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SEQUENT 56

3/3 SOFTWARE GUIDE

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INDEX

Introduction

SEQUENT 56 System

SEQUENT 56 is BRC GAS EQUIPMENT new gaseous phase injection system for application to 5-6 and 8 cylinder vehicles.
This system is part of Sequent family and maintains the main characteristics integrating the further development for Sequent 24 and Sequent Fastness and this makes easier the installation in vehicles with more than 4 cylinders.

SEQUENT 56 installers' programme

The calibration software still maintains unchanged the previous systems main characteristics integrating more advanced operations and adding some more to make the set up process easier. The calibration software is available on internet site www.brc.it where you will also find all update and improvement.

Who is this guide useful for?

This guide is useful for:

- Technicians installing or setting up "SEQUENT 56" systems
- Those installing "SEQUENT 56" installers' programme in the PC
- Those needing a reference guide for the PC programme
- Those desiring to understand or deep "SEQUENT 56" operation principles
- Those requiring a support for the set up and problems' solution when using "SEQUENT 56" system.

Useful References

For further information on "SEQUENT 56" please refer to the other guides and information leaflets published by BRC.

- *SEQUENT 56 installers' guide.* This is the easiest way to obtain basic and general information for SEQUENT 56 installation.
  Inside the guide you will find:
  - Information on the system operation and its structure,
  - A detailed description of its components,
  - Indication for the mechanical and electrical installation.
- *Types of installation.* This guide contains electrical and generic installation examples for the different types of installation. The listed examples are mainly different for the cylinders number and position and the vehicle power. This is mainly useful when the installers has not specific instructions.
- *Specific instructions.* These are the mechanical instructions and electric plans for single vehicles studied at BRC premises where all electrical and mechanical installation are very precise.

1 What do I need to start?

In summary. This is what you need to “talk” with SEQUENT 56 ECU:

1. Portable PC.
2. SEQUENT communication cable (code DE512114)
3. CDROM SEQUENT Software for PC
4. SEQUENT hardware key

Excluding the PC, all the others are contained in the following kits:

- 90AV99002033 (with parallel hardware key)
- 90AV99002037 (with USB hardware key)

Picture 1-1 shows a communication cable for SEQUENT, while Picture 1-1 and Picture 1-2 show an hardware key, the first for parallel port and the second for USB one. Please note that SEQUENT hardware key can be recognised by the writing “SEQUENT” or “SF” on one side (hot printing). Other BRC hardware keys will not work.

Picture 1 Communication cable SEQUENT

Picture 1-1: Hardware key for parallel port

Picture 1-2: Hardware key for USB port

Let’s start to describe the characteristics of the above listed instruments

1.1 The personal computer

SEQUENT 56 software has been written to be used with Windows 98 SE, Windows 2000 and Windows XP operative programmes.

The required Hardware characteristics are

- **Minimum Hardware characteristics:**
  - Microprocessor: Pentium II 350
  - Memory RAM :64 MB
  - Hard Disk: 1 GB
  - Display 1024x768
  - 1 serial port or USB port with “full duplex” type adapter.

1.2 The communication cable for SEQUENT installations

This cable contains an electronic circuit able to translate the signals coming from the ECU (complying with ISO 9141 and ISO 15031 automotive standard) in signals that are suitable for PC that is according to RS232 serial communication standards. The cable is not compatible with BRC previous one (i.e. FLYING INJECTION , JUST and JUST HEAVY.
It can be ordered to BRC indicating code DE512114.

1.3 Software and hardware key

The software is contained in the CDROM supplied with the kit code 90AV99002033 “Software for SEQEUNT” (with hardware parallel key) or code 90AV99002037 (with hardware USB key). The CDROM also includes the update for the ECU programming that can be anyway update through internet http://www.brc.it.

2 Software Installation and hardware key use

The installation can be carried out through CDROM or downloading the files from internet site http://www.brc.it.
With the same procedure you can update the software and the ECU programming files (software, kernel, maps and set up) with both CDROM or internet.

Let's start from zero and try to carry out the installation analysing in details both programming possibilities: with CDROM or diskettes.

2.1 "SEQUENT 56" software installation on PC from CDROM

With the PC and the installation CDROM, please follow next steps to install "SEQUENT 56" software:

1. Start the PC and wait it is operative.
2. Introduce the CD-ROM
3. Wait till the installation programme automatically starts (if this does not happen, follow the note at the end of this paragraph).
4. In the window shown in **Picture 2-1** click on SEQUENT to select all systems part of the family.

Picture 2-1: First installation window

5. In the window shown in Picture 2-2 click on SEQUENT 56

Picture 2-2: Second installation window

6. In the window shown in Picture 2-3 click on SEQUENT 56 logo or, if the software has been already installed and you want to update it, please click on "*UPDATE*".

Picture 2-3: Third installation window

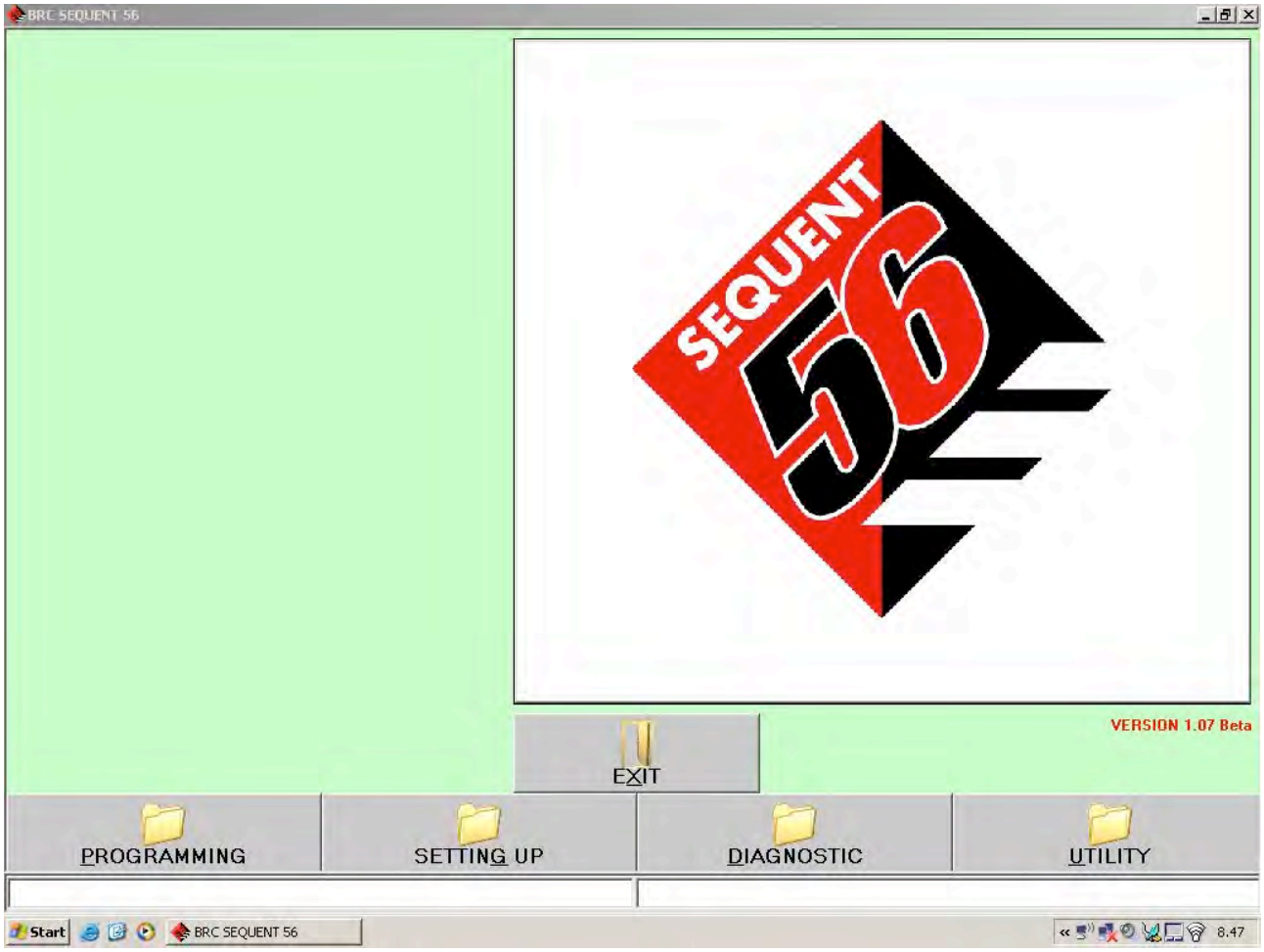
7. The guided procedure will follow you through all installation steps. Please answer always "*Next*" or positively.
8. It the installation asks for the selection for the installation, please leave the original set up one and then click "*Next*".
9. At this point the programme installation starts. Wait till the bar indication if 100%.
10. At this point the PC could ask you to close and restart Windows: answer YES.

NOTE: the automatic start up of SEQUENT 56 installation when introducing the CDROMM depends on the computer set up you are using. In case it does not automatically start, please start "*Setup"* programme in the CDROM main folder (press *Start → Execute, write "D:\Setup.exe"* and press OK. "D" is the letter identifying the CDROM: If the PC indicates another one, please rewrite it using D).

3 Programme start up and structure

3.1 Starting page description

After the installation, if the hardware key has been introduced in the parallel or USB port, you can start SEQUENT 56 programme. To start the programme double-click on SEQUENT 56 icon or click on Start key at the left bottom (select ”Start” → Programs → SEQUENT 56).



Picture 3-1: SEQUENT 56 starting page

The programme starting window is the one in Picture 3-1. If you move the mouse on SEQUENT 56 icon, the pointer will change in a question mark and, clicking the mouse left button a further window will open displaying some software information.

The version of the software can be found on the right bottom without any particular user action.

The screen lower side has 4 keys (called main keys), each one containing a folder and the writing *PROGRAMMING, SETTING UP, DIAGNOSTIC, UTILITY (*described hereunder).

A further “EXIT” key over the 4 previous described ones has to be clicked if you want to leave the programme. If you did not make changes and/or you already saved all, the programme will automatically close.

BE CAREFUL!: by answering NOT, all changes will be lost and it will be not possible to get them back.

At the bottom of the screen there are two narrow and long files covering all the screen width. The left one displays the current communication condition (Fastening, Communication, OK, etc.) while the right one displays possible communication errors as, for example, when the ECU programming is stopped or other events occur.

3.2 Main keys

As already stated, the main keys are 4 and are located at the bottom of the screen.
All the files are closed (see Picture 3.1). Each key has a writing under the file drawing and from left to right we have:

- PROGRAMMING
- SETTING UP
- DIAGNOSTIC
- UTILITY

Please note the underlined letter.

The basic concept to keep in mind to use this program is that each main key corresponds to a main function. To better understand this philosophy you can imagine each main key is a big drawer containing all the necessary equipment to develop an operation. When you decide to perform it, open the drawer (or better click on the key), choose the equipment and carry out the desired operation
For the ECU programming refer to the "PROGRAMMING" key, for the setting up of an already programmed ECU choose "SETTING UP", to verify possible installation errors or to test the actuators choose "DIAGNOSTIC" and finally to select some program options (i.e. language, communication parameters, etc) open the "UTILITY" drawer.
By clicking on each key, the file will open and you will see the contents of the icon coming out. At the same time on the left side of the screen some keys appear and each one has a specific task: these are the keys we mentioned before.

Each main key can be selected by clicking the mouse or keeping the ALT key pushed and contemporarily the underlined letter corresponding to the key (i.e. ALT+P for PROGRAMMING, ALT+S for SETTING UP, etc.)

It is possible to select the key by using the keyboard arrows up and down: the red key is the selected one.
Pushing the keyboard enter key or clicking on the red key with the mouse is the same.

In the next paragraph there is a short description of main keys. For the detailed one including the complete procedures to use for each single function refer to next chapters.

3.2.1 "PROGRAMMING" key

This key allows to program the ECU whether if it is virgin or already programmed. It is possible to carry out both the programming through recorded files or files supplied by BRC (choosing the key **"FROM RECORDS"**) and the **self-map** (choosing the key **"GUIDED PERSONALISED"**). These two keys appear on the left of the screen when selecting the main key "PROGRAMMING".

3.2.2 "SETTING UP" key

It contains all the necessary functions to modify maps, adjustments, changeover parameters and everything could effect the SEQUENT 56 installation operation. By using the SETTING UP instruments it is possible to revise every phase of the guided procedure separately from the others, to change the parameters of petrol to gas change-over, correct the self adapting maps, etc

3.2.3 “DIAGNOSTIC” key

It allows to see the data values in order to understand if there are possible problems or installation mistakes, to verify the type of software, kernel and maps are loaded in the ECU, to test the correct operation of actuators, injectors, solenoidvalves, relays, etc.

3.2.4 “UTILITY” key

It groups all the general utility instruments not included in the previous categories. These allow to effect some useful operations to update the program or to modify some aspects: you can change language, communication parameters with the ECU, display electrical plans, extract the map and the settings from the ECU and save them on the PC, manage the files containing already known vehicles maps, create diskettes to transfer the maps to another PC, update all data on the PC.

4 Programming

4.1 Programming files type

The SEQUENT 56 ECU programming procedure is based on the download of three different types of files:
1. S19 File
2. F56 File
3. A56 File

4.1.1 File S19

The files with S19 extension contain the algorithms and the strategies used by SEQUENT 56 system. Each time you effect a new programming of the ECU it is advisable to update the S19 software with the last version available in the PC. Obviously the PC has to be updated too. This allows to have all the developed functions and strategies available.
To better clarify the function of S19 files, we could say that it calculates the exact gas flow to supply to the engine and pilot the injectors by analysing the vehicle specific parameters (F56 file), the map (A56 file) and all data coming from the different sensors.

4.1.2 File F56

The F56 file contains the specific data of the converted vehicle. For example the type of installation, the engine type (vacuum or LPG turbo), all calibration parameters of the signals coming from the acquired sensors, the change-over parameters, the possible parameters for transients strategies and the ones for the advance setting up.

4.1.3 File A56

The A56 file contains rich/lean map for the vehicle. It also contains the map for the cells status. The map of the cells status is useful to identify the type of vehicle operation in the different operating area, identified by MAP engine revolution couples. These cells could be Open-Loop or Closed-Loop type.

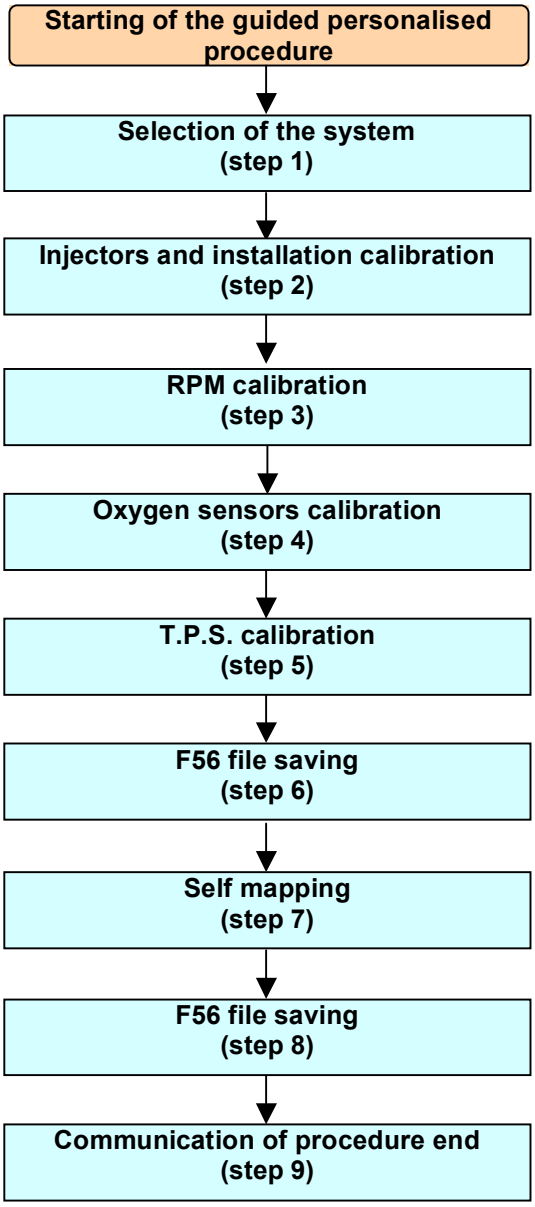
4.2 ECU Programming

In case you need to program an ECU, it is necessary to select the *Programming* key on the main screen.
There are two types of programming available:
- Guided Personalise
- From records

4.2.1 Guided Personalised Procedure

This type of programming has to be carried out when you wish to convert a new vehicle whose map is not available. In this case start the configuration of the personalised parameters and then the real self-map. The guided procedure consists of variable steps depending on the carried out selection. Main steps are indicated in Picture 4.1

Guided Personalised Procedure



Picture 4-1: Guided personalised procedure steps

To enter this procedure, select the *Programming* key at the bottom of the screen and then the *Guided Personalised* one, on the left. The technician will be guided step by step through all the different phases of the procedure by a red capital writing in the centre of the screen. It is possible to go through this procedure taking one or more steps backwards or forward, by using the NEXT or PREVIOUS keys at the bottom of the screen (see Picture 4-5) or by using the PgUp and PgDwn keys on the keyboard

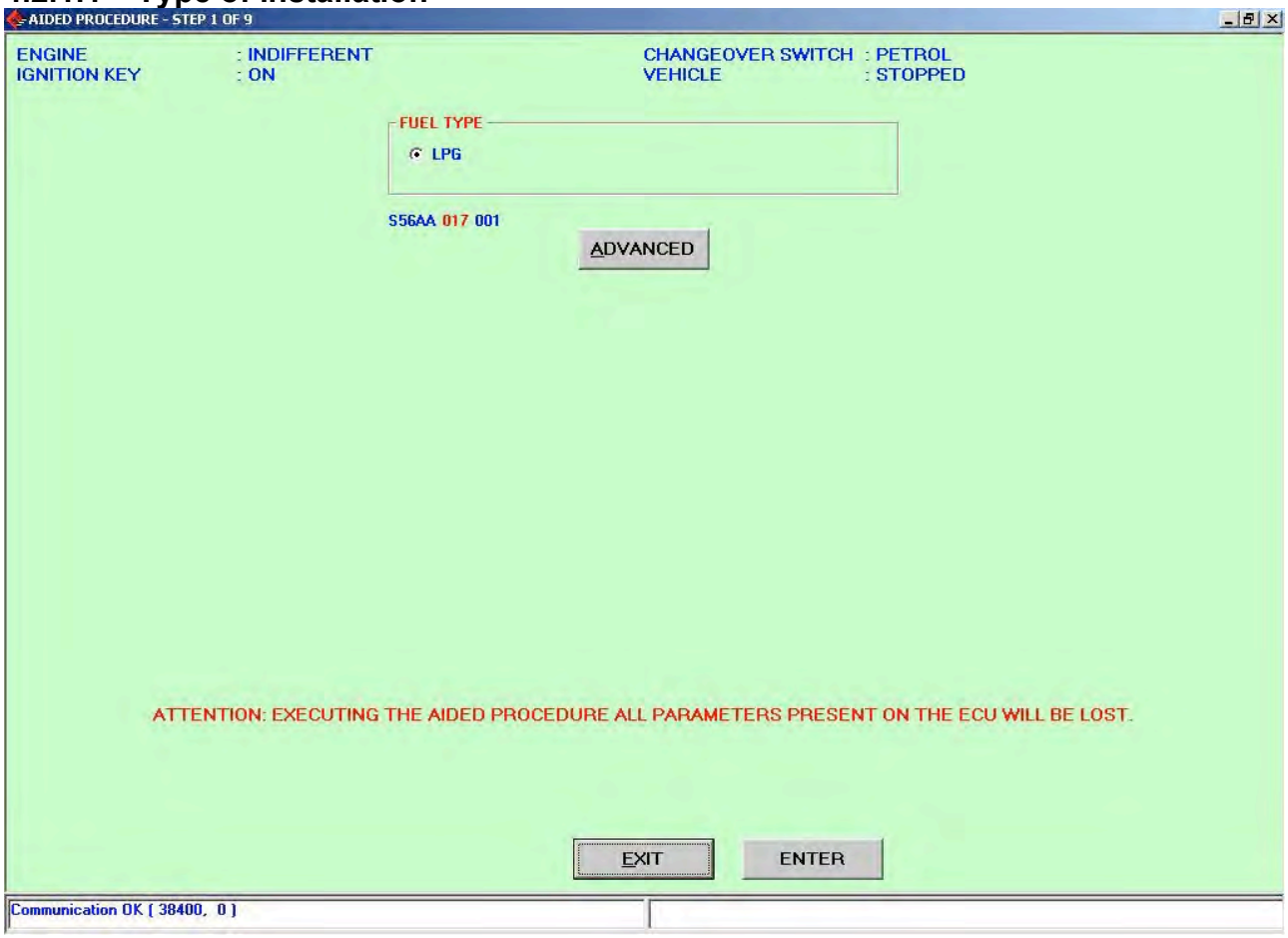
To correctly effect this procedure, respect the conditions indicated at the top of the screen (see Picture 4-2) displaying each step the correct condition of:

- engine (on, off or no indifferent)
- ignition key (on or off)
- the changeover switch (lpg or petrol position)
- the vehicle (stopped or in motion)

Picture 4-2: Conditions at the top of the screen

Be careful: with the guided calibration procedure all the parameters on the ECU will be lost.
Hereunder the explanation of the *Guided Personalised* procedure steps.

4.2.1.1 Type of installation



Picture 4-3: Guided procedure – type of installation

As shown in picture 4.3 this is the first step. In case of standard installation, after selecting the type of equipment, just click on ENTER key.
In case of a usual LPG or CNG installation, after selecting the cell of the type, digit the *ENTER* key. Automatically the ECU will receive the software and a standard map to calibrate the vehicle.
After sending the data the program will ask to disconnect and connect the ignition key again. At the end the ECU contents will be read and the program will go directly to the next step without further intervention of the technician.

At the left of the "ADVANCED" key you will find some figures to indicate the type of software will be downloaded on the ECU with the guided procedure.

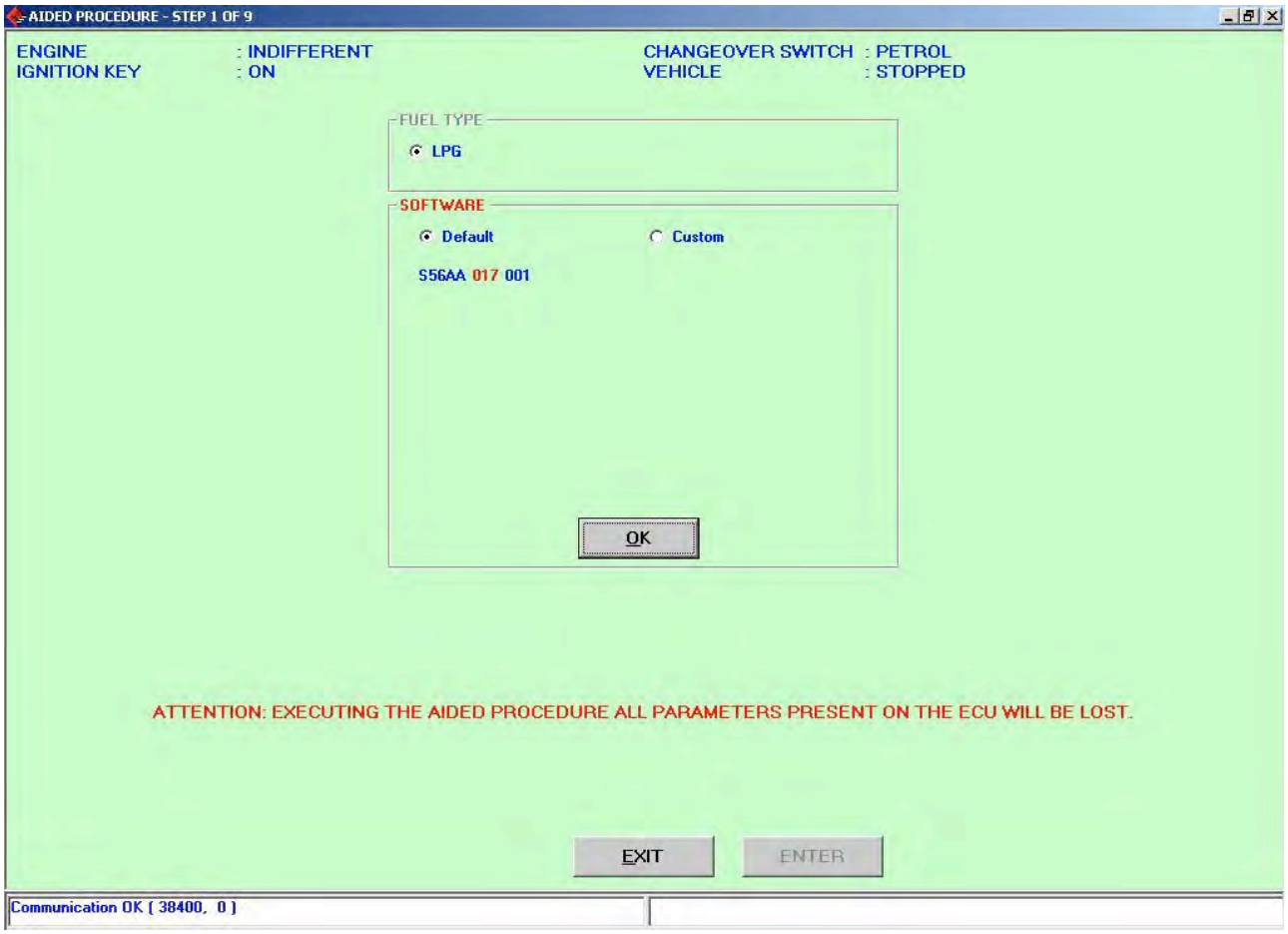
- The first 5 figures indicate the software name ("S56AA" in Picture 4-3).
- The three central figures indicate the software version to be downloaded ("017" in Picture 4-3).
- The last three digits are the type of software depending on the ECU you need to programme ("001" in Picture 4-3 indicates the type of ECU is DE815001- 6-injectors Sequent 56).

NOTE:

1 - When entering this screen, before doing any operation, the PC program verifies the kernel version of the ECU and compares it with the last downloaded one. If the ECU kernel is not updated, a message will ask do that; in this case it is not possible to continue the guided procedure until the ECU contains the updated version (see paragraph 4.2.2 for procedure)

2 - In particular cases indicated by BRC, it could be necessary to download a different software by using the "ADVANCED" key. Clicking on it the following possibilities will appear:

- **Default:** it corresponds to the software normally supplied by BRC. Without a special authorisation given by BRC technicians it will be possible to use only standard software.
- **Custom**: it corresponds to particular software used for testing and development. These ones have to be used only after the indication of BRC technicians. After choosing this option, select the software and click on *OK* in the window for the software selection



Picture 4.4: Guided Procedure – type of installation clicking on "ADVANCED"

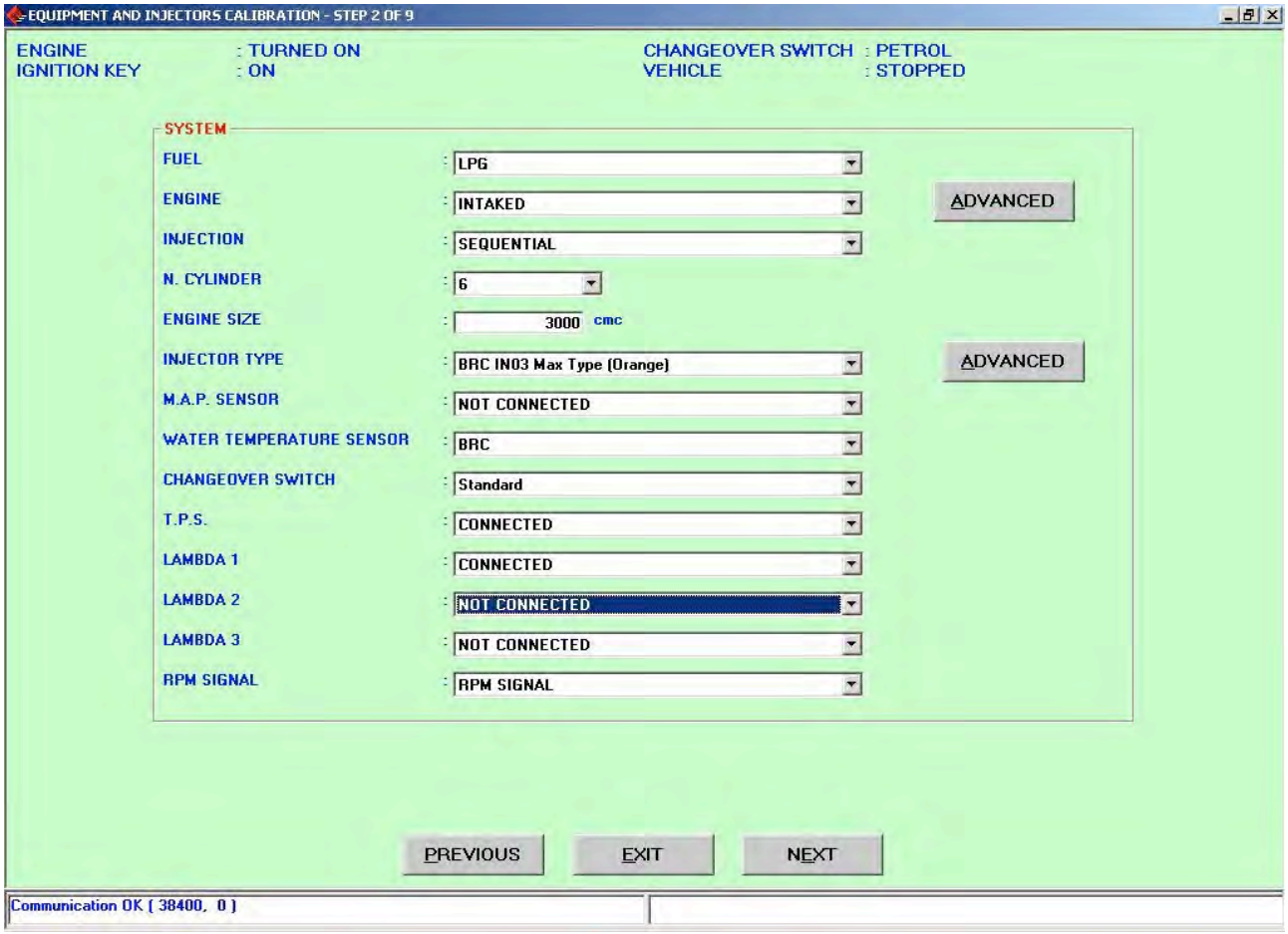
4.2.1.2 Installation and injectors calibration

This is the second step of the procedure. It needs to specify further information about the installed equipment. Particularly it allows to indicate if it is a vacuum or a turbo installation.
In this screen you can select the installation characteristics too.

- **Engine:** indicate if this is vacuum or turbo one
- **Injection:** choose between sequential or semi-sequential injection
- **Cylinder N.:** indicate the engine cylinder number that is also the number of the installed gas injectors and the petrol ones. If this number if lower than the maximum injector number the ECU can supply, pay attention not to connect the injectors with higher number (I.e. using a 6 injector ECU with a 5 cylinder vehicle, you have to avoid to connect the injector n. 6 wire and not just any one with both petrol and gas)
- **Engine power:** indicate the engine power in cc (not litres)
- **Injector type:** indicate the installed type of gas injector choosing among the available ones; please remember the injector selection depends on the vehicle power (see "Sequent 56 Types of installation Guide 2-3" code TA019076L.
- **MAP sensor: indicates the type of used MAP sensor. You can not modify it with the guided procedure that will automatically set the sensor as NOT connected.** In case of NOT connected sensor, please consider you will have to set up the system using the kit code "*09SQ20990001 SEQUENT 56* SET UP KIT".
- **Water sensor:** Display the type of sensor to be used. At the time being there is one only model and it can not be modified.
- **Change-over switch:** Display the type of changeover switch to be used. At the time being there is one only model and it can not be modified.
- **TPS:** it allows to choose if you connected the TPD wire or not. Some strategies will be not available without TPS connection.
- **Oxygen sensors 1 and 2:** it allows to choose if you connected the oxygen sensors wires or not. The programme will display and take care in some specific strategies only the oxygen sensor that are indicated as connected. At the time being it is not possible to activate the oxygen sensor 3 that is anyway indicated for future development.
- **RPM signal:** you have to indicate if the rpm signal is connected to a real rpm one (rpm counter, crankshaft sensor, etc…), if it is connected to the coil negative or if it is not connected. Some strategies will be not available without the rpm connection.

