Multifunctional diagnostic tool

TSPRO

User guide

Dear customer!

We would like to thank you for your decision to buy our product. Diagnostic tool TS*PRO* allows you look for and identify failures on modern automobiles.
Because electronic systems onboard modern automobiles are becoming more and more complex with every new generation, it is necessary to have a proper diagnostic tool if one wants to repair modern automobiles effectively and with great quality.

To be quickly able to control and use TS*PRO* device we recommend to carefully read this user guide.
In the user guide you will find full description of all of the tools functions. All of these functions will be described in detail and presented on a sample image. Because the above-mentioned tool can be used as a 2/4 channel oscilloscope a part of the guide will be dedicated to this operational mode. Communication with computer and usage of supplied software will also be described in detail.

If you happen to have a problem or a question regarding the device or its operation contact you distributor who will help you solve the issue.

Safety instruction

For your safety and safety of other people on the workplace please read following safety instructions before using the device and adhere to them.

Only trained personnel can work with the device described in this guide.

The device must be protected from strong mechanical shocks.

The device nor cable assembly can be laid to proximity of vehicles power lines. If a current surge occurs the device can be destroyed.

The device cannot be used if the cabling is damaged.

The device cannot be exposed to running or spraying water. Personnel must unsure that no fluid will get inside. In case of emergency disconnect power.

Do not expose the device to extreme temperatures! Use of the device in places with high humidity is not allowed.

If a solvent (thinner, paint remover, petrol,...) would be used to clear the devices surface - surface can be damaged.

Warranty voids if seal is broken and the device is opened. Warranty seal can be found at the back of the device.

In the package:

- TS*PRO* diagnostic device
- Transport case
- User guide and guarantee card
- List of supported automobiles
- Connecting cables and software based on your order
- TS*PRO* installation CD (optional)
- Updating cable (optional)

The manufacturer guarantees that all future accessories (connecting cables, modules) will be compatible with the tool you have bought. Because we work hard on improvements of our products, we strongly advise you to check up-to-date offers online. Our home page can be found at www.devcom.cz

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1

First steps

In this chapter we will describe basic handling of the TS*PRO* diagnostic tool. You will be introduced to operation and connection of this device. If you are already familiar with this device, you can skip this chapter although we do not recommend that.

First steps

Introduction

The TS*PRO* diagnostic device is designed as an universal diagnostic tool for modern automobiles with great scalability and possibilities to enhance current function in the future. It is meant to perform serial diagnostics of all automobiles equipped with engine ECU, ABS or gear-box ECU etc. It allows you to use diagnostic functions supported by car manufacturers such as error code memory readouts, error code memory clear, actuator tests, system parameters readout etc. Number of these functions is dependent on type of the ECU and used software version.
TS*PRO* is fully compliant with following international norms: ISO9141, ISO14229, ISO14230, SAE J1850, SAE J1979, SAE J1978, SAE J1962 and SAE J2012.

The device is equipped with enough memory to support all current ECU diagnostics, it is not necessary to load any software into the unit memory during progress of diagnostics.

One major advantage of TS*PRO* is to use it without connection to computer. This feature is extremely valuable especially in assistance service's cars.

Device's operation is controlled by loaded software. This software consists of many modules where each module represents subprogram for a given ECU or ECU group. The advantage of this approach is that customer is not forced to pay for modules that he will not be using and new modules can be loaded both by manufacturer (Devcom s.r.o.) or the customer can perform it via purchased updating cable and CD.

Controlling the device

In the following figure (fig. 1) the TS*PRO* diagnostic tool is displayed, functions of the keys are shown as well.

Figure 1

Working with the device is very straightforward and user friendly, controls are intuitive and most functions are controlled by 6 keys (see fig. 1).

Keys **F1**-**F4** are used as complementary inputs and are usually used to input numbers, letters or for scrolling the screen. They are also used in the oscilloscope mode.

As already mentioned it is sometimes necessary to input numbers or letters. This is done by repeatedly pressing function buttons as requested on the TSPRO display, the input is then confirmed by pressing key **OK**.

First steps

Working with the device

The TS*PRO* diagnostic tool was from the beginning designed to be easy to use even for users with limited or no IT knowledge. We have also had in mind that the interface should be independent on automobile or ECU type. For this reasons working with TS*PRO* is intuitive and effective.

The device is connected to ECUs via supplied cable. This cable is plugged into diagnostic socket in diagnosed car and to connector **D** on the device (see figure 2). Where to find diagnostic socket in your car can be found in service manual, some information can also be found on our web page (www.devcom.cz). For list of supported automobiles please contact your reseller or the manufacturer.

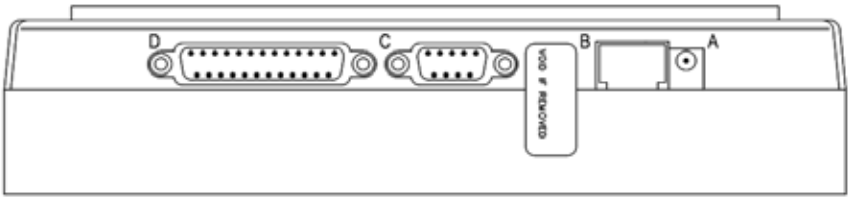


Figure 2

TS*PRO*'s rear side is displayed in figure 2, different connectors are used for:

- **A**: power supply
- **B**: connector RJ45 to connect to PC
- **C**: connector to connect oscilloscope probes
- **D**: connector to connect to diagnostic socket

The connection between PC's and TS*PRO* device in oscilloscope mode will be described in detail further on.

Device connection

TS*PRO* device is typically connected by supplied cable to diagnostic socket in diagnosed car, it can be also powered directly from 12V DC power supply or by connecting directly to auto battery. These modes are useful especially when working in ***Oscilloscope mode***, please note that mentioned cables are not part of the standard delivery.

After connecting the device to the socket, TS*PRO* automatically turns itself on and the Devcom logo will be displayed on screen. User can adjust contrast and brightness of the display.

After pressing the **OK** key ***Main menu*** appears. This is displayed in figure 3.

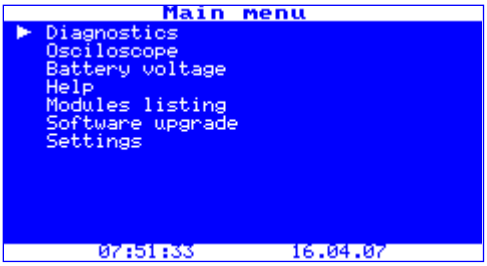


Figure 3

You can select different functions by pressing direction keys and confirming choice by pressing **OK**. All submenus will be described in detail.

Because all diagnostic functions are tightly connected to particular ECU it is not possible to describe all diagnostic functions, for these information please contact vehicle or ECU manufacturer. The basics of EOBD/OBD-II diagnostics can be found in appendixes at the end of this guide.

First steps

When disconnected from cars diagnostic socket the TS*PRO* device will safely turn itself off. There is no risk of damaging the cars ECU neither the device. If some changes are made in the car memory (such as error codes list clear) we recommend to turn ignition off for at least 5 seconds.

Upon connecting TS*PRO* automatically starts to initialize control unit. It is necessary to follow directions on the screen, of most importance are commands *Turn ignition on* a *Turn ignition off*.

If the initialization completes successfully then a message will appear on the screen informing about detected control unit (if the information is available) and after pressing the **OK** key all attainable diagnostic functions will be listed.

If the communication with vehicles ECU is in progress a rotating symbol appear in upper right corner of the screen.

When the **Back** key is pressed user returns back to car type menu.

2

Handling TS*PRO*

We have introduced you to the basic operation of the TS*PRO* diagnostic tool in the previous chapter. The aim of this chapter is to show possibilities and global settings of the TS*PRO* device.

Handling TS*PRO*

Turning on

After the device is plugged into power source a contrast and brightness setup will appear on the screen. (see figure 1). Confirm settings by pressing the **OK** button, ***Main menu*** will appear (see figure 2).

Figure 1

Keys **F1** and **F2** affects contrast settings while brightness is controlled by keys **F3** and **F4**.

Main menu

Main menu (fig. 2) is the starting point when using TS*PRO* device. Here user changes between modes, performs configuration changes etc. The menu structure will be described on following pages, but options ***Diagnostics*** and ***Oscilloscope*** have their separate chapters later on.

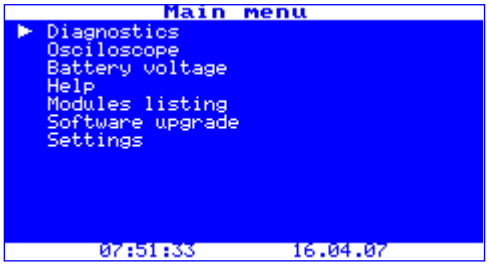


Figure 2

Battery voltage

To monitor on-board electrical system voltage the ***Battery voltage*** feature can be used, the value is refreshed every 100ms. Sample output is shown in figure 3.

The TS*PRO* device can be powered with voltage in range from 7-48V, but these values doesn't apply for on-board electrical systems. For automobiles with 12V on-board system ECUs usually stop to work when voltage drops below approx. 10V.

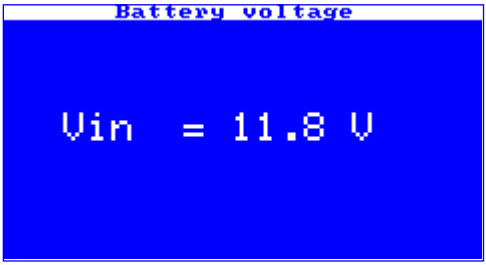


Figure 3

Help

In the ***Help*** option basic key functions are displayed. The screen is shown in figure 4.

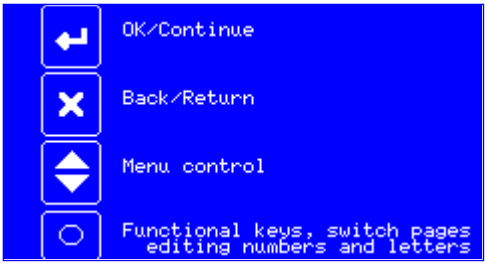


Figure 4

Modules list

In the ***Modules list*** option all information about the device are displayed. On the first line TS*PRO*s version and serial number is shown and second line contains information about memory use. All installed diagnostic modules are listed in further.

To browse through the list use keys **F1** and **F2**, to return to ***Main menu*** press **OK** or **Return** key.

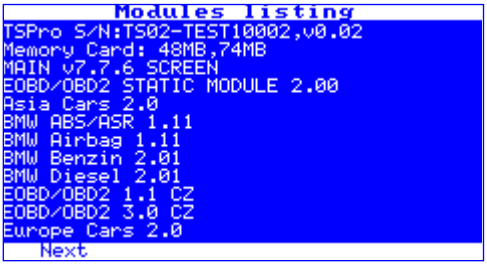


Figure 5

Software upgrade

If you have bought also updating cable and software you can perform updates and install new modules on your own. After confirming the ***Software upgrade*** option in ***Main Menu*** the device will switch itself to update mode. Details about connecting TS*PRO* to PCs can be found in chapter 5.

After the upgrade completes it is necessary to turn the device on and off to reset all values.

If you have not purchased the cable and you want to upgrade your device, please contact the manufacturer or distributor.

Settings

In the ***Settings*** menu user can change parameters of the TS*PRO* device. Language , date and time as well as IP address to communicate with PC can be changed. The screenshot of ***Settings*** menu is presented in figure 6.

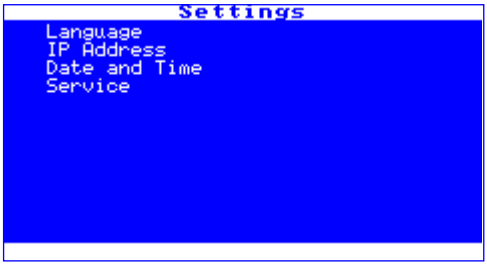


Figure 6

Language

In the ***Language menu*** the language in which TS*PRO* communicates with users can be changed. Currently Czech and English languages are supported. The chosen language will affect menu texts including error messages decoded during diagnostics. Sample screen is presented in figure 7.

Figure 7

IP address

To communicate with PCs LAN interface and UTP cable are used. The advantage of this solution is high speed, robustness and the fact that LAN interface is present in majority of today's computers. The ***IP address*** screen is displayed in figure 8.

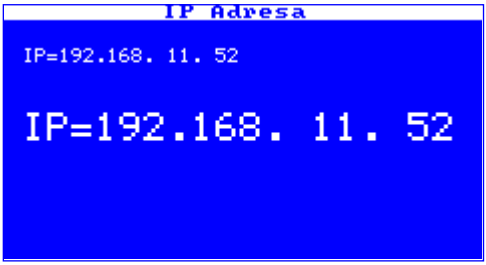


Figure 8

IP address consists of fours segments of three numbers. Highest value is 255. To increase value in specified segment press corresponding function key (**F1**-**F4**) and to decrease the value press corresponding function key (**F1**-**F4**) and key **Down** at the same time.

TS*PRO* can be connected either directly to your computers' network card or it can be plugged into already existing network via hub or switch. Please take into account that if connecting TS*PRO* directly to your computer a **crossed** Ethernet cable must be used and then connecting to hub/switch a **straight-through** cable must be used.

Differences between connection to network card (figure 9) and hub/switch (figure 10) connection is shown in following figures.

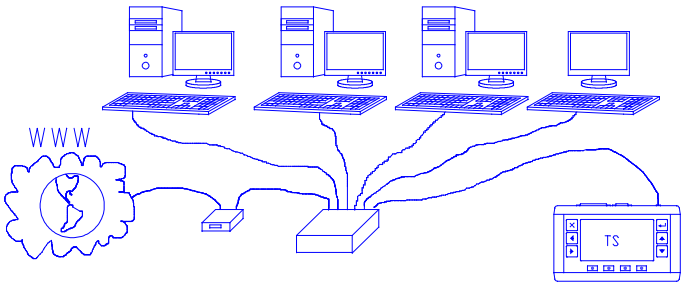


Figure 9

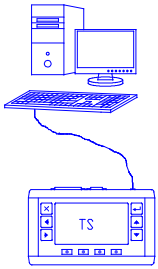


Figure 10

For direct connection with your computer we suggest to use following IP address: 192.168.13.1 for the TS*PRO* device and 192.168.13.2 for your PC. For detailed information see Appendix C.

After the **OK** key is pressed new value is stored and you will return back to ***Settings*** menu. Please note that it is necessary to restart the device for the changes to take effect.

How to change IP address in your computer is described in detail in Appendix C. If the device is to be connected to hub/switch you must know network's settings and setup TS*PRO* properly in order to avoid conflicts and prevent malfunctions in your network.

Date and time

To adjust date and time menu ***Date and time*** is used. Adjustments are done by pressing direction keys. Keys **Left** and **Right** selects position while keys **Up** and **Down** adjusts the values.
To save changes and return to previous menu key **OK** must be pressed.

Handling TS*PRO*

3

Diagnostics

In previous chapters we have introduced you into basic operation of the TS*PRO* diagnostic tool. In this chapter we will focus on performing automobiles ECU diagnostics both on standalone device and via PC.

Diagnostics

We have summarized basic operation with the TS*PRO* diagnostic tool in previous chapters. The aim of this chapter is to show the process of performing diagnostics and explain eventual unclarities.
In the first part diagnostics on standalone device will be described and in the second section the aim will be to explain diagnostics using PC and supplied TS*PRO* PC Center software.
Because diagnostics of VW-group automobiles differ from other manufacturers vehicles further division is done.

TS*PRO* car diagnostics, excluding VW-group

Upon connecting TS*PRO* into OBD socket in the vehicle the device will automatically turn on. After setting contrast and brightness ***Diagnostics*** option should be selected. The selection then is confirmed by pressing the **OK** key.

First it is necessary to select diagnosed vehicle manufacturer (see figure 1). If you select the EOBD/OBD2 option you can perform diagnostics supported by all car manufacturers; the number of measurements is, however, limited.

Figure 1

Menu ***Manufacturer selection*** is displayed in figure 1. To change manufacturer use **Up** and **Down** keys. To confirm your selection press the **OK** key. To scroll up or down by one screen use keys **F1** - up or **F2** - down.

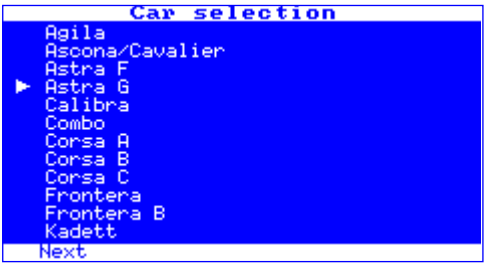


Figure 2

After selecting car manufacturer you have to select car model in the ***Car selection*** menu (figure 2). To change car model use keys **Up** and **Down**. To confirm your selection press the **OK** key. To scroll up or down by one screen use keys **F1** - up or **F2** - down.

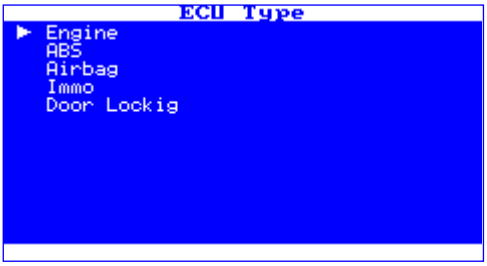


Figure 3

Diagnostics

When the car model is specified a new screen ***ECU selection*** will appear. Now the ECU type on which the diagnostics will be performed must be selected. To change the ECU type use keys **Up** and **Down**. To confirm your selection press the **OK** key. To scroll up or down by one screen use keys **F1** - up or **F2** - down. Sample screen is presented in figure 3.

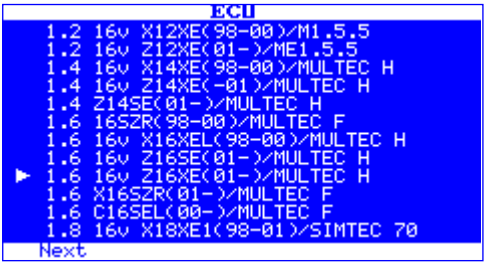


Figure 4

Now it is necessary to setup ECU's system. This is done in the ***ECU*** menu (see figure 4). ECU is selected similarly to previous options. When appropriate ECU is found, confirm your selection by pressing the **OK** key. You will be asked to turn the ignition on (see figure 5) and the device will connect with the control unit.

Figure 5

Figure 6

Menu ***Diagnostics*** (see figure 6) will now appear. All selections will now be described and explained with use of examples.

ECU identification

In this menu (see figure 7) all basic information about the ECU, such as ECU type, manufacturer, vehicle type, engine information etc., are displayed.

To scroll up and down in the list use keys **Up** and **Down** and **F1** and **F2** to scroll whole screen.

To return to previous menu press the **Return** key.

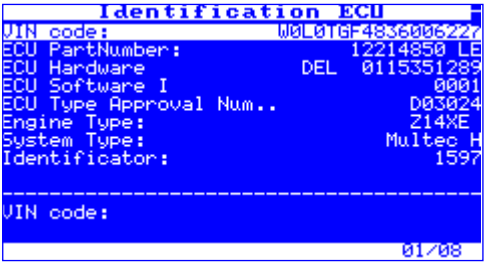


Figure 7

Read fault memory

After confirming the selection by pressing the **OK** key the number of identified faults will be displayed (this screen is captured in figure 8).

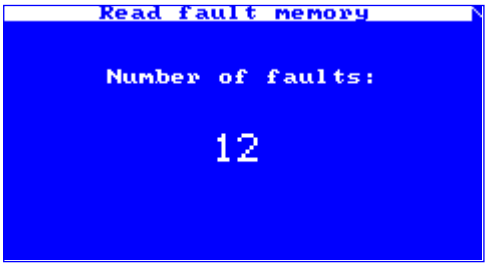


Figure 8

When the **OK** key is pressed once again the list of diagnosed faults will be displayed (see figure 9).

