. BASIC MAP SAVING

By selecting the heading “Basic map saving” (pic.114) from the “Utilities” menu you can make a total or partial backup copy of the basic map files contained in your own directories. This operation is useful both to make a safety copy of these files and to transfer them from a PC to another.

5.13.7.1. Total

To save all the basic map files stored in your own directories, select the heading “Total” from the “Basic map saving” submenu (pic.114). You will see the screen as in pic.115A.

In the window “Save in” select the driver (A, C or D) and the folder where you want to save it. Click on “Save” and the saving operation starts. Once it is over, you will see the screen depicted in pic.115B.

5.13.7.2. Partial

To make a partial saving of one or more basic map files stored in your own directories, select the heading “Partial” from the “Basic map saving” submenu (pic.114). You will see the screen as in pic.116A.

In the window “Save in” select the driver (A, C or D) and the folder where you want to save it.

To select the set-up files you want to save in the specified folder, click on the little square beside the file name in the “basic map saving” window. In the “CAR CARD” window you will see the main characteristics of the chosen map.

After having selected all the maps you want to save, click on the “Save” key and the saving operation starts. Once it is over,

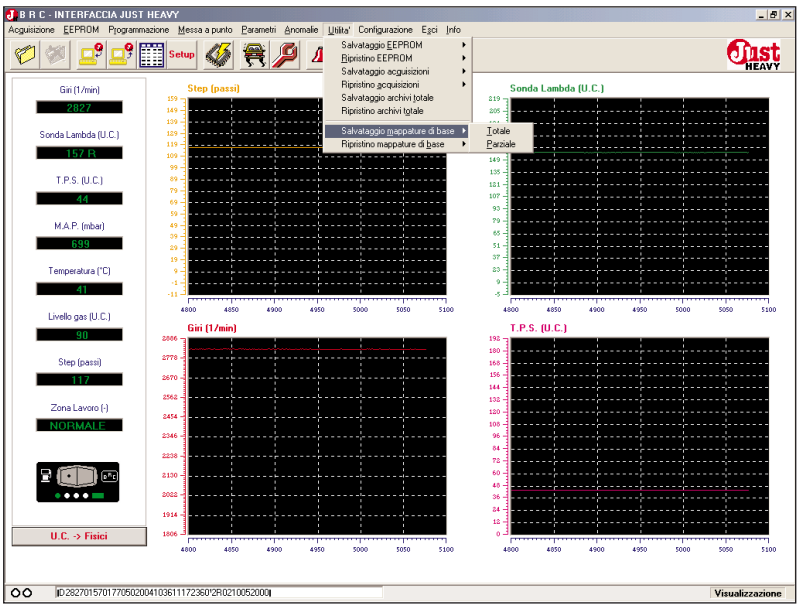


Fig. 114 – Utilità: sottomenu salvataggio mappature di base

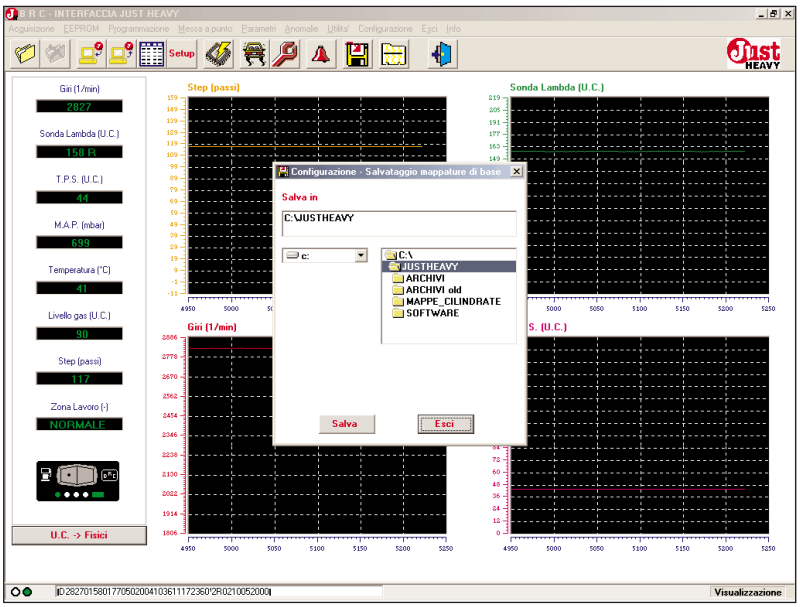


Fig. 115A – Utilità: scelta della cartella di salvataggio totale Mappature di base