Conclude and verify the introduced values, then click FORWARD to continue.

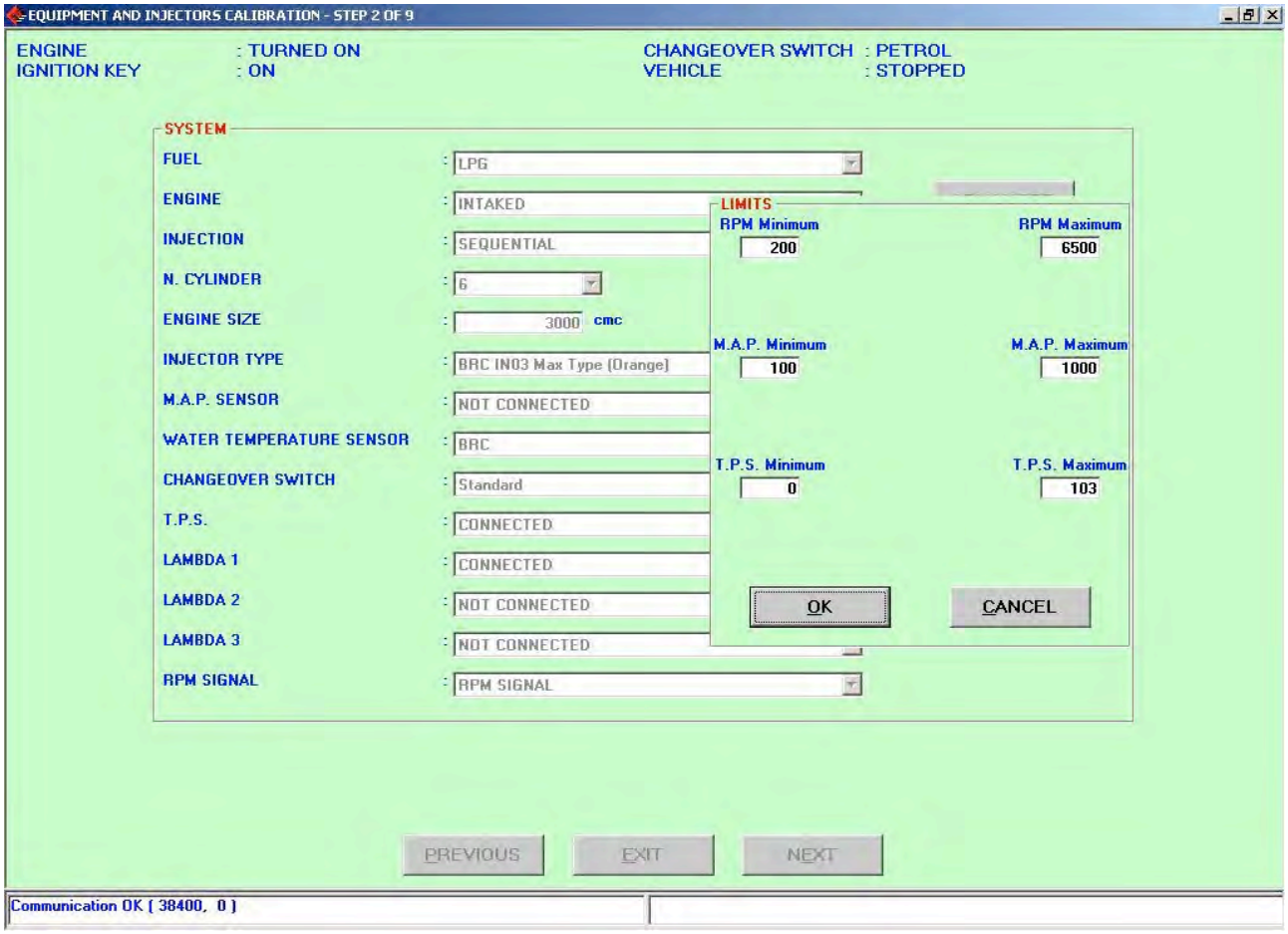
A similar section could be activated from the main screen, outside the guided procedure, by selecting Setting up --> Type of Installation



Picture 4-5:Guided procedure – installation and injectors calibration

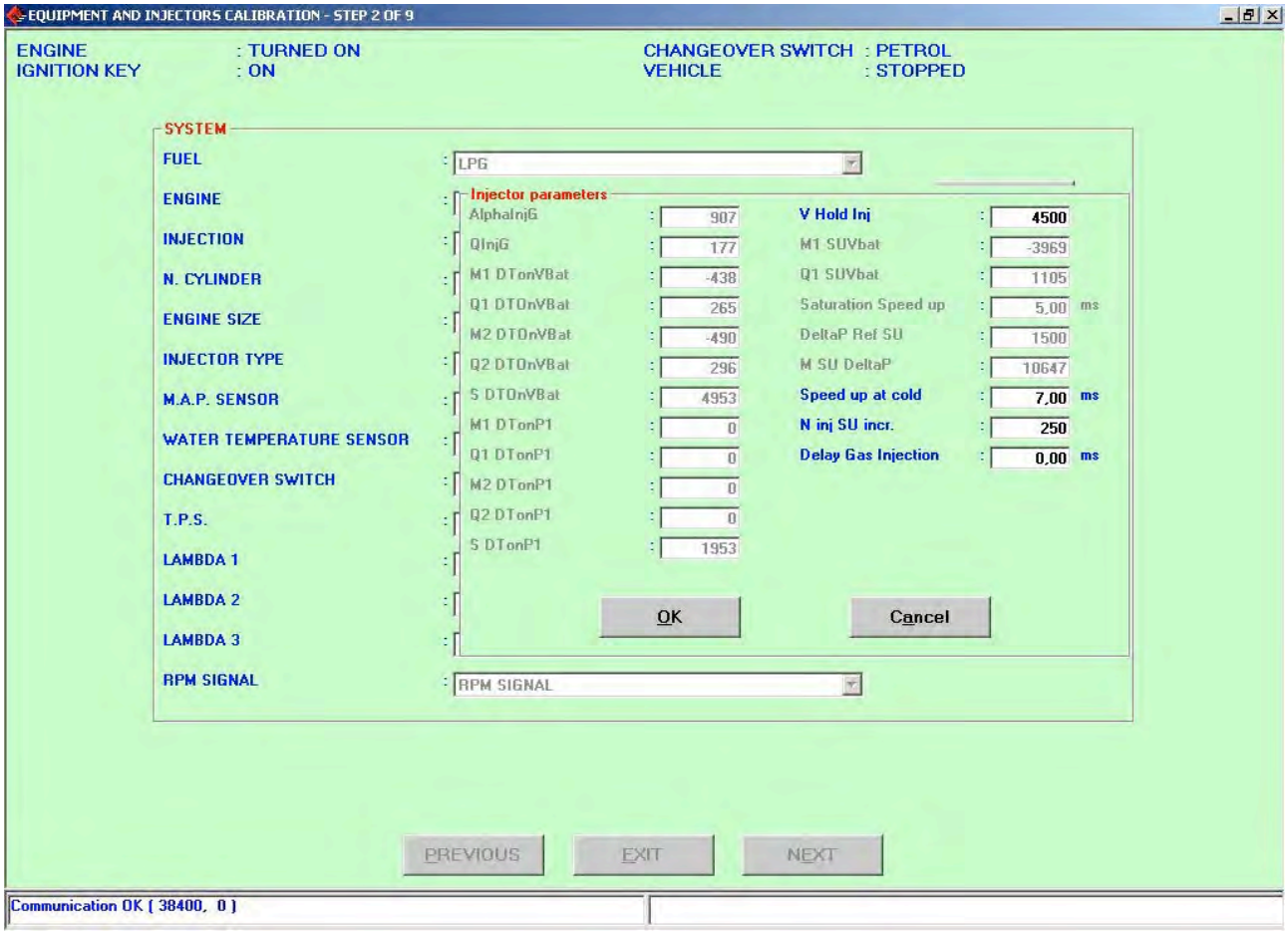
NOTE:
By clicking ADVANCED key at the top of the screen, you can set the operating limits as for a engine rpm signal and the MAP manifold pressure as indicated in Picture 4-5. This operation could not be carried out normally except if indicated by BRC technicians. In details you can input:

- **Min Rpm:** this is the minimum rpm value in the maps. Usually it is better to input a value of about 300 rpm/min less than the idle regime.
- **Max Rpm:** this is the maximum rpm value in the maps. Usually it is better to input a value of about 500-600 rpm/min less than the vehicle out of rev value.
- **Min MAP :** this is the minimum value of absolute pressure (in mbar) of the suction manifold in the maps. Usually it is better to input a positive value of 200-300 mbar less than the MAP value at idle. :
- **Max MAP:** this is the maximum value of absolute pressure (in mbar) of the suction manifold in the maps. Input the maximum value of the reachable manifold pressure. In case of vacuum engines, input 1000 while for turbo ones insert 1700.



Picture 4-6: Guided procedure – Installation and injectors calibration by clicking the first ADVANCED key in the installation section

By clicking on the second key, you can display the injectors' characteristics. It is possible you have to read these values and inform BRC technical assistance in case of problems.

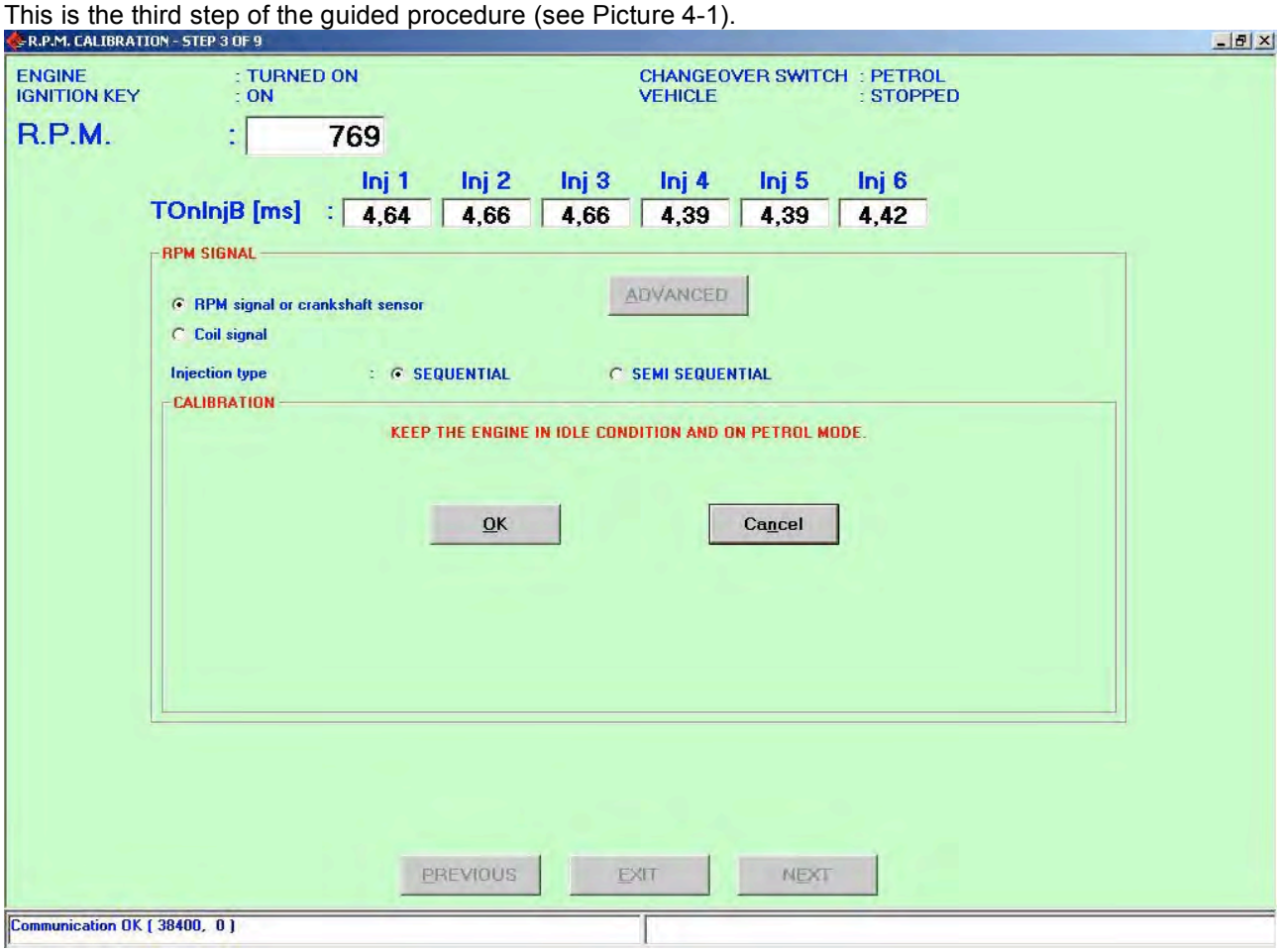


Picture 4-7: Guided procedure – Installation and injectors' calibration by clicking the second ADVANCED key in the injectors' section

Similar section can be activated outside the guided procedure, from the main screen by selecting *Set up --> Type of installation*

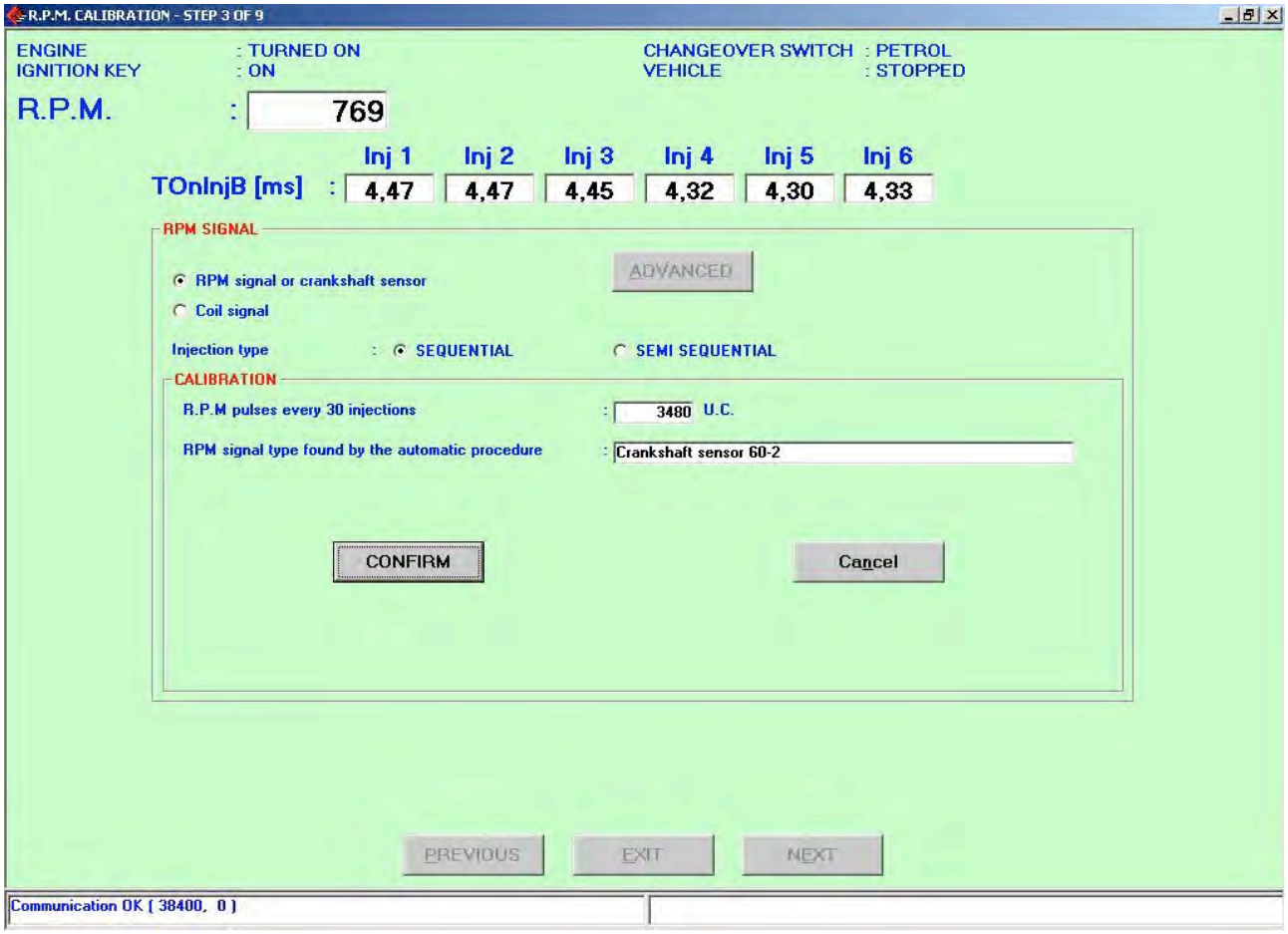
4.2.1.3 RPM calibration

This is the third step of the guided procedure (see Picture 4-1).



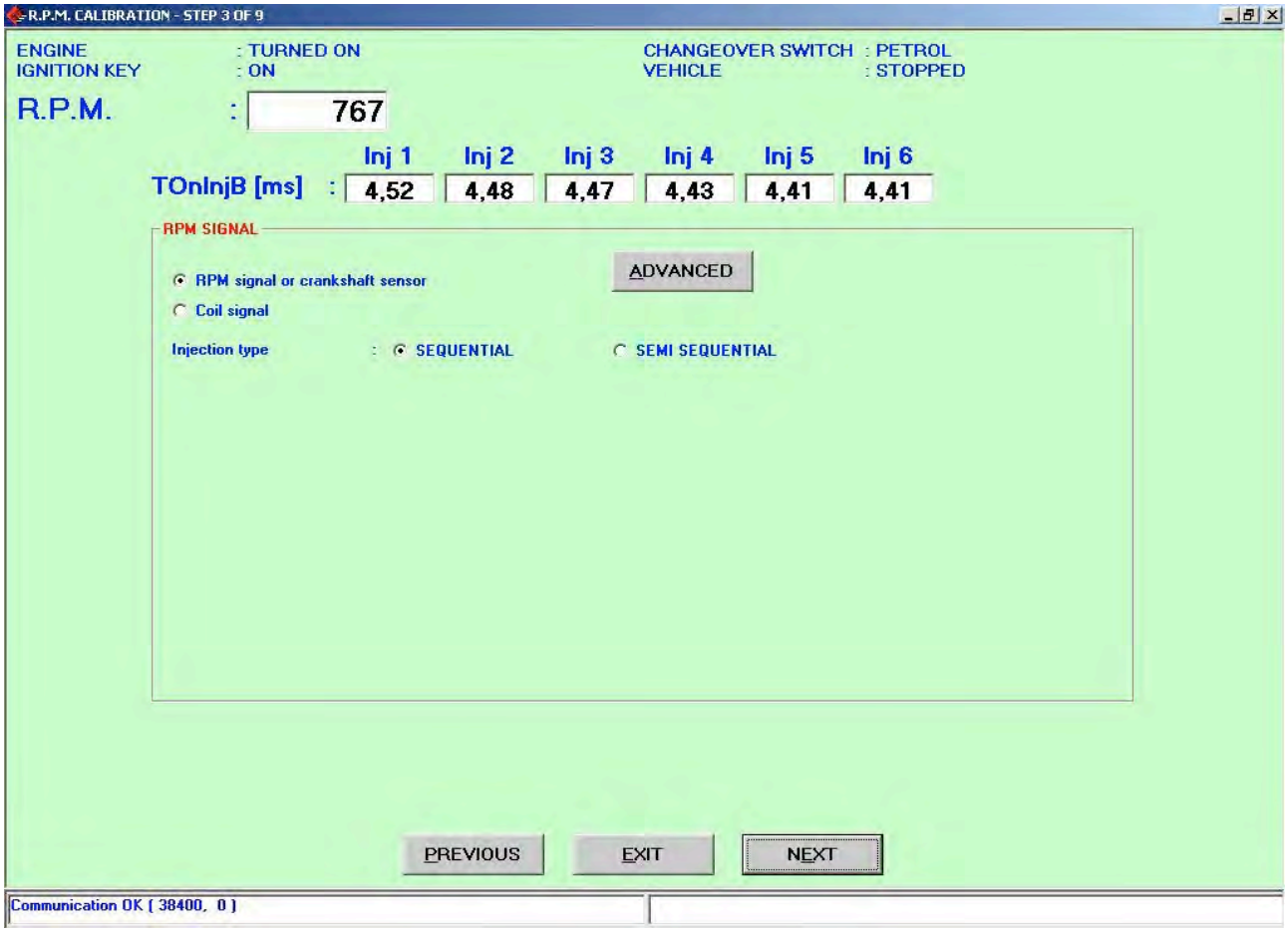
Picture 4-8: Guided procedure – RPM calibration

The programme will ask to keep the engine on at idle with petrol and automatically start the identification of the signal correct type (Picture 4-8). You will be then asked to confirm the rpm number is correct and in this case you will only have to confirm and continue(Picture 4-9).



Picture 4-9: Guided procedure – rpm calibration - confirmation

If the system is not able to recognize a rpm signal among the preset ones, a message saying “no preset definition” will appear. In this case you will have to manually set the parameters with the settings you will see by clicking “CHANGE CALIBRATION” key (P.S. for this operation please contact BRC technicians)
After confirming the recognition of the rpm signal, you will enter the page of Picture 4-10, and confirm (confirm key) to go to the next step of the guided procedure.
At this point it is better to check rpm are correctly read. The control can be carried out at idle and at 3000 rpm (for example).
At the end and if everything is correct, click on *Next*, answer positively to the possible confirmation request and continue the guided procedure.

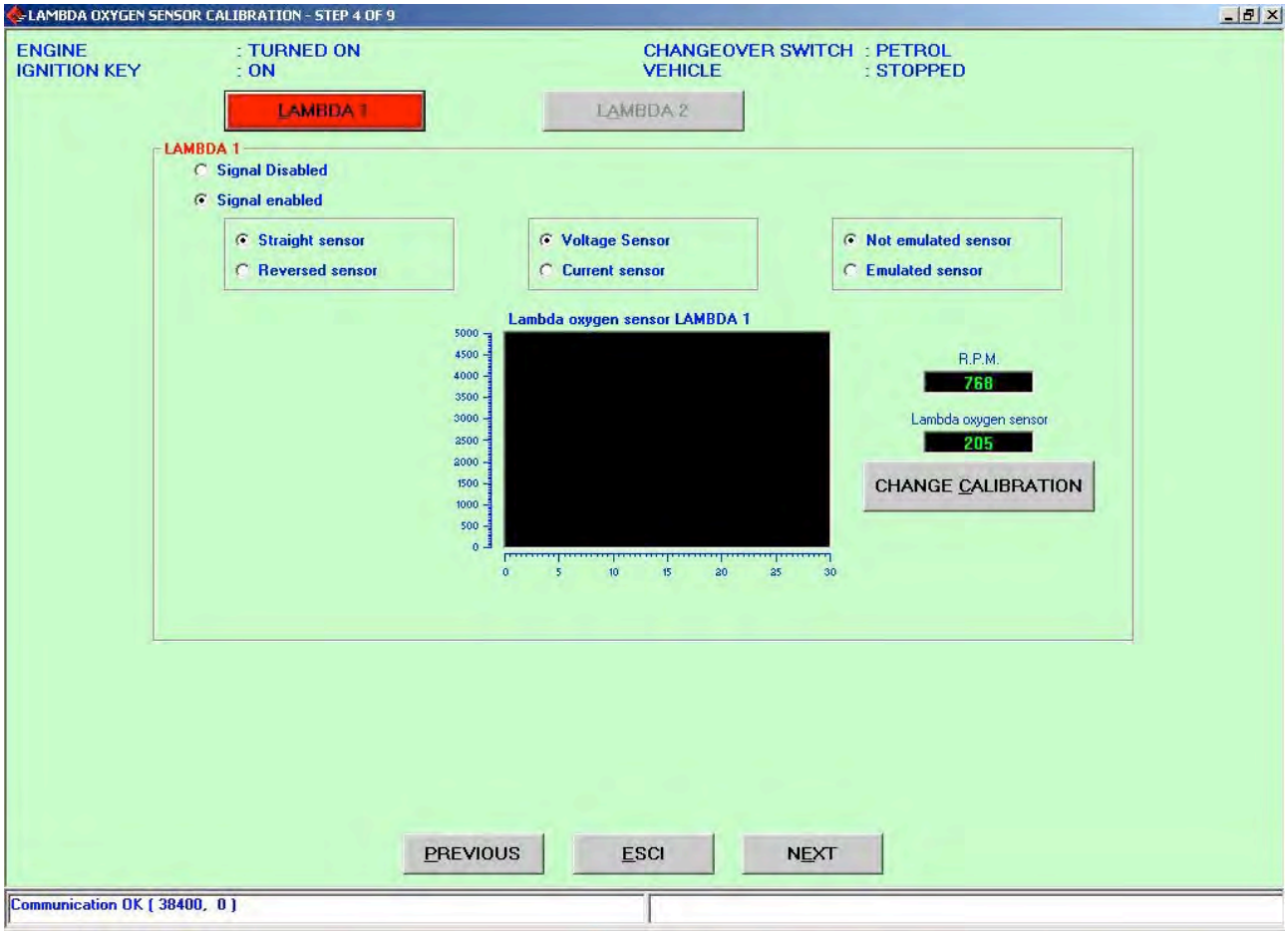


Picture 4-10: Guided procedure – rpm calibration – end calibration

4.2.1.4 Oxygen sensor calibration

This is the fourth step of the guided procedure (see Picture 4-11).
It is important to know some characteristics of the oxygen sensor as for example if it is a “Current” one or one of the most common “Voltage”, if it is “Straight” or “Reversed” one.
Let’s see the terminology in details:

- **Straight Oxygen sensor:** the high tension level corresponds to a rich mixture situation (Rich) and vice versa a low tension level corresponds to a lean mixture situation (Lean).
- **Reversed Oxygen sensor:** the contrary of the *Straight Oxygen Sensor*.
- Note: usually if the oxygen sensor is in Current, it is also reversed.



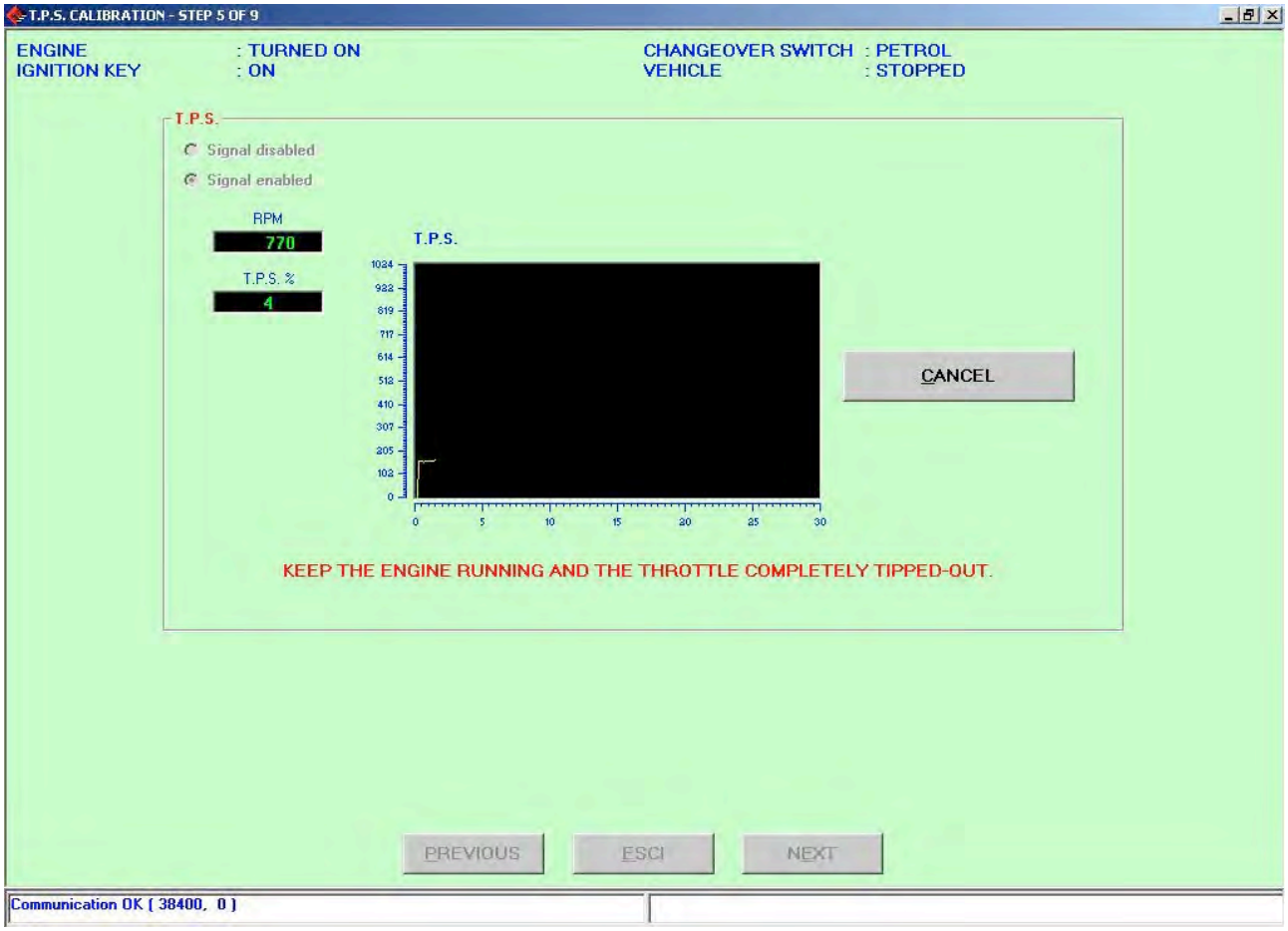
Picture 4-11: Guided procedure – Oxygen sensor calibration

Identification method: through a standing sharp acceleration, make the vehicle carry out a cut-off (release where there is no injection); if during a cut-off the oxygen sensor level is low this is Straight otherwise it is reverse.
The current Oxygen sensor can be recognized for its behavior that is completely different from the tension one. If in stationary conditions, (i.e. at idle) the car is under control, a tension oxygen sensor continuously goes from the minimum to the maximum tension value while a current oxygen sensor keeps a quite constant value. Only during sharp transient or during a open-loop phase this value change considerably. Please consider the current oxygen sensors are the mainly used ones for the car manufacturers (as Volkswagen group) and in a lots of case they have more than 4 wires.
To start the calibration of the oxygen sensor you have to press *“Change Calibration”* key. The programme will start the procedure giving indications for each step in red writing. Particularly the programme will ask to keep the engine at 3000 rpm while the it acquires the field of action of the oxygen sensor. This procedure has to be repeated fro each connected oxygen sensor to be selected with “*LAMBDA1 and LAMBDA2*” key at the top.

The calibration can be repeated in case of error by doing again all the above described operations. At the end, you can go on by clicking *Next* and confirm the acquired data.

4.2.1.5 TPS Calibration

This is the fifth step of the guided procedure (see Picture 4-12).
By entering the TPS calibration window, the procedure automatically starts. First of all it is necessary to control the required operating conditions (these are written in blue at the top of the window) then the vehicle has to be stationary with the engine running with petrol.