To scroll up and down in the list use keys **Up** and **Down** and **F1** and **F2** to scroll whole screen. To return to previous menu press the **Return** key.

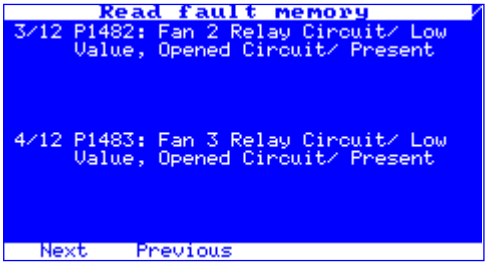


Figure 9

Erase fault memory

We have described how to display list of identified errors on the previous page, let us now show ho to delete the list.
After selecting the proper option in the ***Diagnostics*** menu a new screen will appear asking for confirmation of list clear (see fig. 10).

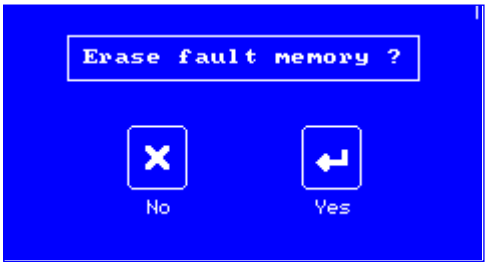


Figure 10

After the **OK** key is pressed the fault memory will be cleared, if the **Return** key is pressed then you will return back to the ***Diagnostics*** menu. If the memory is successfully cleared then a confirmation window appears (figure 11). By pressing the OK key you will return to the ***Diagnostics*** menu.

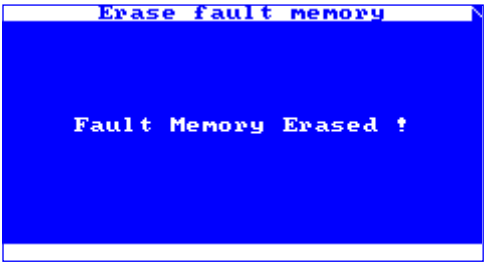


Figure 11

Diagnostics

System parameters

In the ***Parameters*** menu (figures 11 and 12) user can browse through details delivered by the ECU. For example for engine ECU the details may be oxygen sensor voltage, vehicle speed, intake air temperature, engine rpm, throttle angle etc. For detailed description of the above mentioned terms consult documentation to appropriate ECU or vehicles service manual.

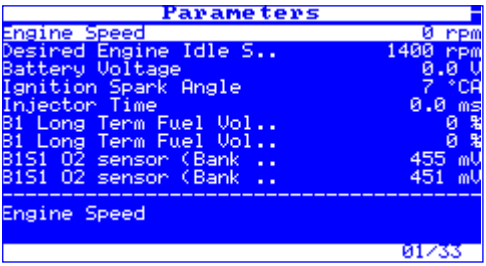


Figure 11

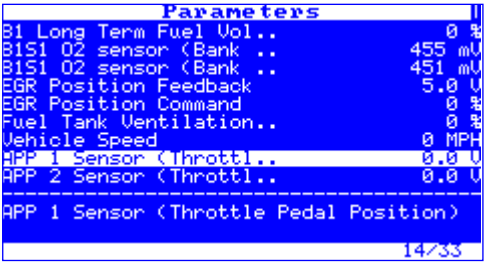


Figure 12

To scroll up and down in the list use keys **Up** and **Down** and **F1** and **F2** to scroll whole screen. To return to previous menu press the **Return** key.

Actuators test

Last option in the ***Diagnostics*** menu is ***Actuators test***. In this option user can test functionality of actuators. For example for engine ECU the actuators are injection valves, fuel pump relay, rpm signal etc.
The menu is displayed in figure 13 and to select specific actuator **Up** and **Down** keys are used, selection is confirmed by pressing the **OK** key.

Figure 13

Depending on the test result a summary will appear. Sample summaries are displayed in figures 14a and 14b.

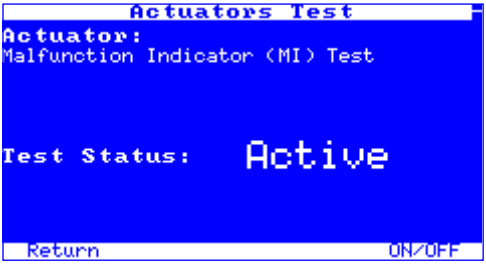


Figure 14

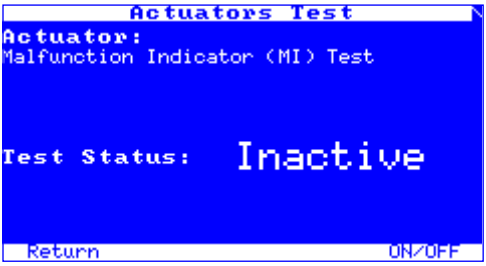


Figure 14b

VW-group car diagnostics, TS*PRO*

As is known manufacturers Audi, Seat, Škoda and Volkswagen form the VW-group. As we already mentioned diagnostics of VW-group vehicles differ from other manufacturers - for this reason a separate section of this chapter will be dedicated to VW-group diagnostics.

After the option ***Diagnostics*** is selected in the ***Main menu*** diagnosed vehicle manufacturer needs to be selected. This is done in ***Manufacturer selection*** screen (see figure 15). To change manufacturer use keys **Up** and **Down** and **F1** and **F2** to scroll whole screen. To confirm your selection press the **Return** key.

Figure 15

After selecting manufacturer a car model must be chosen. Selection is confirmed by pressing the **OK** key. To change car model use keys **Up** and **Down**. Use keys **F1** and **F2** to scroll whole screen up or down

Figure 16

Next step is to select type of diagnosed ECU. This is done in the ECU type menu (figure 17). Principle of selection is the same as before: Selection is confirmed by pressing the **OK** key. To change ECU type use keys **Up** and **Down**. Use keys **F1** and **F2** to scroll whole screen up or down.

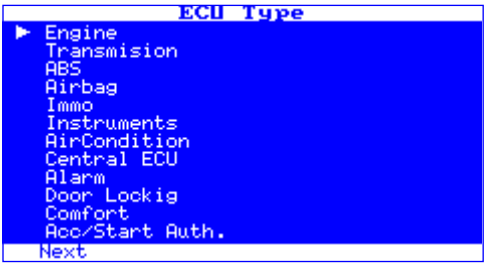


Figure 17

TS*PRO* will now ask you to turn the car's ignition on. Do so and press the **OK** key. The screen is captured in figure 18.

Figure 18

You are now in the ***Diagnostics*** menu (figure 19), from here you can perform different diagnostics of selected ECU. Let us describe available options.

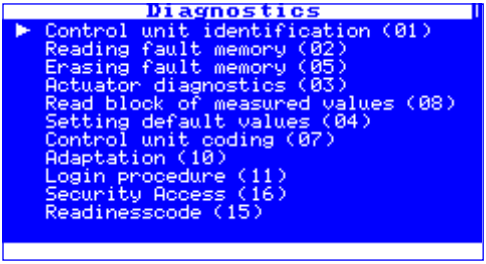


Figure 19

Control unit identification

In this menu basic information about selected ECU are displayed. These information are for example ECU serial number, its type, communication protocol etc. A screenshot can be seen in figure 20.
To browse through the list use keys **Up** and **Down** and to return to ***Diagnostics*** menu press the **Return** key.

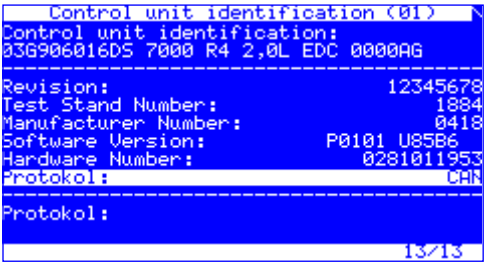


Figure 20

Reading fault memory

In this menu identified faults can be read from the ECU. When selected the number of detected faults appears first (figure 21) and after confirming by pressing the **OK** key full list of faults will show up (figure 22).

To browse through the list use keys **Up** and **Down** and to return to previous menu press the **Return** key.

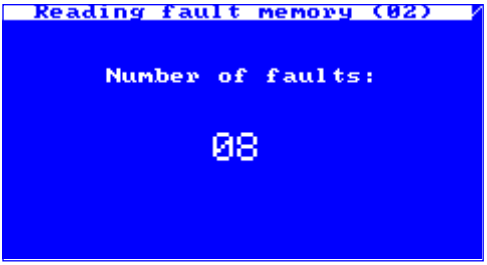


Figure 21

TS*PRO* automatically performs translation from error codes to text description and significantly eases operation - user doesn't have to look up code meaning and can focus on diagnosing and repairing the vehicle (figure 22).

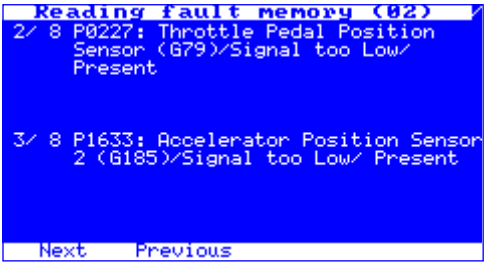


Figure 22

Fault memory erase

On the previous page we have shown how to display fault memory, let's have a look ho to clear the list. After selecting proper option in the ***Diagnostics*** menu a new window will appear asking for confirmation (see figure 23). When the **OK** key is pressed all records will be erased and procedure summary will be displayed (figure 24). By pressing the return key you will return back to ***Diagnostics*** menu.

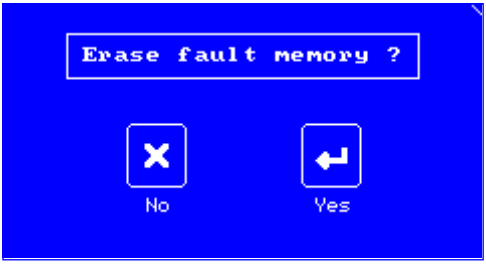


Figure 23

Figure 24

Actuator diagnostics

Next option in the ***Diagnostics*** menu is ***Actuator diagnostics***. In this menu you can test different actuators functionality. For example for engine control unit these are injection valves, fuel pump relay, rpm signal etc.

In figure 25 the menu is shown, you will be informed when the test completes (figure 26). Test is started by pressing the **F1** key, to switch between different tests key **F1** is used and by pressing the **F4** key test is cancelled.

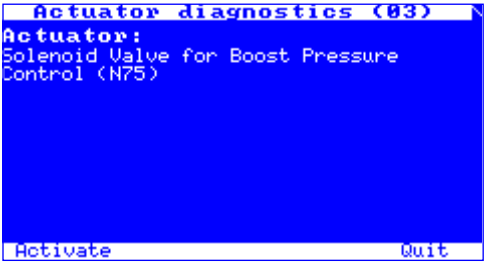


Figure 25

Figure 26

Measured block value read

In the Read block of measured values menu (see figure 27) you can browse through information delivered by selected ECU. For example for engine control unit values such as oxygen sensor voltage, vehicle speed, intake air temperature etc. are displayed.

For detailed explanation of used terms consult manuals provided by the control unit manufacturer or vehicles service manual.

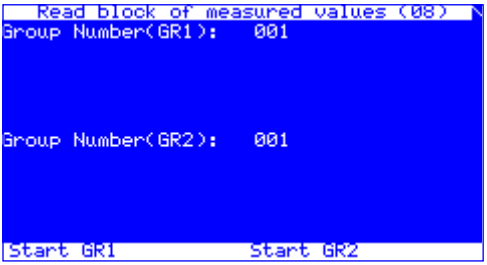


Figure 27

Since the values change in real-time, they can be perfectly well used for test rides to obtain valuable data on the run.

In this mode screen is divided into two parts (GR1 and GR2). To load values into part GR1 press the **F1** key - Start GR1, to load values in the second part press the F2 key - Start GR2 (see figure 28).

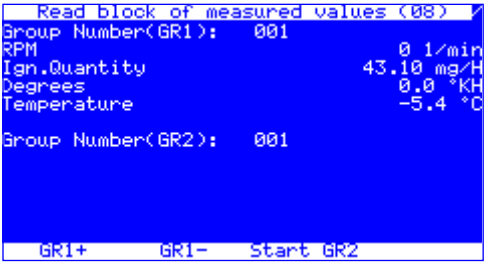


Figure 28

To browse between values use keys **F1**,**F2** for GR1 and **F3**,**F4** for GR2 (see figure 29).

To leave mode and return back to ***Diagnostics*** menu press the **Return** key.

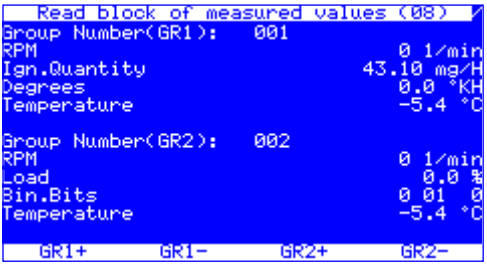


Figure 29

Read single measured value

To load single measured value the ***Read single measured value*** menu is used. The principle of control is the same as in the read block mode. The read single measured value is used mainly by older control units.

The screen is divided into two parts (CH1 and CH2). To load data in part CH1 press key F1 - Start CH1, to load data in part CH2 use the F2 key - Start CH2 (see figure 30).
To browse between values use keys **F1**,**F2** for CH1 and **F3**,**F4** for CH2 (see figure 31).

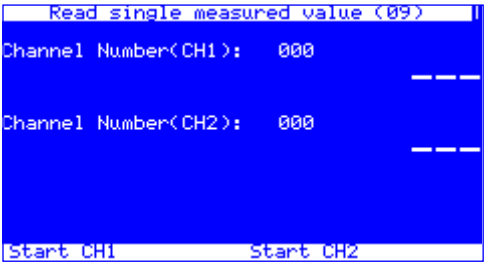


Figure 30

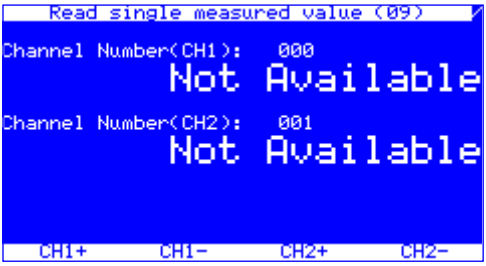


Figure 31

To leave mode and return back to ***Diagnostics*** menu press the **Return** key.

Setting default values

Function ***Setting default values*** (see figure 32) allows user to delete adaptation values and return to defaults. The control is similar to previous options. It is used for example to set catalyst function , after ABS deaeration etc.

Keys **F1** and **F2** selects between GR groups, by pressing the **F3** key adaptation values are cleared and keys **F4** and **Return** returns back to the ***Diagnostics*** menu.

Figure 32

Figure 33 documents the screen after clearing adaptation values.

Figure 33

Control unit coding

In the ***Control unit coding*** menu you can set control unit behavior. It basically means that different ECU preset modes are activated. Screen sample is shown in figure 34.

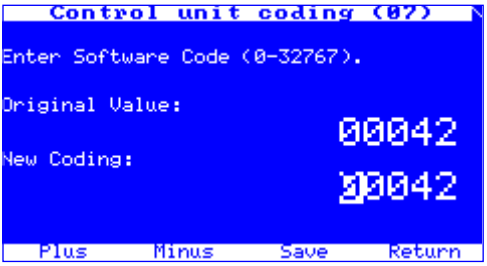


Figure 34

To control this mode use function keys **F1**-**F4**. Keys **F1** and **F2** are used to increase and decrease value respectively. By pressing the **F3** key new value is stored and after pressing the **F4** key you will return back to the ***Diagnostics*** option.

When the **F3** key is pressed TS*PRO* asks for confirmation of change (figure 35) and returns the procedure summary (figure 36).

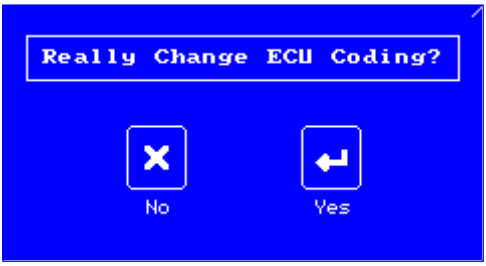


Figure 35

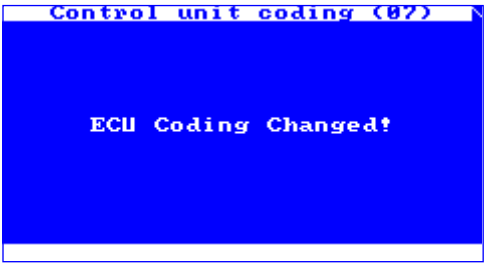


Figure 36

Meaning of different codes is explained in service manuals of proper manufacturers, please consult them it is not purpose of this guide to describe them.

Adaptation

In the ***Adaptation*** menu you can read and modify canals 00-99 of selected control unit. It is for example possible to set idle speed, switch on and off different components (such as Airbags), it is possible to reset service intervals or change interior alarm sensor sensitivity. Other function is to adapt different comfort units (keys to immobilizer, remote control), in some cases it is possible to change different comfort functions (auto-locking during ride etc.)

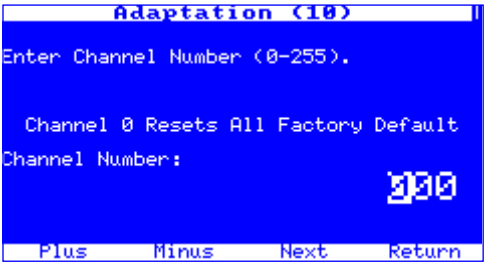


Figure 37

Sample screen from the ***Adaptation*** menu is shown in figure 37. To control this mode use function keys **F1**-**F4**. Keys **F1** and **F2** are used to increase and decrease value respectively. By pressing the **F3** key new value is stored and after pressing the **F4** key you will return back to the ***Diagnostics*** option.

After the **F3** key is pressed TS*PRO* asks for confirmation (see figure 38).

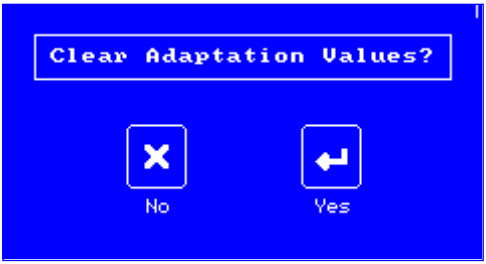


Figure 38

Login procedure

Some control units require entering a code (logging in) before changing its settings. This is called Login procedure and will be described now. See figure 39 for sample screen.

Code is a type of a password which, if not entered correctly, don't allow to perform changes in ECU settings. After the code is entered TS*PRO* will make sure if you want to make changes (see figure 40).

Figure 39

When the **F3** key is pressed TS*PRO* will ask for code input confirmation (figure 40) and will show the login procedure result (figures 41 and 42).

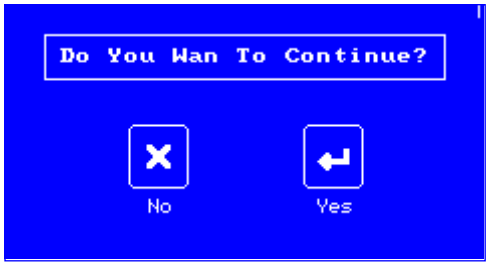


Figure 40

Figure 41

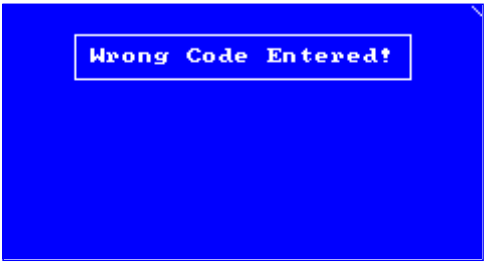


Figure 42

Readiness code read

Readiness code is used in automobiles manufactured after 1996 (supporting OBD-II) and is connected to oxygen sensor and catalyst functionality. Different bit meaning is explained in Appendix A.