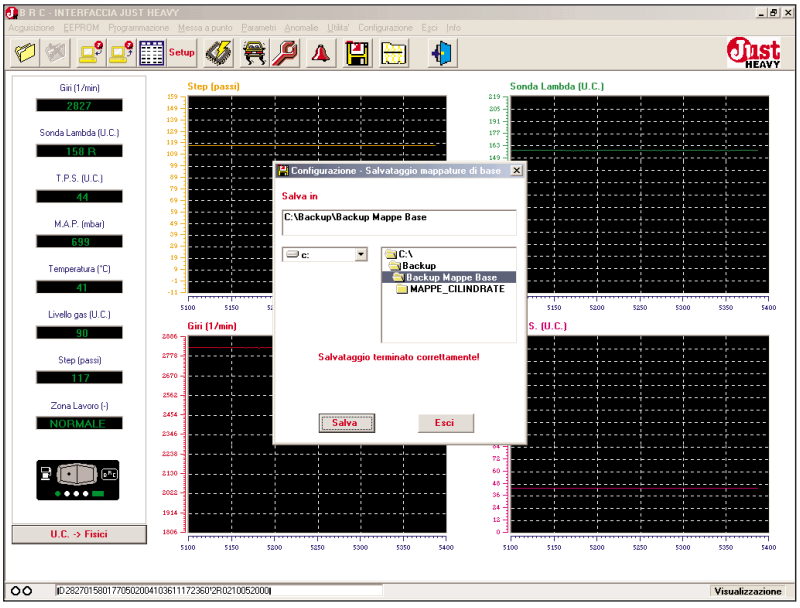


Fig. 115B – Utilità: salvataggio totale Mappature di base terminato

you will see the screen depicted in pic.116B.

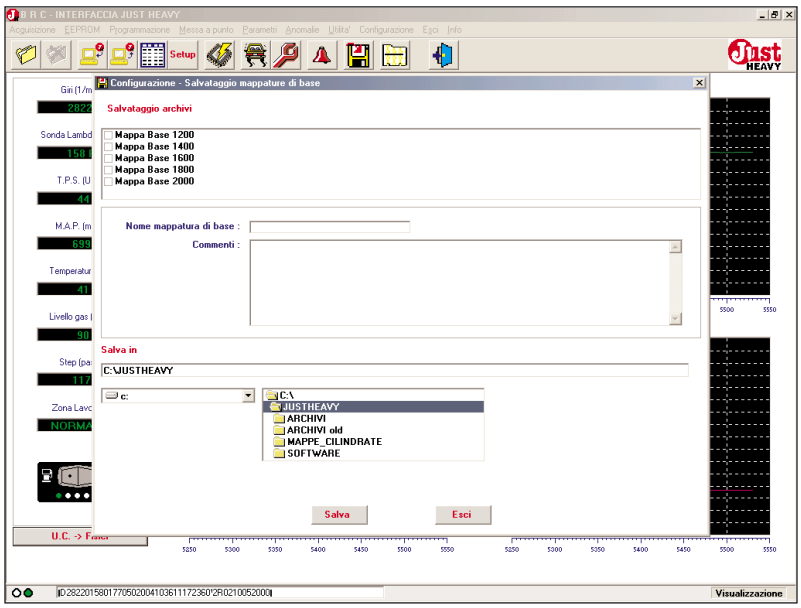


Fig. 116A – Utilità: scelta cartella e file di salvataggio parziale Mappature di base