Picture 4-12: Guided procedure – TPS calibration

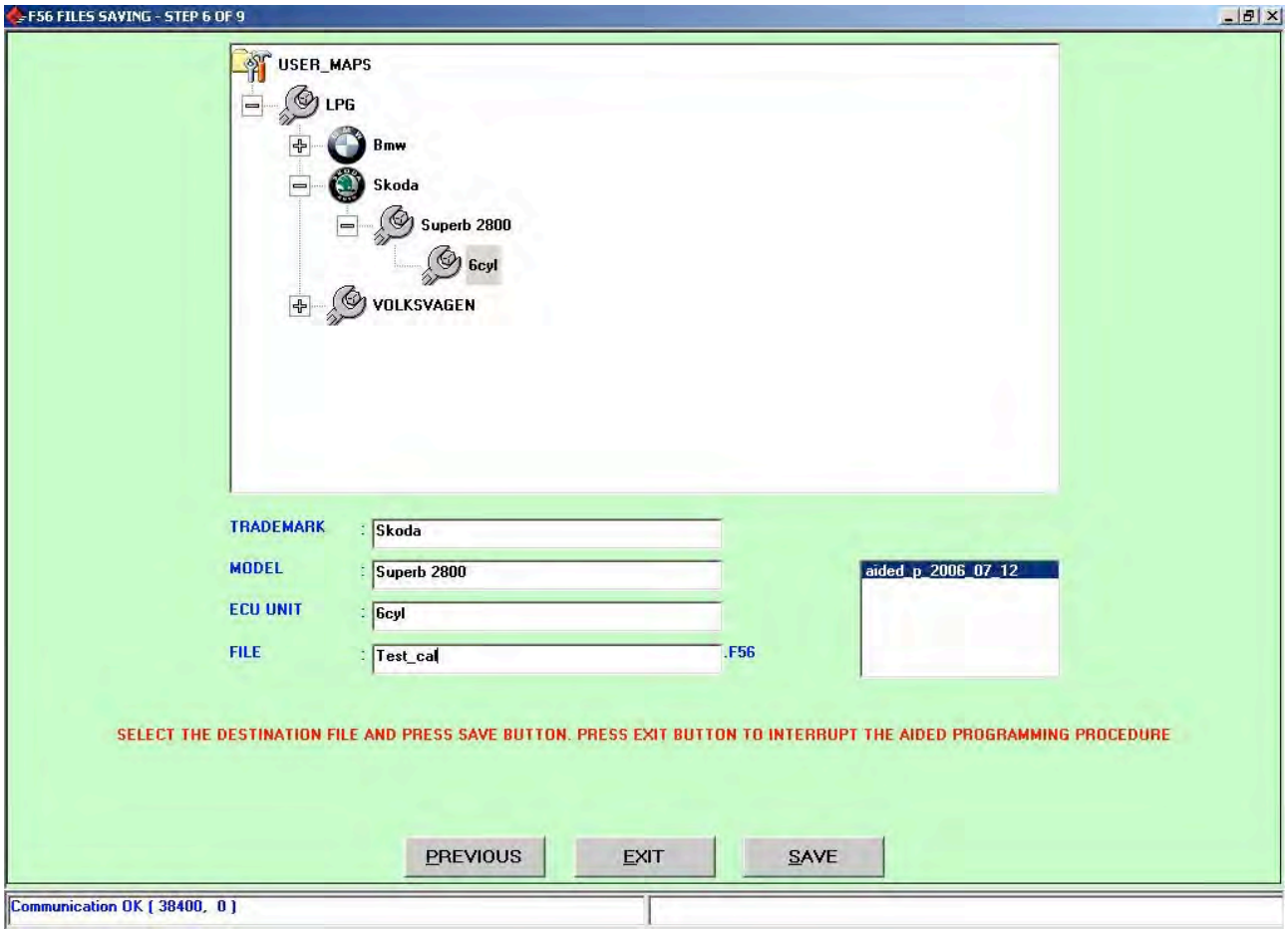
Initially you will be asked to keep the engine on and the accelerator completely released. Then you will have to make three complete and uniform accelerations.

If the TPS calibration has been not correctly carried out, you can modify it by clicking on “Change Calibration” writing that automatically appears at the end of the calibration itself.

A the end, please press *Next* key, confirm the acquisitions and go on with the guided procedure.

4.2.1.6 F56 file saving

This is the sixth step of the guided procedure. This section asks you to select the destination file where all the set configuration have to be saved. You have to select under the main folder *USER_MAPS* the type of installation and fill up the below folder indicating trademark, model, ECU, File in the most detailed way (Picture 4-13).



Picture 4-13: Guided procedure – F56 file saving

Note: when choosing the name of the file you can use whatever name you like. An always valid suggestion is to use one that can help you to identify the vehicle where you downloaded it (for example the name could be the vehicle plate number).

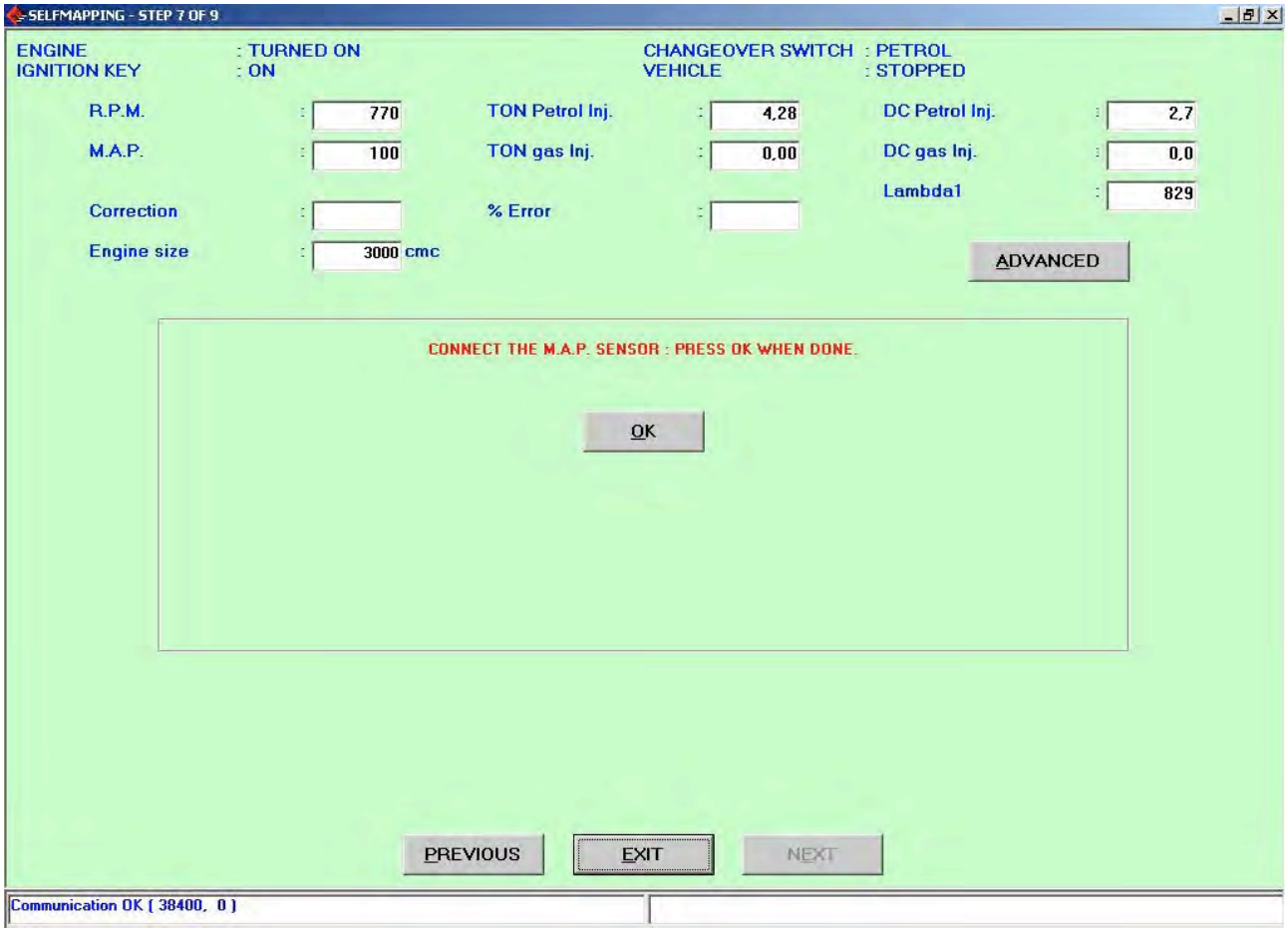
After leaving the vehicle with the engine off and the key contact positive it is possible to press *"Save"* key to save the calibrations on the PC and download them in an ECU. By clicking the *Exit* key, without saving, all calibrations will be lost.

4.2.1.7 Self-mapping

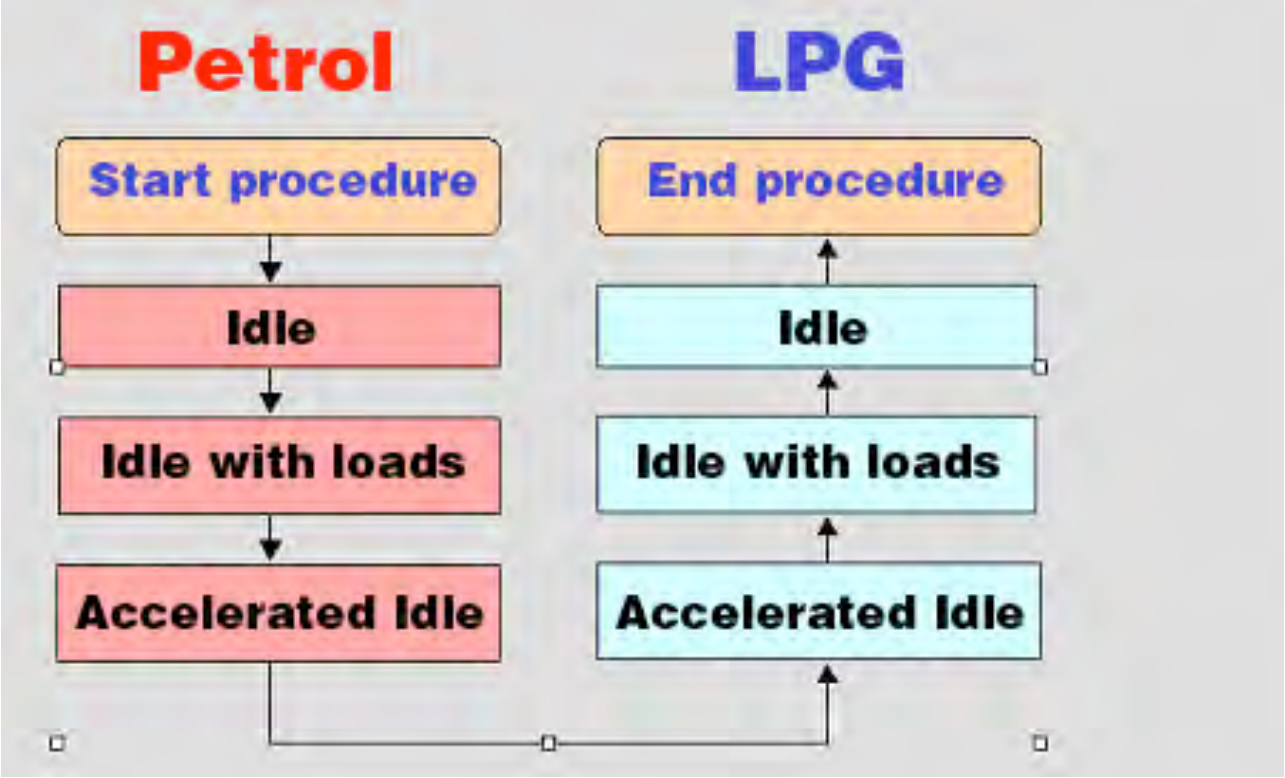
SEQUENT 56 system founds its operation on the maps contained in the ECU allowing to translate the signal of petrol injectors in orders for gas injectors; these are different according to the vehicle. The aim of the **self-mapping** is to obtain the translation maps through simple acquisitions (to be carried out in stationary conditions) of the operating conditions of the vehicle to map, immediately after the installation phase.

The self-mapping procedure consists in the acquisition of the following three points of the vehicle operation first with petrol and then with gas (see Picture 4-15 e Picture 4-16):

1. Idle
2. Idle with loads
3. Accelerated idle



Picture 4-14: Guided procedure – Self-mapping

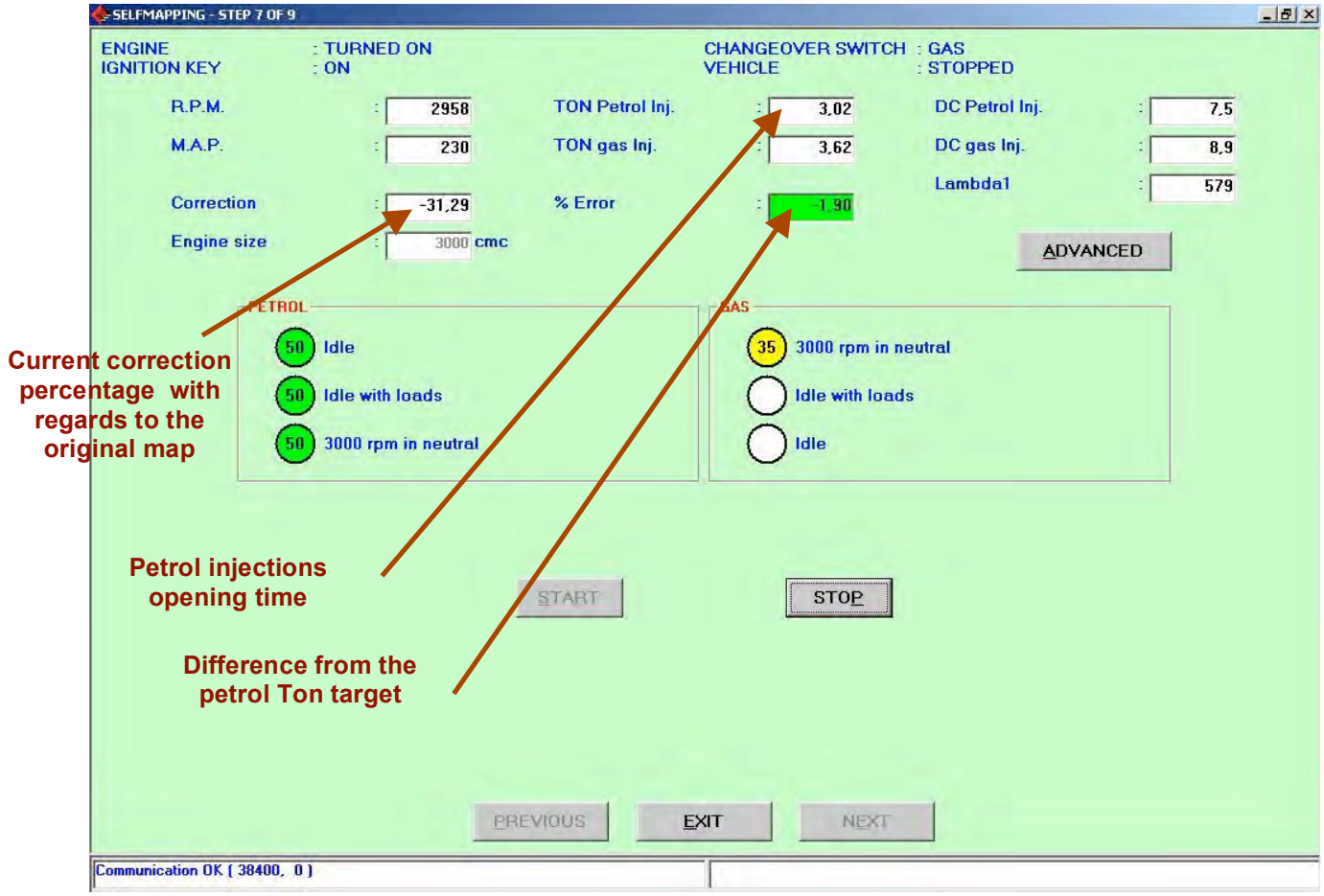


Picture 4-15: Self-mapping – Block diagram

With petrol the order is the one indicated above while for gas operation it is exactly the contrary from step 3. In order to avoid misunderstanding, it has to be specified that “isle” is the vehicle operation at idle, with warm and operating engine, without load (air condition, lights, back window heating,…). The idle with load is the idle after having applied all the available load and the accelerated idle is a regime of about 3000 rpm, with stationary vehicle, in neutral position and without loads.

As soon as the self-mapping starts, the window represented in Picture 4-14 appears and requires to carry out the connection with MAP sensor. By confirming the connection, you automatically go to the window represented in Picture 4-16.
It is advisable to explain the meaning of some numerical parameters (see Picture 4-16):

- **TON Inj petrol** is the current opening time of the petrol injectors in ms (milliseconds).
- **Correction** in a percentage value indicating the correction the programme is carrying out with regards to the map contained in the ECU in that very moment. This has a meaning only during gas operation. The value 0 indicates no correction, 10% indicates a 10% enrichment and -10% is a leaning.
- **Error** during the gas operation is a distance evaluation between the petrol and gas operation, based on the petrol acquisition of the injection time. The value of the correction is continuously and automatically changed by the programme so that the error risk is reduced at the utmost.



Picture 4-16: Self-mapping – First gas point

As indicate by the red writing in the window represented in Picture 4-14, the mapping starts with the engine at idle after clicking on “START”. If the necessary conditions for the first point acquisition are not available, a red warning will be displayed informing to control them. The conditions are:

- Warm engine, started at least one minutes before
- Required regime and load conditions (see appendix A1 at the end of this guide).
- Stationary working conditions

The above conditions can be verified by clicking “Advanced” key.

If the conditions are valid, the round space for the petrol idle will display a number from 0 to 50 first in a white background and then green.
When the first point is acquired, go on to get the necessary conditions for the following point then press “START” again (see Picture 4-16), and so on for the third one.

When the three points with petrol have been acquired, you have to manually change to gas keeping the idle accelerated and then press “START” key.

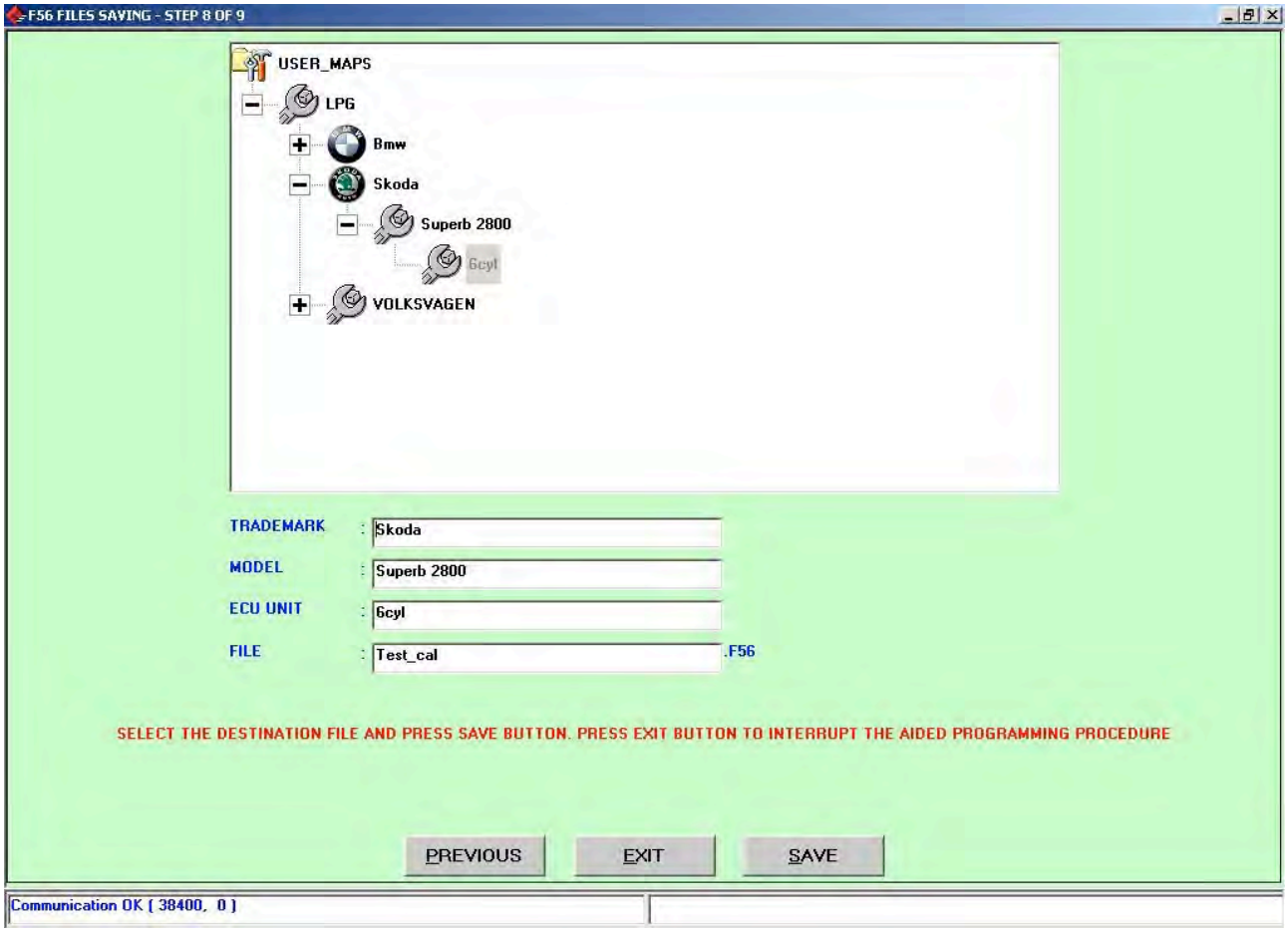
After the acquisition of all 6 points, the map is ended and can be memorized in the file and definitively sent to the ECU.

NOTE 1 if after the gas changeover the vehicle switch off before acquiring the first gas point because the vehicle is too lean or too rich, you can repeat the self-mapping and act on the “Initial Correction” pointer so that as soon as changing in gas operation, the PC enrich or lean the vehicle as you need, after clicking on “ADVANCED”. The initial correction has no effect in the acquisition of the following points.

NOTE 2: after the acquisition of each point of the map you can go back and acquire previous point or the last one by clicking “REPEAT”. Near each acquired point there is a button. By selecting one of them and clicking START the map will start again from the selected point automatically canceling the previous acquisition of that point and the following one that have been already acquired (it there are any).
NOTE 3: during the acquisition of a whatever point, it is possible to stop the operation by clicking the “STOP” key.
NOTE 4: the PC controls the credibility of the acquired data after the third point with petrol and after each point for gas. In case there is a non credibility of the data, an error message will be displayed and you will have to repeat the mapping from the beginning.

4.2.1.8 Sending the parameters to the ECU

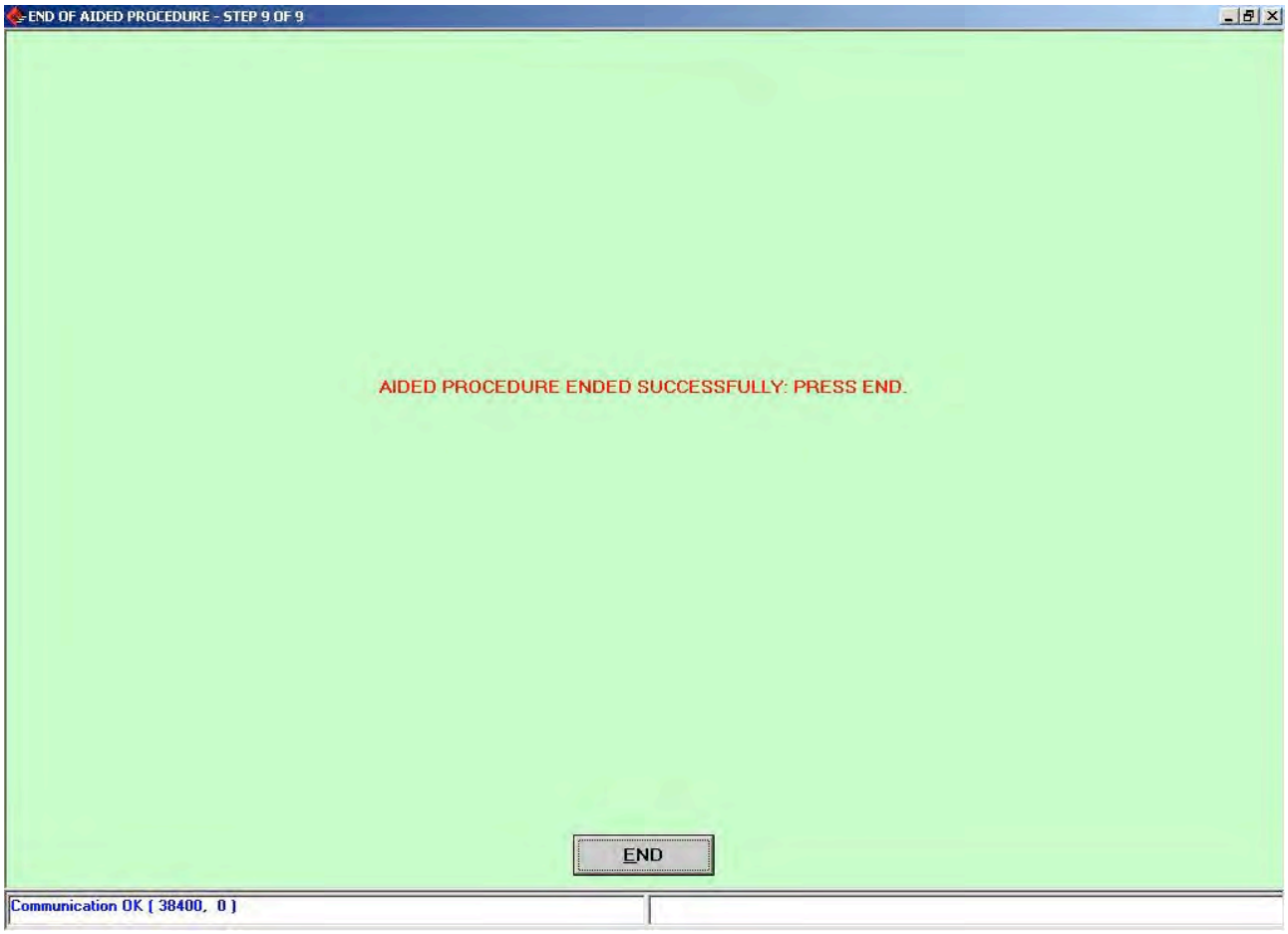
With this last section the signal calibration procedure and the self-mapping of a new vehicle will be ended. If you wish, you can choose a new position otherwise the system will suggest to save in the same position used before (see Picture 4-17).



Picture 4-17: saving

4.2.1.9 End procedure

The last step of the guided procedure has the only aim to advice the positive result of the operation (see Picture 4-18). By clicking on "*Exit"* key the guided procedure is ended and you will be back to the programme starting window.

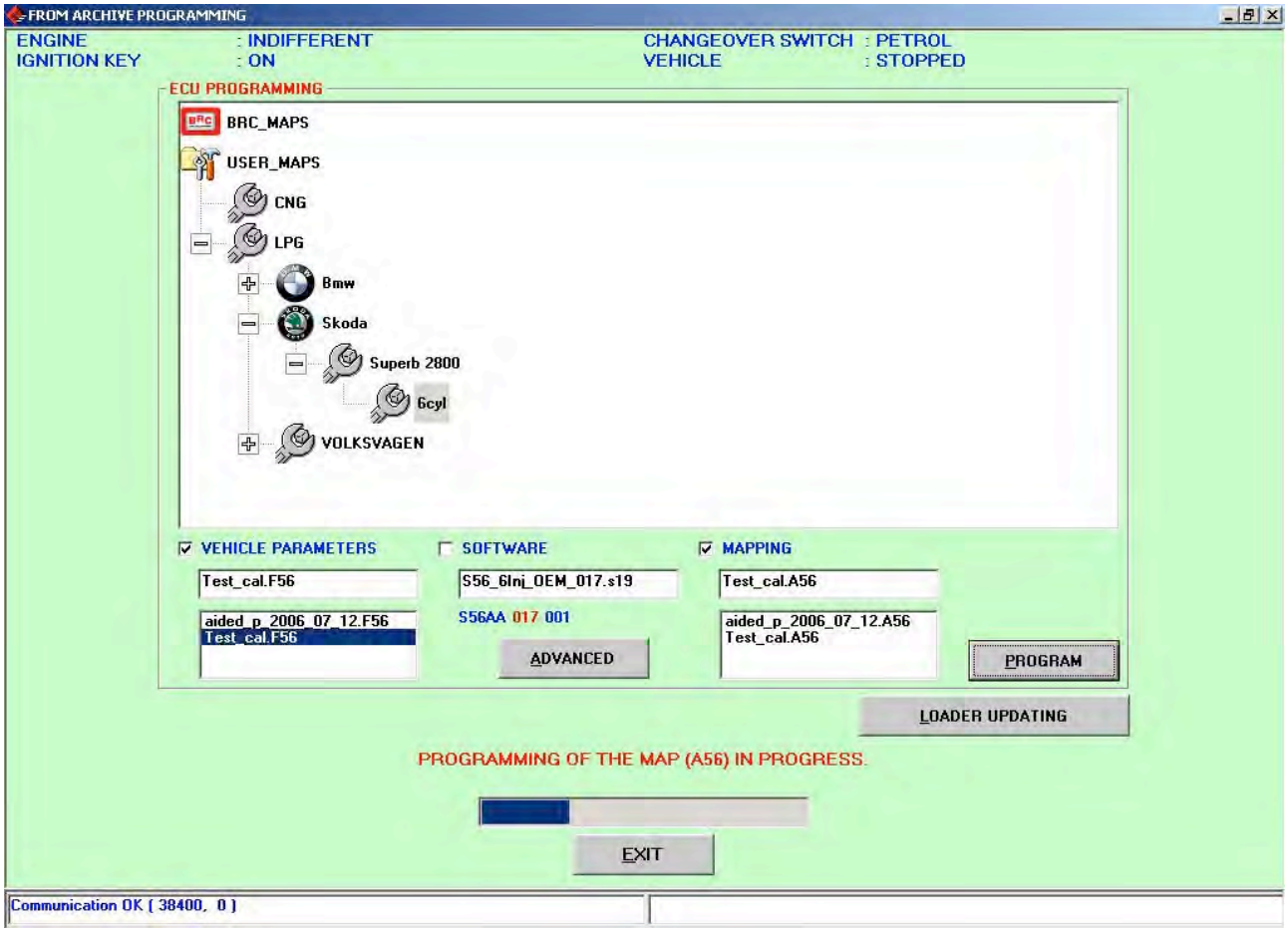


Picture 4-18: final window with red message

4.2.2 Programming "*from records*"

Selecting the key *Programming →from records* you enter the window for the Sequent 56 ECU programming from file that is using the already available files (for example the ones previously developed). To correctly carry out the ECU programming please control the operating conditions as indicated at the top of the window. If you do not respect those conditions it will be not possible to carry out a programming: this situation is anyway informed by the technicians programme.
For the programming, please select the file to download from the records according to the type of installation, trademark and vehicle petrol ECU. If the vehicle is distributed by BRC the files are inside BRC_MAPS folder while if the vehicle has been developed by the technician the files are inside USER_MAPS one.
For the example in Picture 4-19 we choose:

Map	: made by the user (User_Maps)
Installation	: LPG
Trademark	: Skoda
Model	: Superb 2800
ECU	: 6cil



Picture 4-19: programming from records

After you selected the vehicle ECU number, you have to select the files to be download.
The example in the picture shows there is one only F56 file for the selected ECU (UP120905.F56) and a lot of A56 ones. The programme automatically selects the A56 file with the same name (UP120905.A56) and it is usually not advisable to choose another one. In particular cases it could be necessary to make a different choose following BRC technicians suggestion.

The selection of F56 file to be downloaded is done by clicking twice on the selected file. Automatically a thick sign appears near the writing *Vehicle Parameters* and the name of the selected files appears in the area hereunder.

The software selection (file .S19) to download is automatically carried out when you choose the vehicle parameters (file .F56). To transfer the file on the ECU it is necessary the square close to *Software* writing is selected with a thick mark. You can change the software by clicking *ADVANCED.* By doing this, a window containing the different versions of the available software appears and you can choose the desired one by clicking twice on the name. We strongly suggest you to carry out these operations only if suggested by BRC technicians or qualified people.

The thick mark indicates the files that will be downloaded at the same time when you go on with the ECU programming that is by clicking the *Programme* key.

The example in Picture 4-19 shows all files are downloaded (F56 and A56) but not S19 software.

The following programming combinations can be carried out at the same time:

- F56 + A56
- F56 + A56 + S19

Sometimes it could be necessary to update the ECU Kernel. In this case when you choose to carry out a personalized guided programming of the ECU, the programme automatically advices the user. For the kernel update, please click on "*LOADER UPDATING"* (see Picture 4-19): a page will be opened and according to the situation on the ECU, a red writing indicating the operations to be carried out will appear. By clicking *PROGRAM* key at the bottom of the window, the kernel transfer to the ECU starts. At the end of this operation a window informing the operation has been correctly ended will appear.
If the ECU does not need the kernel update, a red writing will indicate the ECU version is already updated. In this case the kernel programming is anyway possible but useless and not advisable.