Special functions TS*PRO*

Menu ***Special functions TSPRO*** allows you to browse through other diagnostic options, for example Bosh Mono-Motronic, Digifant, allows accessing service function in newer control units (see figures 43 and 44).

Keys **F1**,**F2** are used to switch between screens. Pressing the **Return** key return you to previous menu and the selection is confirmed by pressing the **OK** key.

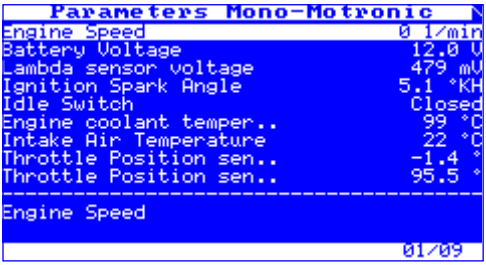


Figure 43

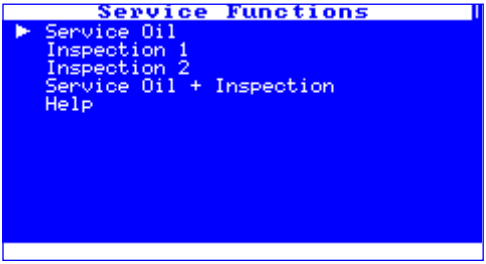


Figure 44

After the diagnostic processed is finished the device must be correctly unplugged from the cars OBD socket. This is done by pressing the Return key in ***Diagnostics*** menu. You will be then asked to turn the ignition off and to confirm by pressing the OK key (see figure 45). After this the device can be safely unplugged.

Figure 45

PC CENTER car diagnostics, excluding VW-group

In this part of the 3rd chapter we will discuss car diagnostics using the supplied TS*PRO* PC Center software. First it is necessary to run the program and choose diagnostics module (see figure 46 - emphasized by circle). Your choice is confirmed by left-clicking your mouse on the icon. It is necessary not have oscilloscope mode running on the TSPRO when starting diagnostics module.

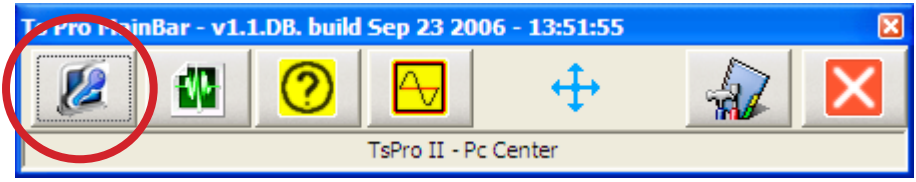


Figure 46

When successfully connected to PC a pictogram will be displayed on TS*PRO*'s screen and the device will not respond when keys are pressed. This image is shown in figure 47.

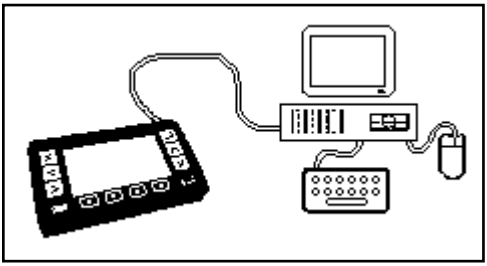


Figure 47

When data from the TS*PRO* device are loaded a window with car manufacturers list will appear. Choose desired manufacturer and left-click on its icon (figure 48).

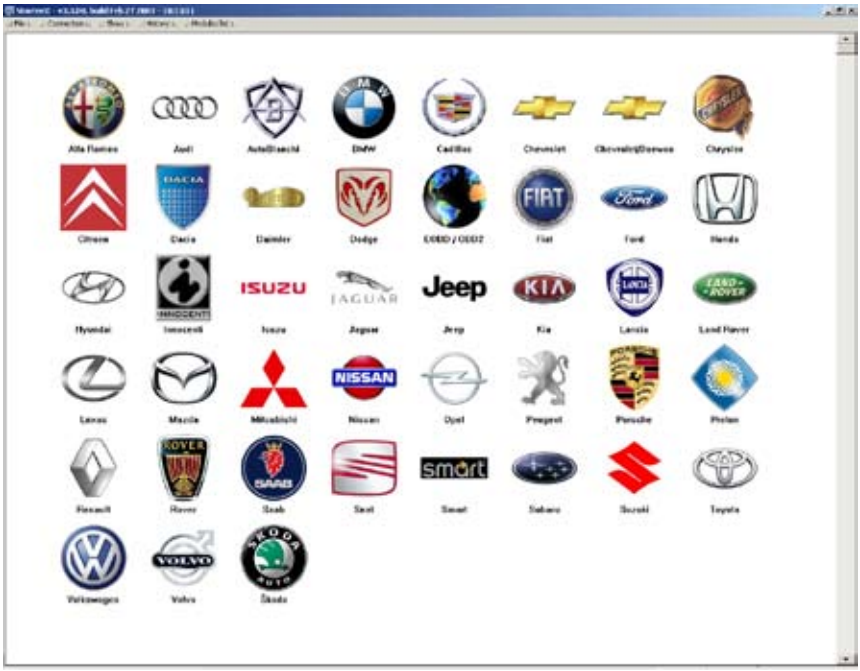


Figure 48

After selecting the manufacturer a new window will appear. In this window model of diagnosed vehicle is to be selected, this window is shown in figure 49. Next a ECU selection is performed. In case of ***classical list*** the window is displayed in figure 50, in case of ***shortened list*** the window is displayed in figure 51.

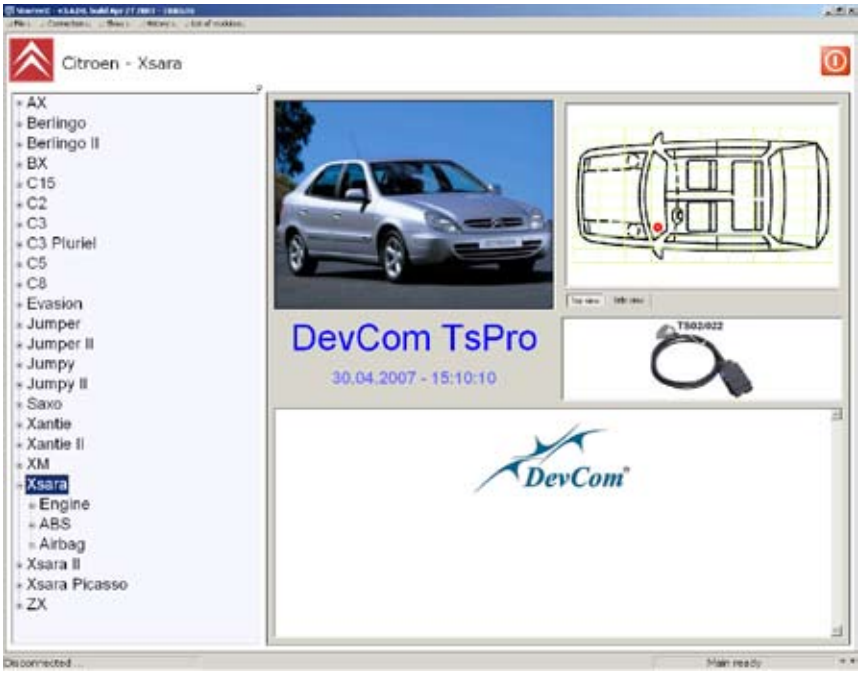


Figure 49

To switch between display modes you must use the ***Show*** menu in the menu bar in upper part of the window. Shortened list is useful if you know the ECU name; on the contrary classical list is useful when selecting based on ECU function such as engine control unit, brake control unit, airbag control unit etc.

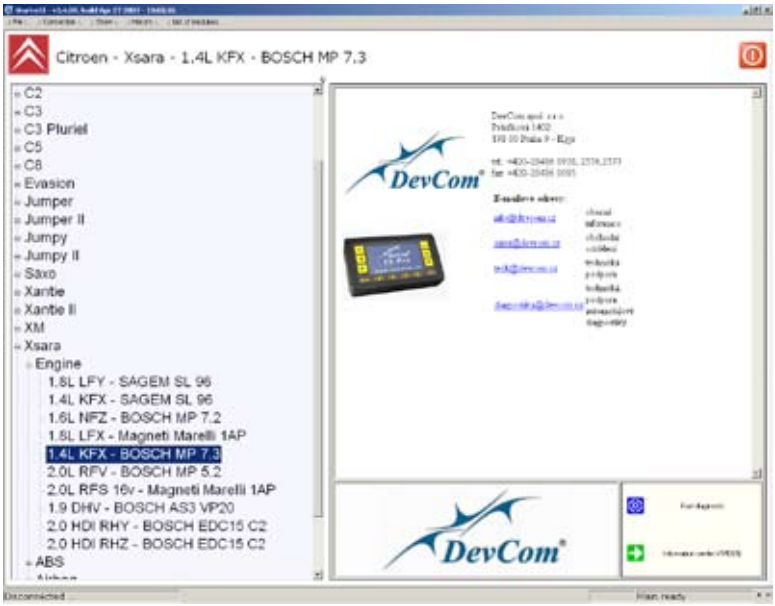


Figure 50

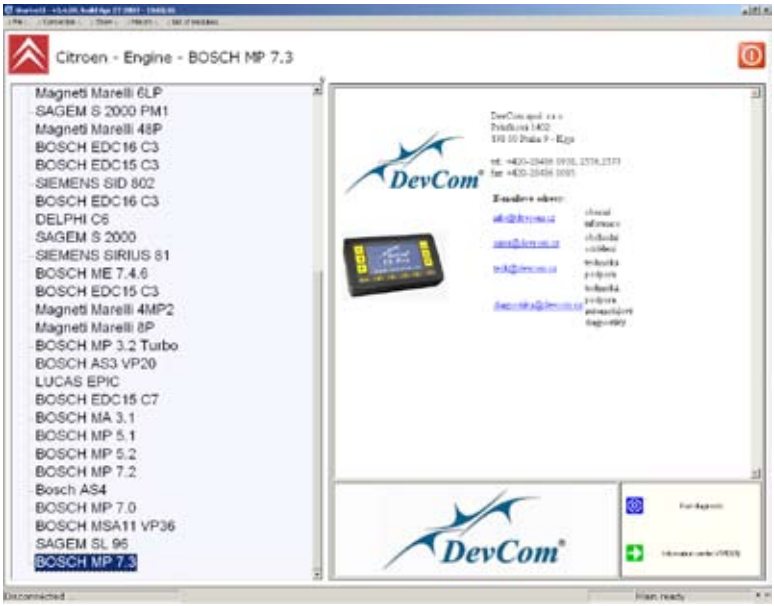


Figure 51

When a proper ECU is selected it is necessary to left-click the ***Start diagnostic*** icon in lower-left part of the window. Then a window requesting turning ignition on will appear (see figure 52). You can continue after clicking the OK **button**.
By clicking on the **Information centre VIVID** icon, the VIVID Workshop program will be (if installed) loaded. This program is not in standard supply, for more information consult Appendix D in this guide.

Figure 52

Identification ECU

After loading data new window with several bookmarks will appear. The active bookmark will be ***Identification ECU***. The window is displayed in figure 53.

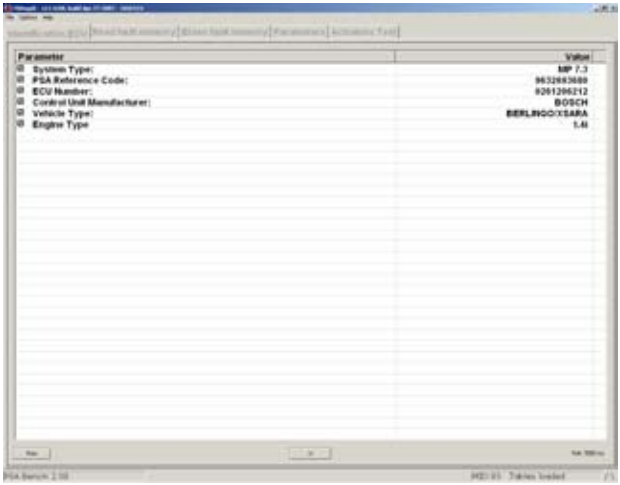


Figure 53

In the window basic data about control unit and vehicle are displayed, loaded data can be printed by clicking on the **Print** button. One must have correctly installed printer to be able to use the print function.

To leave the ***Identification ECU*** bookmark click on button labeled **X**. Main diagnostics windows will appear and displayed bookmarks shows what diagnostic options are available (see figure 54) We will now explain all options of diagnostics in the TS*PRO* PC Center program.

Read fault memory

To display fault memory listing select the ***Read fault memory*** bookmark and confirm by clicking the **Start** button. After obtaining data from the ECU first the number of identified fault will be displayed and after confirming by clicking the OK button a list will be displayed. See figures 54 and 55 for sample screenshots.

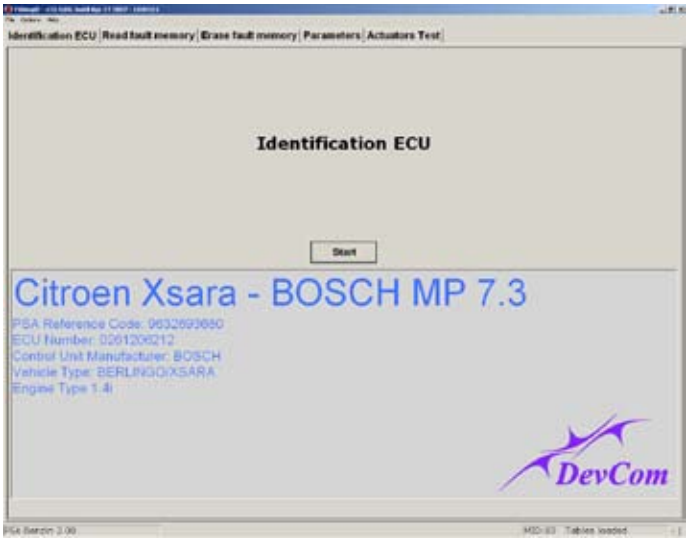


Figure 54

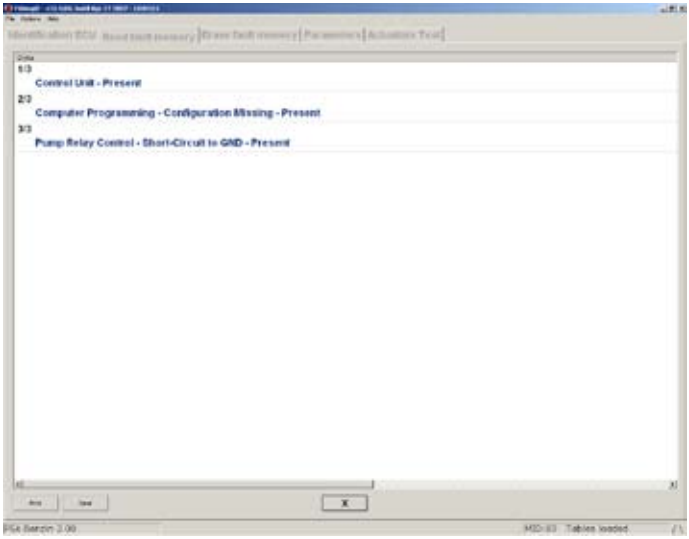


Figure 55

It is possible to print the list and it is also possible to store the data in a file to process it later. List is saved to file after clicking the **Save** button - a dialog will appear and you will choose the pathname and filename. Default pathway for files is Archive directory in main PC Center directory. To print data simply click on the **Print** button and follow instructions. To exit the bookmark click the **X** button.

Erase fault memory

To clear stored error codes use the ***Erase fault memory*** bookmark. When launched the program will ask for confirmation and if the **Yes** button is clicked on then the memory is cleared. The window is shown in figure 56. After the process is finished click the emphasized area to return back to ***Diagnostics*** menu.

Figure 56

Actuators test

By selecting the ***Actuators test*** bookmark one can test different actuators functionality. The program will offer different possibilities to test, required test is selected by clicking on the name of the actuator in the list and confirming by pressing the Start button (see figure 57 for engine control unit).

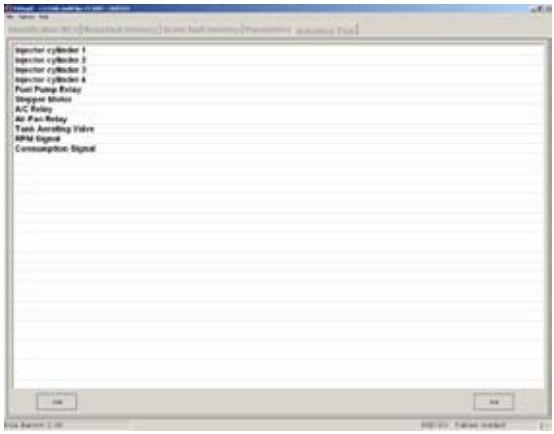


Figure 57

When the test is complete it will be together with other options displayed on screen. To leave the mode click on the End button in lower right corner (figure 57).

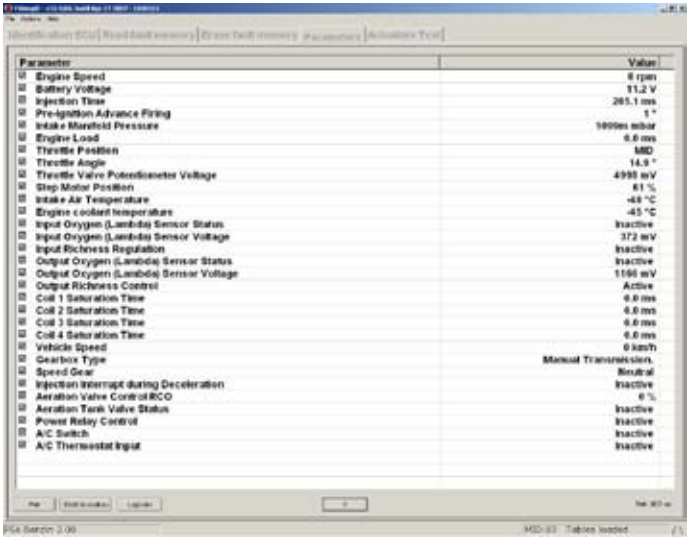


Figure 58

System parameters

When the ***System parameters*** bookmark is selected a new window displaying all actual values obtained from ECU appears. A list of parameters from engine control unit is displayed in figure 58. As one can see information such as engine rpm, throttle valve angle, intake air pressure etc. are displayed.

Information listed in bookmark ***System parameters*** can be saved to file or printed on a printer by clicking **Save** or **Print** button respectively.

The program offers very useful function called ***logging***. If you print or save data they are related to exact time, on the other hand when the logging function is used you can observe parameter changes in time.

When the **Logging** button is clicked dialog window requesting input of pathway to log file will appear. When entered buttons in lower part of the main window changes (see figure 59).
By clicking on the **Log. Start** button measured values start to be saved to file. Values refresh approx. every 1s. Data acquisition is stopped by pressing the **Log. Stop** button and values are stored to file by pressing the **Log. Uložit** button. Only parameters which are checked in the list are saved to file, checkboxes can be found left from the parameter name.
This function is very useful during test rides when all parameters are connected in time and trends can be easily observed.