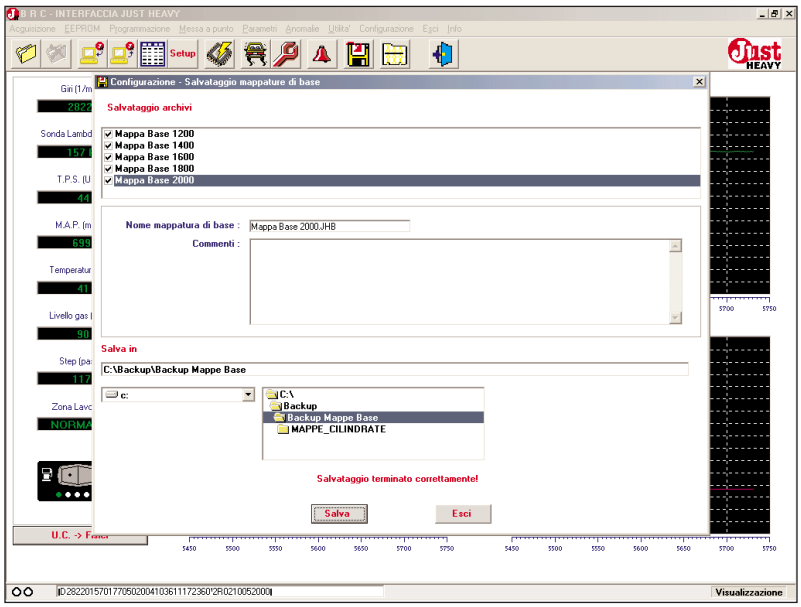


Fig. 116B – Utilità: salvataggio parziale Mappature di base terminato Mappature di base terminato

5.13.8. BASIC MAP RESET

Select the heading “Basic map reset” (pic. 117) from the “Utilities” menu to update the basic map files, by making a total or partial transfer of basic map from a backup copy. This operation is useful to insert one or more basic map files from another PC or directly from BRC.

5.13.8.1. Total

To reset all the basic map files stored in backup copy (file created from a previous saving), select the heading “Total” from the “Basic map reset” submenu (pic.117). You will see the screen as in pic.118A.

In the window “Reset basic map from” select the driver (A, C or D) and the folder where you want to take the basic maps from. Click on the “Reset” key and the reset operation starts. In the bottom window you will see the characteristics of the transferred basic maps. Once it is over, you will see the screen depicted in pic.118B.

If an acquisition file you want to reset is already present in the directory, you can replace it, not replace it or save it with another name (pic.118C).

5.13.8.2. Partial

To make a partial reset of one or more basic maps contained in a backup copy (file created during a previous saving), select the heading “Partial” from the “Basic map reset” submenu (pic.117). You will see the screen as in pic.119A.

In the window “Reset basic maps from” select the driver (A, C or D) and the folder where you want to take the basic maps from.