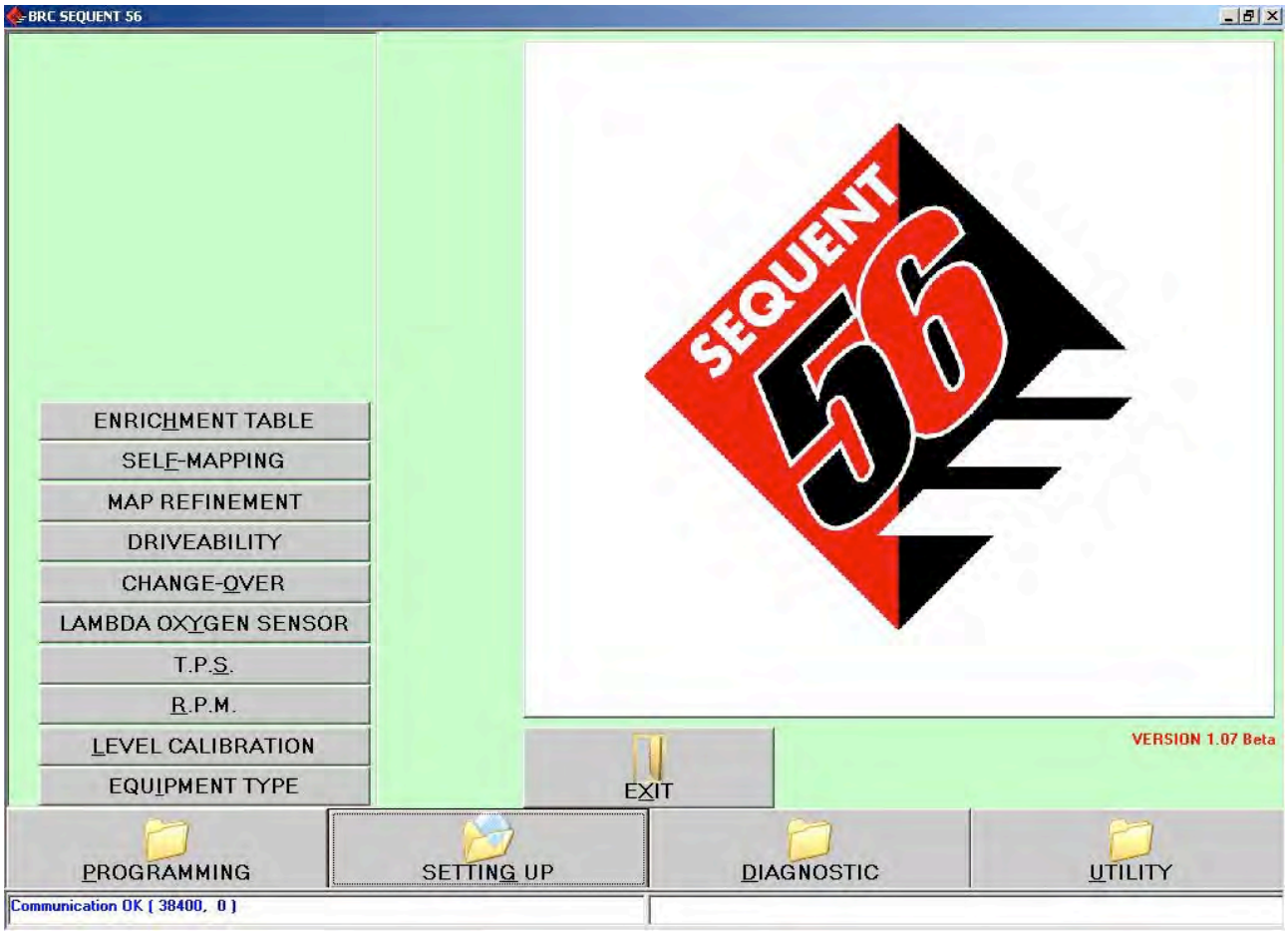
WARNING!:

- The kernel update if a delicate and potentially dangerous operation. Please be sure the PC batteries are charged or the electric feeding is connected before starting.
- If the loader programming stops as soon as it starts, you have to turn the ignition key off and then on, and try again.
- Trying to update the kernel, the programming could be not executed in spite of the repeated attempts. In this case follow the listed indications:

1. From the main page select *PROGRAMMING → FROM RECORDS*
2. Select a start map from *BRC_MAPS* .
3. In the *VEHICLE PARAMETERS* window, select the F56 file in order to mark a tick on the cell.
4. Click on *PROGRAM* at the bottom right to start the F56 programming.
5. When the sliding bar indicating the programming process appears, stop the communication by turning the ignition key off and then on.
6. Try again to update the kernel.

5 Setting up

Selecting *Setting up* from the main screen it is possible to enter some sections dedicated to the control and modification of the vehicle parameters allowing to optimise or correct the calibrations of a previously programmed vehicle (picture 5.1). Most of the possible operations are equivalent to the guided personalised procedure ones described in the previous chapter so that here you will only find a reference to the concerned paragraph. This chapter describes in detail the different sections.



Picture 5-1: Setting up

The changes introduced in the setting up sections are marked with a red “X” near the modified section key so that the carried out change is pointed out. For example a red X near RPM key means you changed the rpm setting, a red X near TPS means you changed the TPS setting and so on.

Leaving the setting up section, or sometimes by selecting other functions or if you did changes, you will be asked to save the modification on file, specifying the type of installation, manufacturer, model, ECU and file name as already described in the guided procedure.

5.1 Previously described functions

Selecting *Setting up* from the main screen, the previously described functions among the listed ones are the following:

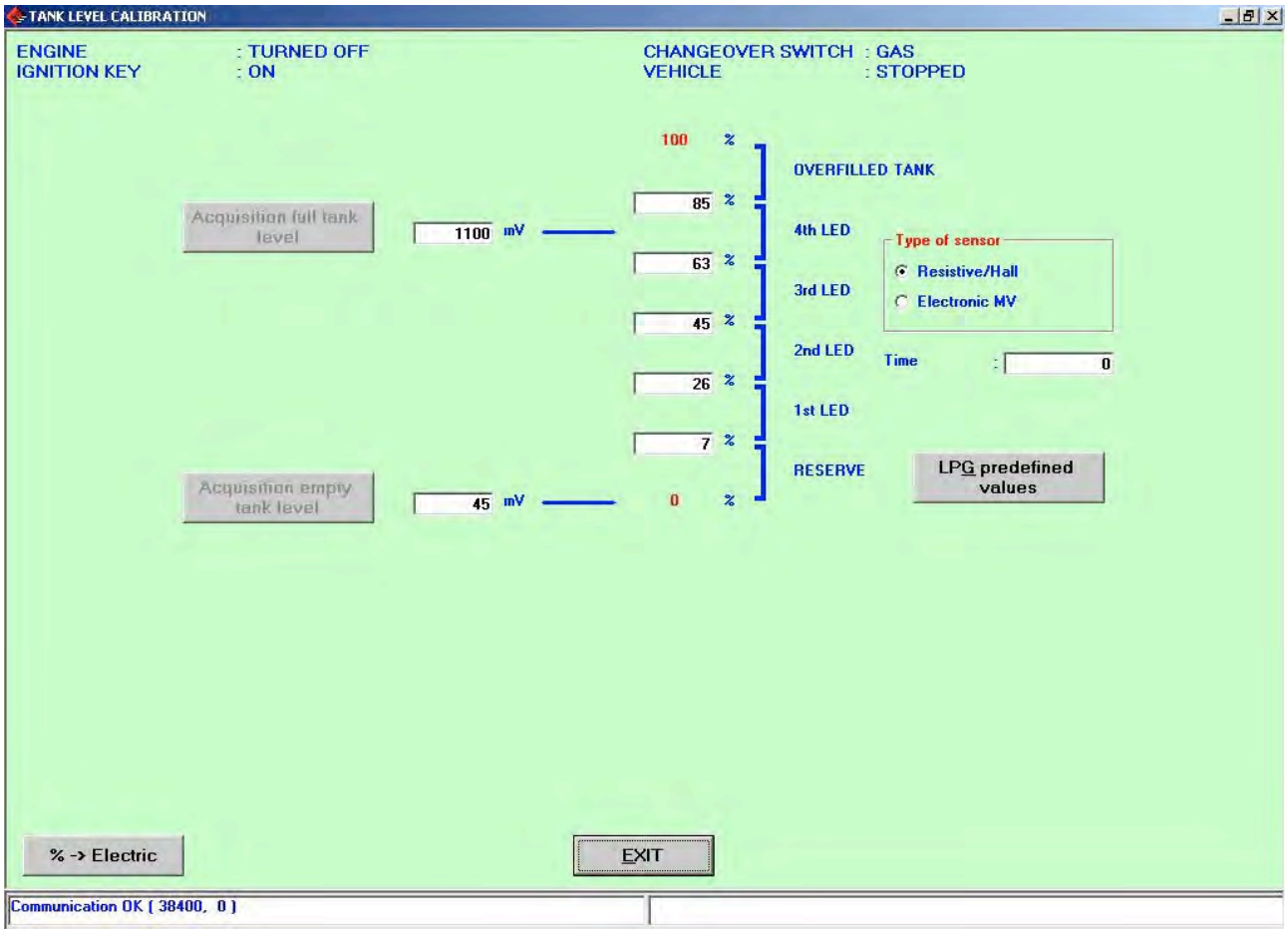
- Type of installation (see paragraph 4.2.1.2 page 16)
- RPM (see paragraph 4.2.1.3 page 20)
- T.P.S. (see paragraph 4.2.1.5 page 24)
- Oxygen sensor(see paragraph 4.2.1.4 page 23)
- Self-mapping (see paragraph 4.2.1.7 page 26)

Then the following functions not considered before will be described (see Picture 5-1):

- Level calibration (see paragraph 5.2 page 35)
- Changeover (see paragraph 5.3 page 36)
- Driveability (see paragraph 5.4 page 40)
- Map refining (see paragraph 5.5 page 45)
- Enrichment table (see paragraph 5.6 page 46)

5.2 Level Calibration

This section allows to calibrate the tank level sensor signal so that the level indication on the changeover switch led will be correctly displayed. As usual, the indicated values are the ones contained in the ECU.Come sempre, i valori visualizzati sullo schermo sono quelli presenti in ECU.



Picture 5-2 Setting up – tank level calibration

For a correct calibration the tank has to be empty in order to get the level sensor signal in this condition clicking *Acquisition empty tank level* key; the registered value appears in the cell near the key (picture 5.2). After the gas filling up click on *Acquisition full tank level* and the obtained value appears in the cell near the key.
Clicking on *LPG preset values*, some standard values are automatically set which normally correspond to a correct calibration of BRC resistive level sensor. In this way you can easily restore a working approximate calibration.

As you can see in Picture 5-2, you can set some percentage discriminating the passage among the various level and the following change in the on LED numbers on the changeover switch. Usually these values are preset to have a balanced levels division. Anyway if you wish to increase or decrease the permanence in one of the levels, to better set the indication you only have to manually change those values.
Clicking *%->Electric* the values of the screen are displayed in mV instead of as a percentage and vice versa. Clicking again the same key, the percentage values will be restored.

When the calibration is ended and controlled, you go on clicking on Exit. If you changed some settings, confirm them by clicking YES when required.

5.3 Changeover

This screen allows to modify the parameters for the petrol-gas change-over. Two sections have been displayed in red (see picture 5.3) and are:
1.*Cold engine*
2.Warm engine
The first is necessary for the gas/petrol change-over calibration when the vehicle is cold (for example after a long stop without starting the engine); the second for the change-over calibration when the engine is warm (for example when you start the engine after a short stop) The reference temperature is the engine cooling liquid one read by the sensor inside the pressure reducer.

In the ***Cold Engine*** section you can introduce the following data:

- ***Change-over temperature higher than****:* when this temperature is achieved, the changeover occurs only if a time longer or equal to the "changeover delay" is passed from the engine starting.
- ***Change-over Delay****:* it corresponds to the waiting time before which any type of changeover can occur not even if the changeover temperature condition is valid.

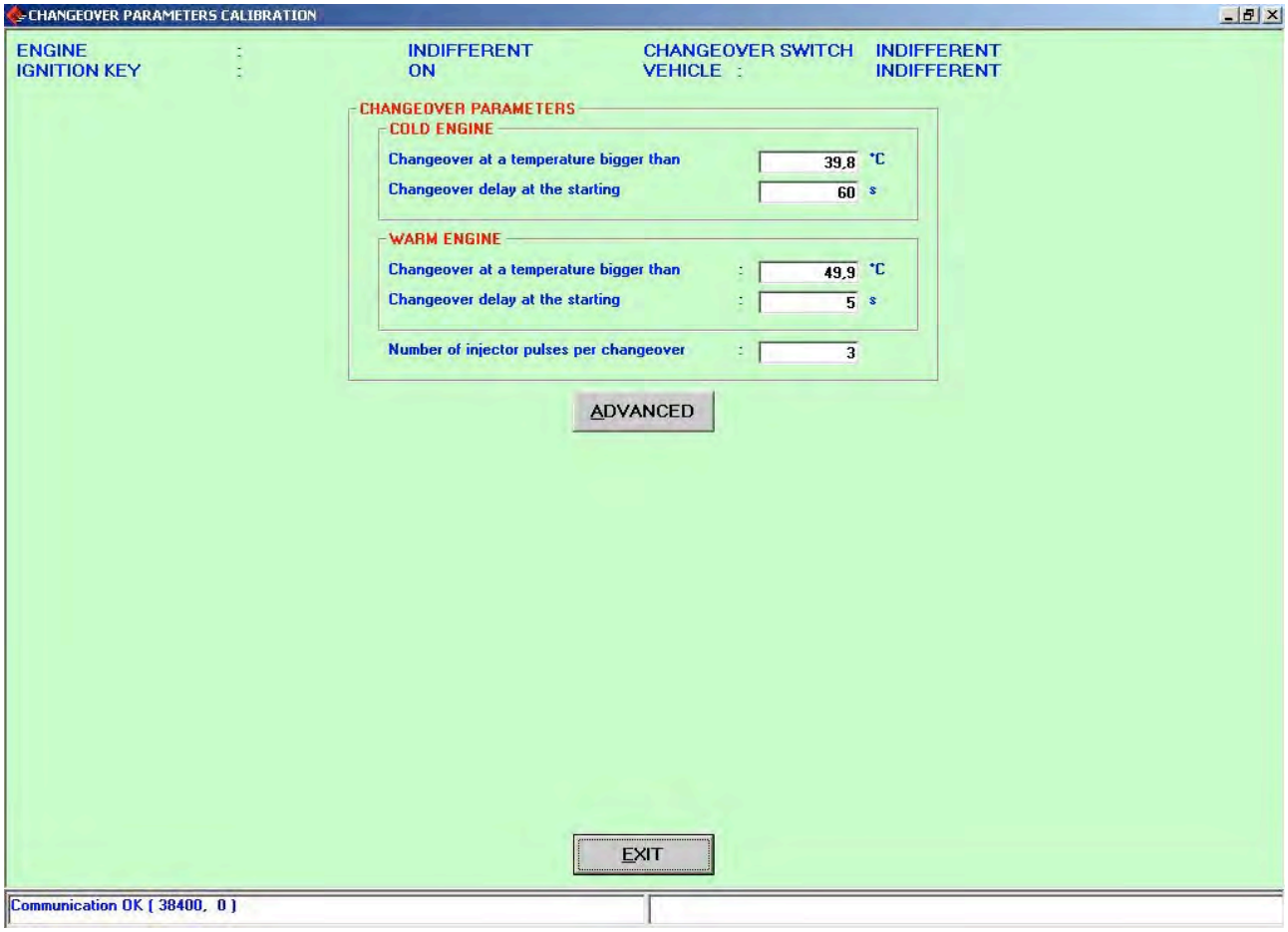
Similar paragraphs are included in the ***Warm Engine*** section. If the temperature of the cooling liquid is more than the set one in the ***Warm Engine*** section, the parameters in ***Cold Engine*** are ignored and will be considered only the ones for warm engine.
Vice versa, for a temperature lower than the one set in Warm Engine section, only the parameters for Cold Engine will be considered.

For example, considering the parameters in Picture 5-3, the changeover will occur when at least one of the two following conditions happens (the first is the winning one):

1. the cooling liquid has a temperature higher than 40°C and 60 seconds passed from the engine starting.
2. the cooling liquid has a temperature higher than 50°C and 5 seconds passed from the engine starting.

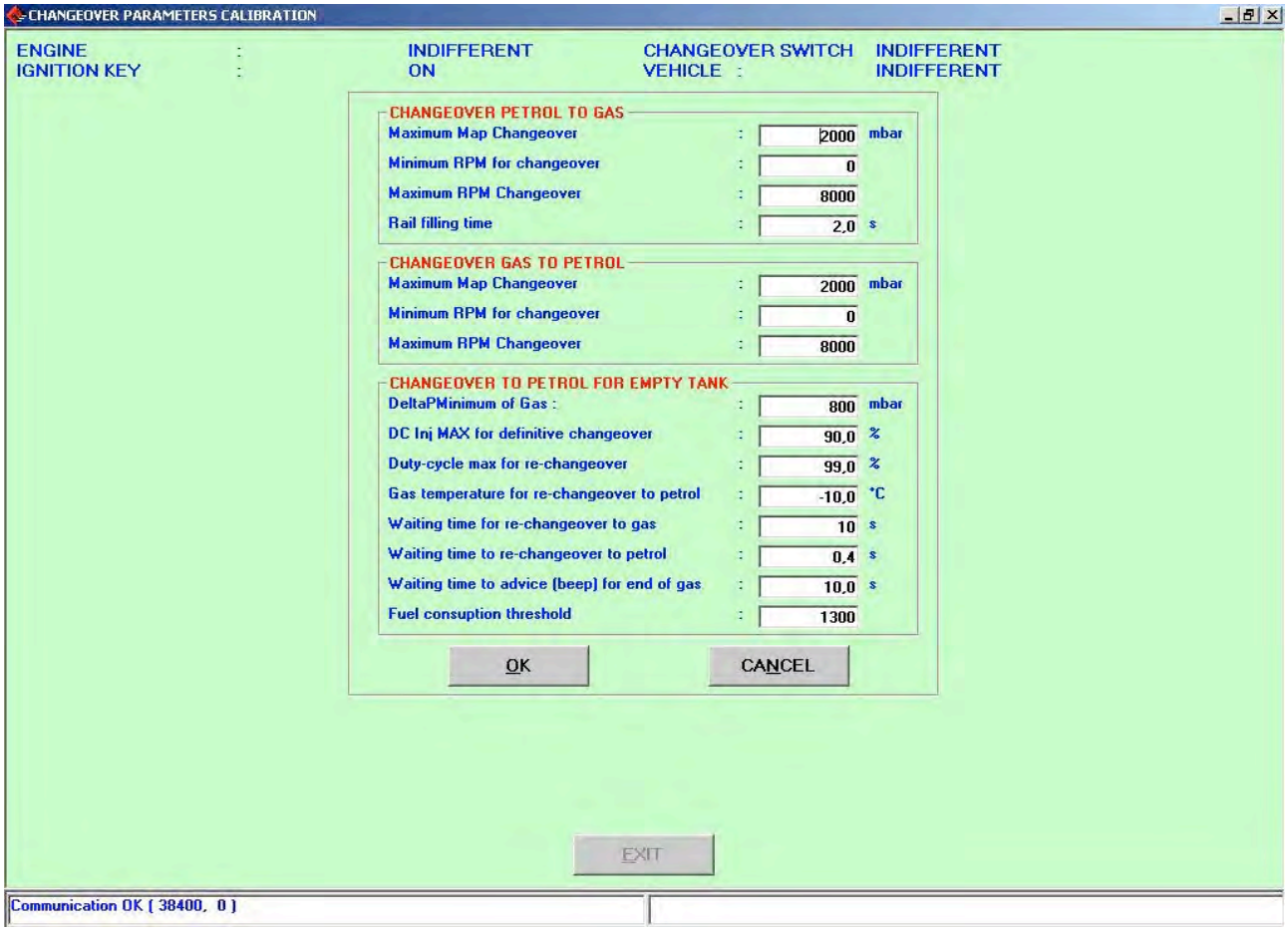
It is clear that when the vehicle is warm, the changeover will occur within 5 seconds or less more while with a cold vehicle it will be necessary to wait at least a minute.

"***Injector impulse N. for changeover***" parameter allows to set the speed according to which the changeover from petrol to gas and vice versa occurs (BRC patent).
In practice you have to set how many injections each gas injector has to carry out before changing the next one.
With the value of 3 injections visible in Picture 5-3, taking as example a 4-cylinder vehicle, after the changeover of the first injector there will be 3 injections where 3 cylinders will be still fed with petrol and one only with gas. Then for 3 injections there will be 2 cylinders with gas and 2 with petrol and after other 3 injections 3 cylinders with gas and 1 with petrol. After other 3 injections the last injector will operate with gas too.



Picture 5-3: Setting up – changeover parameters calibration

ADVANCED key allows to set other parameters for the changeover from petrol to gas and to manage the gas/petrol changeover that occurs in case of no gas in the tank or when the gas temperature is too low (see Picture 5-4). We suggest to modify this window parameters only with BRC technicians support.



Picture 5-4: Setting up – Changeover parameters - ADVANCED key

The configuration parameters in “Changeover Petrol To Gas” section allow to manage the normal petrol-gas changeover. These are:

- ***Maximum MAP change-over****:* it corresponds to the manifold absolute pressure value beyond which it is possible to change to gas. Inputting a value of “2000” as indicated in Picture 5-4, the changeover is possible only for MAP values under 2000 mbar
- ***Minimum RPM for change-over****:* it corresponds to a rpm value below which the gas change-over is not possible. Inputting a value “0” as indicated in Picture 5-4, the change-over is possible with whatever rpm value.
- ***Maximum RPM change-over****:* it corresponds to a rpm value below which the gas change-over is not possible. Inputting a value of “8000” as indicated in Picture 5-4, the change-over is possible only for a rpm value lower than 8000 rpm.
- ***Rail filling time****:* this is the time from the changeover phase when solenoidvalves are opened till the first injector changeover starts. This time is useful to set the installation pressure before changeover. Inputting a value “2” as indicated in Picture 5-4, the change-over starts 2 seconds after the solenoidvalves opening.

The configuration parameters in the “***Changeover Gas To Petrol”*** allow to manage the automatic gas-petrol change-over that could occur for example because the changeover switch is pushed of automatically in case of gas shortage or for other situation we will describe later.
The configuration parameters are:

- ***Maximum MAP change-over***
- ***Minimum RPM for change-over***
- ***Maximum RPM change-over***

The parameters meaning is the same described for the petrol-gas change-over.

With the values indicated in Picture 5-4 the vehicle can not change to petrol for MAP values more than 2000 mbar (that is it can change with whatever MAP value), can not change for rpm value less than 1 rpm (so it

can change also for very high RPM) and can not change for rpm value more than 8000 rpm (that means it can change for very high RPM too). These are standard values allowing the changeover in every conditions.

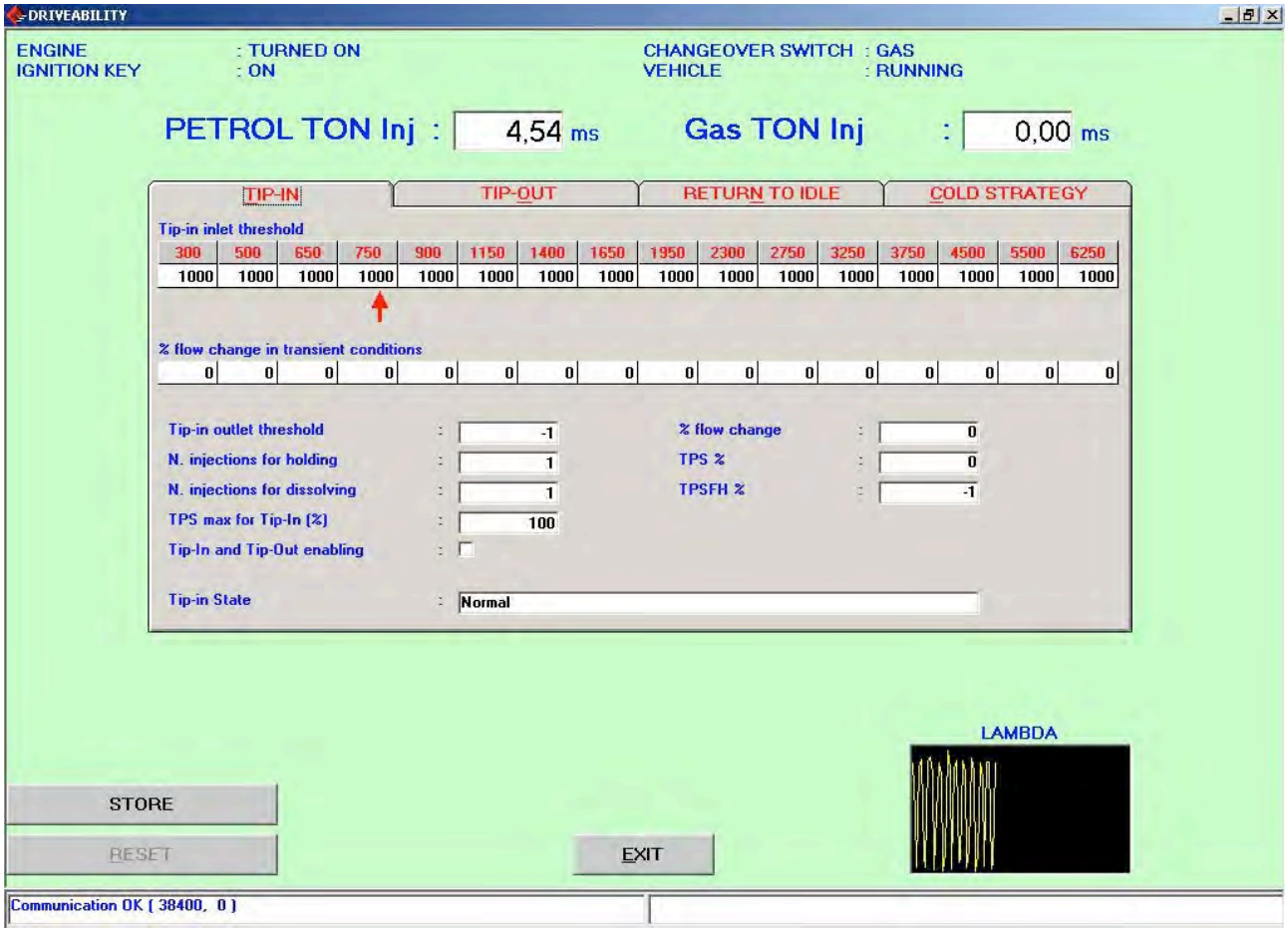
ATTENTION: by changing these values in an improper way, you could stop the gas-petrol change-over even if the change-over Is turned on petrol position. In this case the driver is not able to change to petrol by acting on the changeover. We suggest to change these values only after BRC technicians suggestion.

The configuration parameters in the **"Changeover to Petrol for empty tank"** section allow to manage the gas to petrol change-over caused by gas pressure lack, by gas injectors impossibility to supply enough fuel (excessive duty cycle), or too low gas temperature.
The parameters are:

- ***DeltaPMinimum of Gas**:* It corresponds to the DeltaP value (difference between rail gas pressure and MAP) under which the petrol change-over occurs. In the example in Picture 5-4 a DeltaP less than 700 mbar causes the change-over to petrol for gas shortage.
- ***D.C. Inj. Max for definitive changeover**:* If a changeover due to a *minimum DeltaP* occurs, the system will try to change to gas again if the gas injectors duty cycle was less than the set value in the cell to use all the gas contained in the tank. On the contrary, the changeover will be definitive and the buzzer will start to ring to inform the driver the gas installation has been automatically disconnected. In Picture 5-4 a changeover caused by DeltaP is recognized as definitive when it occurs with a gas duty cycle more than 90%.
- ***Duty-cycle Max for re-changeover**:* It corresponds to the gas injectors duty cycle threshold over which the change-over occurs for the reaching of the maximum duty cycle of the gas injectors.
- ***Gas temperature for re-changeover to petrol**:* if the gas temperature is less than the set value (-10°C in Picture 5-4 example), the system changes to petrol to prevent possible bad working due to too low temperature.
- ***Waiting time for re-changeover to gas**:* indicates the time between the conditions recognition allowing to return to gas operation and the real change-over. The system waits for this time before carrying out the changeover again.
- ***Waiting time for re-changeover to petrol**:* indicates the time between the recognition of a possible petrol change-over cause and the real change-over.
- ***Waiting time to advice (beep) for end of**:* indicates the time between the conditions recognition of the gas end and the warning signal to the user (buzzer).
- ***Fuel consumption threshold:*** according to the type of installation and the injectors number, this threshold is useful to know when 0,5 petrol litres have been consumed after a non definitive change-over to petrol due to gas shortage. When this happens, the buzzer rings so that the driver knows to drive with petrol

5.4 Driveability

When necessary, the windows in this page allow to calibrate some setting up parameters to improve driveability during sharp acceleration, sudden releases of the acceleration pedal or return to idle.
Let's analyze the transients window in Picture 5-5.



Picture 5-5: Setting up – Driveability – transients calibration

First of all you can select among four different folders: transients, release, back to idle and cold leaning strategies.
Then there are two keys at the lower bottom with the writing "STORE" and "RESET".

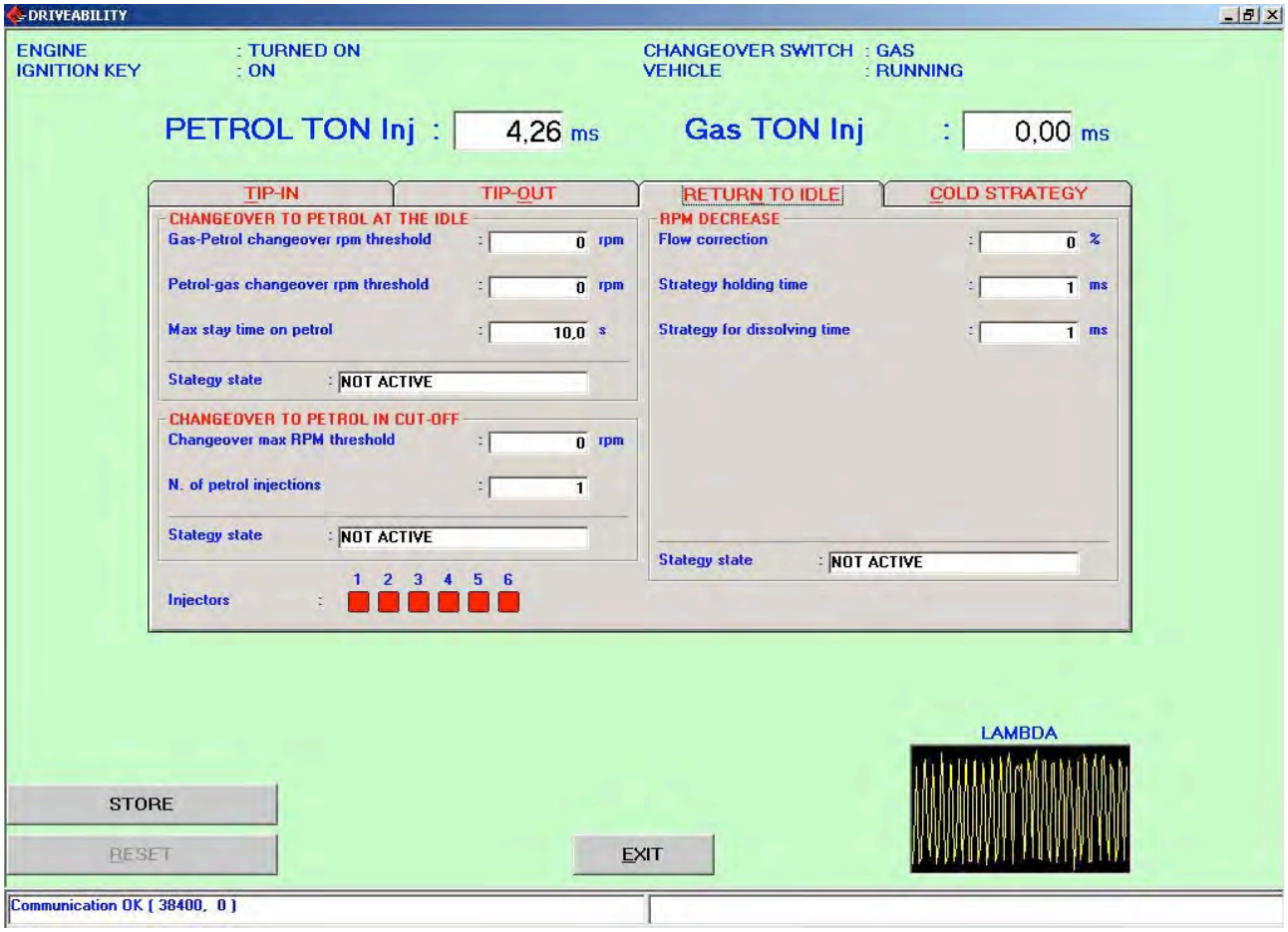
- ***Store**:* it is used to memorize the made changes so that you can restore them in every moment, going back to the memorized condition.
- ***Reset**:* back to the last parameters configuration memorization.