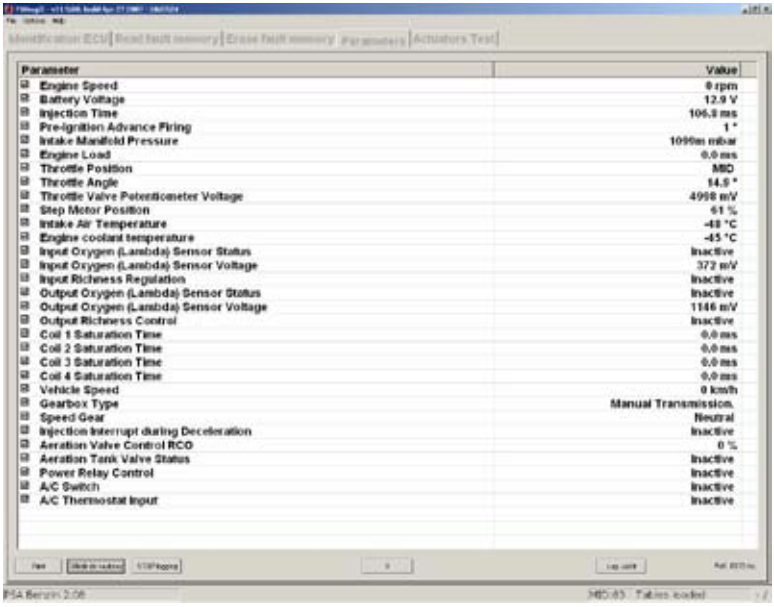


Figure 59

Data is saved in comma separated files (.csv) files. These files can be opened in almost all text editors. We however recommend using a spreadsheet editor such as Microsoft Excel.

Font and language settings

To adjust fonts used to display data and to change language settings use the ***Settings*** menu. It is located in ***File*** -> ***Options*** menu. These settings are then used in whole diagnostic program. Sample of this window is displayed in figure 60.

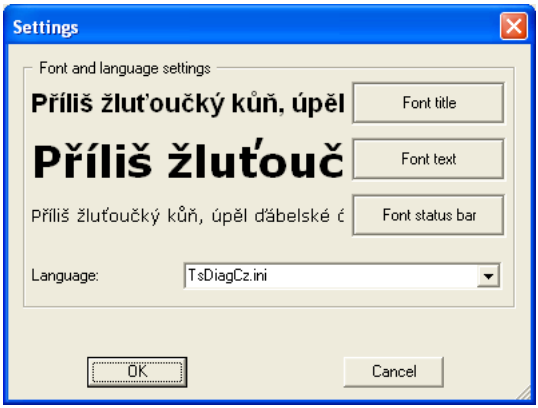


Figure 60

PC CENTER, VW-group car diagnostics

In the last section of this chapter we will describe car diagnostics of the VW-group automobiles in the TS*PRO* PC Center program. First it is necessary to launch TS*PRO* PC Center program and select the diagnostics module. In figure 61 it is emphasized by the circle. Your choice is confirmed by left-clicking on the icon. The oscilloscope mode must not be running in the TS*PRO* device, otherwise the communication may freeze.

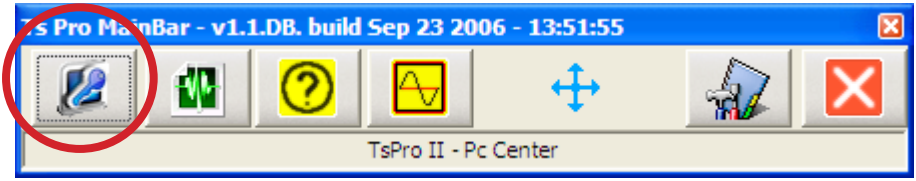


Figure 61

After successfully connecting with computer there will a pictogram appear on the TS*PRO* screen and the device will no longer respond to key-press. This image is illustrated in figure 62.

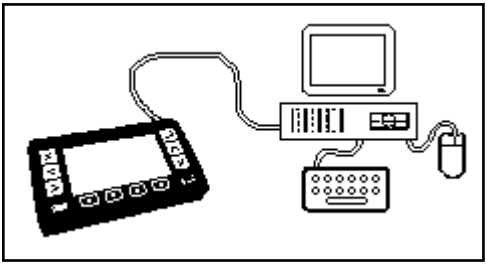


Figure 62

After the module is started first windows that appears is the manufacturer selection window (see figure 63), choose manufacturer here and left-click its icon. We will show the diagnostic process on Škoda Fabia concern car.

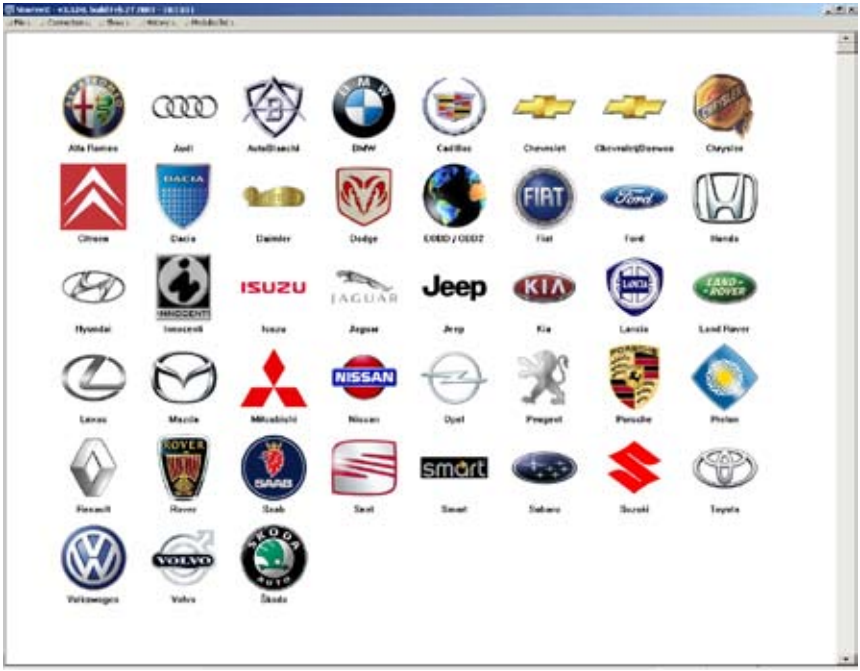


Figure 63

When the manufacturer is selected new window appears (figure 64). Here a car model must be selected, after this an ECU which is going to be diagnosed has to be selected. The ECU selection window is displayed in figure 65.

Figure 64

Figure 65

After required ECU is selected click the **Start Diagnostics** button in lower-right corner of the window. New window appears (see figure 66) requesting to turn ignition on, after pressing the **OK** button TS*PRO* connects with the selected control unit.
Clicking on the ***Information centre VIVID*** will launch (in the case VIVID Workshop is installed) VIVID Workshop program. This program is not in standard delivery but can be ordered separately. For more information consult Appendix D.

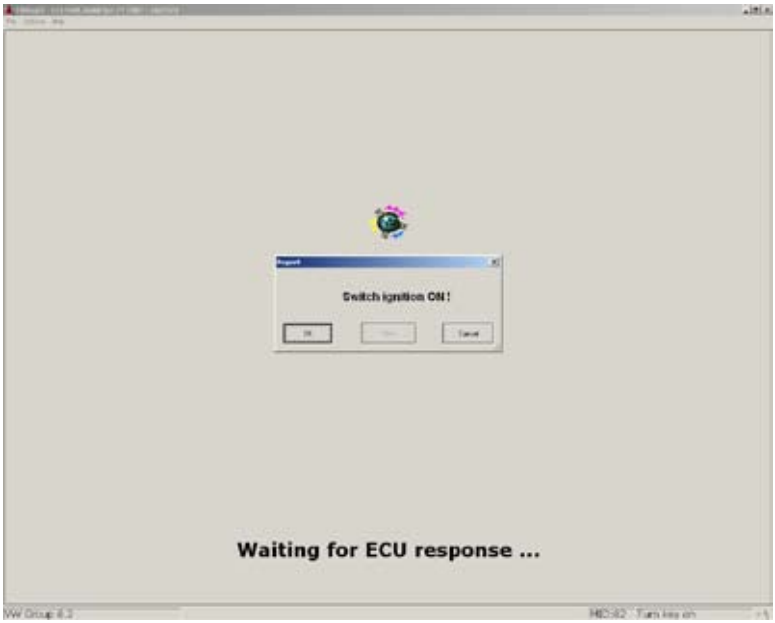


Figure 66

Control unit identification

After data are successfully loaded a diagnostics window appears and the active bookmark will be ***Control unit identification*** (figure 67). To run the test left-click the **Start** button, you can see the resulting window in figure 68.

Figure 67

In the new window (figure 68) basic information about control unit and vehicle are displayed. Loaded data can be printed or saved to file by pressing appropriate buttons. To print one must have correctly installed printer in the computer.

To leave the ***Control unit identification*** bookmark click on the **X** button. A main diagnostic window will appear and shown bookmarks represent available diagnostic functions (see figure 67). Let us introduce all other diagnostic options in the TS*PRO* PC Center program.

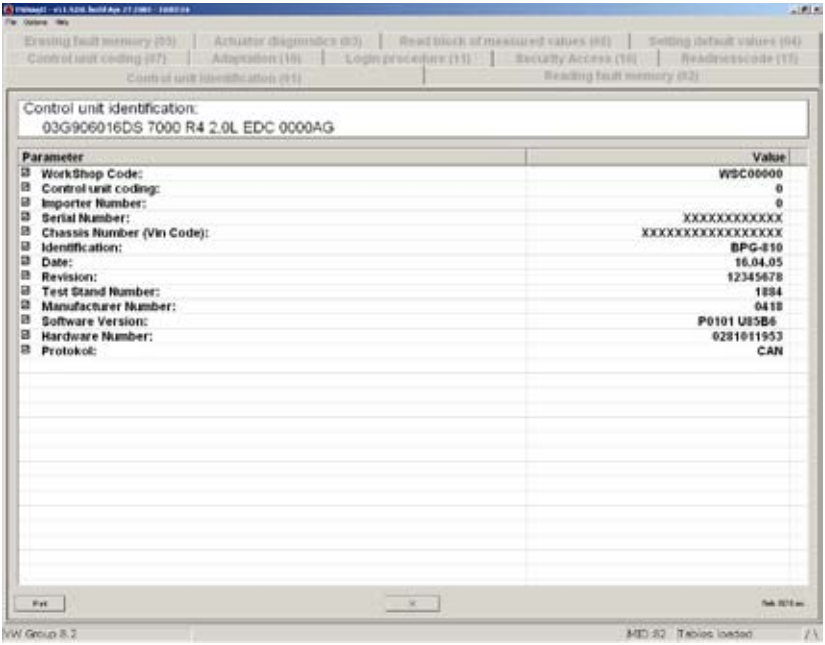


Figure 68

Reading fault memory

To list identified errors list open the ***Reading fault memory*** bookmark and confirm by clicking the **Start** button. First number of found faults is displayed and after clicking on the **OK** button full list is displayed (see figure 69).

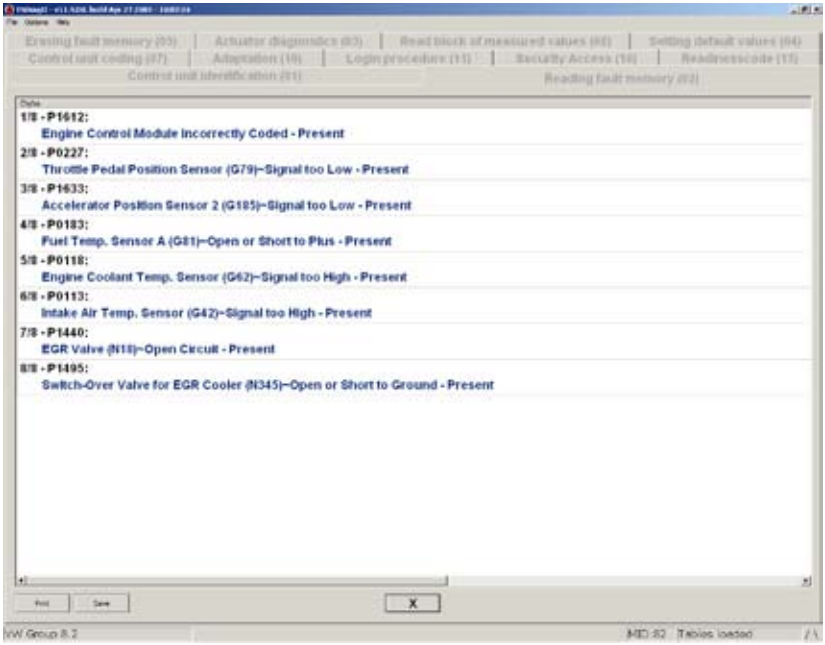


Figure 69

It is possible to print the list and it is also possible to store the data in a file to process it later. List is saved to file after clicking the **Save** button - a dialog will appear and you will choose the pathname and filename. Default pathway for files is *Archive* directory in main PC Center directory. To print data simply click on the **Print** button and follow instructions. To exit the bookmark click the **X** button.

Erase fault memory

To clear stored error codes use the ***Erase fault memory*** bookmark. When launched the program will ask for confirmation and if the **Yes** button is clicked on then the memory is cleared. The window is shown in figure 70. After the process is finished click the emphasized area to return back to ***Diagnostics*** menu.

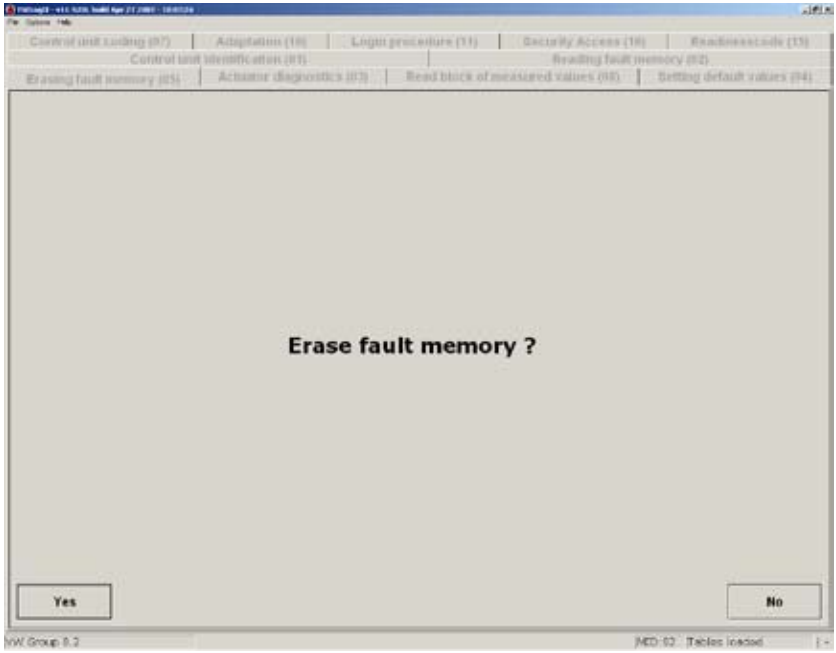


Figure 70

Actuators test

By selecting the ***Actuators test*** bookmark one can test different actuators functionality. The program will offer different possibilities to test, required test is selected by clicking on the name of the actuator in the list and confirming by pressing the **Start** button (see figure 71 for engine control unit).

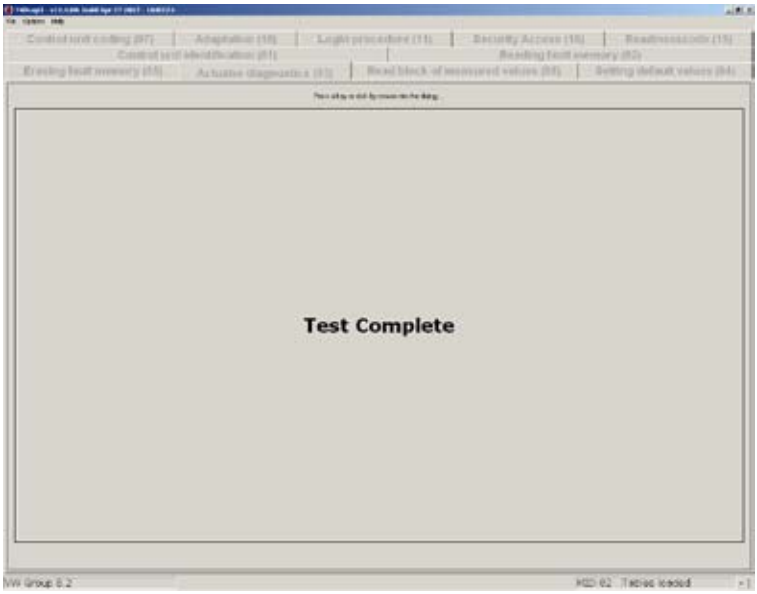


Figure 71

Measured block value read

In the ***Measured block value read*** bookmark (see figure 72) you can browse through information obtained by TS*PRO* from control unit. For example for engine control unit values such as oxygen sensor voltage, vehicle speed, intake air temperature etc. are displayed.

For detailed explanation of used terms consult manuals provided by the control unit manufacturer or vehicles service manual.

Since the values change in real-time, they can be perfectly well used for test rides to obtain valuable data on the run.

The window is divided into four parts in this mode (GR1, GR2, GR3, GR4) and allows you to monitor more parameters at a time. In each sub-window you can browse between groups by clicking the **GR+** and **GR-** buttons. Monitoring is started and stopped by clicking on the **Start GRx** and **Stop GRx** buttons respectively.

To return to previous menu click on the **X** button.

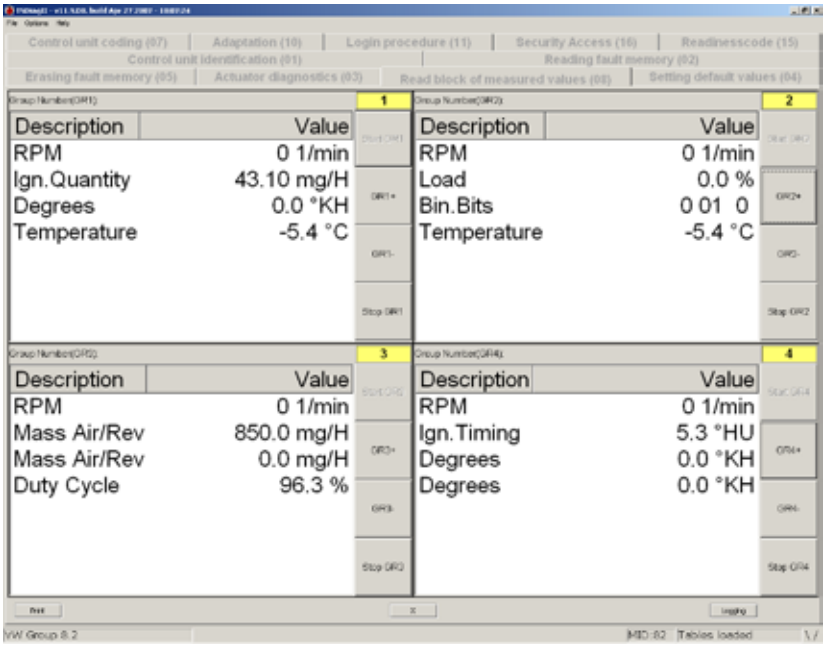


Figure 72

The program offers very useful function called ***logging***. If you print or save data they are bound to exact time, on the contrary when the logging function is used you can observe parameter changes in time.

Diagnostics

When the Logging button is clicked dialog window requesting input of pathway to log file will appear. When entered buttons in lower part of the main window changes (see figure 73).