To select the basic maps you

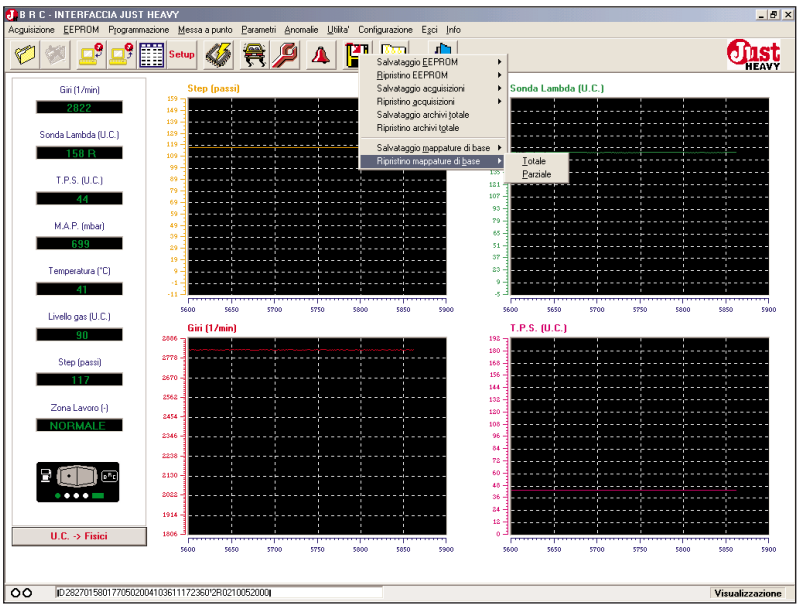


Fig. 117 – Utilità: sottomenu ripristino Mappature di base

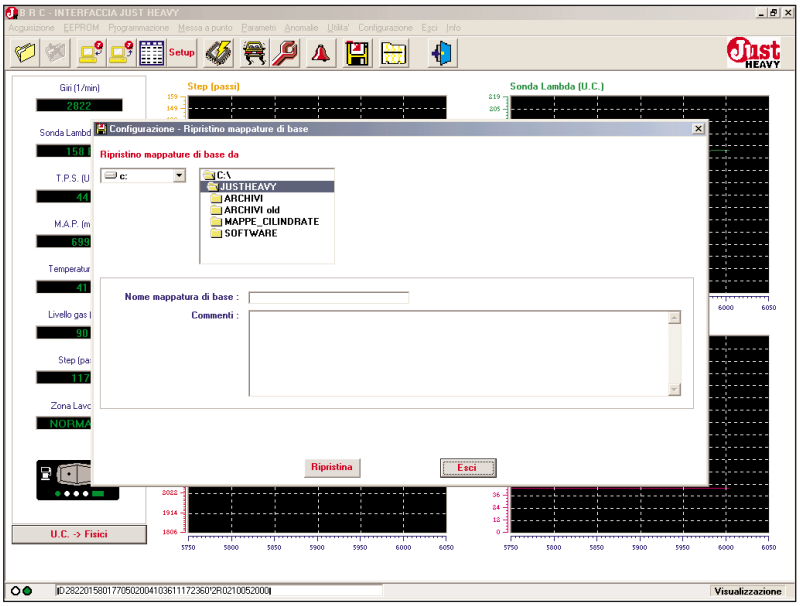


Fig. 118A – Utilità: ripristino totale Mappature di base

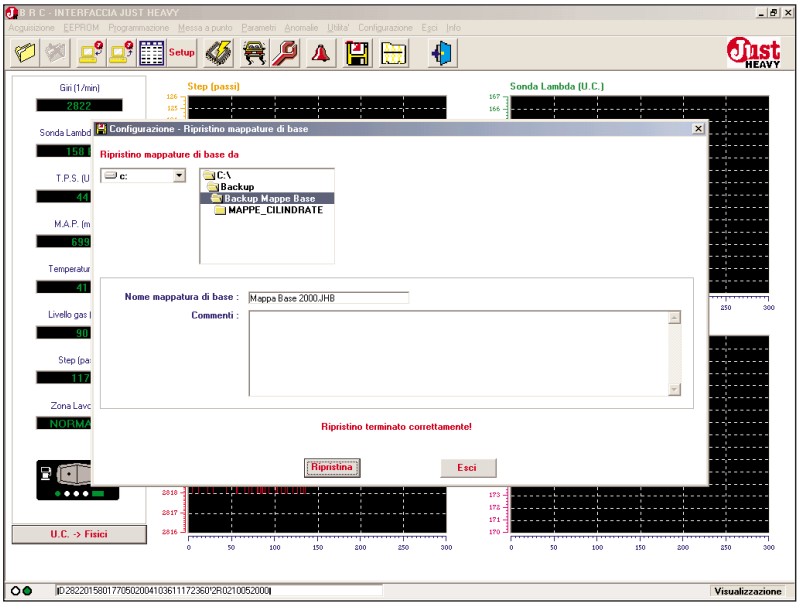


Fig. 118B – Utilità: ripristino totale Mappature di base terminato

want to copy in your own directories, click on the little square beside the map name in the window below. In the last window you will see the main characteristics of the chosen file.

After having selected all the maps you want to transfer, click on “Reset” to copy them in your directories. Once it is over, you will see the screen depicted in pic.119B.

If a basic map you want to reset is already present in the directory, you can replace it or not (pic.118C).