After selecting the transients or releases, in the upper side of the window the rpm threshold will be displayed in red where the transients are divided (for example in Picture 5-5 for all values the threshold is 1000 deactivating the strategy intervention).
The cells containing these thresholds are set by user and indicate the release entry threshold based on the TPS signal (throttle body position). A red arrow indicates what is the condition of the vehicle and consequently what are the cells to be modified to change the transient. The value to introduce is always a positive one and it can be understood from the read one in the "*TPSFH %* cell. This latter indicates every second the filtered TPS value; you just have to read the inside value, during a transient you need to modify and introduce it in the entry threshold cells, where there is the transient starting condition.
For example, if you wish to modify a transient at 1000 rpm, it is necessary to modify the cell 5a and 6a, identified by 900 and 1150 rpm (Picture 5-5) even if the transient exceed this rpm threshold, introducing as entry threshold a value which is the same to the one contained in the "*TPSFH %"* cell.
With an release entry threshold value of 1000 in a cell concerning a certain condition, transients will be deactivated for that condition.

The cells indicated as ***% change for transient flow*** allow to input the percentage value to increase the gas flow during the transient. A 10 positive value for example riches the fuel quantity during the transient of 10% while a 10 negative one leans the transient of 10%. In the cell *flow % Change* the effect of the strategy is visible in each moment. You can easily understand if it works or not, the value and the length.
The other parameters are:

- ***Transients exit threshold****:* indicates the TPS threshold for the transient exit and usually it is negative: the exit usually occurs with a deceleration.
- ***Upkeep time****:* indicates the transient time. It is indicated in injections number (counted on the first injector) .
- ***Dissolving time****:* it is the connection time to go from the transient flow to the one usually required by the vehicle. This time begins at the end of the upkeep one and it is expressed in injections number (counted on the first injector)
- ***Releases and transients qualification:*** **ATTENTION**! The transients and releases strategies is active only if this cell has been selected.
- ***Transients condition****:* this indicates the vehicle condition:
    - *"Normal":* indicates the normal operating status when the strategy is not active.
    - *"transients, transients fade-in, release, release fade-in* indicate in that moment the transient or release strategy is active in its maintenance or fade-in phase.

As for the releases, the same considerations described above for the transients are valid keeping into account the entry threshold will be negative. The flow % change can be positive or negative for both releases and transients
In Picture 5-6 you can see the window after selecting ***back to idle*** folder.



Picture 5-6: Setting up – Driveability – back to idle

As you can see, in this folder you can select among three strategies:

- ***Changeover to Petrol at idle***
- ***Changeover to Petrol in cut-off***
- ***RPM decrease***

The three strategies will be described later in details.
At the bottom there are some squares that in Picture 5-6 are red and numbered from 1 to 4.
This is the display of the feeding status for each cylinder in every moment. When the square is red this means the cylinder is fed with petrol; if it is green the cylinder is fed with gas. This visualization allows to keep under control the operation of the strategies described hereunder.

5.4.1 Petrol change-over at idle

This strategy is useful to solve possible problems when returning to idle in those vehicles where it is not possible to solve this problem with other methods.
The strategy allows to change to petrol for a few instants when returning to idle with a negligible petrol consumption but avoiding the engine switch off or an excessive rpm fall.

The parameters you can act on are:

- ***Gas-petrol changeover RPM threshold****:* when rpm is lower than the value contained in this cell, the strategy is effective and the vehicle changes to petrol. In Picture 5-6 there is a preset value of 0: this deactivates the strategy.
- ***Petrol-gas changeover RPM threshold****:* when rpm is more than the value contained in this cell, the strategy immediately deactivates and the vehicle changes to gas again no matter how many time passes. In Picture 5-6 there is the preset value of 0: this deactivates the strategy.
- ***Max stay time on petrol****:* after this time the strategy ends its effect and the vehicle returns to gas independently from the rpm. In Picture 5-6 there is a preset value of 10 seconds.

NOTE: in addition to the injectors status, at the bottom of the window you ca control the current status of the strategy in *"Strategy Status"* cell.

5.4.2 Petrol change-over in cut-off

This strategy is useful to solve possible problems when during rpm fall after a cut-off (temporarily switching off on the injectors during deceleration) in those vehicles where it is not possible to solve this problem with other methods. It could be necessary to use this strategy to avoid engine switching off that can occur for a sudden pressure of the clutch with consequent fast rpm fall.
The strategy allows to change to petrol for a few instants after a cut-off with a negligible petrol consumption but avoiding the engine switch off or an excessive rpm fall.

The parameters you can act on are:

- ***Changeover Max rpm threshold:*** when rpm are less than the value set in this cell, the strategy activates itself and the vehicle changes to petrol. In Picture 5-6 there is the set value of 0: this value deactivates the strategy.
- ***Number of Petrol injections****:* it determinates the maximum length of the strategy. After the injections set in this cell (counted on the first injector) the system changes to gas. In Picture 5-6 there is a value of 1 injection.

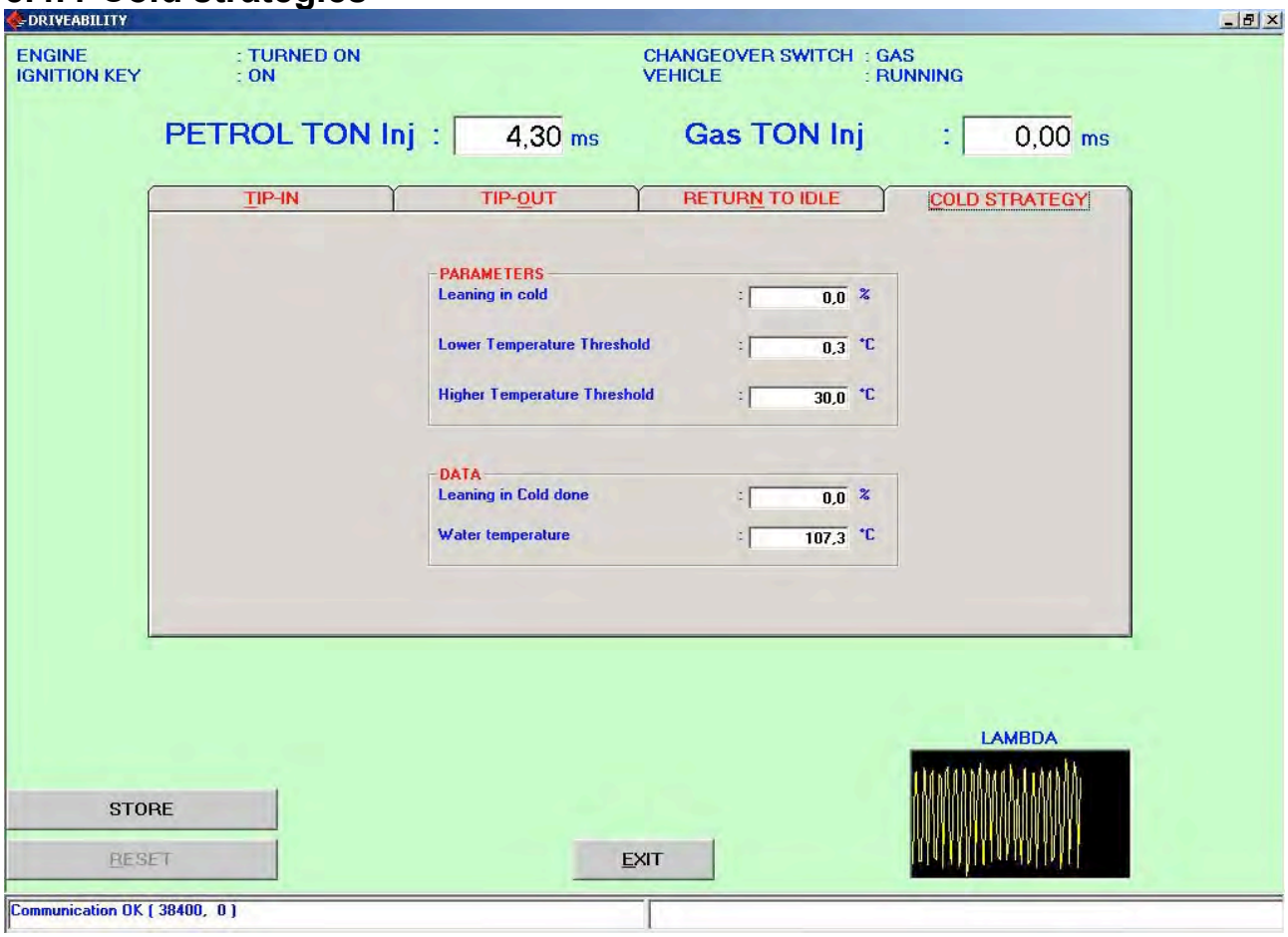
NOTE: in addition to the injectors status, at the bottom of the window you can control the current status of the strategy in *"Strategy Status"* cell.

5.4.3 RPM fall

This strategy is necessary to solve the problems for the idle return or rpm fast decreasing without temporary changing to petrol but only acting on gas flow corrections.
The parameters you can act on are:

- ***Flow correction***: this is the percentage value for the gas flow correction the strategy has to carry out. For example if you input a value of 10 you will obtain a 10% enrichment while inputting a value of –10 you will obtain a 10% leaning. In Picture 5-6 you have the pre-set value of 0: this one deactivate the strategy.
- ***Strategy holding time:*** it determinates the duration of the strategy holding, in milliseconds. When the strategy is operative, during this duration it applies the flow correction as described in the previous point.
- ***Strategy for dissolving time***: it determines the duration of the strategy fade-in phase, in milliseconds. After the holding phase, the strategy gradually comes back to the normal operating conditions with a null gas flow correction in the time pre-set in this cell.

5.4.4 Cold strategies



Picture 5-7: Setting up – Driveability – Cold strategies

In Picture 5-7 you can see the window as it appears after selecting ***Cold Strategies***.
This strategy is necessary to compensate the excessive enrichment the petrol ECU could carry out during cold engine conditions (low temperature for the cooling liquid).
The parameters you can act on are:

- ***Leaning in cold***: this is the percentage value for the gas flow correction the strategy has to carry out. For example if you input a value of 10 you will obtain a 10% enrichment while inputting a value of –10 you will obtain a 10% leaning. In Picture 5-6 you have the pre-set value of 0: this one deactivate the strategy.
- ***Lower temperature threshold***: it determines the temperature of the cooling liquid under which the leaning described above is applied.
- ***Higher temperature threshold***: it determines the temperature of the cooling liquid over which the leaning is no more applied.

Practically the leaning will be the following:

- **No leaning** if the cooling liquid temperature is higher than the higher temperature
- **All the leaning** set if the temperature is lower than the inferior temperature
- **A partial leaning** if the temperature is between the two thresholds. If the temperature is close to the higher threshold, the leaning will be null while if it is close to the lower threshold the leaning will be nearly complete. In the middle of the range between the two thresholds the leaning will be equal to the half of the set one.

In "**Data**" cell you can check the leaning that is carried out each instant in the cell ***"Leaning in cold done"*** and it also displays the temperature of the cooling liquid in the cell "***Water Temperature".***

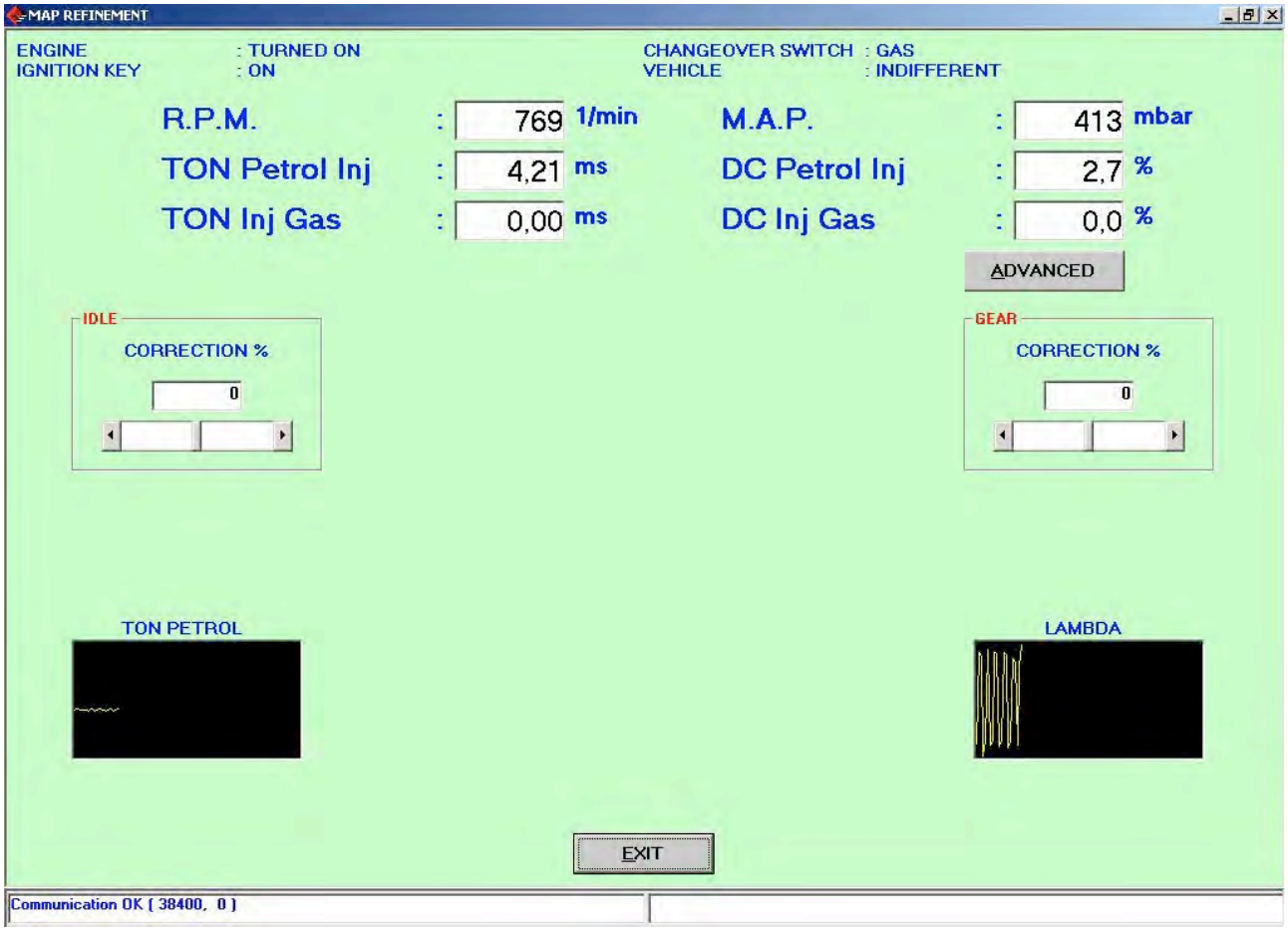
5.5 Map Refining

In this window you can adjust whatever available in the ECU and particularly this can be useful to refine the results of a just completed self-mapping.
The map refining can be carried out by using two “cursors” as shown in picture 5-8.
The first is indicated as IDLE and the second as GEAR
The function of these two pointers can be considered the same of the reducer and adjusting screw ones in the traditional systems.

- ***IDLE***: this cursor is more or less equivalent to the idle and sensibility adjustment of a traditional reducer with the result to rich or lean in the idle operation range. By moving the cursor to the right you increase the gas flow at idle to the indicated percentage (numbers higher than 0). Viceversa to the left you will decrease the gas flow of the indicated percentage (numbers lower than 0) Use this one to better centre the map at idle.

- ***GEAR***: this cursor is more or less equivalent to the adjusting screw effect on a traditional system with the result to rich or lean the points with average or high engine load. By moving the cursor to the right you increase the gas flow at idle to the indicated percentage (numbers higher than 0). Viceversa to the left you will decrease the gas flow of the indicated percentage (numbers lower than 0) Use this one to correct the carburation with average or high engine loads.

Each of the above adjustments do not influence the system behaviour in the other condition.
After a self-mapping it is better to control the correct operation of the vehicle on the road with average or high power condition, in closed loop conditions, using tools and equipment allowing to see the self-adaptive parameters of the petrol ECU (OBD tester) or on the oxygen sensor behaviour too (if necessary use a Diagnostic Box or other suitable tools). Possible carburation anomalies in such conditions can be solved by acting on “GEAR” cursor.



Picture 5-8: Setting up – map refining

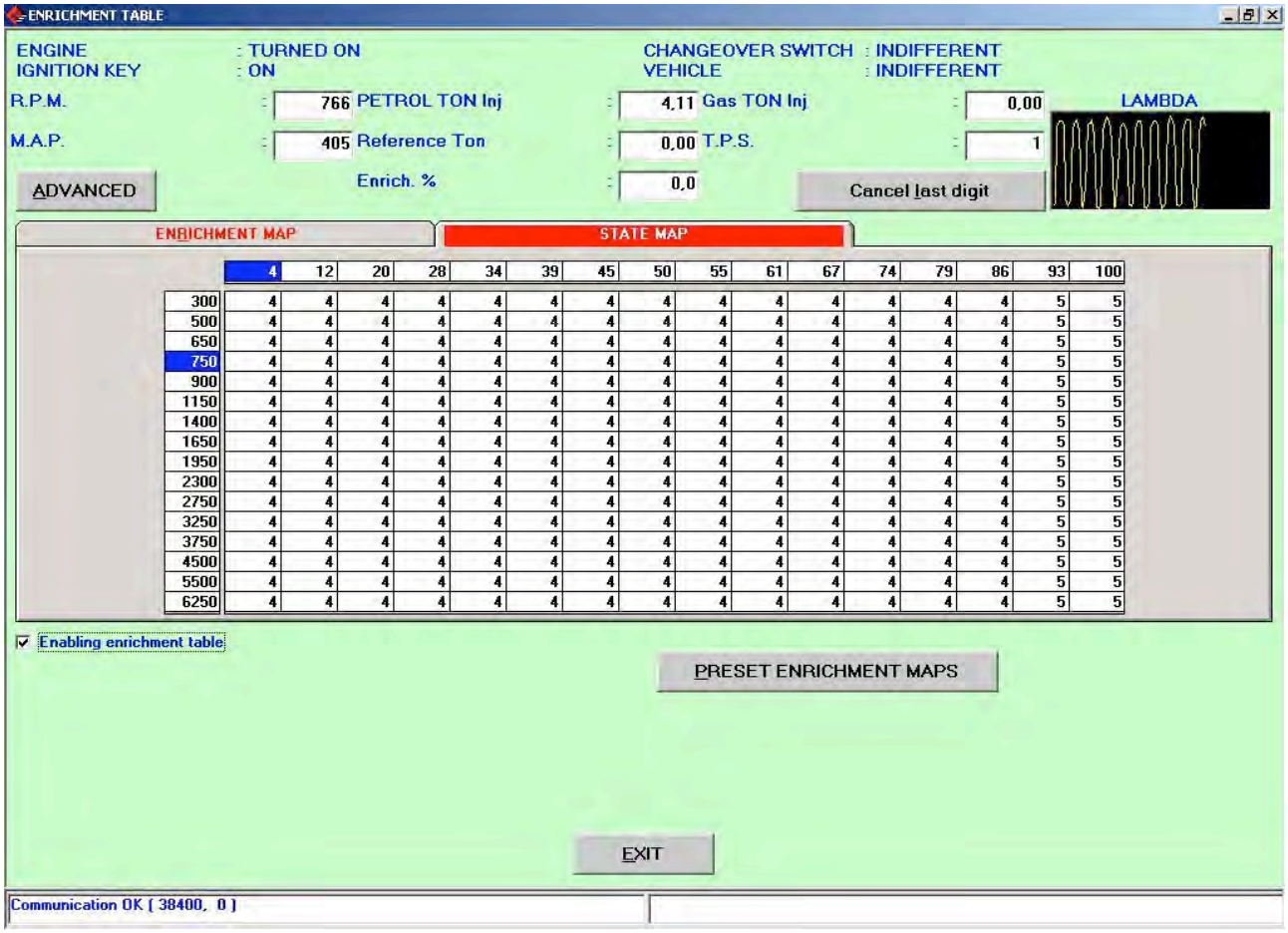
5.6 Enrichment Table

This strategy works only if the TPS rpm are activated. The Oxygen Sensor connection will extend its use, as we will see later.
It allows to change the map richness in each gas working point through a table according to rpm and TPS as shown in Picture 5-9 where rpm are on the left (vertical axe) while TPS is at the top (horizontal axe).
Please remember the map refining can not and does not have to replace this strategy. In fact the leaning of the map using the map refining to obtain leaner full load is a wrong process and causes lean map in closed loop areas with the possibility to switch on the engine breakdown led.
The correct way to lean the points where the mixture is too rich and causes jerks or problems is the enrichment table where you only intervene on the desired open loop areas without changing other parameters.

Picture 5-9 shows the status map, you can see how it is possible to indicate for each cell if in these conditions the engine control works in:

- closed loop (status 4, green cells),
- open loop (status 5, red cells),
- this status can not be determinated a priori (status 7, yellow cell)

In case of yellow cells or status 7 (to be used with maximum care) the strategy available in Sequent 56 will try to understand each time the operating status according to the oxygen sensor behaviour. For this particular status it is necessary that oxygen sensor is a normal tension one and that it is enabled and set in the software.

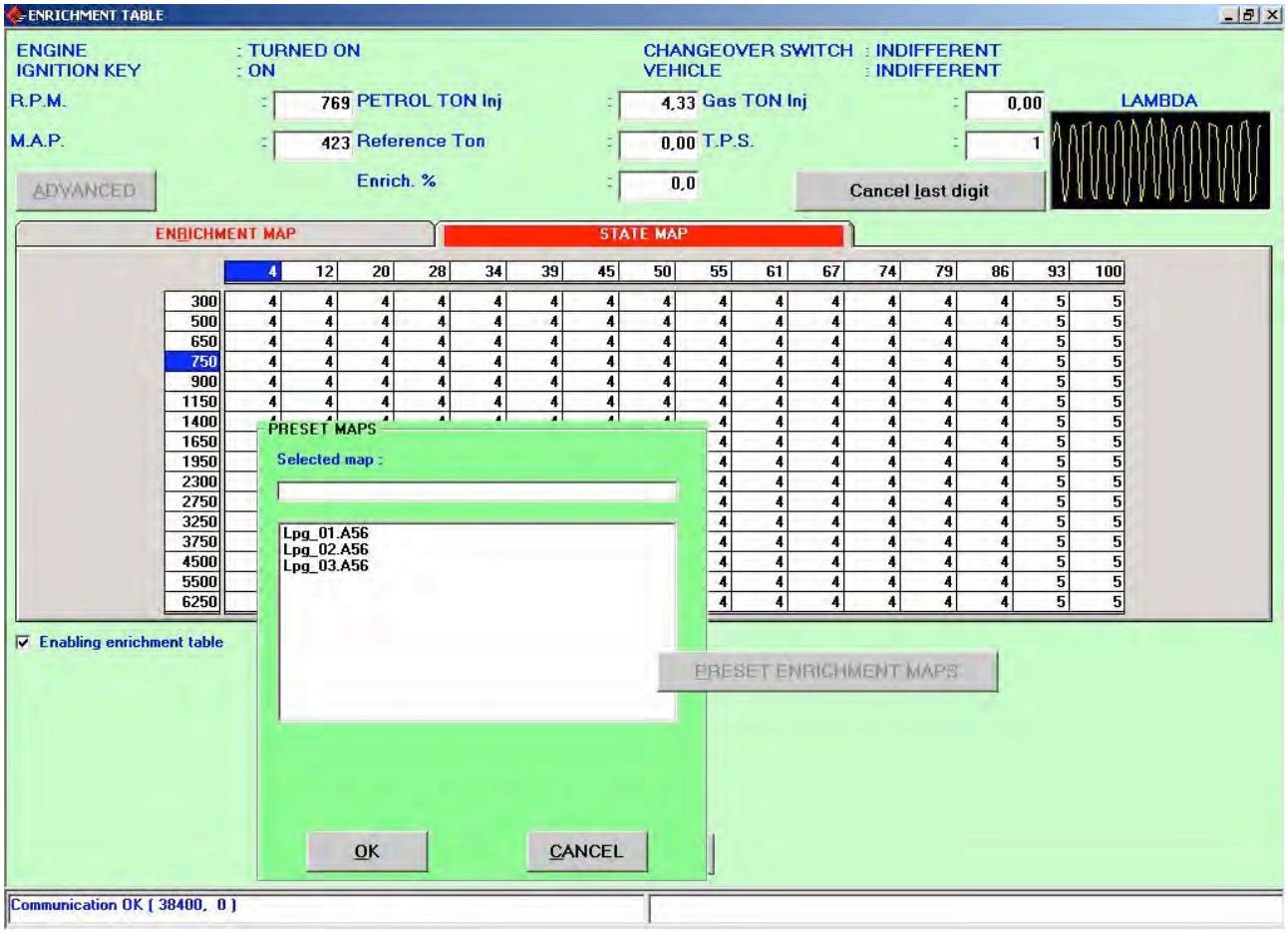


Picture 5-9: Setting up – Enrichment Table – Status map

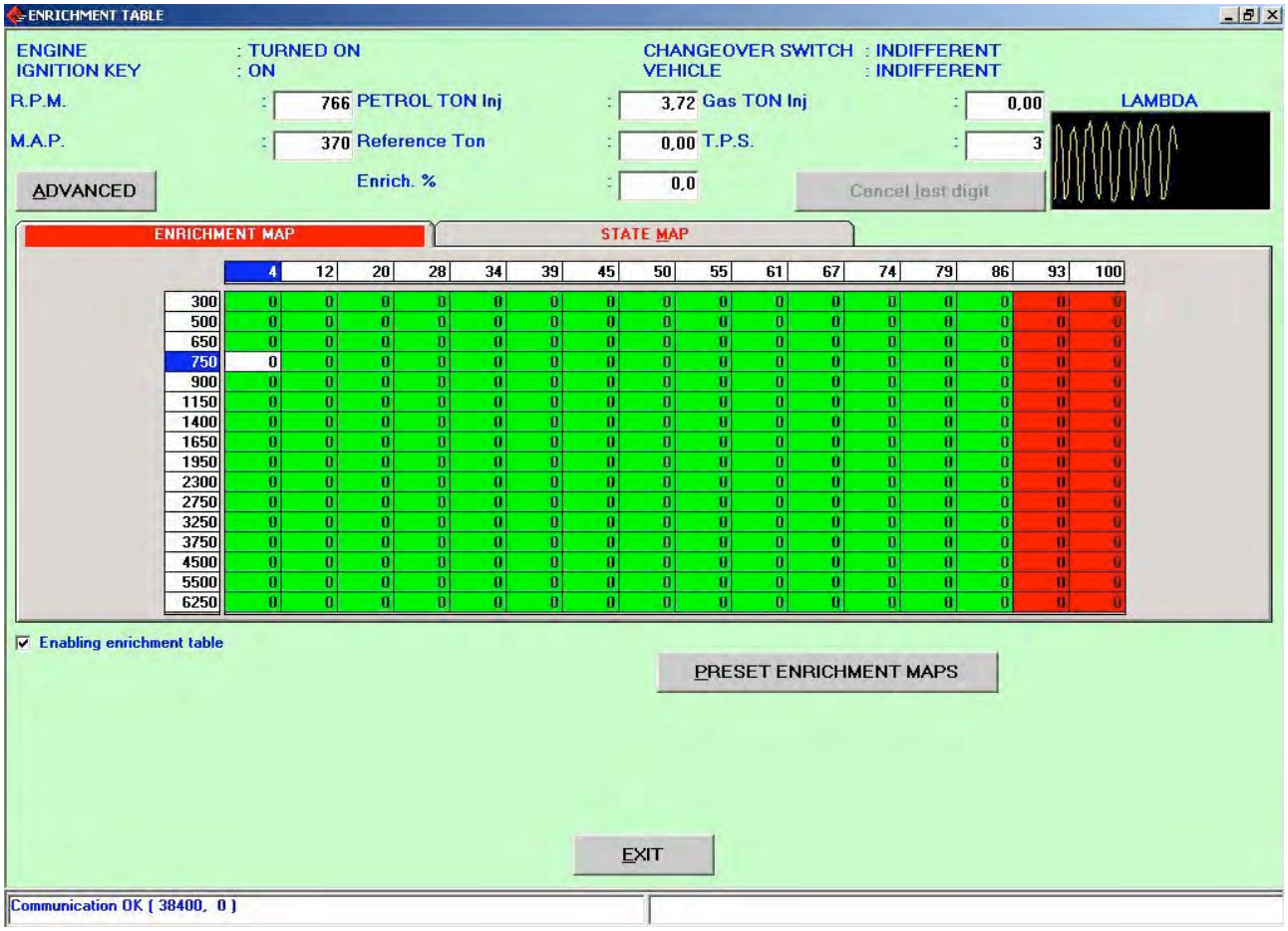
After determining and checking off the cells with their status, you can input in each cell the enrichment (positive) or leaning (negative) value.
Please note that selecting an area you could change the value of the whole area and the keyboard spacebar cancel the value of the selected cells.

In Picture 5-11 you can see how the enrichment map is. Only the values in the red cells (or eventually the yellow ones) will have an effects so that you have to select carefully the open loop area before inputting the values (usually negative) in the cells.

By clicking on “PRESET ENRICHMENT MAPS” key, the programme allows to select on of the pre-determinated speeding the necessary tests to optimise the vehicle setting up.
By clicking the key, you open a selection window as indicated in Picture 5-10. You can select the map by clicking twice the list and then “OK”.

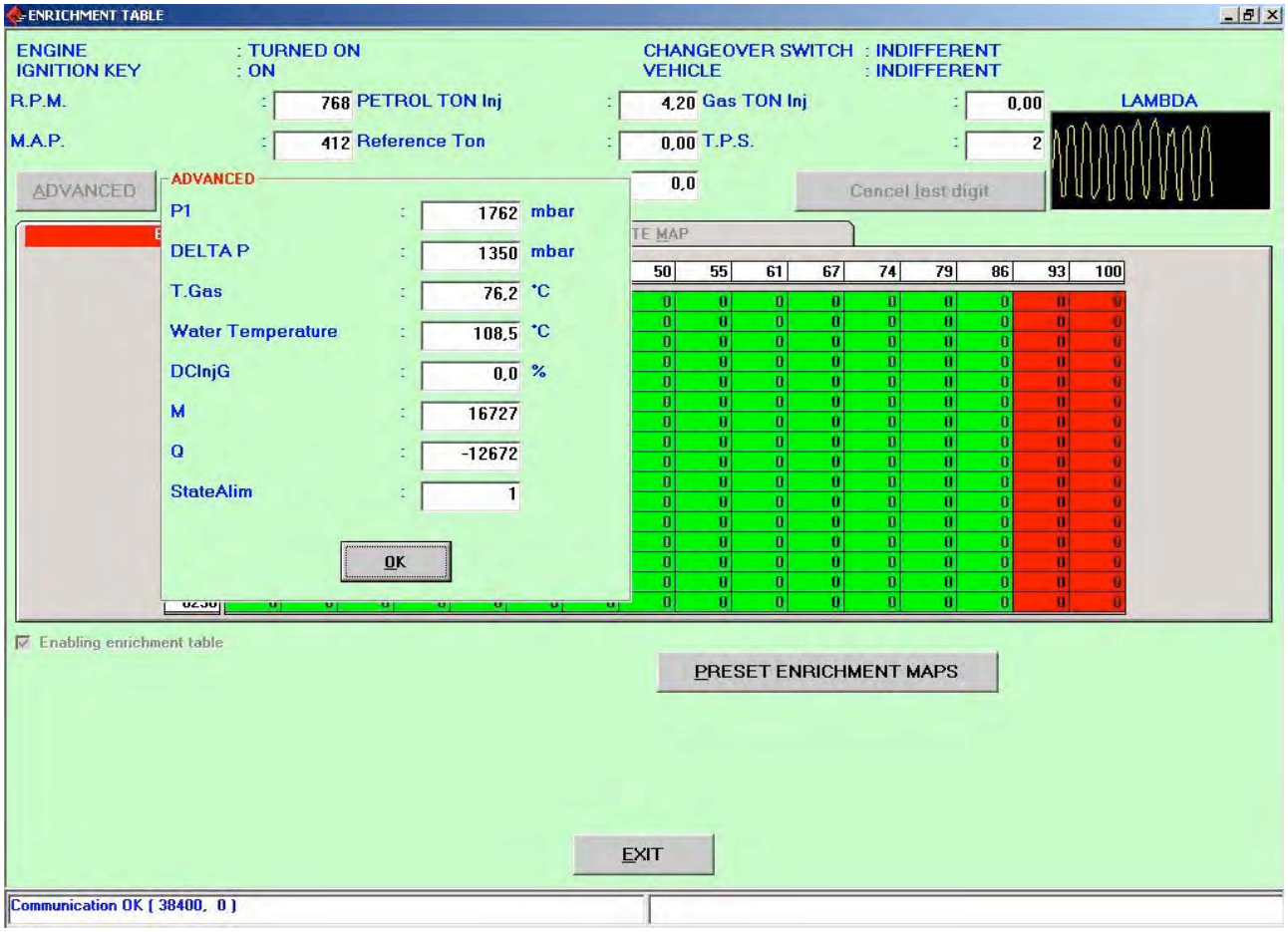


Picture 5-10: Setting up – Enrichment table – Preset maps



Picture 5-11: Setting up – Enrichment table – Enrichment map

Clicking “ADVANCED” key, you can display some parameters (as indicated in Picture 5-12) that it is sometimes better to control.