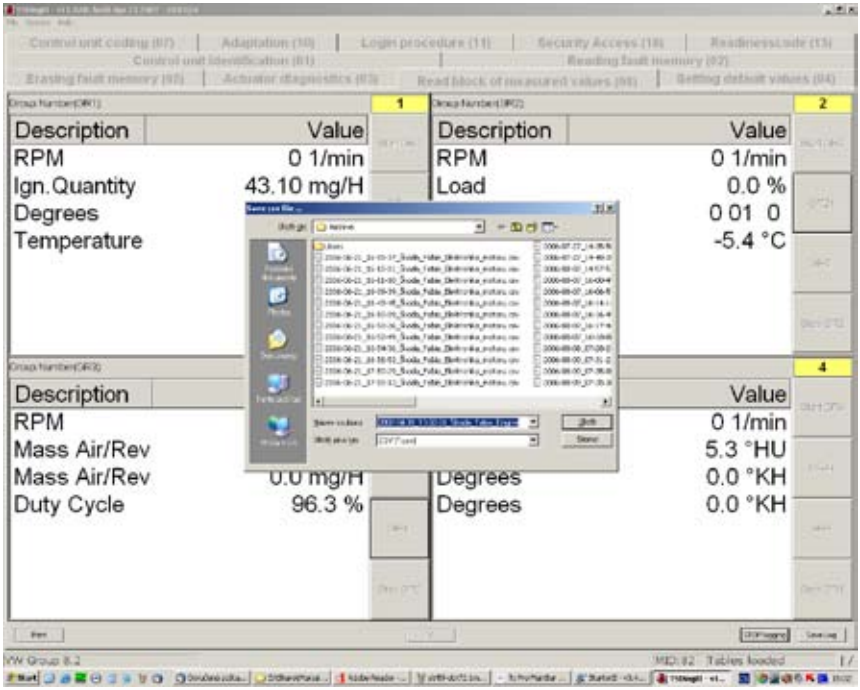


Figure 73

By clicking on the **Log. Start** button measured values start to be saved to file. Values refresh approx. every 1s. Data acquisition is stopped by pressing the **Log. Stop** button and values are stored to file by pressing the **Log. Uložit** button. This function is very useful during test rides when all parameters are connected in time and trends can be easily observed.

Detailed information about files in the TS*PRO* PC Center program can be found in the appendixes at the end of this guide.

Setting default values

Bookmark ***Setting default values*** (see figure 74) allows user to delete adaptation values and return to defaults. It is used for example to set catalyst function , after ABS deaeration etc.

By clicking on the **GR+** and **GR-** buttons you choose between GR groups, when the **Start GR** button is clicked on the adaptation values are deleted. To return back to main window click on the **X** button.

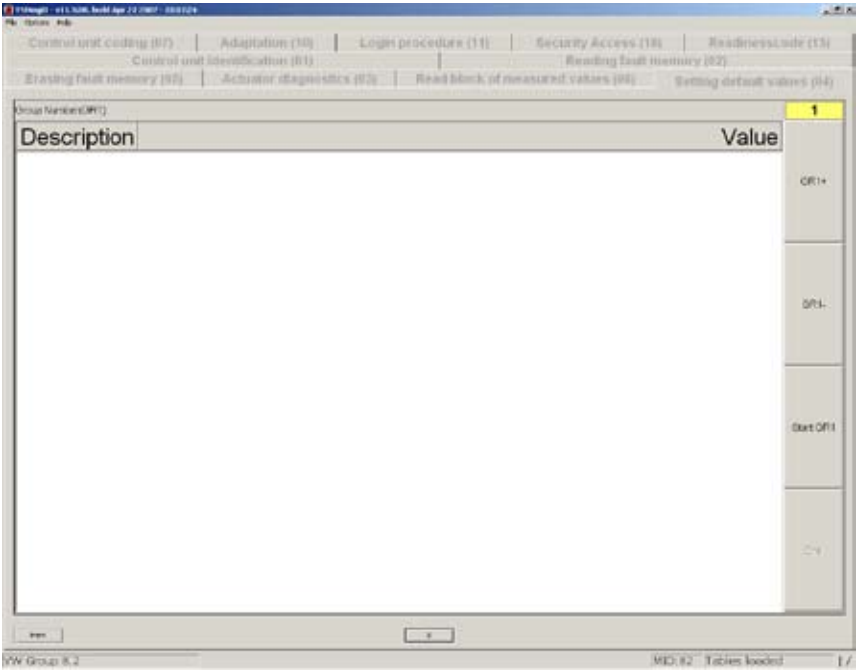


Figure 74

Control unit coding

In the ***Control unit coding*** menu you can set control unit behavior. It basically means that different ECU preset modes are activated. Screen sample is in figure 75.

When the code is entered the program will demand confirmation by clicking the **OK** button (see figure 76) and if confirmed it performs control unit coding.
To return back to previous menu click on the **Return** button.

Meaning of different codes is explained in service manuals of proper manufacturers, please consult them it is not purpose of this guide to describe them.

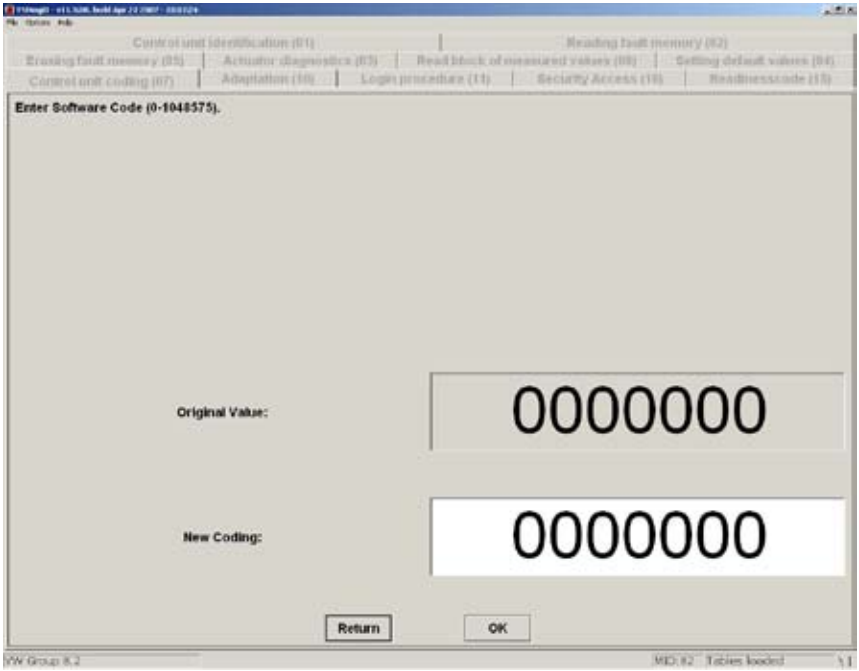


Figure 75

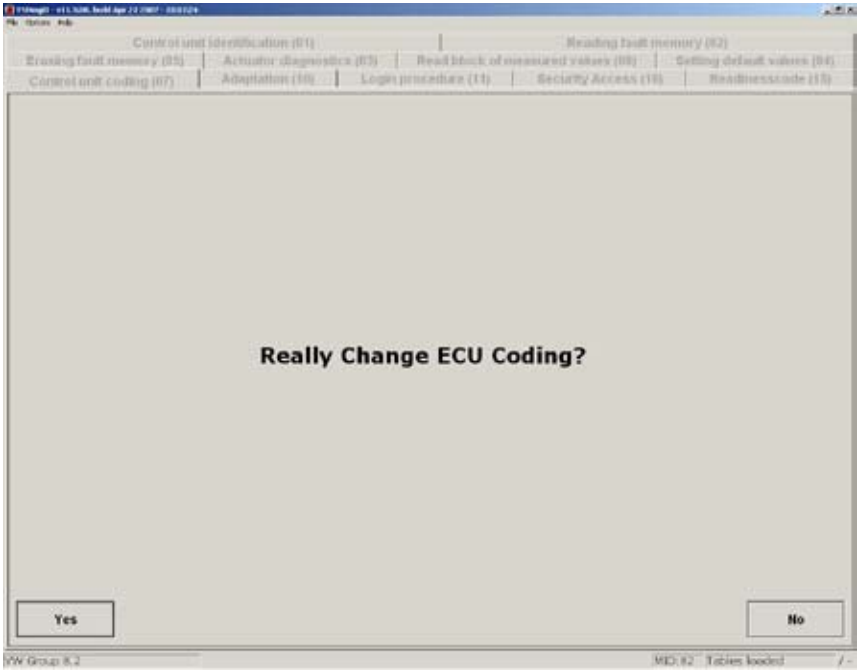


Figure 76

Adaptation

In the ***Adaptation*** menu you can read and modify canals 00-99 of selected control unit. It is for example possible to set idle speed, switch on and off different components (such as Airbags), it is possible to reset service intervals or change interior alarm sensor sensitivity. Other function is to adapt different comfort units (keys to immobilizer, remote control), in some cases it is possible to change different comfort functions (auto-locking during ride etc.)

The window is shown in figure 77, after entering the proper code click the **OK** button to save changes. Program will ask for confirmation (see figure 78). To return back to previous menu click on the **Return** button.

Figure 77

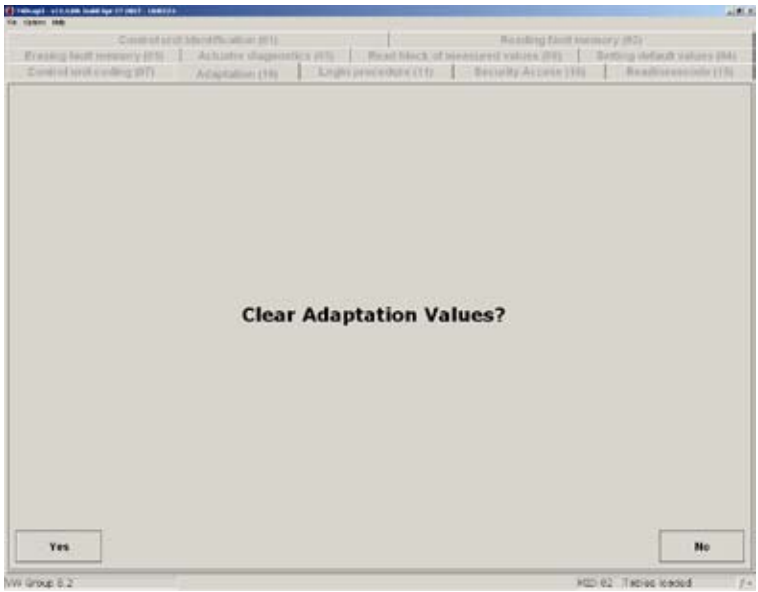


Figure 78

Procedura login

Some control units require entering a code (logging in) before changing its settings. This is called Login procedure and will be described now. See figure 79 for sample screen.

There are tasks in the ECU which cannot be performed when not logged in.

When the code is entered click on the **OK** button and the program will ask for confirmation (see figure 80) and if the code was entered properly then the unit unlocks itself. Press any key or click in the dialog to continue.

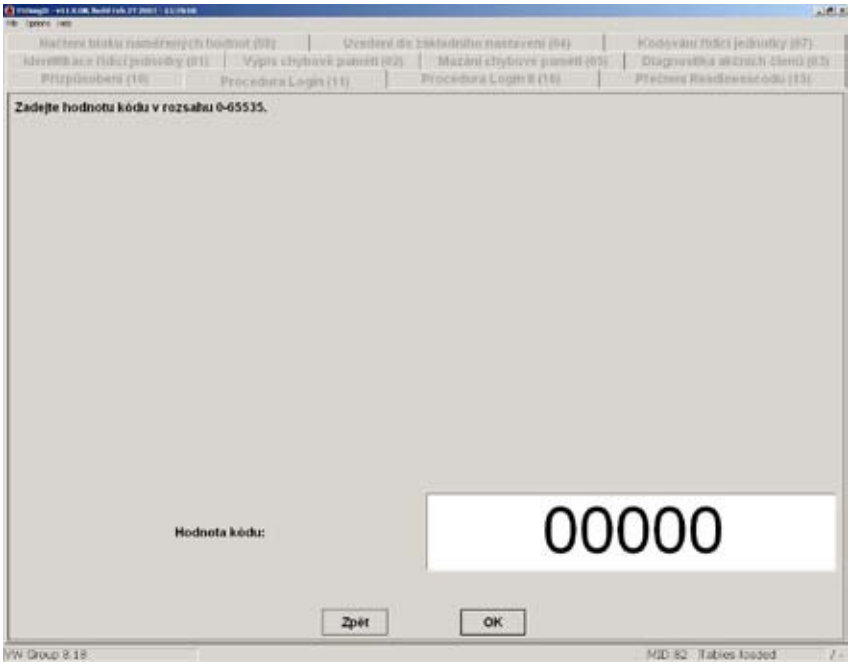


Figure 79

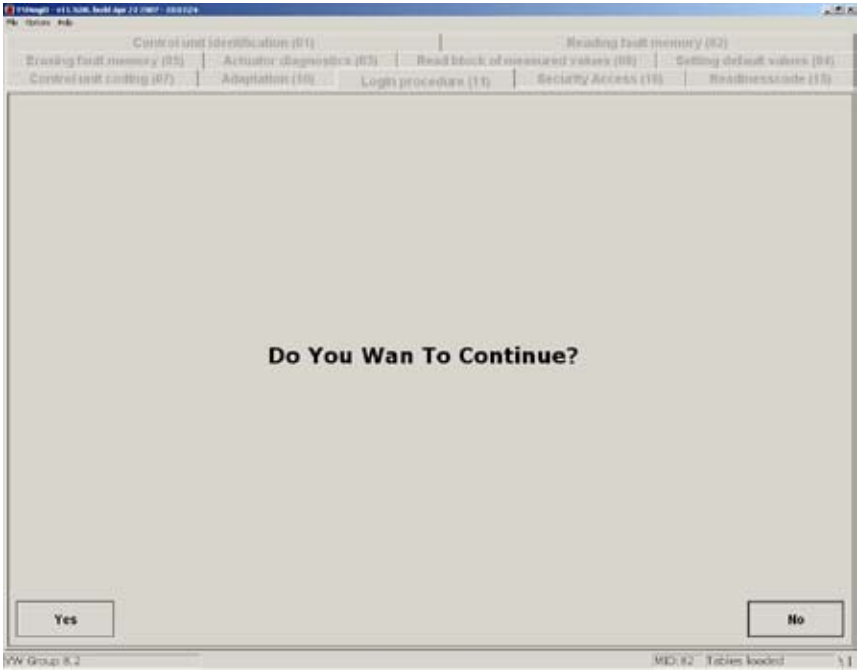


Figure 80

Read readiness code

Readiness code is used in automobiles manufactured after 1996 (supporting OBD-II) and is connected to oxygen sensor and catalyst functionality. Different bit meaning is explained in Appendix A.

Sample window is displayed in figure 81. The results can be printed on installed printer, to do this click on the **Print** button. To return to previous menu click on the **X** button.

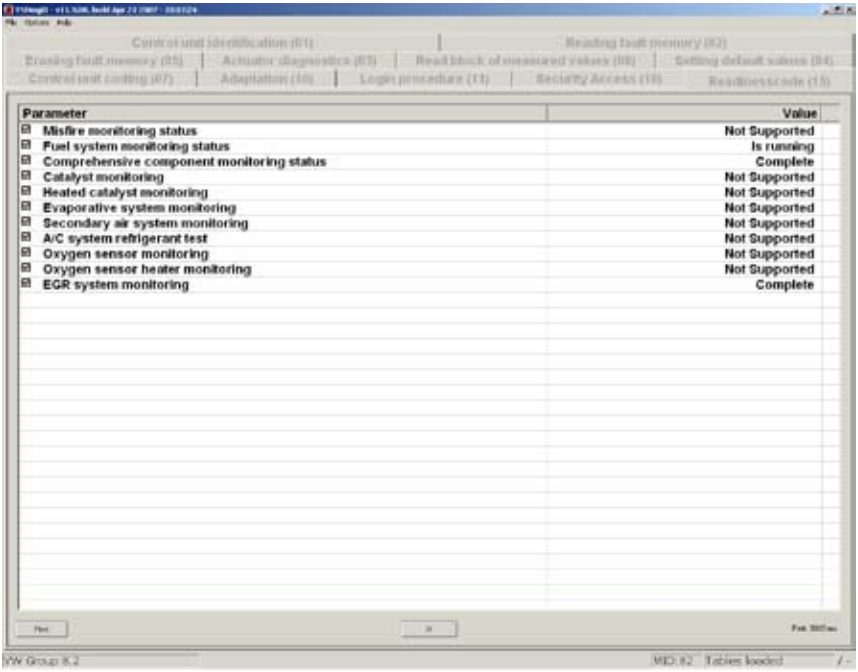

Control unit identification (01)
Reading fault memory (02)
Erasing fault memory (05)
Actuator diagnostics (03)
Read block of measured values (08)
Setting default values (04)
Control unit coding (07)
Adaptation (10)
Login procedure (11)
Security Access (16)
Readiness code (15)
Parameter
Value
Misfire monitoring status
Not Supported
Fuel system monitoring status
Is running
Comprehensive component monitoring status
Complete
Catalyst monitoring
Not Supported
Heated catalyst monitoring
Not Supported
Evaporative system monitoring
Not Supported
Secondary air system monitoring
Not Supported
A/C system refrigerant test
Not Supported
Oxygen sensor monitoring
Not Supported
Oxygen sensor heater monitoring
Not Supported
EGR system monitoring
Complete
Print
Help
VW Group K-2
MID: 82
Tables loaded

Figure 81

Font and language settings

To adjust fonts used to display data and to change language settings use the ***Settings*** menu. It is located in ***File*** -> ***Options*** menu. These settings are then used in whole diagnostic program. Sample of this window is displayed in figure 82.

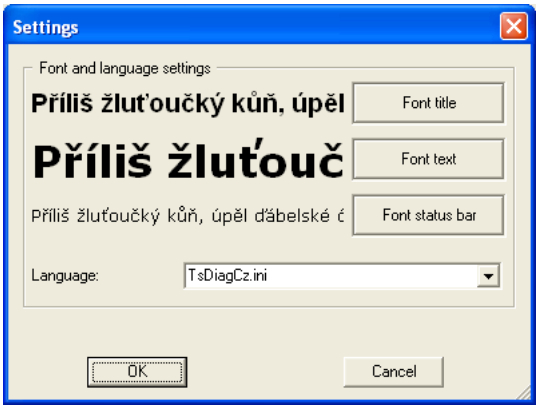


Figure 82

4

Oscilloscope

In technical praxis oscilloscope is proven tool to monitor electrical signals over time. On the contrary to classical ampermeter or voltmeter oscilloscope has huge advantages. It allows to display signal progression in time, this is done by displaying voltage on the vertical axis (Y) and time on horizontal axis (X). This mode is called X-T mode and is implemented in the TS*PRO* diagnostic tool. With its help we can evaluate signals and can discover its trend over time, measure its frequency, discover noise or DC offset...
Every displayed signal uses one channel, if TS*PRO* is connected to the computer it can be used as a four channel oscilloscope. Otherwise a two channel oscilloscope is a default mode.

Detailed description of oscilloscope principle cannot be included in this guide, it is however necessary to learn work with this tool because it is indispensable in praxis. This chapter is meant to learn you the basics of oscilloscope diagnostics, you will be introduced to both modes available and basic terms will be explained.

Oscilloscope

Oscilloscope TS*PRO*, introduction

To switch the device to Oscilloscope mode choose the ***Oscilloscope*** option in the ***Main menu*** (figure 1).

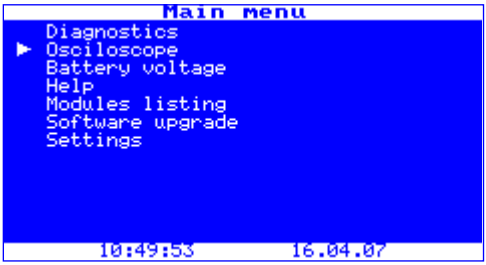


Figure 1

After the **OK** key is pressed an ***Oscilloscope*** menu will appear. There you have to choose between different oscilloscope modes - one and two channel oscilloscope as well as multimeter (see figure 2).