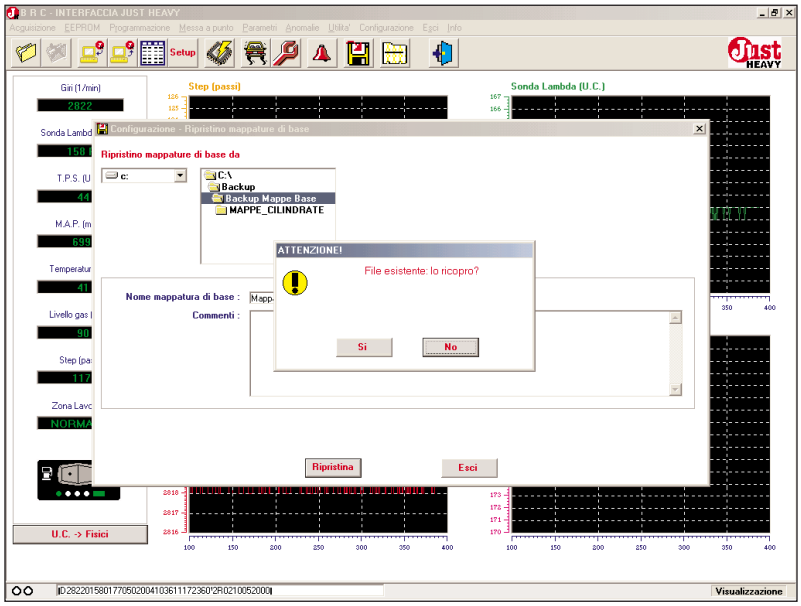


Fig. 118C – Utilità: file Mappature di base da ripristinare già presente in archivio

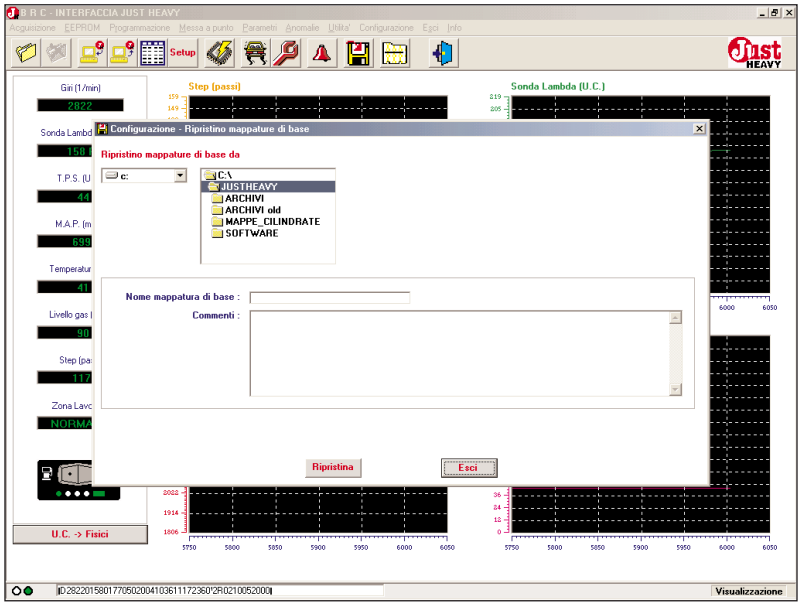


Fig. 119A – Utilità: scelta cartella e file ripristino parziale Mappature di base