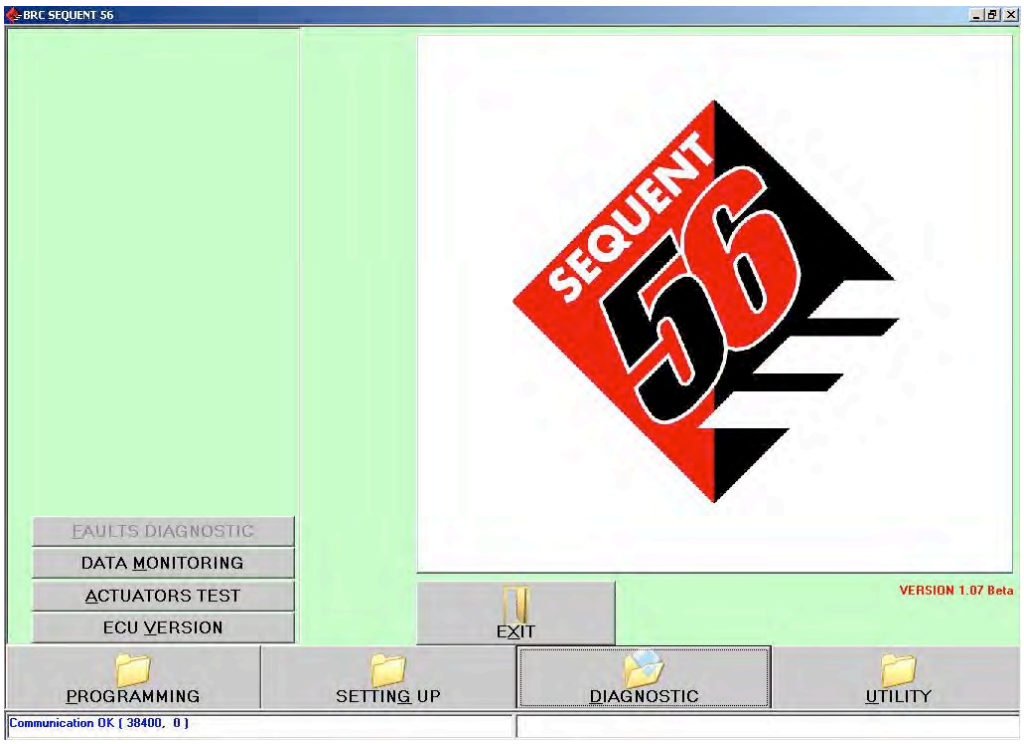


Picture 5-12: Setting up – Enrichment table – ADVANCED key

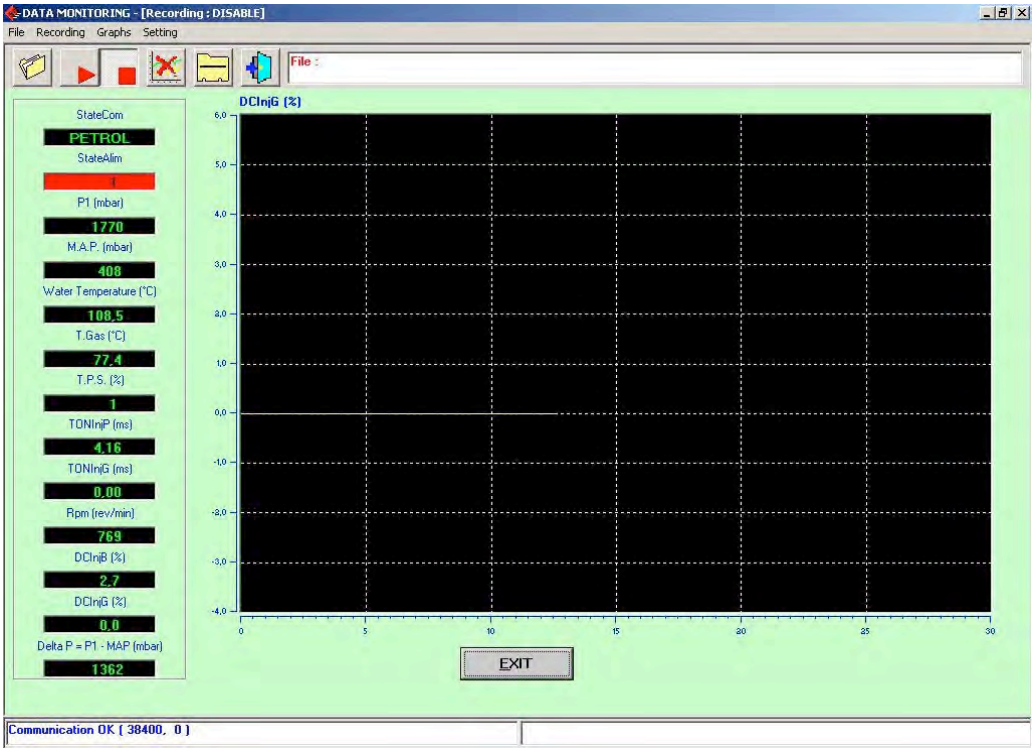
6 Diagnostic

6.1 Data Display

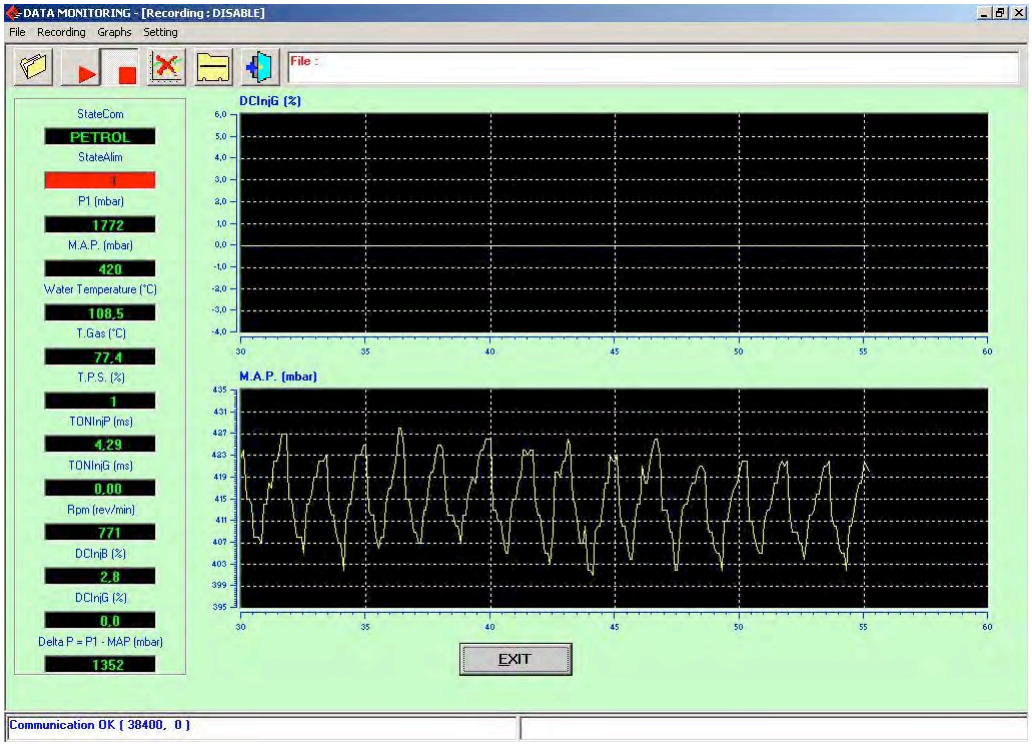
Clicking DIAGNOSTIC key at the bottom of the main window and selecting “Data Monitoring” among the keys on the left (as in Picture 6-1) you enter the window as in Picture 6-2, where you can display the ECU various operative parameters both in numerical or graphic form.
As you can see in Picture 6-2, the numerical values are listed on the left while graphics are in the middle of the window. These latter can be minimum one or maximum four (or nothing) as indicated in Picture 6-2, Picture 6-3, Picture 6-4, Picture 6-5 and Picture 6-6. To add a new graphic or cancel one you only have to double-click the corresponding numerical value. If you have fours graphics and you wish to add a new one, you first have to remove one of the four.



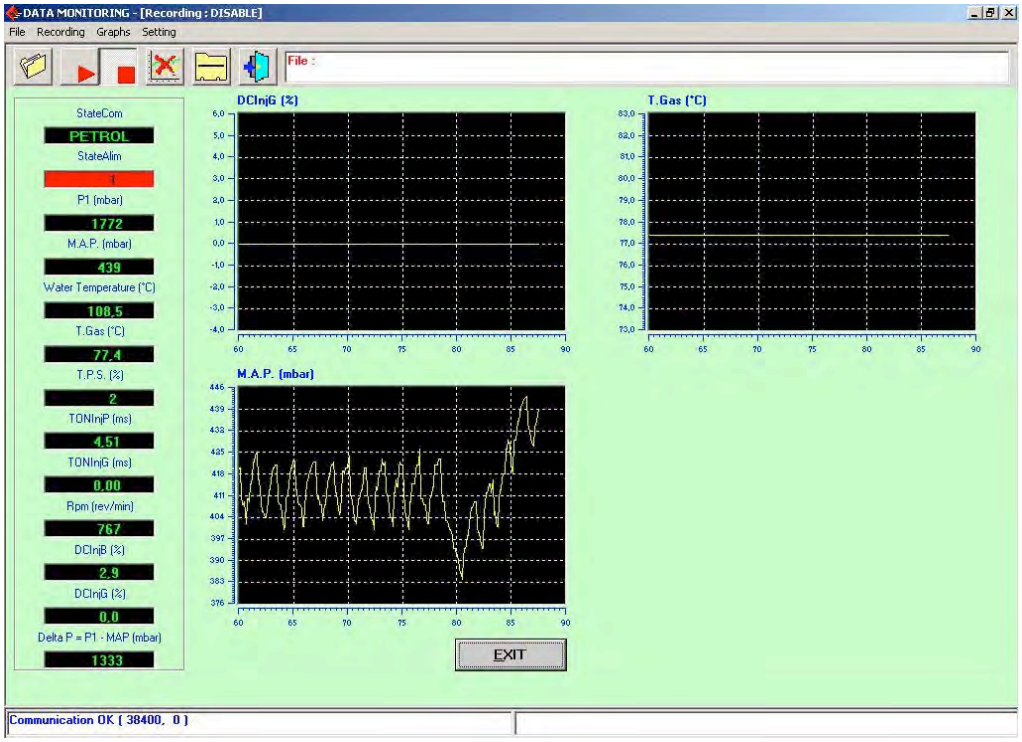
Picture 6-1: Data Display selection



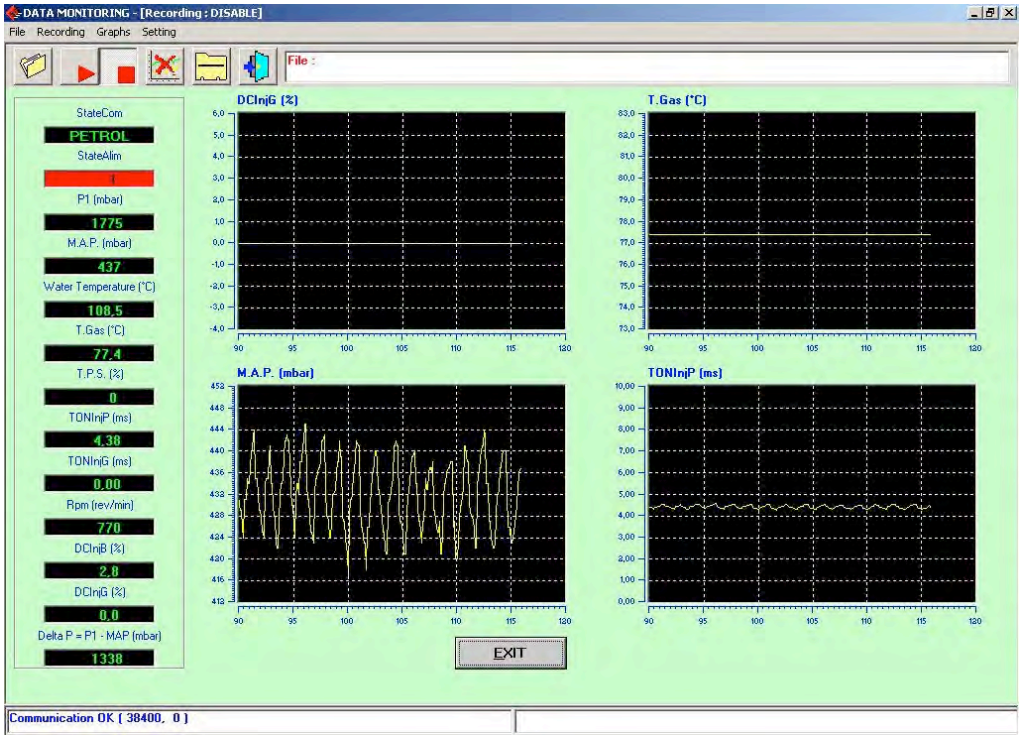
Picture 6-2: Data display with one graphic



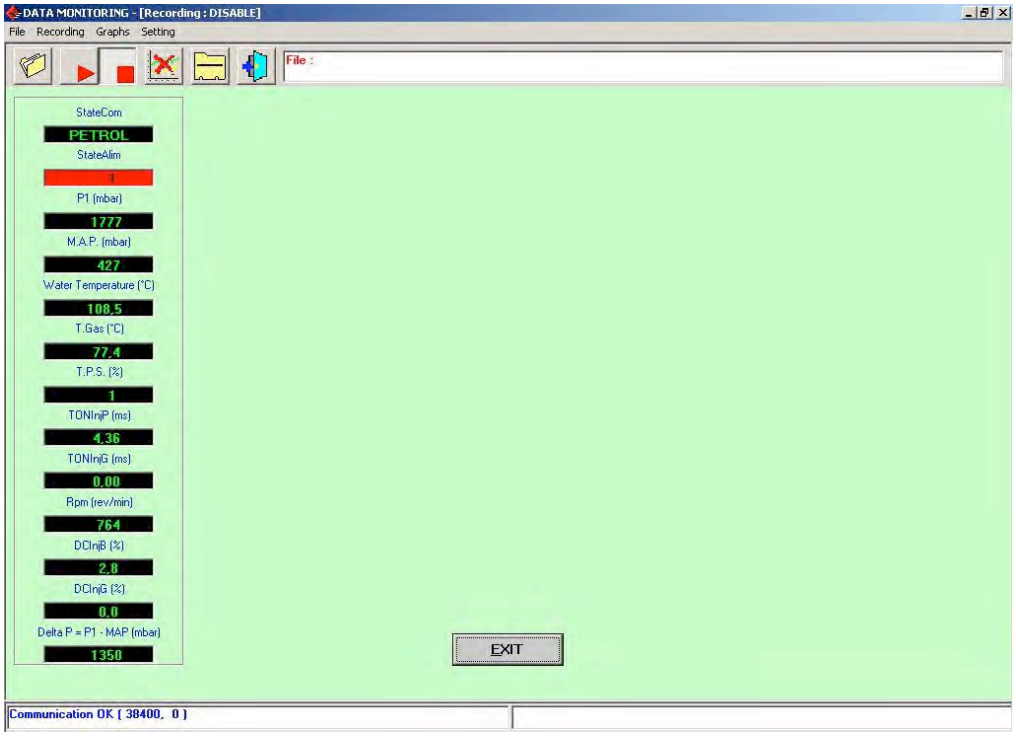
Picture 6-3: data display with two graphics



Picture 6-4: data display with three graphics



Picture 6-5: data display with four graphics

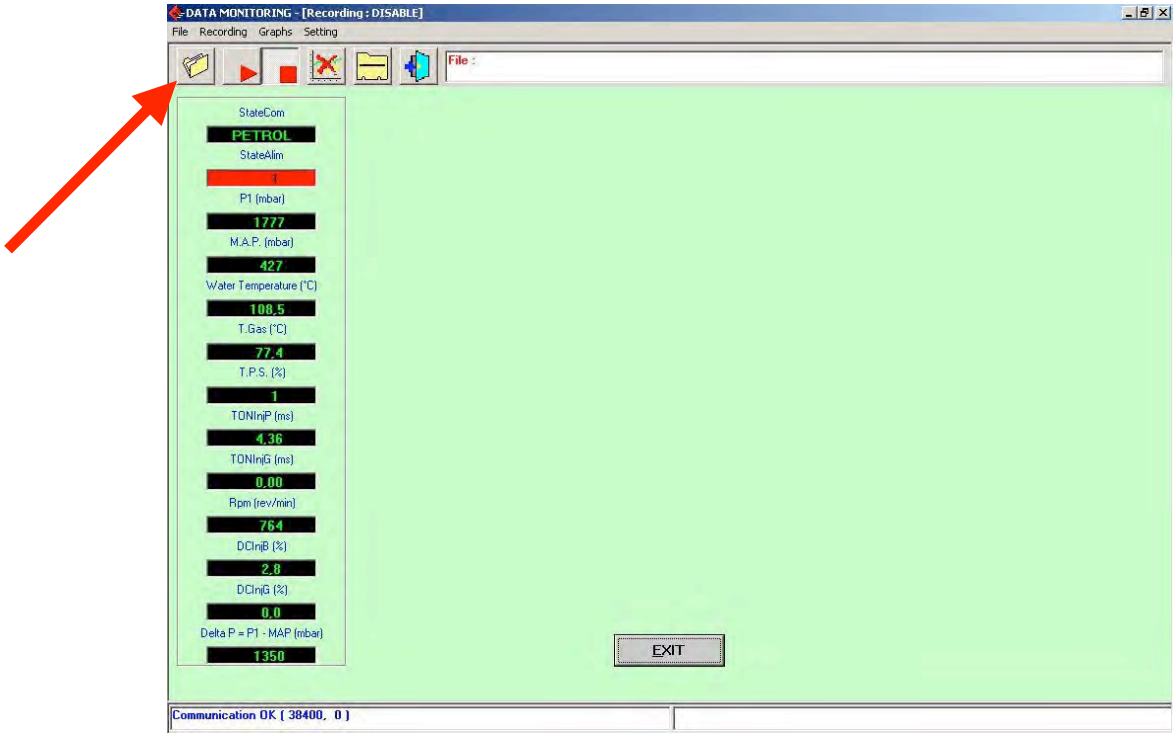


Picture 6-6: data display without graphics

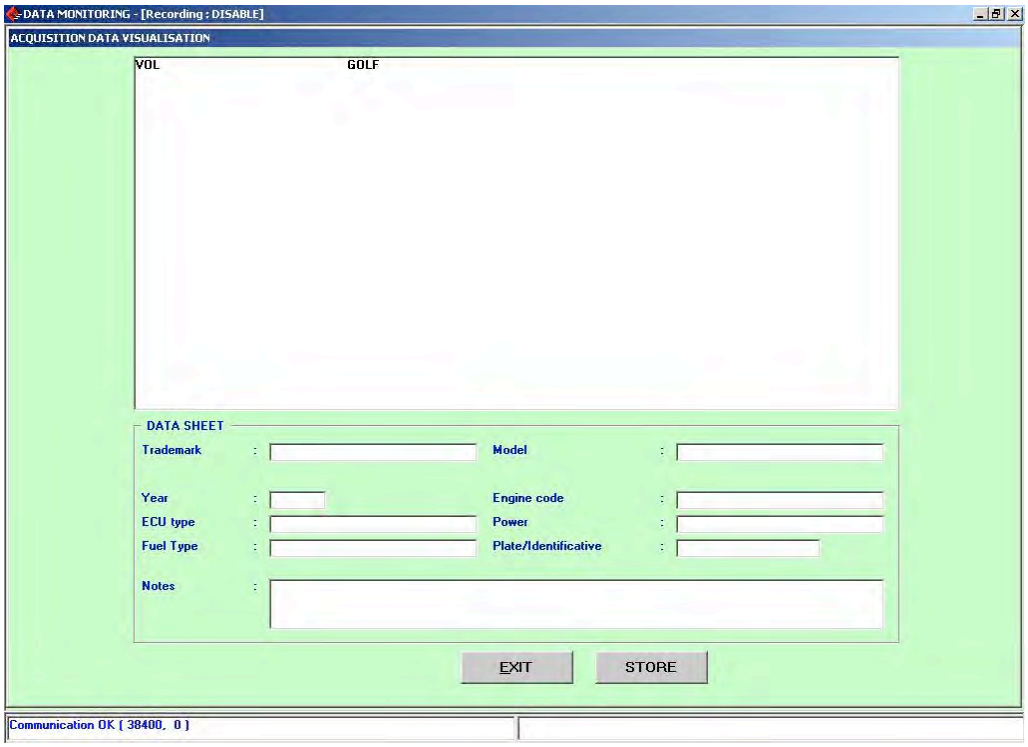
Above the graphics and the numerical values you find 6 square keys each of them carrying out a particular function we will describe later. Pointing the mouse on each of them, a writing will appear for some instants describing the function. These latter will enable to acquire displayed data and parameters on file, to change the list of the numerical data displayed in the window by choosing the desired ones from the list, to change the list of the values to be saved on file by choosing the desired ones.
Let's see how to do that in details.

6.1.1 Memorisation Parameters

The first key on the left, on icons bar in Picture 6-6, and shown bigger in Picture 6-7, allows to change memorisation parameters that is the position where the acquisition file will be saved that can be created in this page. By clicking the key, a window as shown in Picture 6-8 will be automatically displayed.



Picture 6-7: memorisation parameters



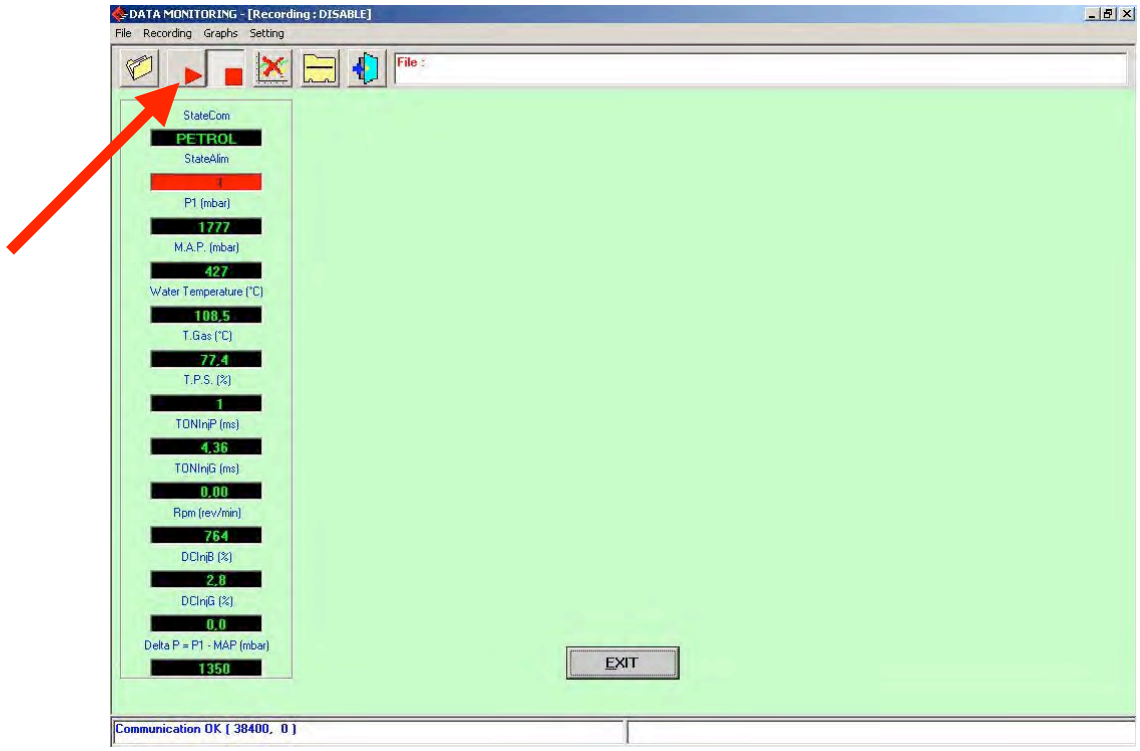
Picture 6-8: Diagnosis – Data Display – Data Memorisation

The same effect can be obtained by selecting *"File"* and then *"Recording Parameters"* from the Menu bar (on the top left).

In the top centre of the window there is a big folder where the characteristics of all the previous acquisitions are displayed.
Immediately under this, there is a table *"Data Scheme"* where you find some cells to be filled up: you are obliged to input the following fields: *Trademark, Model and Plate/identificative*. All other data *(year, engine code, ECU type, Power, fuel type, Notes)* are optional and will be memorised are memo in the acquired file.
Let's imagine to input "Skoda" as for *trademark* " and "Superb" for model and "AJ280CN" as *Plate/identification,* in this case the acquisition file will have the following name and tracking: ***C:\Programmi\SEQUENT56\RECORD\DIR_DATI\Skoda\SuperbAJ280CN.ACQ"*** (the position could vary according to the computer setting where SEQUENT 56 programme is downloaded). By clicking on *Memorise* you will create the file where acquiring the data while by clicking *Exit* you will return to the previous page and no data will be memorised.
Please note the new record is memorised in the cell at the top of the window so that you could easily select it next time without rewriting all the tracking. Choosing it the below cells will display the input data including the notes you wanted to add.

6.1.2 Recording Start/Restart

The second key on the left represented with a red triangle with the point to the right (as the key PLAY on a recorder – see Picture 6-9) starts the data acquisition when pressed.
When the data acquisition is active, the key changes into two parallel lines (as PAUSE key in a recorder). If you press it the acquisition is stopped and the key changes again in the red triangle with the point to the right. If you click it again the acquisition will start again adding new data to the previous ones, without cancelling these latter.



Picture 6-9: Recording start and restart

The same records can be carried out by selecting "Recording" from the menu bar (on the top left) then "Recording Start/restart" or by using SHIFT+F2, SHIFT+F5, SHIFT+F9 on the keyboard.

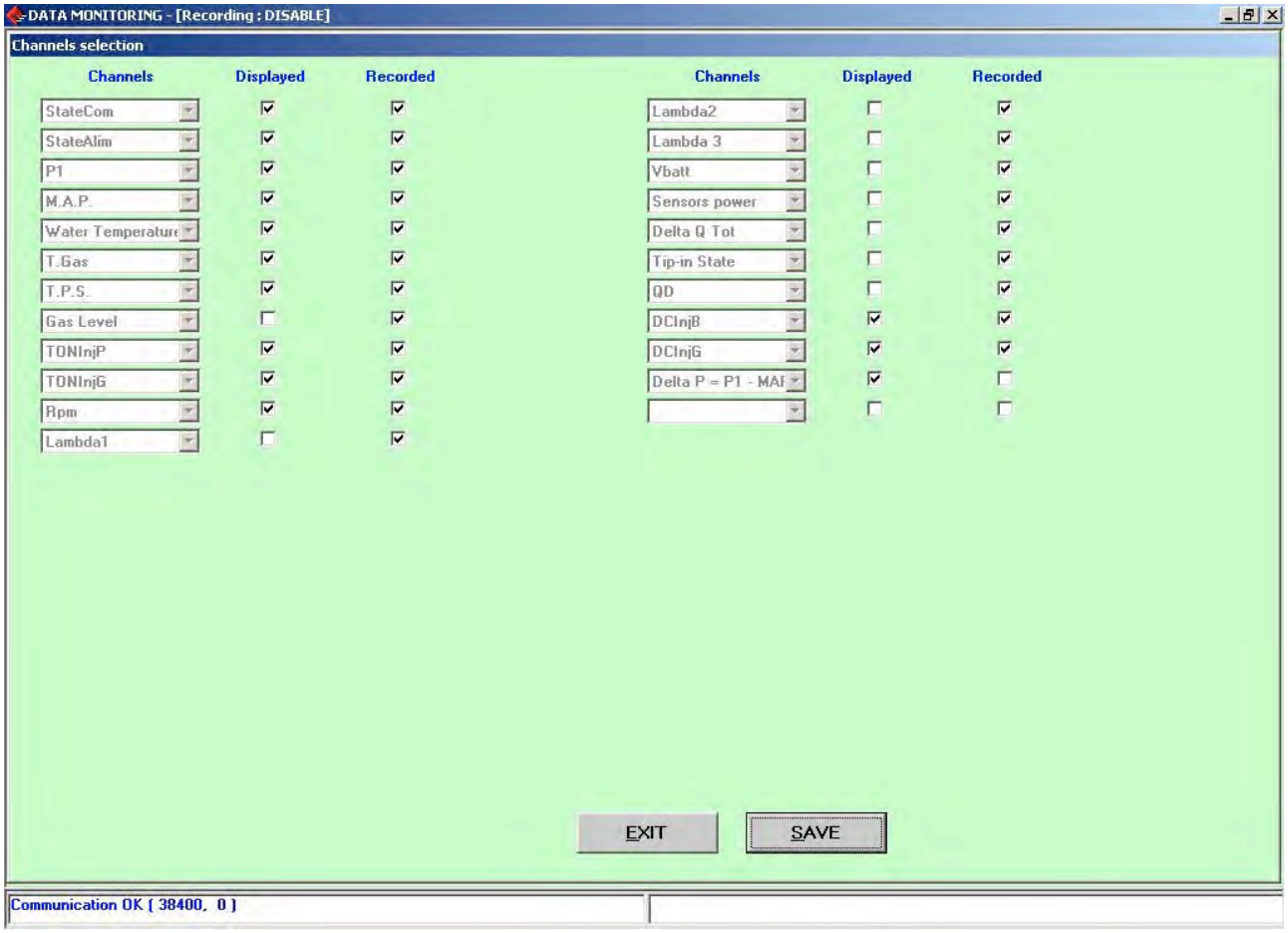
It is possible to stop the recording whenever you wish with STOP key (red square as a recorder STOP button)
By clicking again START or PLAY, the acquisition will start again adding new data to the previous ones without cancelling them.

6.1.3 Graphics lock up

The forth key on the left is used to block the graphics and the numerical value. At the beginning select the key with the graphic with a red cross on it. By clicking graphics will be frozen in the current status and numerical values do not change anymore. The key will change in a graphic without red cross.
By clicking again the key, all graphics will be cancelled and you will start from the beginning while numbers will change again.

6.1.4 Set up

The 5th key on the left, at the top of the data display window is useful to select what are the data to be shown and what are the ones to memorise during acquisition.



Picture 6-10: Diagnosis – Data Display – Channels set up

As you can see in Picture 6-10 there are two cells close to each value where you can add the thick mark. The first refers to the displayed value so that, selecting or deselecting it you add or take out the data in the displayed data column. The minimum number of displayed data that you can select is one while the maximum is 10. If you already have 10 data to add a new one you will have to remove one.

Under the writing "*Recorded*" there are some cells to select the data you will acquire and save in the file.ACQ. You can save how many data you want, even all of them if you wish. You only have to consider that more data you store longer the acquisition file will be; in the same way the file will proportionally increase as the length of the acquisition itself.