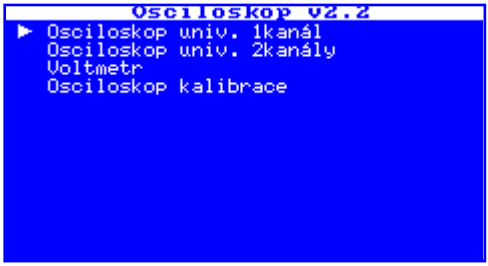


Figure 2

Depending on selected mode the control of oscilloscope slightly varies. These will be of course described later on in the guide.

After selecting the required mode an oscilloscope window will appear (see figure 3). If one channel mode is selected channel two data are of course not displayed. Let us now describe basic principles of controlling the oscilloscope.

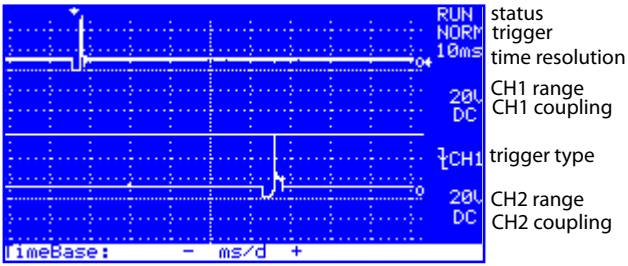


Figure 3

All labels which appear in the oscilloscope window are shown in figure 3, their function will be described later on.

Using oscilloscope

Basic controls are the same as in the diagnostics mode. They were already explained in chapter 1 and are summarized in table 1 below. Description of separate menus between which you switch by pressing the **F1** key will be together with oscilloscope basics content of this chapter.

Key	Function
OK/Confirm	Start or Stop oscilloscope
Up, Down	Sets triggering level
F1	Switching between menus
F2,F3,F4	Setting range, timebase and trigger type
Left, Right	Mode trigger on the screen

Table 1

Oscilloscope

Volts per square setting

Oscilloscope sensitivity and input range can be set by the ***Volts per square*** setting. Input voltage ranges for different settings are summarized in a table in Appendix 3. Screen sample outputs are in figures 4a (for single channel mode) and 4b (for 2-channel mode).

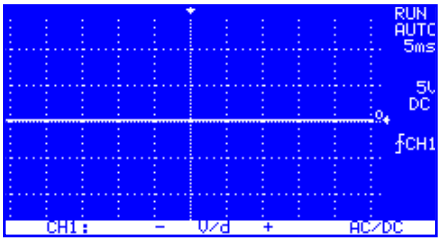


Figure 4a

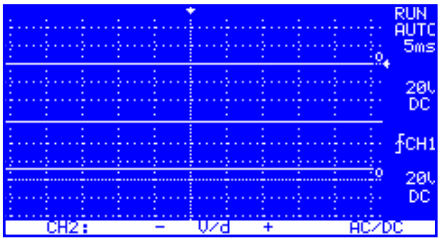


Figure 4b

To increase or decrease number of volts per unit press the **F3** resp. **F4** key. By changing input voltage resolution you can greatly improve readability of signals such as enabling to read amplitude for very low amplitude signals or on the other hand for signals with high amplitude (maximum is 100V per unit)

We must mention the fact that when 2-channel oscilloscope is selected you can adjust parameters for second channel as well. Also you can of course adjust settings for both channels (CH1 and CH2) separately.

AC/DC coupling

In this option you can set **coupling** for selected channel. You have two options between which you switch by pressing the **F4** key.

Electrical signals can be basically divided into two groups. Direct (DC) and alternating (AC), measuring correctly DC signals is a quite easy task. Measuring AC signals can, however, sometimes become tricky. Moreover all AC signals may also contain DC offset, which will appear as an average value shift (can be both positive or negative) in the voltage amplitude plot (see figure 5).

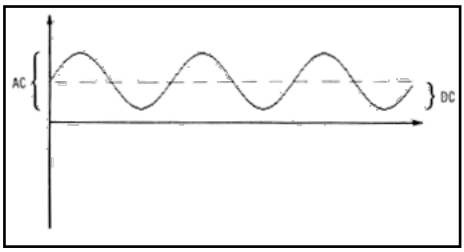


Figure 5

Let us now introduce coupling options of the **TS*PRO*** diagnostic device.

AC coupling: only AC signal will be displayed on oscilloscope screen, DC part, if exists, will be suppressed and filtered out (it will not appear on the screen).

DC coupling: when set to DC coupling oscilloscope will display both AC and DC part of the signal.

Let us show the differences once again on another picture. In figures 6a and 6b AC signal with DC part is displayed. In left image signal is displayed with coupling set to AC, in the right image coupling is set to DC. Chosen figures are very illustrative.

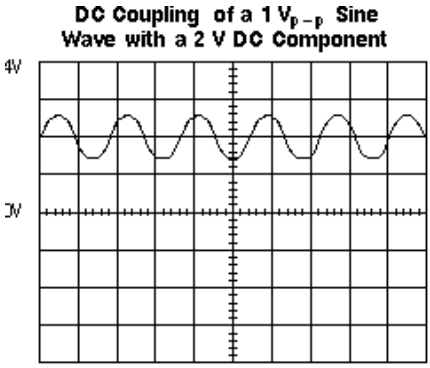


Figure 6a

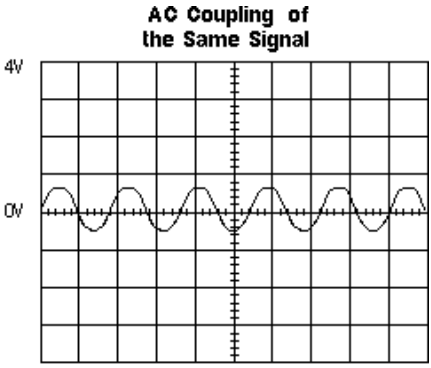


Figure 6b

Triggering

Trigger allows us to display periodical signal on the oscilloscope screen without flickering. Without trigger the display would look like image in figure 7. In praxis it is near impossible to redraw screen in full multiple of signal period and for that reason trigger is used.

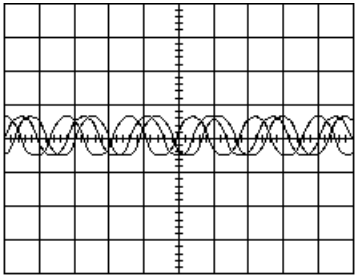


Figure 7

Oscilloscope TS*PRO* offers three triggering modes. Sample screenshots for one- and two-channel oscilloscope mode are shown in figures 8a and 8b. The modes and their use is explained further on.

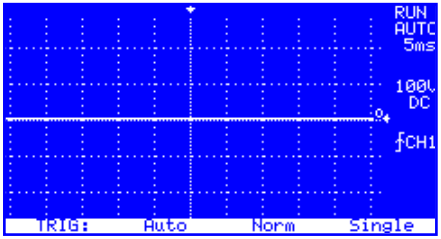


Figure 8a

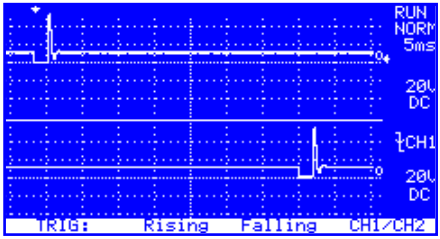


Figure 8b

Trigger **NORMAL**:
In this mode triggering is performed on rising or falling edge of the signal (depending on what you have selected), if no edge is detected than last signal sample is displayed. This mode can be confusing and if not set properly you can observe outmoded signal.

Trigger **AUTO**:
In this mode image on screen is refreshed even if no trigger is found; for this reason it is suitable if looking for signals with very small amplitude. It is also suitable when observing bigger number of signals since it is not necessary to change too many settings.

Trigger **SINGLE**:
In this mode data are acquired once and then displayed on the screen, the screen is refreshed whenever the **OK** key is pressed.

Even when NORMAL or AUTO trigger is set it possible to pause acquisition by pressing the **OK** key on the device. Acquisition is resumed by pressing of **F2**-**F4** keys.

If the **F1** key is pressed again you will get into the ***trigger*** menu. You can choose between rising edge or falling edge trigger. Selected mode is displayed on screen together with selected triggering mode (see figures 9a - single and 9b-dualchannel oscilloscope).

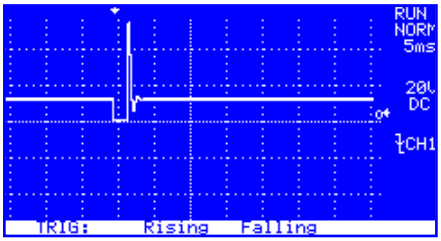


Figure 9a

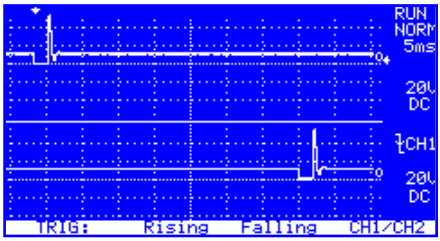


Figure 9b

TimeBase setting

With help of the ***TimeBase*** setting time base or time resolution in milliseconds per unit can be set. The range is 5 ms to 5 s and when the time base is set to 50 ms and more than trigger is no longer used. The influence of this setting on the output can be seen in figures 10a and 10b.

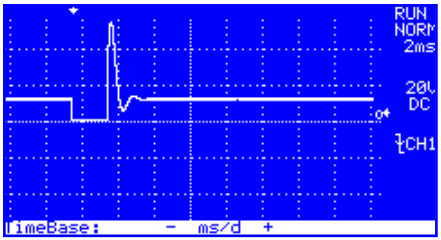


Figure 10a

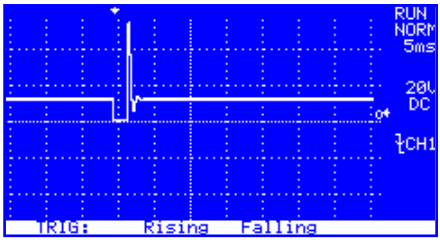


Figure 10b

To set time base use the **F2** and **F3** keys.

DisView - channel display

Using the ***DisView*** function you can set which of the channels will be displayed and which not. This means that in the two-channel mode one channel can be turned off to improve readability.

The ***U/I*** mode activated by pressing the **F4** key allows to display current on display using current clamps. (see figure 11 for example). System is calibrated for clamps provided by the manufacturer.

If you press the **F4** key multiple times, then ratio between displayed unit and measured current can be set. You have following options:
1V:10A
1V:100A
1V:1000A

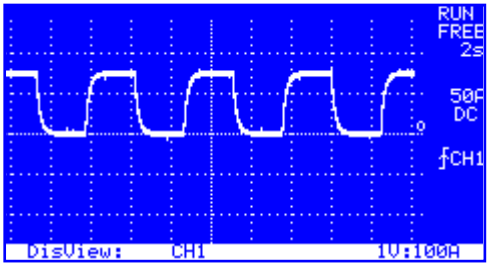


Figure 11

Cursor settings

The ***Cursor*** function is especially useful if you want to get difference between two instants. This is usually used when looking for signal frequency or when rise time needs to be found.

By pressing the **F4** key you can switch between the cursors, pressing keys **F2** and **F3** moves cursor left or right. Resulting time difference is displayed in milliseconds and corresponding frequency.

Oscilloscope

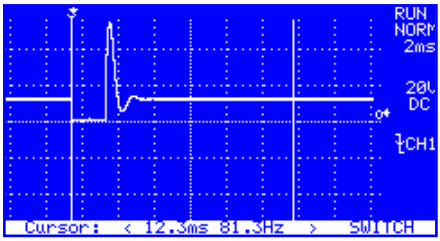


Figure 12a

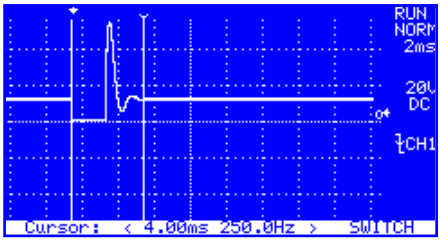


Figure 12b

A transient is displayed in figures 12a and 12b. By using oscilloscope and cursors it is very easy to find its duration time and diagnose the failure in electrical system.

Voltmeter

In the oscilloscope menu you can find the ***Voltmeter*** function - a handy function to measure voltages. This TS*PRO's* mode allows you to measure channel potential against ground for all channels and potential difference between channels. A sample screenshot is in figure 13; in left part there are channel voltages in the right part there are voltage differences between channels.

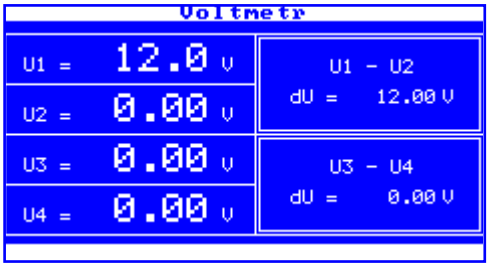


Figure 13

To return back to ***Main menu*** press the **Return** key.

TS*PRO* PC Center - Oscilloscope

For higher user comfort and additional functions you can use the Oscilloscope module in the TS*PRO* PC Center software.

The device if connected to PC can be used as a 4-channel oscilloscope. The number of channels is set when launching the TS*PRO* Scope software or when running by clicking in the Button bar in lower part of the oscilloscope window. We will demonstrate only one channel oscilloscope in the figures because the principle of the control is the same for all configurations.

The greatest advantage of TS*PRO* Scope over classical TS*PRO* Oscilloscope interface is its user friendliness. You are not limited by a few hardware keys, but instead high resolution of PC's screen is available to display measurements, you can save and print acquired data etc.

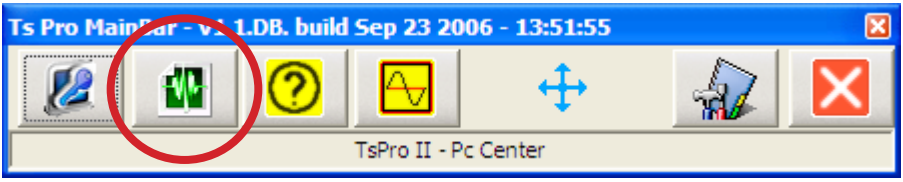


Figure 14

When you click on the TS*PRO* PC Center icon in the Programs menu or corresponding icon on your desktop TS*PRO* Main bar opens (figure 14). To run TS*PRO* Scope module click on emphasized icon.
When proper icon is clicked on a ***Scope settings*** window appears (see figure 15).

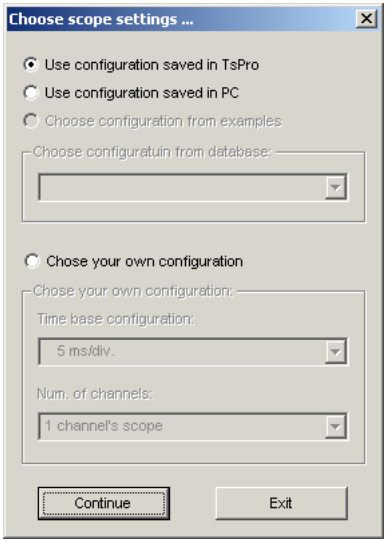


Figure 15

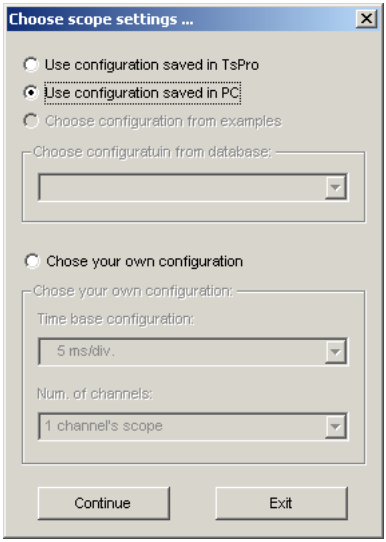


Figure 16

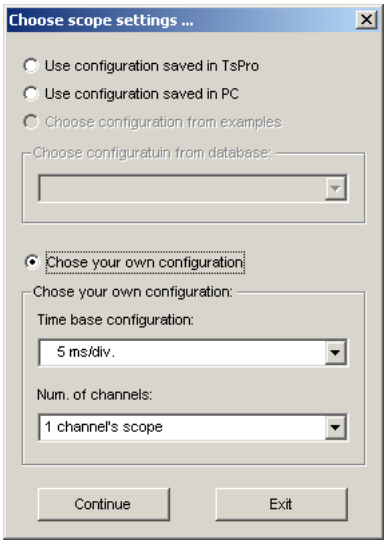


Figure 17

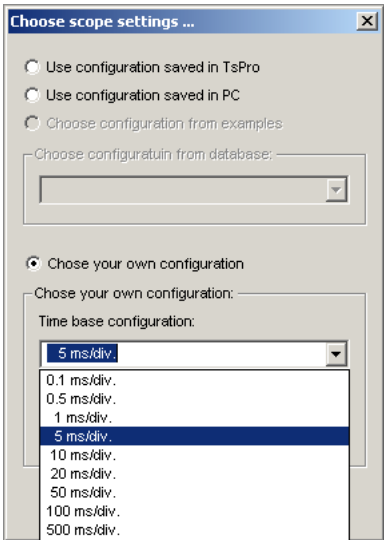


Figure 18

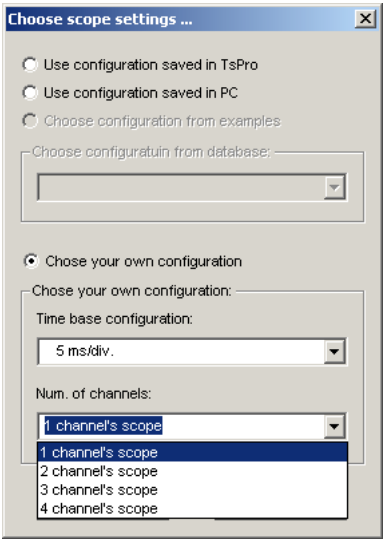


Figure 19

In the ***Scope settings*** window oscilloscope parameters can be set. You can of course adjust them later in proper menus in the TS*PRO* Scope program.

You have three possibilities of setting program parameters. First is to use settings stored in the TS*PRO* device. By selecting this option configuration from TS*PRO* will be copied into PC (see figure 15).

Second possibility is to use configuration used the last time TSPRO Scope was run. (viz. obrázek 16).

Last option is to manually set the parameters. (figure 17), you can adjust time resolution and number of channels used. Available parameters are displayed in figures 18 and 19.

If you click on the **Continue** button main Oscilloscope window will open.

Oscilloscope

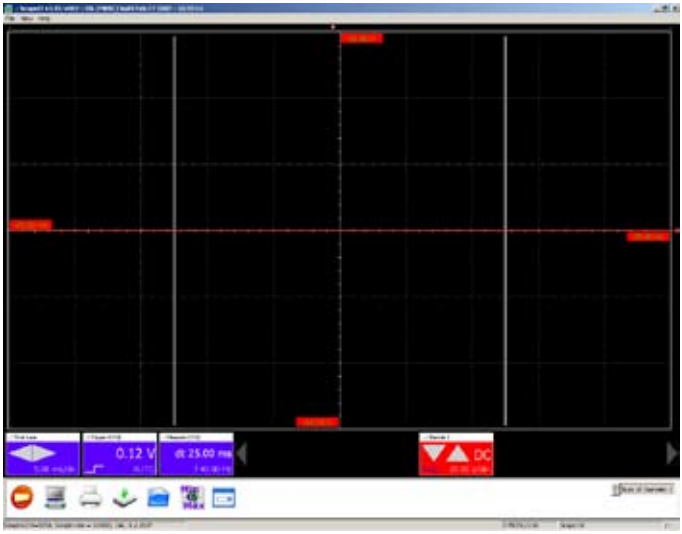


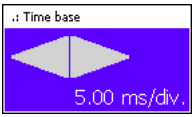
Figure 20

TS*PRO* Scope's main window is shown in figure 20; let us have a look at how the program should be controlled and how different parameters can be changed.