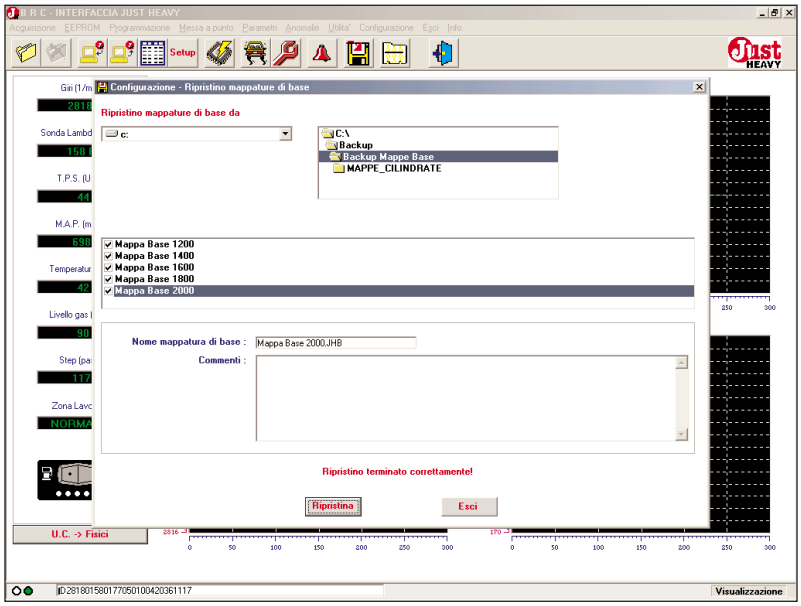


Fig. 119B – Utilità: ripristino parziale Mappature di base terminato

5.14 CONFIGURATION

Pic.120 depicts the “Configuration” menu that others the functions to choose the programme language and the PC serial port setting for a correct communication with the Just Heavy ECU.

5.14.1. LANGUAGE

By selecting “Language” the screen of pic.121 appears. It is then possible to choose among four languages by clicking on the icon corresponding to the chosen language and on “Save”.

Restart the programme to make the new language selection active.

5.14.2 SERIAL

By selecting “Serial” the screen of pic.122 appears. It is then possible to configurate the PC serial port to communicate correctly with the Just Heavy ECU microcontroller. 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 recommended to apply to the BRC Servicing.

5.15. PROGRAMME EXIT

You can quit the Just Heavy interface programme by selecting “Quit” from the main menu (pic.62) or clicking on the corresponding quick choice icon (last icon on the right).

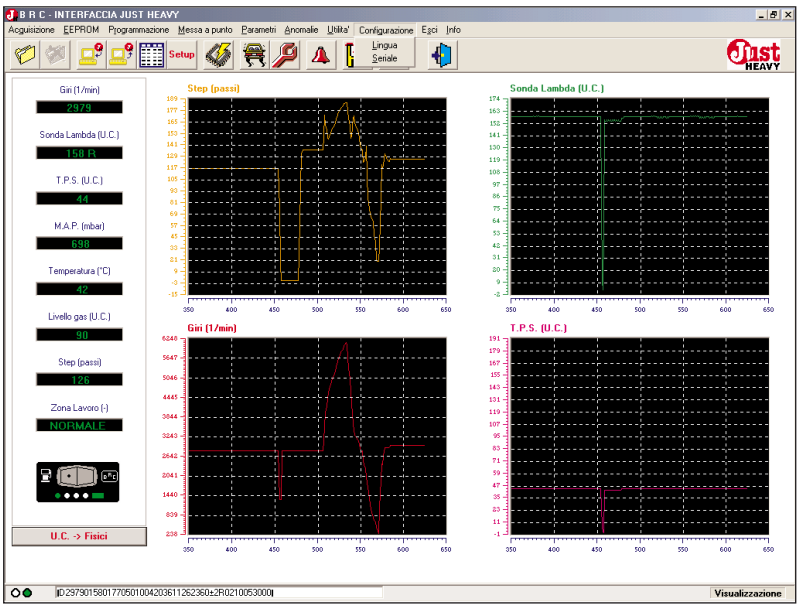


Fig. 120 – Menu “Configurazione”