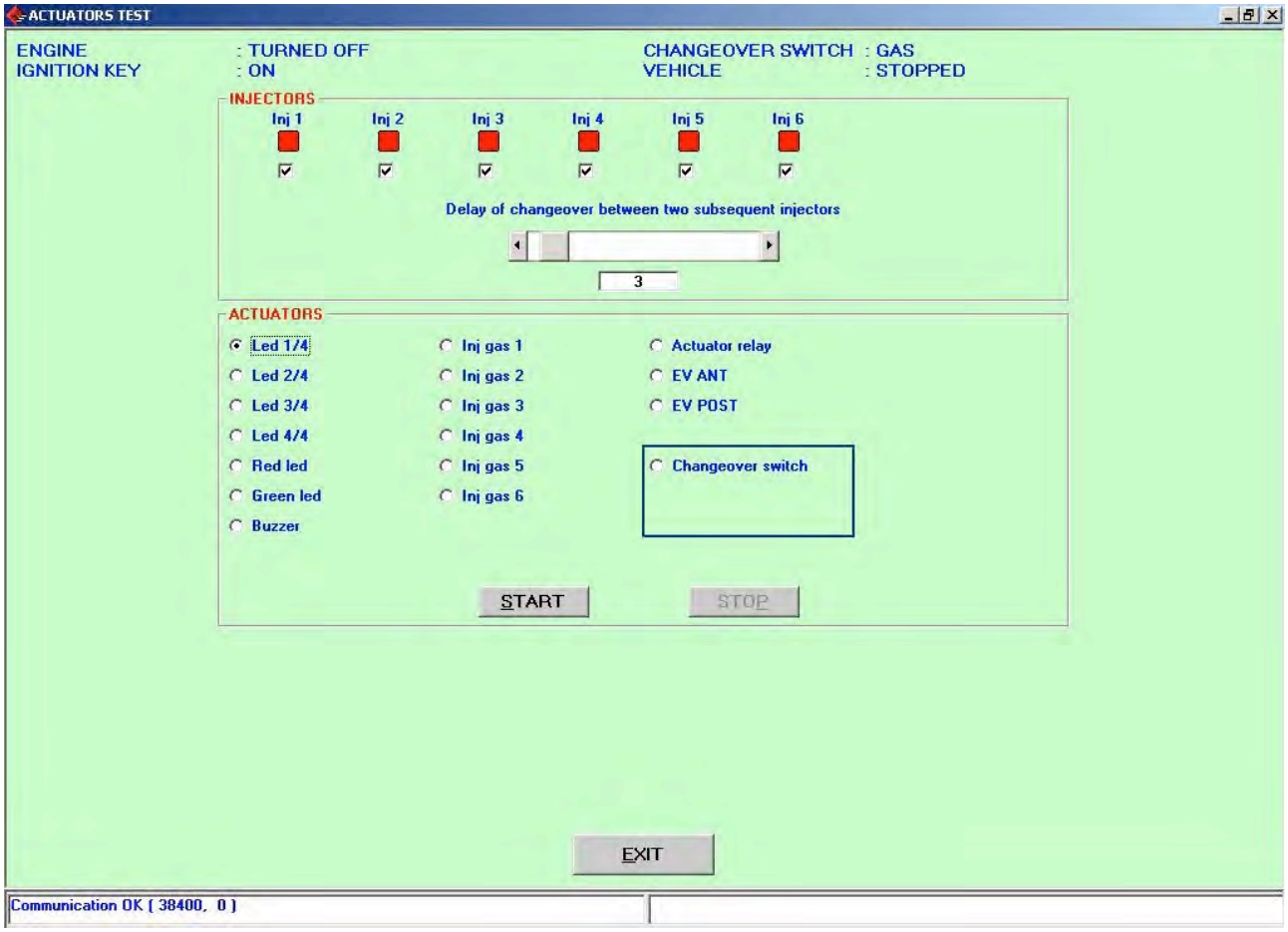
6.1.5 Page exit

The sixth key on the left, at the top of the data display page, will make you exit from the page itself. The same action can be obtained by using EXIT key at the bottom centre of the page or also by clicking the ENTER key when this is marked with a cross-hatching (technically we call it "on fire").

6.2 Actuators Test

By clicking “Actuators Test” key shown in Picture 6-1 on the left bottom, you enter a page for the control of the actuators functionality (see Picture 6-11), where you can control:

- The correct sequence of the injectors connection
- The operation of each gas injector
- The operation of the system main relays
- The operation of the two solenoid valves
- The operation of the petrol injections cut
- The operation of each LED for the gas level indication
- The operation of the changeover switch buzzer
- The operation of the changeover switch button



Picture 6-11: Diagnosis – Actuators Test

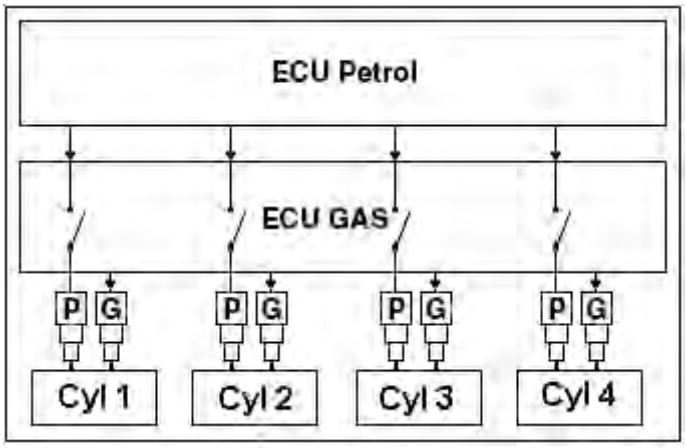
Let’s begin with the “*injectors”* in Picture 6-11 to control the correct sequence for the injectors connection.

6.2.1 Injectors Sequence

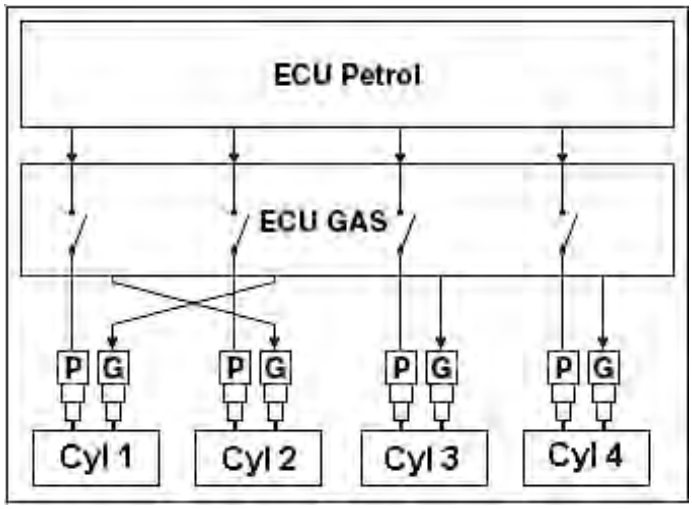
When the map of an ECU has been programmed, it is important to control there is a precise correspondence with the injectors that is the signal coming from petrol injection 1 is the one piloting gas injector 1 and so on for all other injectors.
From the tests we carried out, possible mistakes of this type do not create big problems in the vehicle operation with stabilised regime but you can perceive them during transient and changeover phase.

Particularly during the changeover phase, the inversion of two injectors is really damaging as for a certain time a cylinder will be not fed while another one will receive both gas and petrol.

Picture 6-12 shows an example of correct installation while in Picture 6-13 there is a wrong one for gas injectors 1 and 2.



Picture 6-12: Example of correct installation



Picture 6-13: Example of wrong installation

In SEQUENT 56 system the changeover is managed so that only one injector each time changes to gas to make the changeover from gas to petrol softly and vice versa. Practically, in an engine with 4 cylinders, you go from petrol to 3 cylinders with petrol and one with gas then two for each fuel, then one only with petrol and one with gas and finally all cylinders with gas. Between the changeover of one injector to another, a certain number of engine cycles has to be carried out (usually 3) and these can be set with the installers' programme.

In case of correct installation (see Picture 6-12) when changing to gas the following steps will be carried out:

- At a certain moment the petrol injector 1 is cut and the gas injector 1 is fed: ok
- After 3 injections the petrol injector 2 is cut and the gas injector 2 is fed: ok
- After other 3 injections the petrol injector 3 is cut and the gas injector 3 is fed: ok
- After three injections the petrol injector 4 is cut and the gas injector 4 is fed: ok

In this case during the changeover all the cylinders are continuously fed and with one only fuel.

In case of wrong installation (see Picture 6-13) when changing to gas you will have the following conditions:

- At a certain moment the petrol injector 1 is cut and the gas injector 2 is fed: the cylinder 1 is without fuel and the 2 is fed with both petrol and gas.
- After 3 injections the petrol injector 2 is cut and the gas injector 1 is fed: the engine normally runs because only cylinders 1 and 2 are fed with gas.
- After other 3 injections the petrol injector 3 is cut and the gas injector 3 is fed: ok.
- After other 3 injections the petrol injector 4 is cut and the gas injector 4 is fed: ok

Practically, during the first phase we have the cylinder 1 that is not fed while the cylinder 2 contemporarily works with gas and petrol.

To easily find possible mistakes in connecting the injectors you can use the Actuators Test page, injectors section, at the top in Picture 6-11 (found in *Diagnostic* → *Actuators Test*).

When entering this window, the programme reads on the ECU how many injectors are connected to the ECU (4 in the example) and what is the delay as for injections numbers between the changeover in a cylinder and the one in the following one (3 in the example).

Taking away the tick marks from the single injectors (cells under the green square in Picture 6-11) it is possible the selected cylinder immediately changes to petrol even if the changeover switch is on gas and the led is green; so I can decide (in case of a 4 cylinder) to let the engine work with one cylinder with gas and three with petrol, or two each or three with gas and one with petrol or all with petrol. Please note that in this latter case even if the vehicle correctly operates with petrol, the changeover led will be green and solenoid valves open (or will open when changing). This could create confusion. Moving to the right the sliding bar you can increase the changeover delay between two consecutive injectors. In this case a wrong connection will cause a longer and more sensitive engine bad operation allowing an easy and fast diagnosis or the problem.

Procedures to identify mistakes in the injectors' harness

Let's imagine to be in the same conditions as Picture 6-13 and that we need to check if the injectors have been correctly connected.

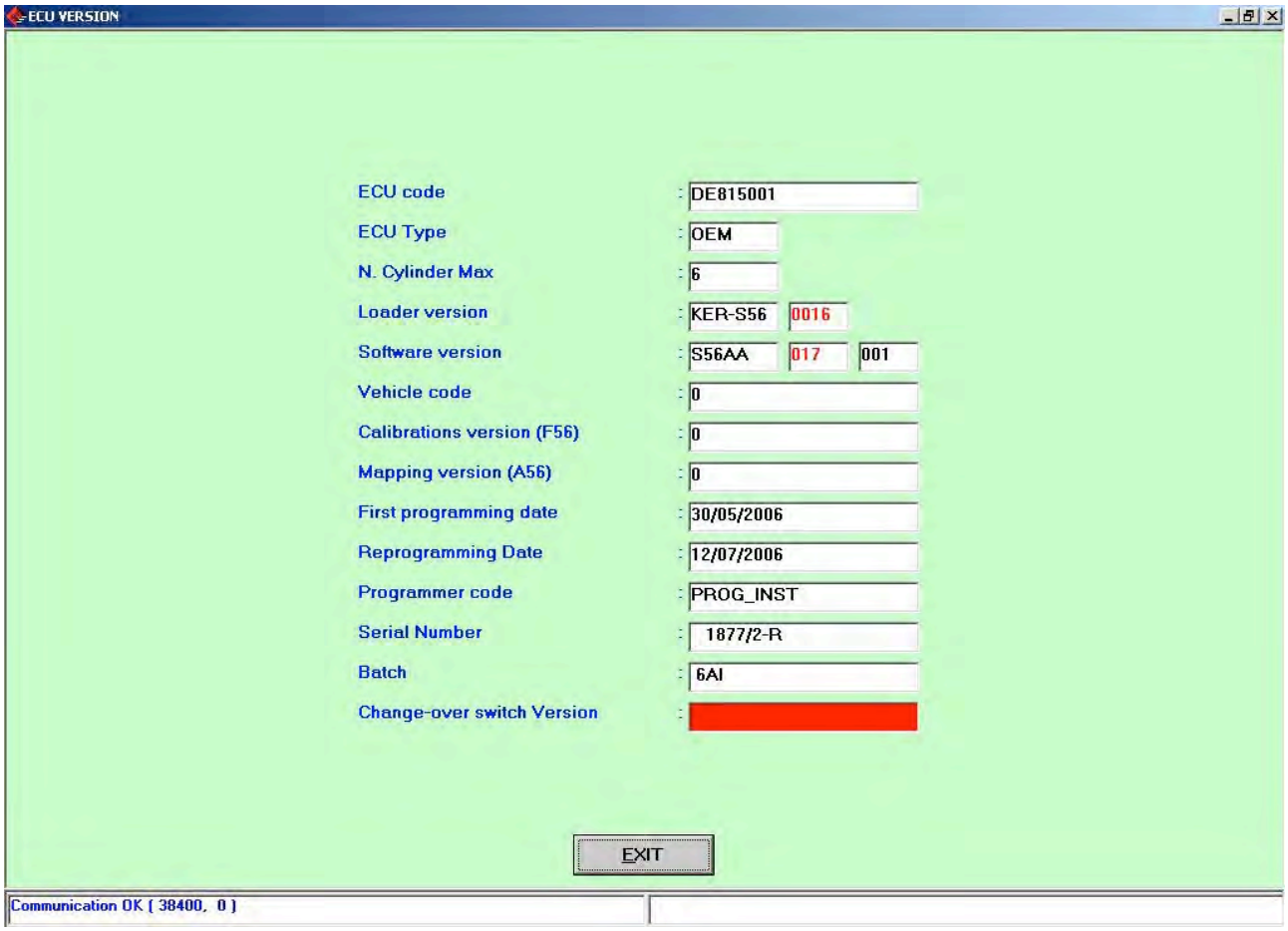
By increasing the changeover switch delay, you will also increase the timing during which the vehicle has a non fed cylinder (the first) and another receiving both fuels (the second) so that you could easily "feel" the engine "running bad") or, in the worst case, switching off.
At this point we know an exchange among injectors connection occurred but we do not want which. To find it out, the process to follow is the one hereunder.

Procedures to correct mistakes for injectors harness:

1. Take out all tick marks for each injector. At this point the engine will completely run with petrol.
2. Ad a tick mark in injector 1 cell.
3. If the gas injector 1 injects in the correct cylinder (that is the petrol one identified as n. 1) the engine will correctly work. In this case, repeat the procedure from step 1 with the next injector. If, on the other hand, you face problems, go to step 4.
4. The selected gas injector has to be moved: you only have to move the connector to another gas injector till the engine correctly works.
5. Repeat the procedure from step 1 with next injectors till you find the correct placing of all gas injectors' connectors.

6.3 ECU version

By clicking *DIAGNOSTIC* key at the bottom of the main window and selecting *ECU VERSION* in the keys on the left you will enter the page shown in picture 6.8 where all parameters identifying the type of software, data and other parameters for the ECU programming are displayed. Let's see them all.



Picture 6-14: Diagnostic – ECU version

6.3.1 Parameters description

6.3.1.1 ECU code

Represents the code of the products that is the code identifying this particular type of ECU. For example the one indicated in the picture is "DE815001" identifies the prototype version of SEQUENT 56 ECU for 6 injectors. After the code will change into DE815001-2, where the main code (DE815001) identifies the product (Sequent 56 ECU for 6 cylinders), while the number after the dash identifies the ECU hardware revision. In absence of the number after the dash, the revision is "0" that means the first version has been not modified.

6.3.1.2 Loader Version

It indicates the kernel version in the ECU memory. It is a sequence of letters and numbers as the following one: "***KER-S56 0016***". The last 4 digits are the version (in this case 16). Higher is the version number, more update and improve is the Kernel.

6.3.1.3 Software version

It indicates the software inside the ECU. It is made by 5 figures + 3 numbers + 3 numbers. The first 5 figures indicates the software type, the first 3 numbers indicate the software version (higher is the number, more updated and improved is the programme) and the last 3 numbers indicate the hardware version for which the hardware is dedicated (001 is for ECU code DE815001, that is the Sequent 56 one for 6 cylinders).

6.3.1.4 Vehicle code
This number has been paired by BRC to each developed and validated vehicle. If the mapping has been created by an installer with the guided personalised procedure the value is 65535. If the installer creates a new mapping using one already created by BRC and without using the guided personalised procedure, BRC original vehicle number will not change.

6.3.1.5 Calibration Version
It indicates the ECU calibration version (file .F56) and not the map version that is file .A56. For BRC maps this is at least equal to 1 and increase each time BRC release a new calibration version. The maps realised by installers are always indicated with a 0.

6.3.1.6 Mapping Version
It indicates the ECU map version (file .A56). For BRC maps with number is at least equal to 1 increase each time BRC release a new mapping version. The maps realised by installers are always indicated with a 0.

6.3.1.7 First programming date
It indicates the first time the ECU has been programmed by the installer. After the first programming, the date will not change for the ECU entire life indicating when it was used the first time.

6.3.1.8 Reprogramming date
It indicates the last time the ECU has been programmed by the installer. This is the date of the final programming for the vehicle.

6.3.1.9 Programmer Code
It identifies the type of programme used on PC to carry out the last ECU programming. Usually you will have "***PROG_INST"*** indicating Sequent 56 installers' programme has been used. If you have ***"PROG_ACM"***, this means an experimental or not released dedicated programme has been used.

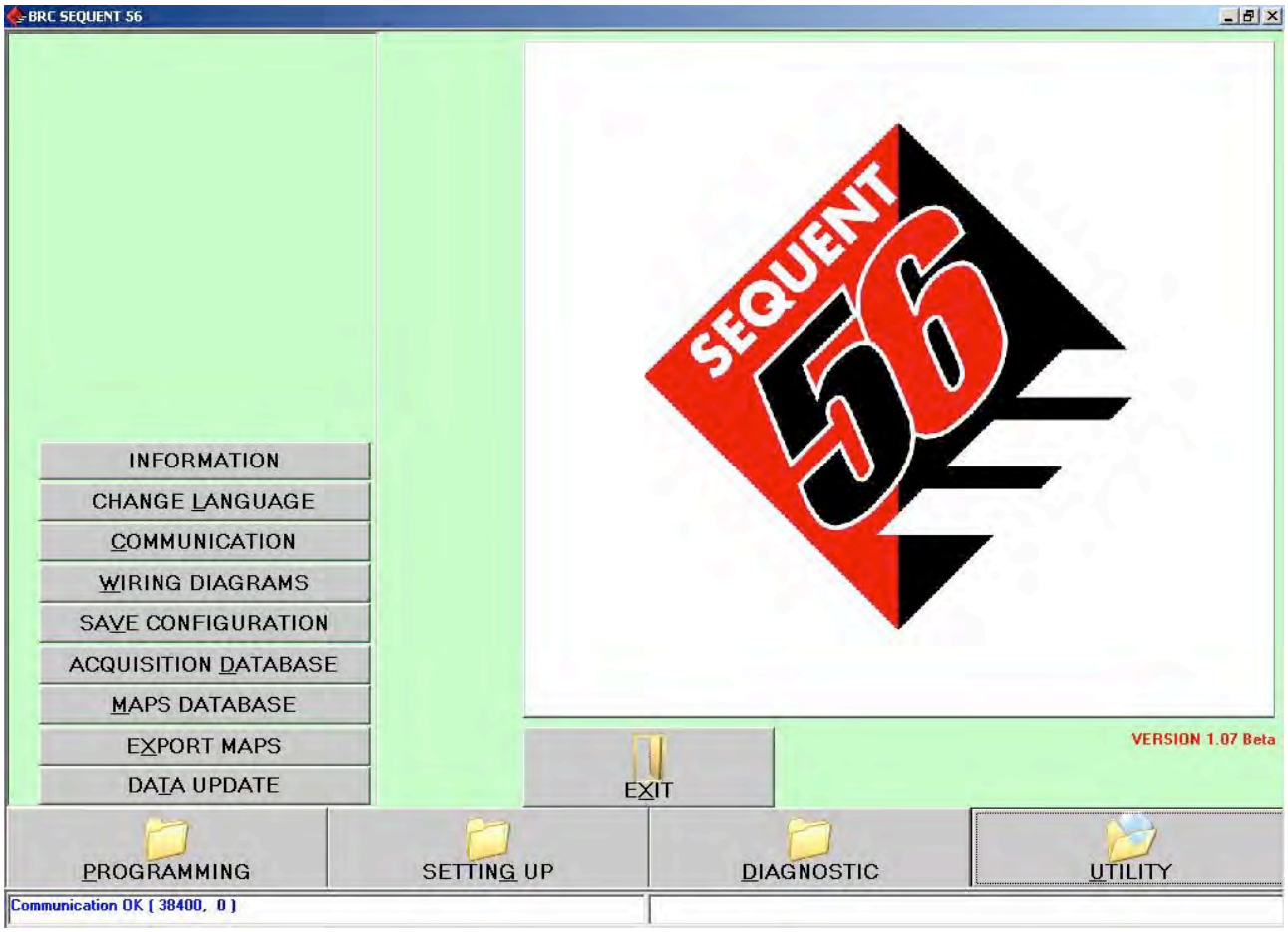
6.3.1.10 Serial number
It identifies the serial number (consecutive) of each single SEQUENT 56 ECU manufactured in BRC that is successful to tests. After the serial number (after a "/") there is the indication of the testing equipment carrying out the test while after a dash ("-") there is the indication of the test type.

6.3.1.11 Batch
It identifies the ECU production lot that is a code from which you can calculate the year and week the ECU has been manufactured. For Example "5LB" means it has been manufactured in 2005 (first number) second week (L=0 and B=2).

6.3.1.12 Changeover switch version
When the changeover switch is in gas position, it indicates the version of the changeover switch itself.

7 Utility

All available functions are contained in *UTILITY* main key and allow to carry out different operations to update the programme in the PC or to modify some aspects. These functions do not need the connection with the ECU except for the option "*SAVE CONFIGURATION*", that allow the update of maps and calibrations present in the PC by extracting and adding them to the installer's PC. After selecting "*UTILITY*", you will enter a page as indicated in Picture 7-1 with various tools on the left. Let's see what are them.

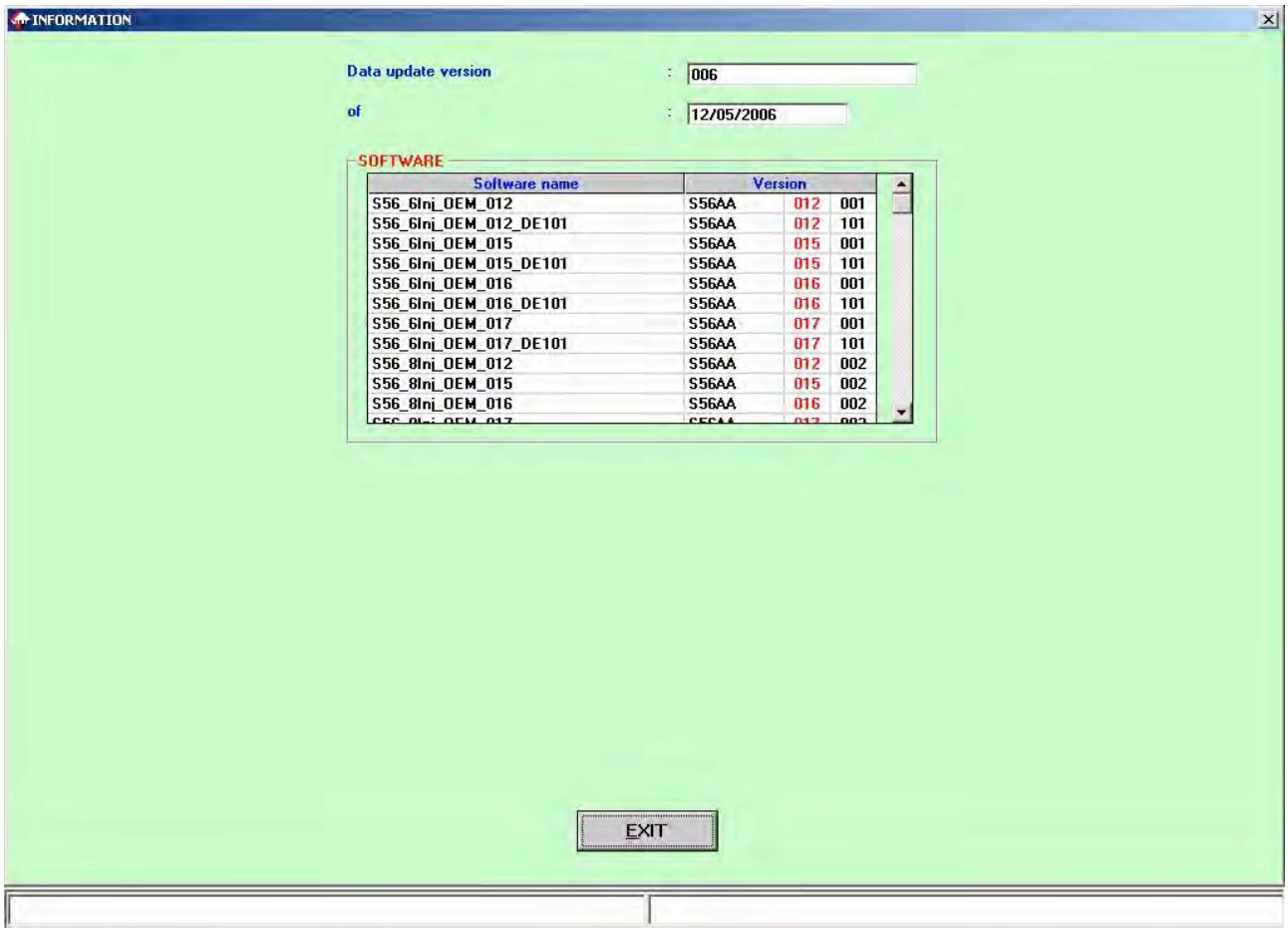


Picture 7-1: Utility

7.1 Information

With this function you can see the version of all the software available in the PC. You have the name and the version (see Picture 7-2).
Please remember version number is made of 5 letters + 3 numbers + 3 numbers. The first 5 figures indicate the software type, the first 3 numbers indicate the software version (higher is the number, more updated and improved is the programme) and the last 3 numbers indicate the hardware version for which the hardware is dedicated (001 is for ECU code DE815001, that is the Sequent 56 one for 6 cylinders).

This utility is particularly useful to check if you have all the last update or if you need to update the programme.

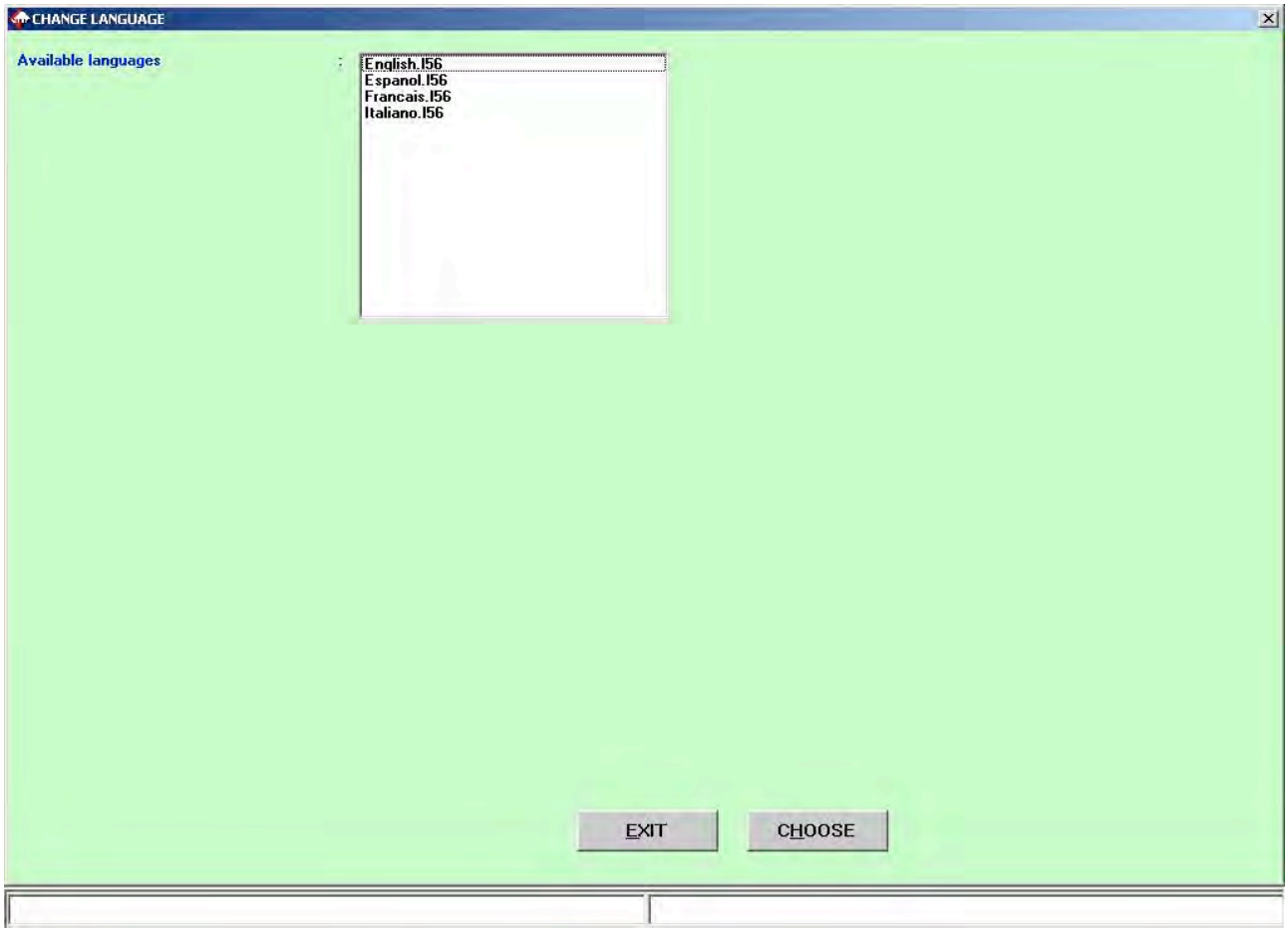


Picture 7-2: Utility - information

7.2 Change language

It allows to select the language the PC will use for messages, writings, description and all text information. The programme is structured to allow to use different languages by only input a suitable language file (type .LNG) in the installation folder (usually “C:\programs\SEQUENT56). The procedure for the language choice is the following.

1. Start SEQUENT56 programme,
2. From main page select “*UTILITY*” main key
3. Click “CHANGE LANGUAGE” on the left
4. Select the language file in the “AVAILABLE LANGUAGES” window (see Picture 7-3),
5. Click “CHOOSE” in the window
6. Click “*EXIT*” to go back to main page

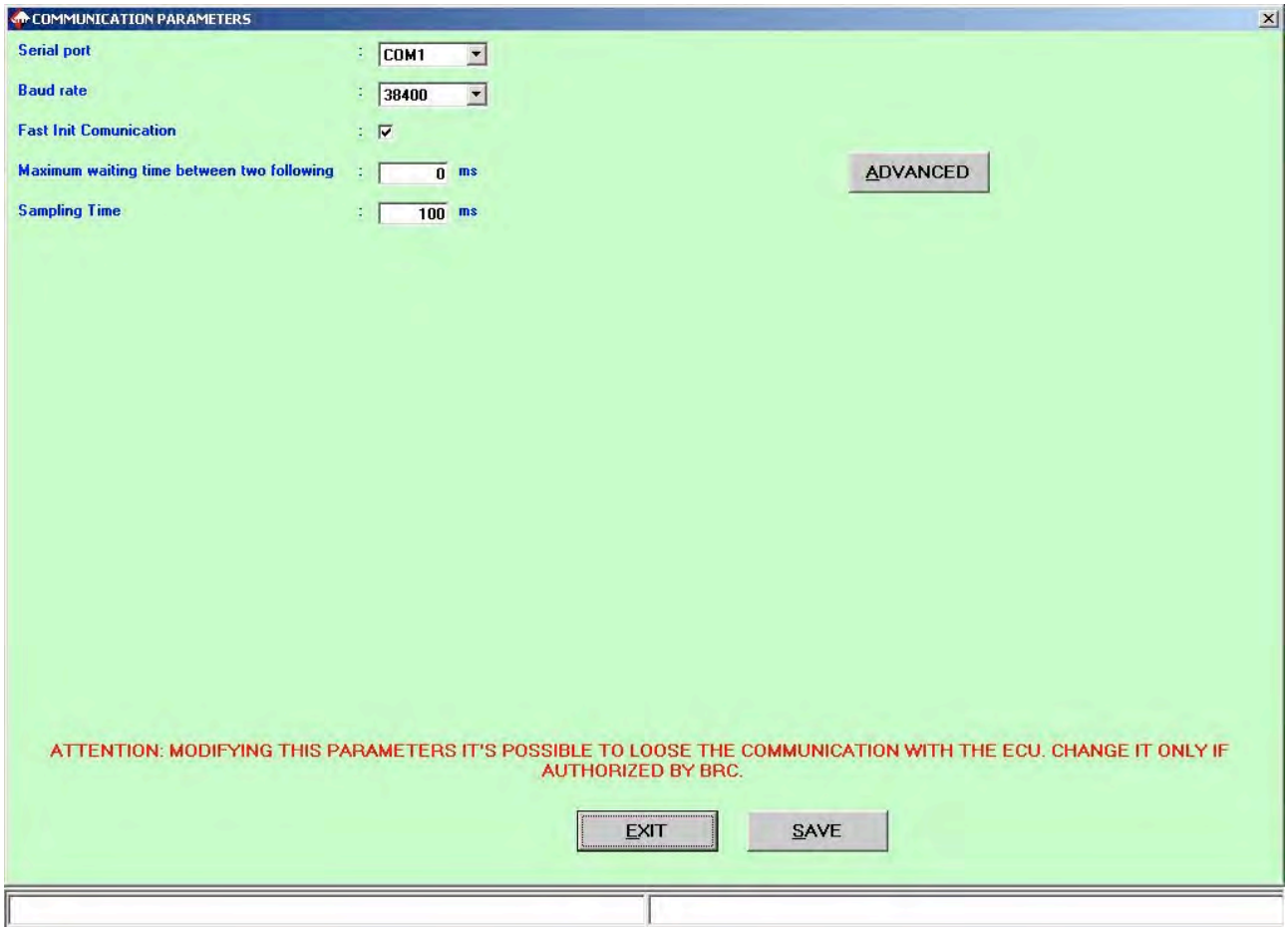


Picture 7-3: Utility – change language

Clicking on “*EXIT*” or ESC on the keyboard (at the left top) you leave the page of language choice without carrying out changes.
To see language changes you have to close the programme and start it again.