As already mentioned TS*PRO* Scope contains several additional functions compared to TS*PRO's* built in module. Probably the most useful one is ***Zoom***. It works on well known drag&frop principle - selected area is then magnified. This function can be used for both acquisition running and stopped.

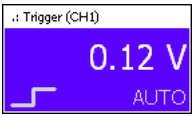
Main part of the window is represented by the oscilloscope screen, maximal and minimal values are printed out on the edges of the window.

Under the oscilloscope window icons which changes oscilloscope settings can be found.



Time base

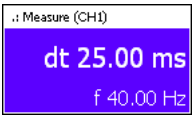
By clicking on the arrows left and right in the ***Time base*** area, the time resolution will be affected. Values in range from 200 µs to 5 s can be selected.



Trigger

By left clicking in the ***Trigger*** icon area you can define which triggering mode will be used. Throughout description of trigger and its modes can be found on pages 74-75 in this guide.

If you left-click on the trigger symbol in lower left part rising or falling edge is used to trigger. By clicking on the text AUTO/NORM/SINGLE you can choose between different modes. It must be explicitly said that not all modes are available for all time base settings.



Measure

In the TS*PRO* Scope software you can use cursors on time axis as well as in build-in oscilloscope in TS*PRO*. Cursors are moved by left-click and dragging the grey line to desired position. In the ***Measure*** area the time difference and corresponding frequency is displayed.

Channel

In the ***Channel*** area you can change settings for active channel. If you are working in multichannel mode you can switch between channels by clicking on the left/right arrows at the sides of the area. By clicking on arrows up/down voltage per square can be set. Coupling is set by clicking on the DC/AC/GND text in the area (see pages 72-73 for more details on coupling settings).

Oscilloscope

Start/Stop refresh

If you left-click on the Start/Stop icon oscilloscope refreshing will be started/paused.

Plot settings

If you choose to use oscilloscope as multichannel you can choose between two displaying modes. First one displays all channels in one window (they differ by color) and the second plots each signal into separate window. You can switch between these two modes by clicking on the ***Plot settings*** icon displayed above.

Print

You have possibility to print actual oscilloscope plot. After clicking on the Print icon a new window will appear (see figure 21 left). When all details are filled in the page is printed. Resulting document can be seen in figure 21 right. To be able to print you must have correctly set-up printer connected to your computer.

Save

Printing is not the only way of storing data, they can be saved and loaded to be evaluated later. Oscilloscope plots are saved by clicking on the ***Save*** icon. When clicked on a new window appears - then pathway must be set. File is saved afterwards to desired directory in your PC. The window is displayed on next page in figure 22.

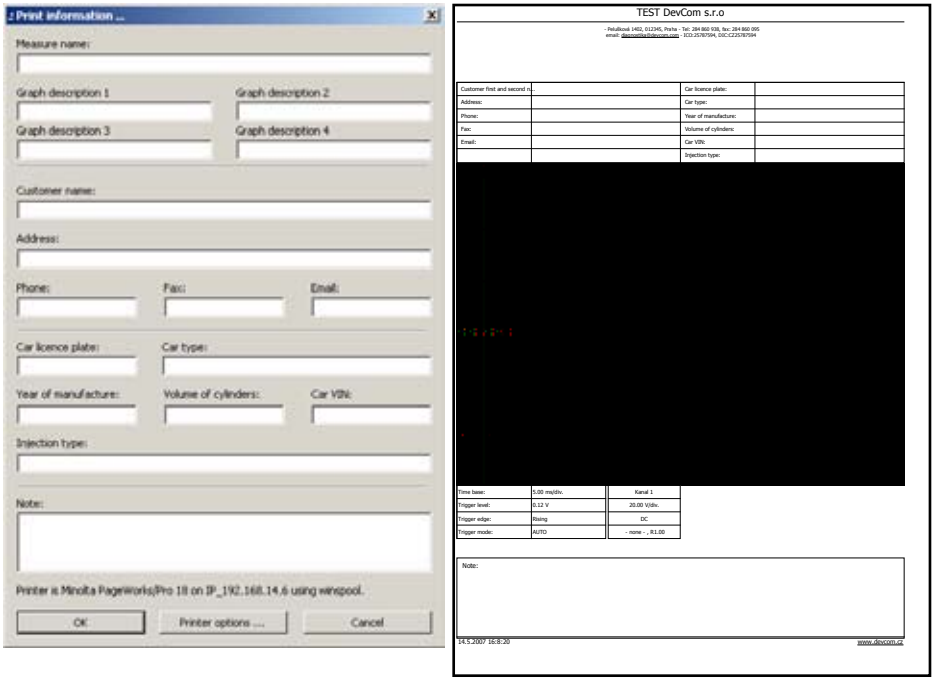


Figure 21

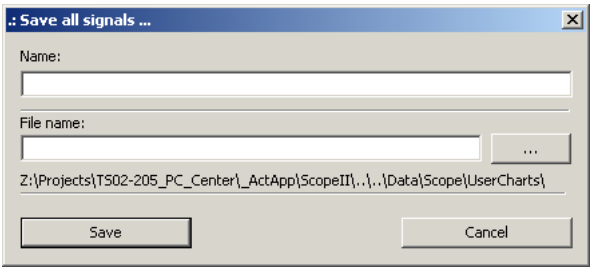


Figure 22

Oscilloscope

Load data

As was already mentioned data can be loaded from file and displayed in the program. File is loaded by clicking on the ***Load data*** icon. In newly opened dialog window you can choose desired filename and data will be displayed in the oscilloscope window.

Data plot settings

There are several display modes available in the TS*PRO* Scope program. You can switch between them by clicking on the Data plot settings icon. Let us shortly introduce available modes:

MIN: minimum values displayed, maximums filtered
MAX: maximal values displayed, minimums filtered
MIN-MAX: signal displayed in full range
AVG: averaged signal displayed, good to filter out high frequency noise

Load sample data

Program install contains sample data; to load them click on the ***Load sample data*** icon. In newly opened dialog window choose which signal you wan to display and confirm by clicking on the **OK** button. You can choose to load display settings or signal plot or both. The dialog window can be found in figure 23.

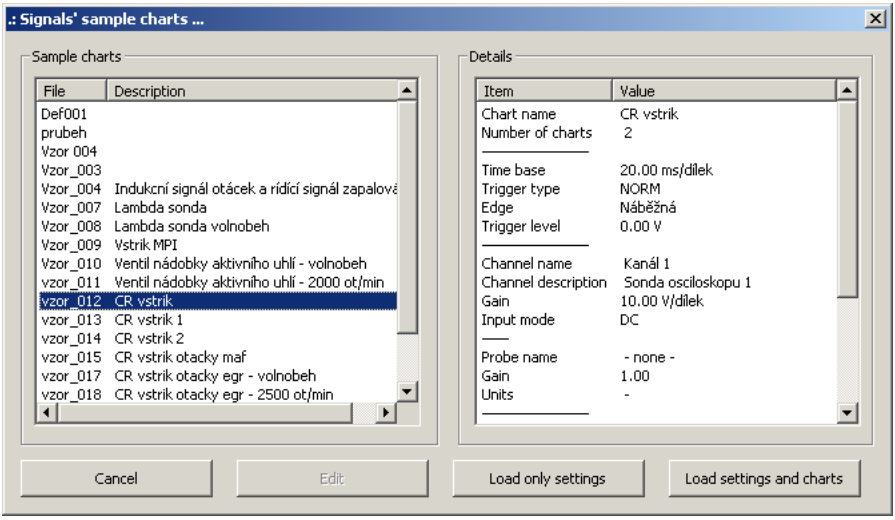


Figure 23

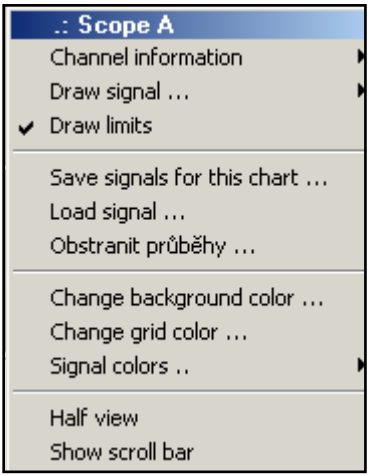


Figure 24

Oscilloscope

Display settings menu

To change other display settings click in the oscilloscope window and click the right mouse button. New menu will appear where several displaying option can be set (see figure 24) We will now briefly summarize menu entries:

Channel info:
Displays channel settings, this will be described later on.

Draw plot:
Turn plot drawing on and off.

Show limits:
Plots limits on axis, can be set to on or off.

Save measured data:
Saves measured data (see save data).

Load data:
Loads measured data (see load data).

Remove plot:
Removes selected signal from the plot.

Change background/grid color:
Opens color dialog where colors can be selected.

Signal colors:
Allows to set colors for signal plots.

Half display:
Switching between main and/or minor grid in oscilloscope wind.

Show/Hide scrollbar:
Displays or hides scrollbar. Scrollbar can be useful in Zoom mode.

Figure 25

Channel options menu is displayed in figure 25, with its help you can adjust following parameters:

Change channel coupling
Coupling can be changed in the ***Input mode***, you can choose between AC/DC and GND coupling:

AC coupling: only AC component of the signal will be displayed in the plot, DC component (if exists) will be filtered out.

DC coupling: in this setting oscilloscope will display both AC and DC component of the signal

GND coupl.: in this mode oscilloscope blocks input signal, mode is used to set channel zero

Resolution
Voltage resolution can be changed by clicking on the arrows.

Channel offset
With help of ***Channel offset*** you can set desired offset to input signal and display it in the plot.

Channel color
Sets the color of signal in the oscilloscope window.

Probe

After the probe is connected it is always necessary to set it up properly. This is done in the **Probe** area. Manufacturer will support you with values necessary to set up bought probe (or current clamps).

To load probe data file press the **Load probe** button. A dialog window will appear where you will select the probe initialization file. To unload the probe simply click on the **Unload probe** button. How to create new probe initialization file can be found in Appendix D.

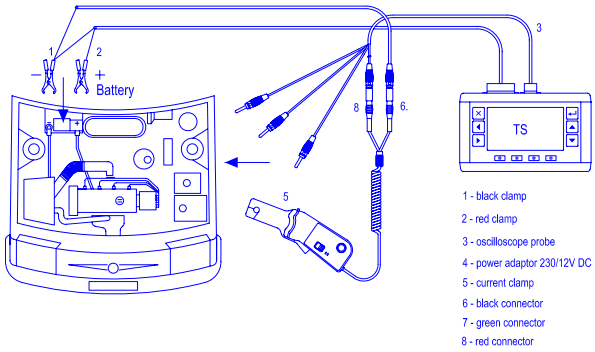
To save values click on the **Save** button in menu ***File***.

We strongly recommend to first turn off the TS*PRO* Scope program and then disconnect the the TS*PRO* device from the network interface.

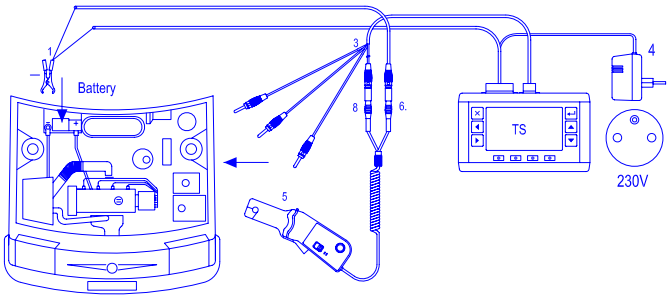
How to connect the TS*PRO*

In the last part of the chapter we will show different way of connecting the TS*PRO* device to diagnosed automobile. On following figures all possibilities are displayed.

Battery-powered + current clamp

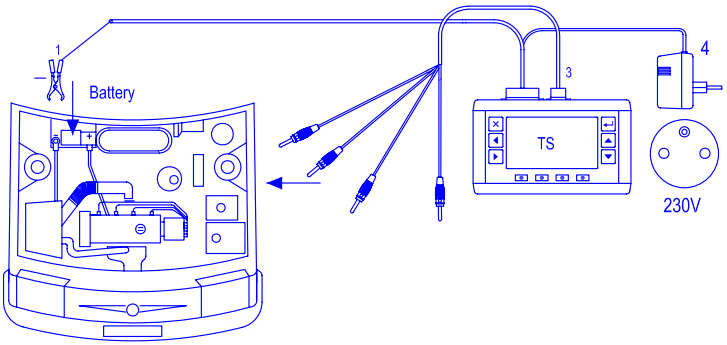


Mains-powered + current clamp

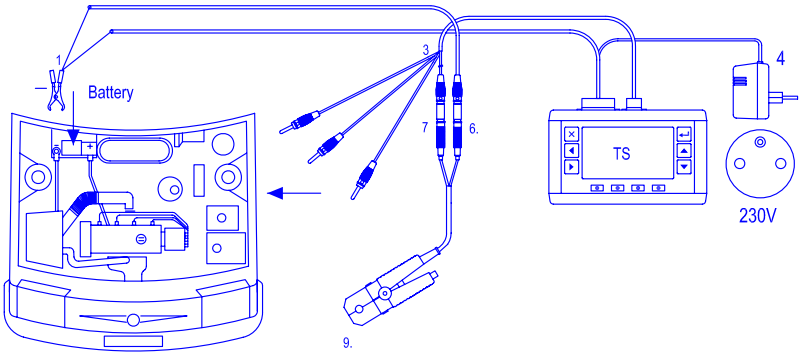


Oscilloscope

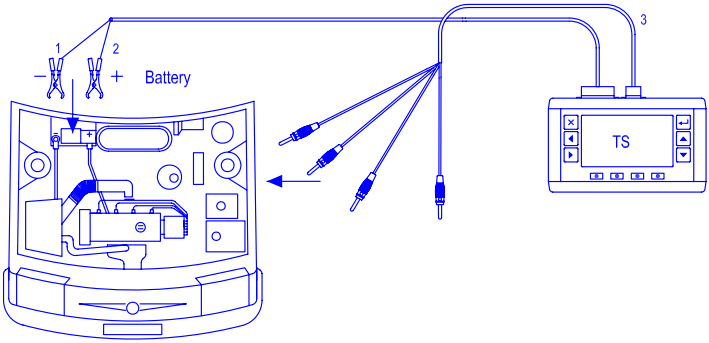
Mains-powered + oscilloscope



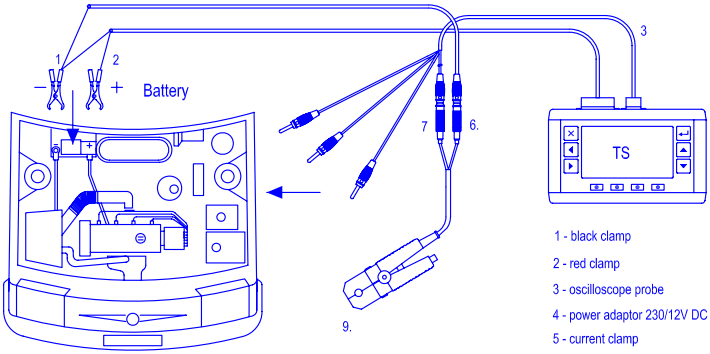
Mains-powered + high voltage clamp



Battery-powered + oscilloscope



Battery-powered + high voltage clamp



1 - black clamp
2 - red clamp
3 - oscilloscope probe
4 - power adaptor 230/12V DC
5 - current clamp
6 - black connector
7 - green connector
8 - red connector
9. - high voltage clamp

Oscilloscope

A

Appendix

Introduction to OBD-II and E-OBD

In order to effectively use the TS*PRO* diagnostic tool it is necessary to understand at least basics of OBD diagnostic systems. In this appendix you will be introduced to the electronic control unit (ECU) diagnostics.

Introduction to probematics

EOBD/OBDII diagnostic is a unified car diagnostic system. It mainly focuses on engine emissions. Since there is a lot of resources available both on the Internet and in the printed literature only basics will be mentioned in this guide.

The possibility to use universal diagnostic device to diagnose EOBD equipped car is a great advantage. This means that only one device can be used to diagnose all EOBD/OBDII compliant vehicles no matter which company manufactured the vehicle. This fact is of great importance especially for smaller repair shops which work with cars of different brands.

Every diagnostic device must be able to communicate in two diagnostic modes: ISO and SAE. The ISO standard is used by European manufacturers, while American and Asian manufacturers prefer SAE norm. Moreover all diagnostic devices must be able to detect appropriate transmission mode on all vehicles.

Four different transmission protocols are used to communicate on the buses. The majority of European car manufacturers prefer ISO 1947-2 communication protocol, some use 14230-KWP2000 protocol. American manufacturers use SAE J 1850 protocol. A transition to CAN protocol is currently in progress.

Since 1995 the OBD-II diagnostics is mandatory in the USA for gasoline engines and since 1996 it is mandatory for diesel engines as well; in the EU EOBD is defined by EU 98/69/ES directive.

ECU must check single systems, frequency of these checks depends on the system important and the systems are divided into two groups: *Continuously* and *Non-continuously* monitored systems.

Continuously monitored systems

- Ignition misfire check
- Emission relevant electrical check
- Fuel system

Non-continuously monitored systems

Because checks on some systems can be performed only under special conditions, they are controlled only occasionally.

- Secondary air system
- Catalyst
- Oxygen sensor and its heating
- Fuel tank bleeding and a seal tests

Readiness code

One of the ECU functions is to present Readiness code. It is an indication that certain emission control components of your car have been self-tested

It contains two pieces of information (see table 1). First value tells which systems are checked or tested by ECU while the second value specifies which tests were successfully completed.

Readiness codes however doesn't say anything about the results. To get result of performed tests one must decode the code from the list of **Error codes**. For complete system diagnostics it is unfortunately necessary to acquire all Readiness Codes which requires quite sophisticated test ride.

Bit number	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11	12
Test supported	0	1	0	0	1	0	1	0	1	1	0	0
Test not performed	0	0	0	0	0	0	0	0	0	1	0	0
	Ignition misfiring	Fuel system	General check	N/A	Catalyst	Catalyst heating	Evaporation system	Secondary air system	Cooling system	Oxygen sensors	Oxygen sens. heating	Exhaust recirculation

Table 1

Test modes

Independently on used protocol, data must be saved in nine specified test modes, modes one to nine are used to check and measure vehicle emission and they can be also used for diagnostic purposes as well.

On-board test results - mode 1

In this mode there are various information about system condition, measured values of analog and digital inputs and outputs, values computed by ECU, number of failures stored in ECU memory etc. Values relevant to engine emission measurements as well as Readiness codes are presented.

Running conditions - mode 2

This mode retrieves certain data that was saved at the time the vehicle set a diagnostic trouble code (DTC). If other failure occurs with higher priority, running conditions will be overwritten with newer ones. Failures related to fuel mixture regulation and ignition misfiring are considered to be of highest priority. Up to six running conditions parameters are stored with one error code.

Powertrain DTC - mode 3

Error memory is usually divided into two parts. If the failure occurs for the first time it is saved in the *Pending error memory*, it is not saved into *Confirmed error memory* until it is verified and identified.
After confirmation the MIL error indicator on automobiles dashboard starts to shine.

The use of two memories helps to prevent excessive MIL indicator operation.
If the diagnosed failure doesn't appear in three following driving cycles , MIL is turned off. After another forty engine start-ups the failure is deleted from the memory.

The principle of decoding is shown in table 2. The TS*PRO* diagnostic device automatically performs decoding of each code to significantly reduce time needed to perform diagnostics.