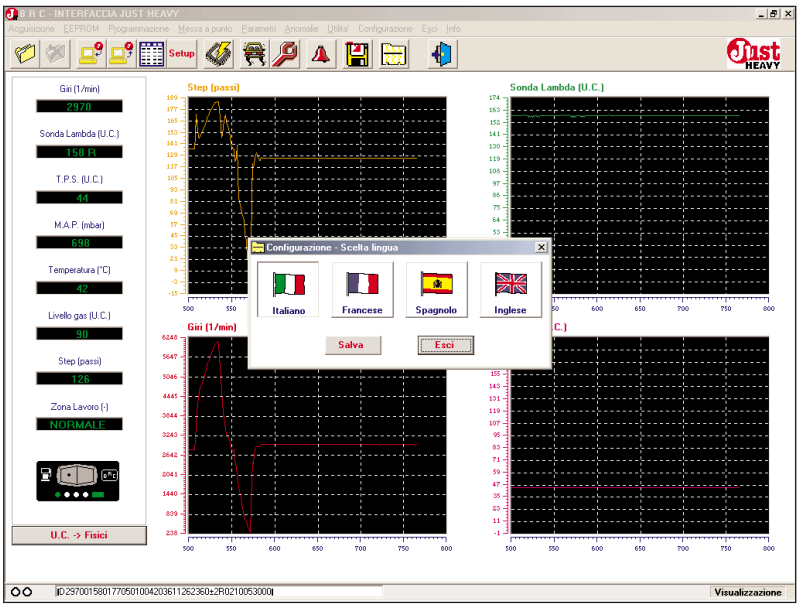


Fig. 121 – Scelta della lingua del programma di interfaccia

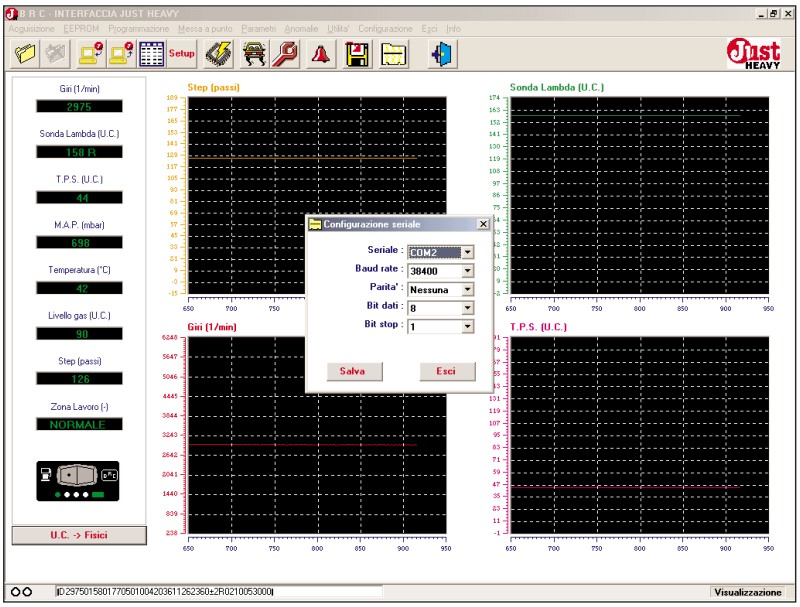


Fig. 122 – Configurazione della porta seriale

5.16. INFORMATION ON THE INTERFACE PROGRAMME

By selecting the “Info” menu heading of the main screen, or clicking on the corresponding quick choice icon, you will see the screen of pic.123 where it is specified, together with other information, the current version of the interface programme software.

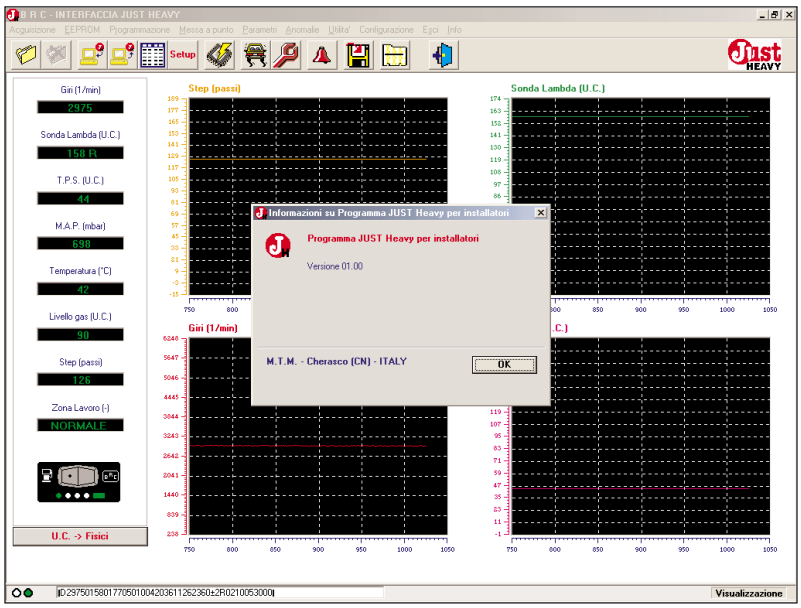


Fig. 123 – Informazioni sul programma di interfaccia