7.3 Communication

It allows to change communication parameters between PC and ECU. It is necessary to modify these options especially when using a PC without serial plug. In this case you need to use a USB/Serial adapter adding a virtual port to the PC. In *"Serial port"* folder shown in Picture 7-4 the normal value *"COM 1"* has to be replaced according to the value the operative system sets for the adapter (you find it in Windows control panel, under "System" option).



Picture 7-4: Utility – communication

"*Baud rate*" cell (see Picture 7-4) allows to change transmission speed. If you have no particular problems, we suggest to input the maximum speed (38400 baud), set automatically by the programme itself, to get the fastest ECU programming timing.

Another parameter you could find interesting is the *"Maximum waiting time between two following"*. Decreasing it you obtain higher speed while programming the ECU but also more possibilities the communication could fail. We suggest to set as minimum value 0 ms, except in case of problems.

Options appearing by clicking "ADVANCED" key have to be changed only in case of problems under indications from BRC technical assistance or skilful personnel.

In case some parameters have been modified and this causes the impossibility to communicate with the ECU, you can restore standard data. For each cell, you can know the standard value by just pointing the mouse: a cell will show the standard value. It will automatically disappear when moving the mouse away.

To save changes and go back to main page click on SAVE. To exit this page without saving changes and be back in the main page, just click EXIT or ESC on the keyboard (at the left top).

7.4 Wiring diagrams

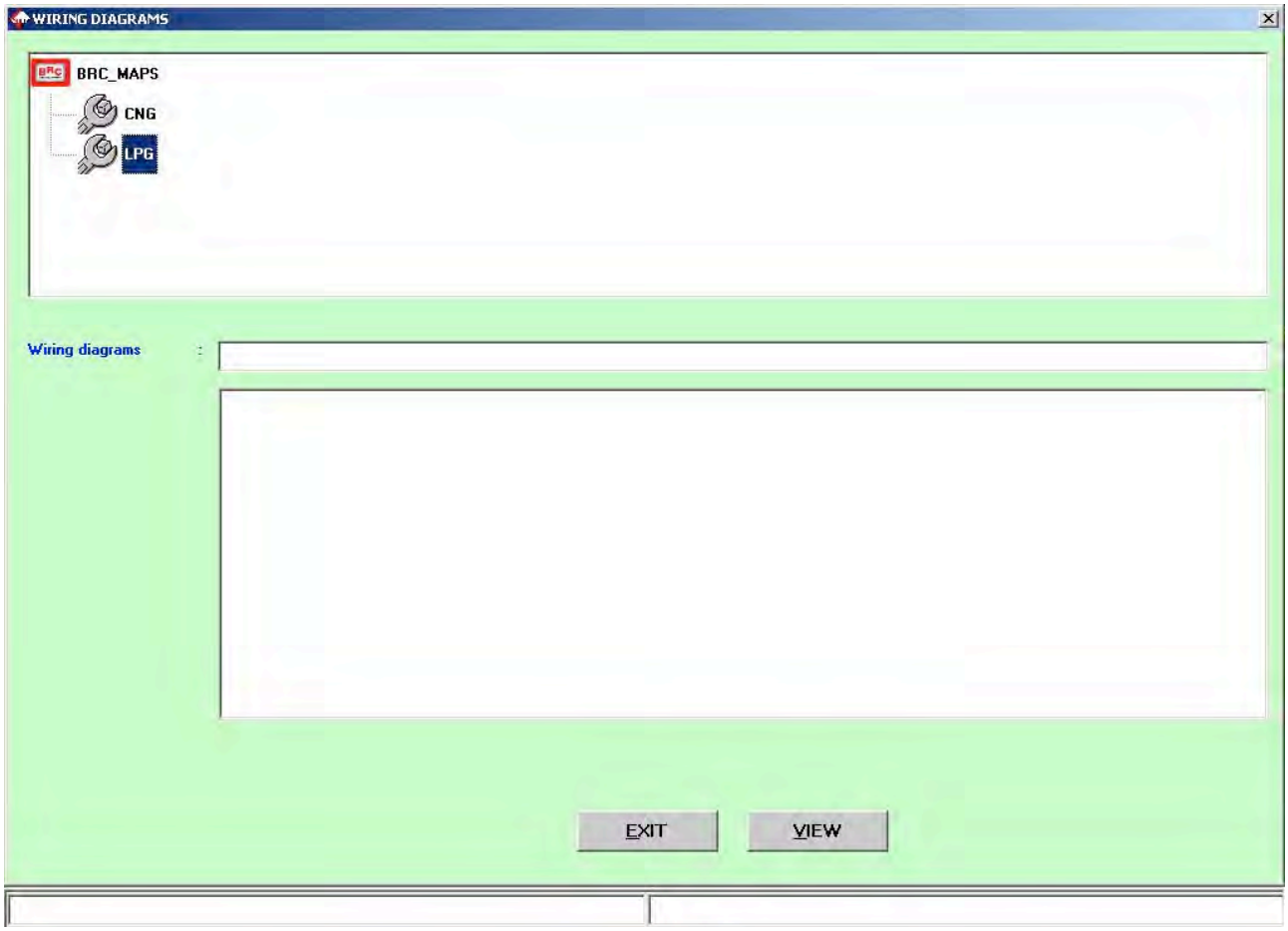
Clicking this key you enter the electrical plans folder. The plan is recorded on the PC as PDF file and opened with "Adobe *Acrobat® Reader™* " [(1)]. It is necessary this programme is installed in the computer (see note [(1)]). You can use the software installation CDROM and follow next steps:

1. Start the PC
2. Introduce the CD-ROM
3. Wait till the installation programme automatically runs (if not, follow the procedure described in the Note hereunder).
4. Click on "Install Acrobat Reader" o "Adobe"
5. Follow the installation guided procedure

NOTE: the automatic start of SEQUENT programme installation when introducing the CDROM depends on the computer setting where the CDROM is used. In case the installation does not automatically start, you need to start "*Setup"* programme in the CDROM main folder (Press *Start → Execute, write "D:\Setup.exe" and* click OK. "D" represents the letter identifying the CDROM: if you have a different one please input the correct letter.

The process to show an electrical plan is the following:

1. Form the main page select "*UTILITY",*
2. Click on "*WIRING DIAGRAMS*", on the left of the page
3. Double-click on "*BRC_MAPS"* folder in the record page (on the top left)
4. Select the installation type (see Picture 7-5),
5. Always in the record page, choose the trademark, the model and the ECU type to display the plan and select it using the mouse or the arrows.
6. In the big text cell, in the centre of the window, you have the list of all available plans. If the cell is empty, it means there are not available plans in that folder.
7. If you have at least one plan, select it with a double-click. The upper text cell "Electrical plans" (blue writing) will show the selected file.
8. Click on *"VIEW"* at the page bottom.
9. Wait "Adobe *Acrobat® Reader™* " programme starts displaying the desired plan.
10. When you finish, close "Adobe *Acrobat® Reader™* " .



Picture 7-5: Utility –wiring diagrams

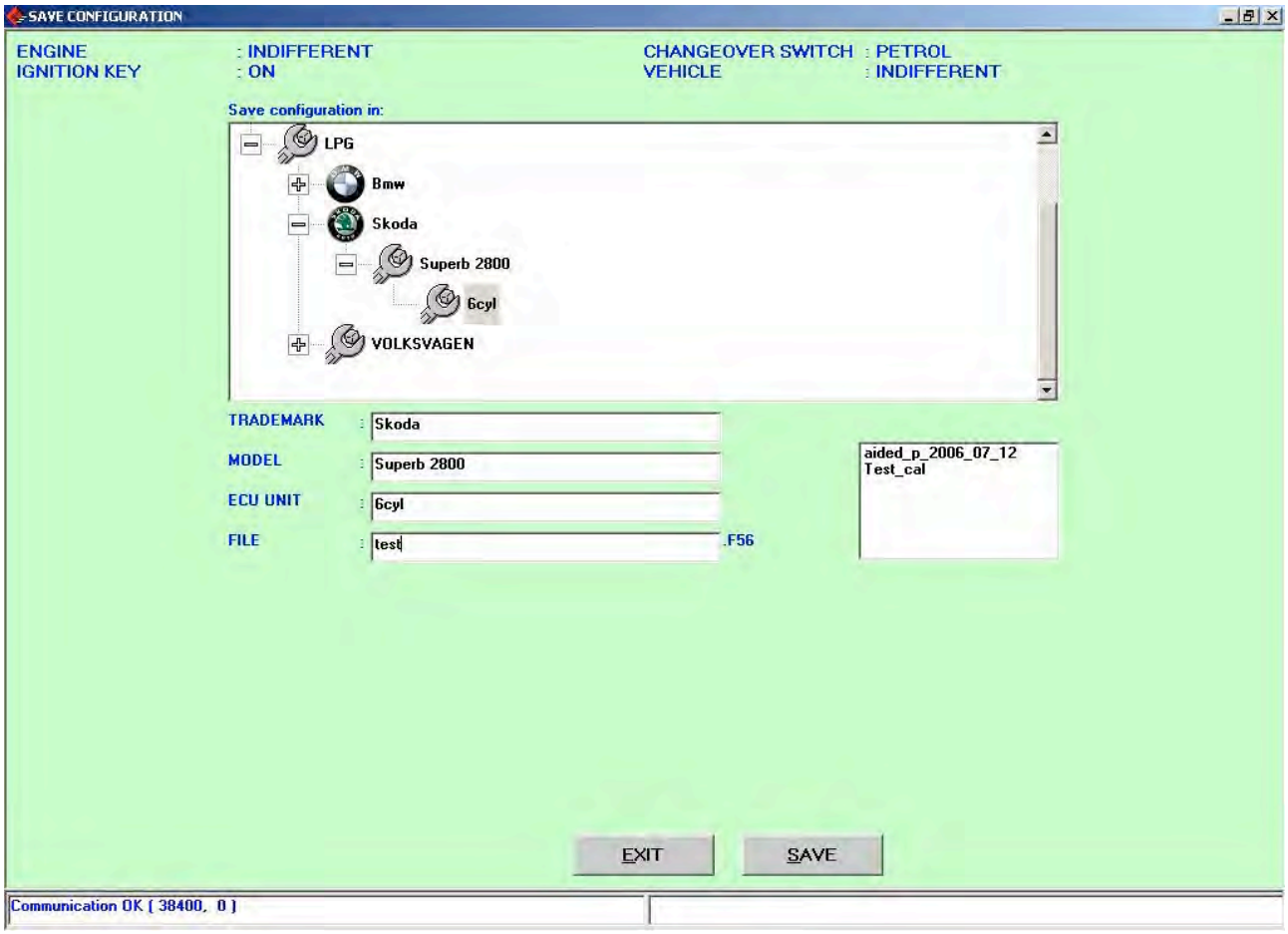
If you wish to read "Adobe *Acrobat® Reader™*" user guide, start the programme (usually clicking *START* on *Windows* bar, then *PROGRAMS* then *ACROBAT READER*), select *"?"* from the menu and than "*Reader Guide".*
To exit the page with SEQUENT 56 electrical plans and go back to main page, click *"EXIT"* or ESC on the keyboard.

(1) Adobe Portable Document Format (PDF) lets you capture and view robust information — from any application, on any computer system — and share it with anyone around the world. PDF Adobe is a universal format maintaining all characters, formatting, colours and imagines from any origin, no matter what application or platform have been used to create it. PDF Adobe files are compact and can be shared, displayed, seen and printed thanks to the free utility Adobe Acrobat® Reader™ on Adobe® site www.adobe.com.

7.5 Save configuration

This is the key to extract the data contained in a previously programmed ECU and save them on your PC as new map. By doing this you can increase the range of vehicles to convert without using update diskettes and you can install whatever vehicle by only modifying maps or calibrations in case you have not the dedicated map on your PC.
The procedure is the following (refer to Picture 7-6):

1. Connect the PC to SEQUENT 56 ECU with the suitable communication cable
2. Start SEQUENT 56 programme
3. Switch on the vehicle dashboard.
4. Select "*UTILITY*" from the main page
5. Click on "*SAVE CONFIGURATION*", on the page left
6. In case the communication is not active (you will not see the writing "Communication OK" on the page left bottom) wait and try again. If this does not activate check the connection and the key contact.
7. Select the installation type in "*USER_MAPS*" folder in the windows on the left top.
8. Select the folder according to the trademark, model, and type of ECU where you wish to save the new map and calibration. If the folder does not exist, input trademark, model or ECU type in the below text cells to create a new one.
9. In the text cell identified with the blue writing "*FILE*:", input a meaningful name easy to remember to use to save all files related to map and calibration extracted from the ECU in the PC folder.
10. Click on "*SAVE*" at the bottom right
11. Wait till you get the red "CONFIGURATION SAVE CORRECTLY ENDED" writing.

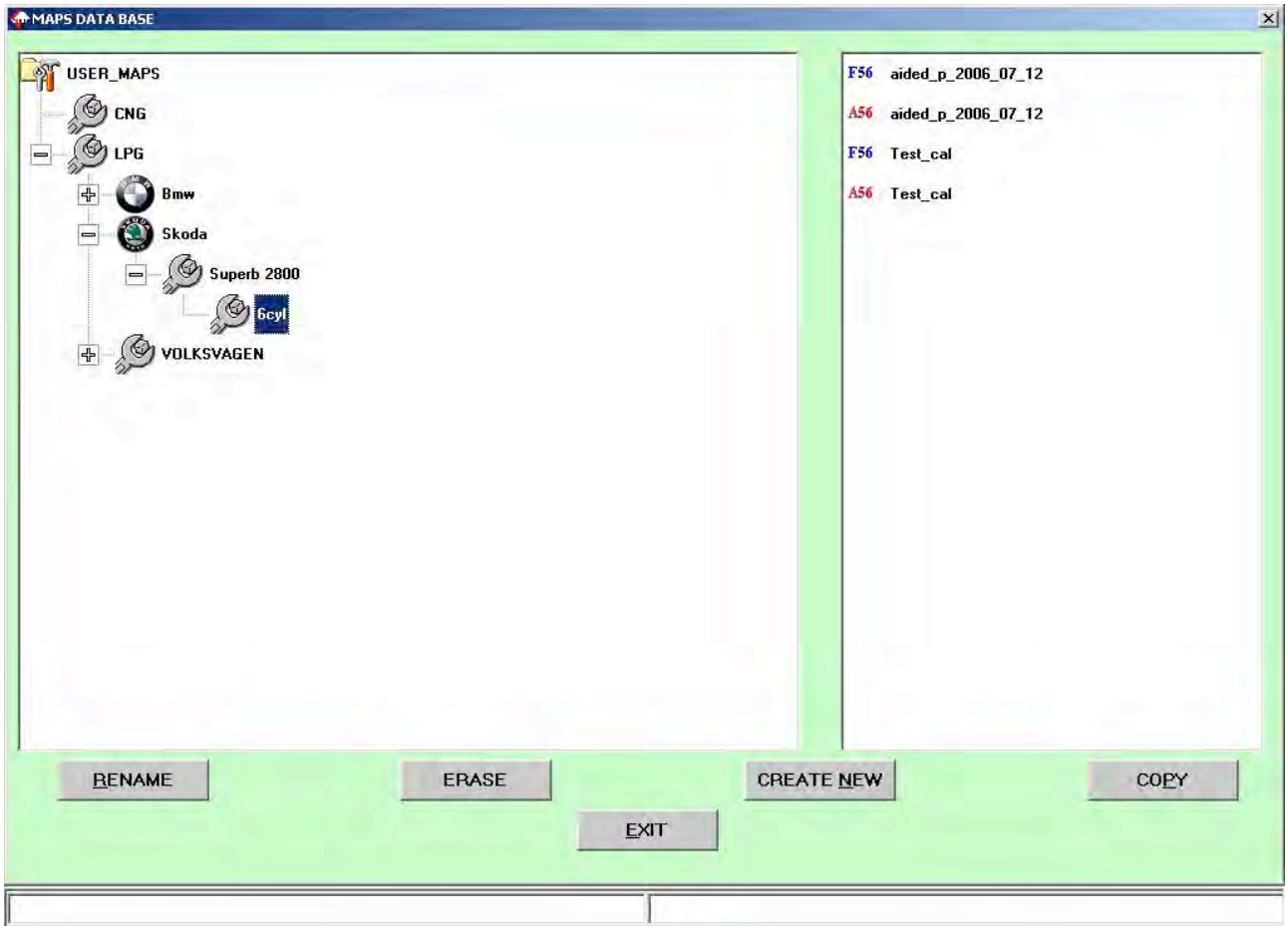


Picture 7-6: Utility - save configuration

To exit "*SAVE CONFIGURATION*" page and go back to the main one, click on "*EXIT*", or on ESC on the keyboard (usually on the left top).

7.6 Maps database

It allows to modify the record of user's maps renaming folder name, moving, cancelling and copying them somewhere else (refer to Picture 7-7).



Picture 7-7: Utility - Maps record

- **To rename a folder** (for trademark, model or ECU type) follow this procedure:
  1. From main page select "*UTILITY",*
  2. Click on "*MAPS DATABASE*", on the page left,
  3. Double-click on "*USER MAPS"* folder
  4. Select the installation type in the folder window,
  5. Select the folder to rename with the mouse or with the arrows,
  6. Click on "*RENAME"* on the page bottom
  7. Input the new name
  8. Click on "Enter" key

- **To erase a folder** (for trademark, model or ECU type) follow this procedure:
  9. From main page select "*UTILITY",*
  10. Click on "*MAPS DATABASE*", on the page left,
  11. Double-click on "*USER MAPS"* folder
  11. Select the installation type in the folder window,
  12. Select the folder to erase with the mouse or with the arrows,
  13. Click on "*ERASE"* in on the page bottom
  14. You will see a window asking your confirmation to delete the folder. Answering yes the folder will be erased while with negative answer the folder will be not erased.
  15. If you decided to erase the folder, a new dialogue window will open informing the operation was successful. Click on "OK" or "Enter" to continue.

WARNING!: The erase operation for a record folder is very dangerous and can involve the lost of important data contained in the user's folder. Please note that if you select a folder for a trademark (let's say "*Skoda")* and confirm the erase, all the folders corresponding to all models and ECU types contained inside it (that is all Skoda vehicles) will be erased.

- **To create a new folder** (for trademark, model or ECU type) follow this procedure:
  1. From main page select "*UTILITY",*
  2. Click on "*MAPS DATABASE*", on the page left,
  3. Double-click on "*USER MAPS"* folder
  4. Select the installation type in the folder window,,
  5. If you want to create a folder for a new trademark (for example "LEXUS"), go to step 8
  6. If you want to create a folder for a new model (if you already have "SKODA" folder and want to add "Superb 2800" model) go to step 9.
  7. If you want to create a folder for a new ECU type (example "6 cil") go to step 15
  8. Click on "*CREATE NEW".* You will get a new folder named "*New_trademark"*,
  9. Write the trademark name and then click "enter" to change it into the desired one
  10. Go to step 18
  11. Select with the mouse the folder for the trademark (in this case "Fiat"),
  12. Click on "*CREATE NEW".* You will get a new folder named "*New_model "*.
  13. Write the model name and then click "enter" to change it into the desired,
  14. Go to step 18,
  15. Select with the mouse the folder for the new ECU (example "6 cil"),
  16. Click on "*CREATE NEW".* You will get a new folder named "*New_ECU"*.
  17. Write the name of the ECU type and click "enter" to change it into the desired one
  18. the new folder has been created but empty. To transfer data inside it please follow the guided personalised programming procedure or the setting up one.

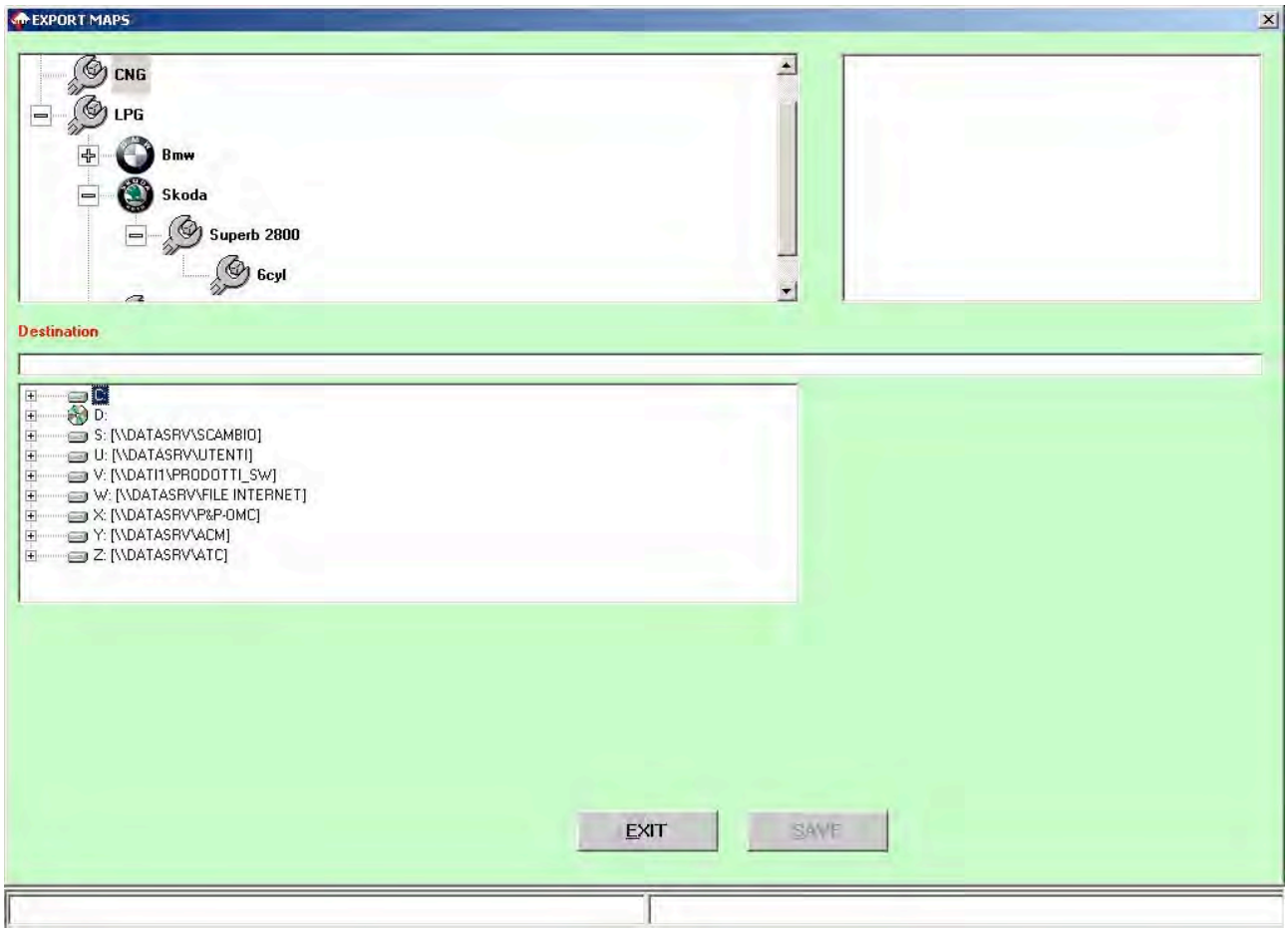
- **To Copy a model folder or a petrol ECU type in another position:**
  1. From main page select "*UTILITY*
  2. Click on "*MAPS DATABASE*", on the page left,
  3. Double-click on "*USER MAPS"* folder,
  4. Select the installation type,
  5. If you want to move the folder of a whole trademark (for example all "Fiat" maps) from one folder to another one, go to step 8,
  6. If you want to move a model folder (with all ECU types inside) from a trademark folder to another one, go to step 13.
  7. If you want to copy a folder of ECU types contained in a trademark folder to another model folder contained (of the same trademark or not) go to step 18.
  8. Select with the mouse or the arrows the trademark folder (i.e. "Skoda"),
  9. Click on "*COPY"* at the page bottom and the key will change into "PASTE"*,*
  10. Select the installation type where you wish to copy the trademark folder,
  11. click "*PASTE"*.
  12. Go to step 22.,
  13. Select the model folder from Copy (i.e. select "LPG" then "SKODA" then "Superb 2800"),
  14. Click on "*COPY"* at the page bottom and the key will change into "PASTE*",*
  15. Select the trademark folder where you wish to copy the model,
  16. Click on "*PASTE"*,
  17. Go to step 22,
  18. Select the folder for the Petrol ECU type to be copied (i.e. select "LPG" then "SKODA" then "Superb 2800" and finally "6cil"),
  19. Click on "*COPY"* at the page bottom and the key will change into "PASTE"*,*
  20. Select the model folder contained in the trademark where you wish to copy it,
  21. Click on "*PASTE"*,
  22. The new folder has been created with the same name it had when selected for the copying and the same files inside. To change the contained data or rename it follow the procedures described in this guide.

To exit "maps database*"* page and go back to the main one, click on "*EXIT*", or on ESC on the keyboard (usually on the left top).

7.7 Export maps

This key allow to save the maps taken from the user folder on the PC in a diskette or a removable unit to that you can easily transfer them on another PC. The procedure allows to export the map anywhere else in the PC hard disk or in whatever unit found by the operative system.
The procedure to follow to export a map on a PC available unit is the following (see Picture 7-8):

1. Start SEQUENT 56 programme from the PC containing the map to be exported
2. Eventually introduce a diskette or a removable unit in the PC.
3. From the main page select "*UTILITY*"
4. Click on *"EXPORT MAPS"*
5. In the customers' record select the type of installation, the model and the ECU type for the map you want to export.
6. Click on "*SAVE"* at the bottom of the page
7. When the copy is ended, you can repeat the operation described at step 4 till you have maps to export or till you finish the available space on the diskette or the removable unit. In this case repeat the last not successful operation replacing the diskette or making some more space available).
8. At the end of the copy, click on "*EXIT"* to go back to main page.

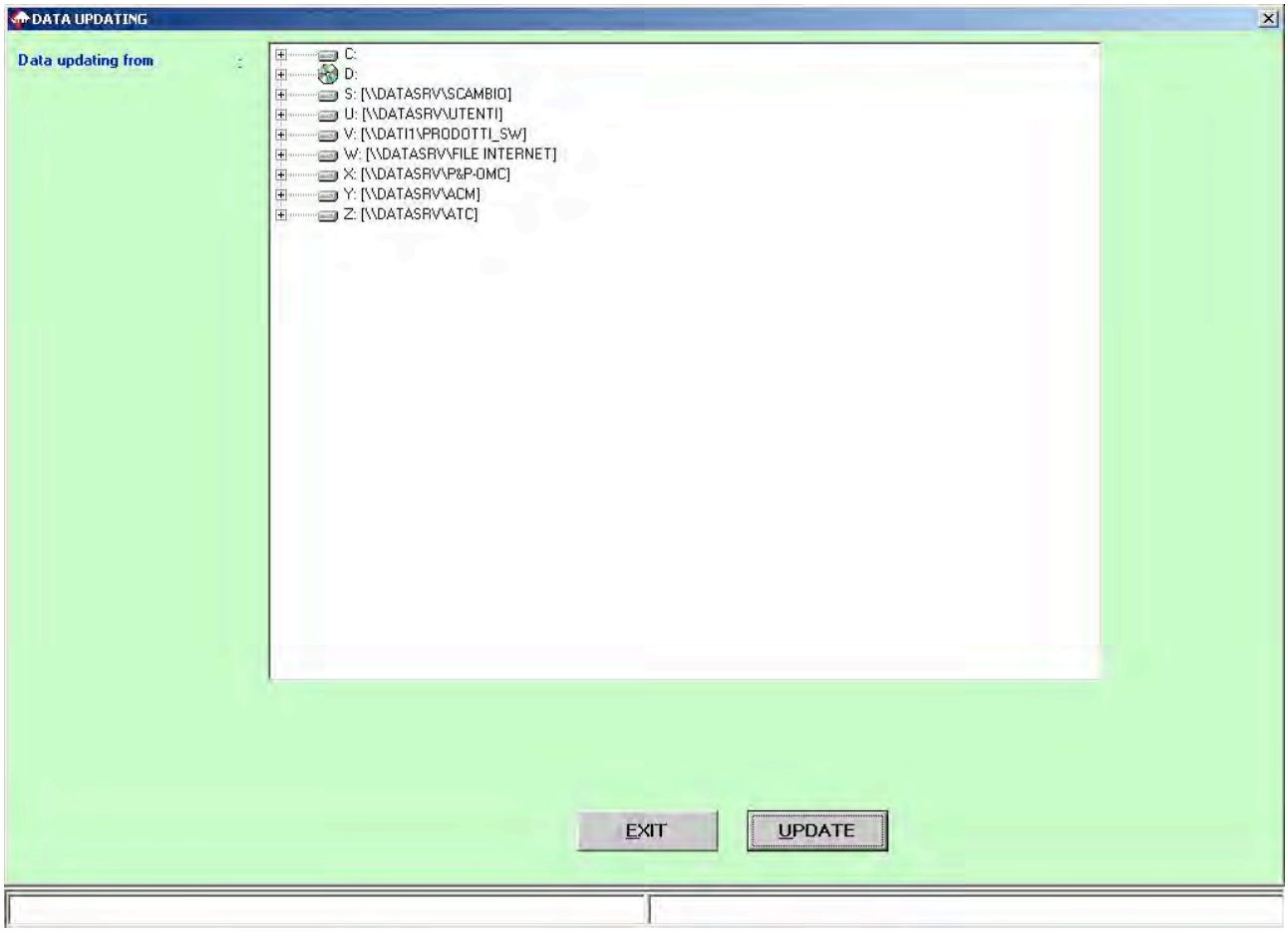


Picture 7-8: Utility – export maps

To transfer a map from a movable or shared unit to a new computer, please follow the Data Update procedure from diskettes, as described in the following paragraph.

7.8 Data update

Hereunder you find all the procedures to update data on the PC both from CDROM and from any kind of removable or shared unit. Updated data can include maps, software and kernels for the ECU.
Update CDROM are created by BRC while maps on removable units can be created by users both using the procedure described in the previous paragraph and downloading the data from BRC internet site http://www.brc.it. Data Update main page is shown in Picture 7-9.



Picture 7-9: Utility - Data update

The procedure to follow is this one:

1. Start SEQUENT 56 programme on the PC from UPDATE (at the bottom left of the main page select "Start" → Programs → SEQUENT 56)
2. Introduce the CDROM or the removable unit in the PC
3. From the main page select "*UTILITY".*
4. Select "*DATA UPDATE*" on the left.
5. Select the folder containing the maps to be updated from the folder at the top near the writing "*Data update from*:"
6. Select the folder containing the update files. For example, from CDROM this could be "D:\SEQUENT56\UPDATE". Start the update by clicking "*UPDATE*", at the bottom of the page.
7. When the diskette copy is ended, click on "*EXIT"* to go back to the main page.