P	0	1	2 3
System	Standard	Localization	Type
P Powertrain B Body C Chassis U Undefined	0- error codes according to norm (OBD-codes, required from all manufacturers.) Other codes are chosen by manufacturers.	0 – general 1 – mixture preparation /secondary air system 2 – fuel system 3 - ignition 4 – additional sys. /emission regulation 5 – speed and idle regulation system 6 - input/output signals, ECU 7 - gearbox	Component identification (01 - 99 = system parts), specified failure causing failure or affecting component function signal error etc.

Table 2

Clear diagnostic trouble codes (DTC) - mode 4

Mode 4 clears memory of all systems. In other words it clears powetrain DTC memory (mode 3), running conditions memory (mode 2), oxygen sensor test results memory (mode 5) as well as confirmation of test performed on non-continuously tested systems.

Oxygen sensors test reports - mode 5

Results of tests of oxygen sensors are reported in mode 5. (values are often obtained from tests in mode 1). Reports are sorted according to test IDs, ie. treshold voltage lean-rich mixture etc. Mode 5 can be used during emission tests when not all readiness codes are known.

In figure 1 one can see oxygen sensor photo. In the following figure 2 the values of voltages on oxygen sensors during measurement are displayed.

Figure 1

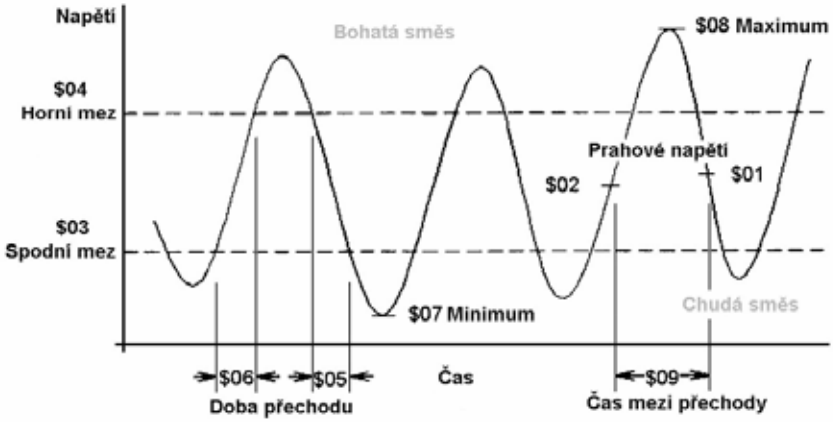


Figure 2

On board test results - mode 6

This mode is not defined by norm and is specified by each manufacturer independently. Moreover it is not supported by all ECUs. It is usually used to report measured and demanded values for non-continuously monitored systems.

Erratic errors - mode 7

To load pending errors memory mode 7 is used. ECU must in following driving cycle confirm their status and if appropriate move them to confirmed error memory. Although this mode is not used to diagnose emissions their results are of importance during diagnostics. The codes are similar to mode 3.

Components test - mode 8

This mode is specified by each manufacturer, it is meant to be used for special tests such as driving actuators tests etc. It is not widely spread.

ECU information - mode 9

This mode is also specified by each manufacturer. It contains VIN (vehicle identification number), CIN (Calibration identification number) a nd CVN (calibration vehicle number) codes.

OBD socket

Position of the EOBD, OBD-II diagnostic socket, its shape and pinouts must adhere to norm. The diagnostic socket must be located on the drivers side of the dashboard and must be reachable from drivers seat, while recommended location is between steering column and cars center line.

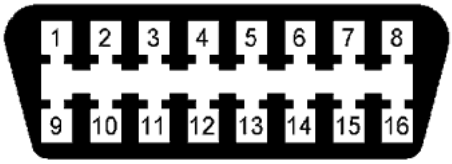


Figure 3

Introduction to OBD-II a E-OBD

Unified diagnostic socket (often referred to as a CARB connector) has 16 pins; its schematics is displayed in figure 3 and pinouts are summarized in table 3.

Pins listed in the table has exact function and must be implemented according to the norm. Other pins (ie. 1,3,8,9,11,12,13) can be used for other purposes and manufacturers assign them different diagnostic functions.

Pin	**Used for**
7 a 15	data transmission according to ISO 9141-2 nebo ISO 14230 (KWP2000) norms
2 a 10	data transmission according to SAE J 1850 norm
4	vehicle ground
5	signal ground
6 a 14	CAN (ISO 15031-3) bus
16	battery +

Table 3

B

Appendix
Technical specification

This part of user guide focuses on technical specification of the TS*PRO* diagnostic tool. Built-in oscilloscope parameters are described as well.

Minimum requirements for supplied hardware and software is mentioned further on.

Technical specification

Technical parameters of the TS*PRO* device are summarized in table 1.

Operating temp.	5 - 40°C
Storage temp.	-10 - 50°C
Connectors	canon 25 pins to connect on CAN bus
	canon 9 pins to connect oscilloscope probes
	RJ45 To connect with PCs
Dimensions	194x115x46mm (LxWxH)
Safety	IP44
Weight	600g
Supply	10-48 V DC
Power drain	8W

Table 1

Table 2 summarizes technical details of integrated oscilloscope. To use oscilloscope you must use oscilloscope probes, these are part of the delivery.

Appendix B

Number of channels	2/4
Input impedance	1MΩ
Sampling frequency	1MHz
Voltage range	500 mV/unit; -1,5V~1,5V
	1,0 V/unit; -3V~3V
	2,5 V/unit; -7,5V~7,5V
	5,0 V/unit; -15V~15V
	10 V/unit; -30V~30V
	20 V/unit; -60V~60V
	50 V/unit; -150V~150V
	100 V/unit; -300V~300V
Grid	6x10 units
Triggering	auto/norm/single

Table 2

It is possible to use both AC and DC coupling for all ranges.

Technical specification

The TS*PRO* diagnostic device supports communication with PCs. To be able to use this option your PC must fulfill following minimum requirements:

- CPU at least Pentium III 600MHz or equivalent
- at least 512MB of operating memory
- CD-ROM drive
- hard drive with at least 100 MB of free space
- network card with RJ 45 connector
- Windows 98, ME, 2000, XP operation system

There are no special demands on the VGA adapter. It can be said that software supplied with TS*PRO* diagnostic tool will work on all current PCs; we hovewer strongly recommend to use the supplied software on MS Windows 2000 or MS Windows XP operating systems.

To view or print user guide and other documentation it is necessary to have Adobe Reader installer on your PC. This program can be found on the installation CD or can be downloaded from Adobe web page at www.adobe.com.

C

Appendix

Configuring IP address in MS Windows

This appendix explains how to setup correctly IP address in MS Windows operating systems. This setting needs to be changes before the TS*PRO* diagnostic tool is connected to you computer. Computer requirements are listed in previous appendix; how to change IP address in the TS*PRO* device can be found in chapter 2. First we will describe configuring IP address in Windows XP and then in Windows 98/9x and Windows 2000.

Configuring IP address in MS Windows

To be able to use the TS*PRO* PC Center software it is necessary to connect your TS*PRO* device with your PC and correctly setup IP address.

We will show the procedure for currently most widely spread operating system - MS Windows XP, for other versions the procedure is similar and will be only summarized in text. Please note that based on you Local settings and installed programs the procedure may slightly vary.

First connect your PC with the TS*PRO* device. Connection is done via LAN interface with UTP cable connection. UTP cable socket is displyed in figure 1. Information about setup of the TS*PRO* device can be fou nd in chapter 2.

Figure 1

Configuring IP address in Windows XP

To configure IP address manually in Windows follow these steps:

In the ***Start*** menu on taskbar select the ***Settings*** option and click on ***Network connections***. If you select ***Local area connection*** you will get directly to its properties The procedure is displayed in figure 2a.

In the ***Start*** menu on taskbar select the ***Connect to*** option and click on the ***Show all connections*** option. The procedure is displayed in figure 2b.

Figure 2a

Figure 2b

Configuring IP address in MS Windows

In the ***Network connections*** window right-click on the ***Local area connection*** and select the ***Properties*** option - see figure 3.

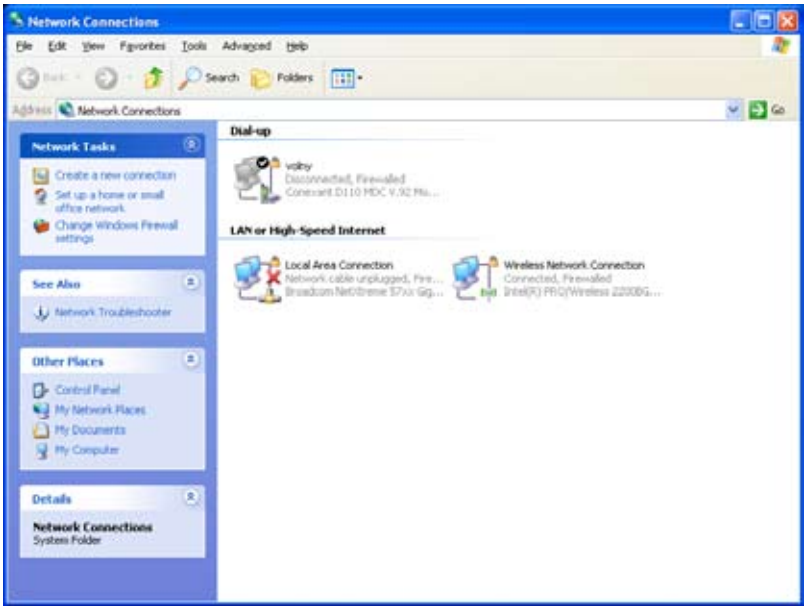


Figure 3

In newly opened window ***Local area connection properties*** select the ***General*** bookmark. Select the ***Internet protocol (TCP/IP)*** option and click on the **Properties** button. The procedure is well documented in figures 4 and 5.

Select the ***Use the following IP address*** option and enter the IP address from the same range as is set in the TS*PRO* device. For example for recommended IP address in TS*PRO* 192.168.13.1 enter IP address for your PC 192.168.13.2. IP addresses cannot be the same, otherwise conflict will appear. The ***Submask*** text field is filled in automatically when clicked into.

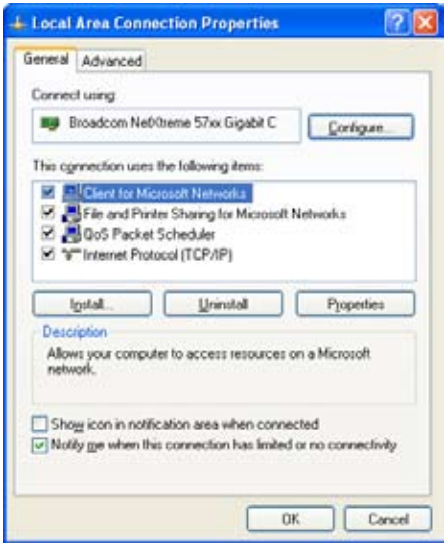


Figure 4

Figure 5

Configuring IP address in MS Windows

Configuring Windows 95 or Windows 98

To configure IP address in Windows 95/98 follow these steps:

From the ***Start*** menu select the ***Settings*** option and click on the ***Control panels*** option. Procedure is displayed in figure 6.

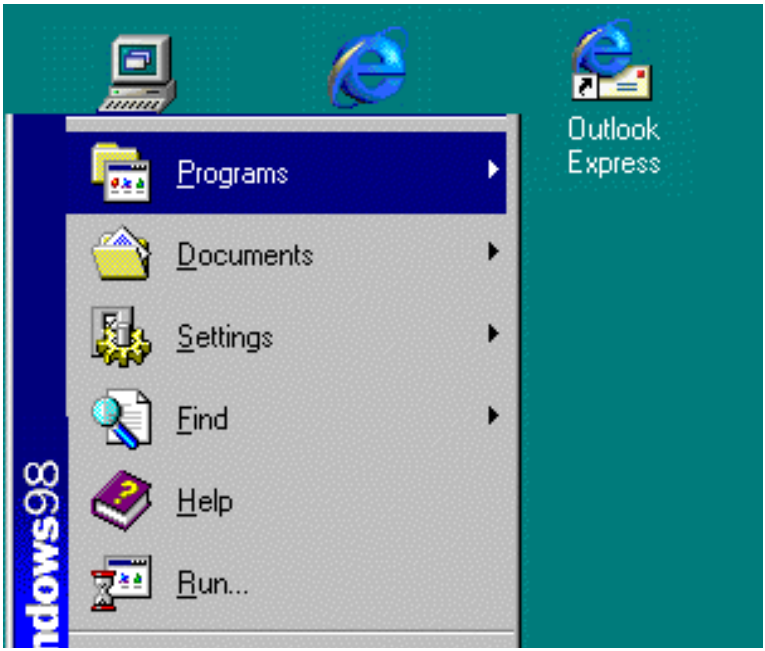


Figure 6

In the ***Control panels*** double-click on the ***Network*** icon. See figure 7 for more detail.

After clicking on the ***Network*** icon new window with network options named ***Network*** will open. This window is shown in figure 8.

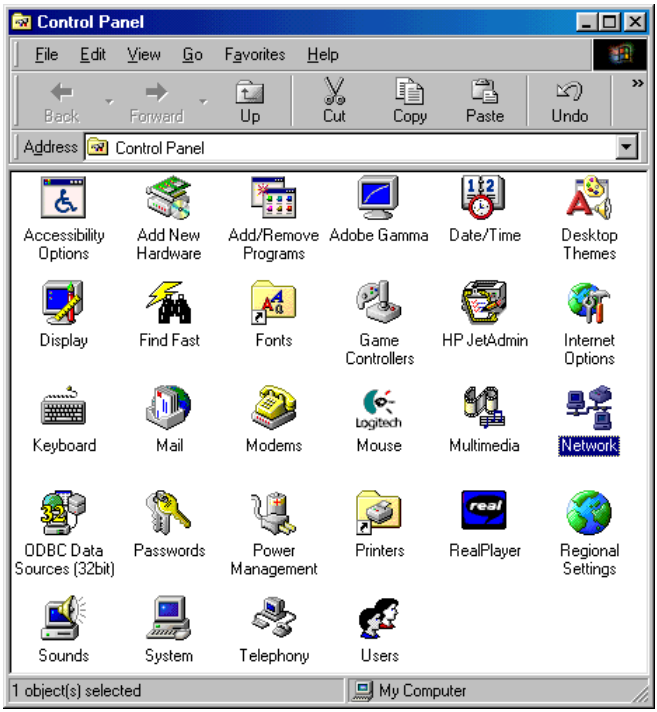


Figure 7

Select network component named ***TCP/IP*** and then click on the Properties button (see figure 8). If the TCP/IP protocol is displayed multiple times select the option corresponding to your LAN adapter. In the ***TCP/IP properties*** window click on the ***IP address*** bookmark (see figure 9).

Configuring IP address in MS Windows

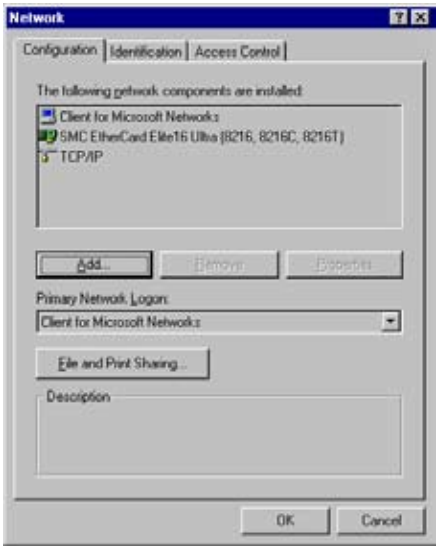


Figure 8

Figure 9

Select the ***Specify an IP address*** option enter the IP address from the same range as is set in the TS*PRO* device. For example for recommended IP address in TS*PRO* 192.168.13.1 enter IP address for your PC 192.168.13.2. IP addresses cannot be the same, otherwise conflict will appear. As ***Submask*** enter 255.255.255.0.

You will be asked to restart Windows, close other running programs and click the **Yes** button.

When computer restart you are ready to connect TS*PRO* and start using it.

Congratulations!

Now you can start using your TS*PRO* diagnostic tool and fully unleash its power.

Configuring IP address in MS Windows

Configuring Windows 2000

- In the ***Control panels*** double-click the ***Network and Dial-up connections***.
- In the ***Network and Dial-up connections*** window right click on the ***Local area connection*** icon and select ***Properties*.**
- In the ***Local area connections properties*** dialog window select the ***Internet protocol (TCP/IP)*** option and select ***Properties***.
- In the ***Internet protocol (TCP/IP) properties*** dialog window click in the IP address text field and enter requested IP address.
- Confirm by clicking on the **Apply** button and quit by clicking on the **OK** button.

Configuring Windows ME

- In the ***Control panels*** double-click the ***Network and Dial-up connections***.
- In the ***Network and Dial-up connections*** window right click on the ***Local area connection*** icon and select ***Properties*.**
- In the ***Properties*** dialog window click in the IP address text field and enter requested IP address.
- Confirm by clicking on the **OK** button and close Control panels; you may be asked to restart your computer.

D

Appendix

TS*PRO* PC Center Installation

This chapter contains information about the TS*PRO* PC Center software installation and setup in MS Windows operating system. Different modes description can be found elsewhere in the guide.

TS*PRO* PC Center installation

When the installation CD is inserted into your CD/DVD drive of your computer an installation program will start automatically. If it doesn't then probably your autorun function is turned off and you have to start setup manually. This is done by double-clicking on the ***My Computer*** icon on Desktop. Then select the CD/DVD drive and run the **PcCenterSetup.exe** file.

We will now take you through the installation process and we will also explain basic program settings.

TS*PRO* PC Center Installation

When the install program is run first a language selection dialog will appear (see figure 1). Select desired language and click on the **OK** button. In this guide only English version will be described, there is fully translated Czech version of the user manual available as well.

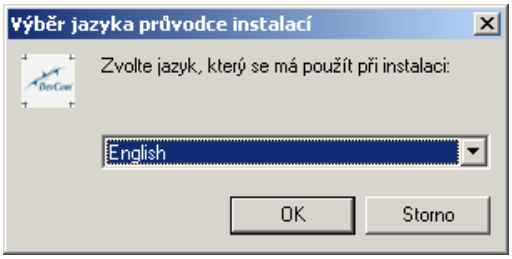


Figure 1

After selecting the language you will be greeted and the installation process can begin (see figure 2). To continue click on the **Next** button.

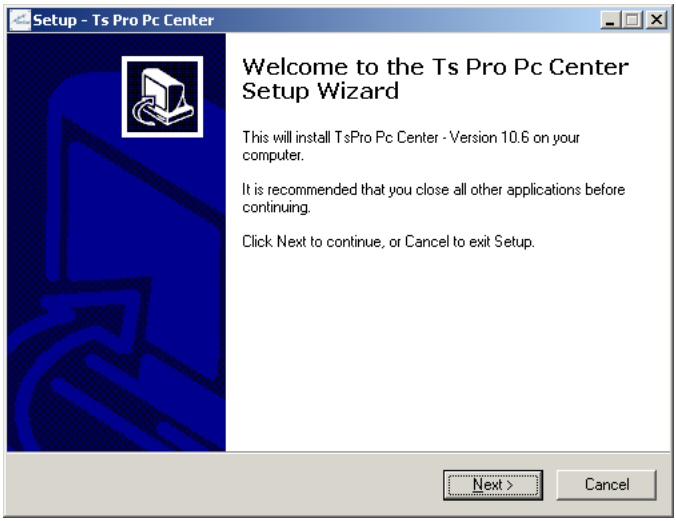


Figure 2

In the following window licence agreement is displayed. Read this agreement, since it contains information regarding licence ownership and software usage. To continue check the ***I accept the agreement*** line and click on the **Next** button. See the window in figure 3.

In figure 4 information about software and installation are displayed, you can find manufacturer address and minimal requirements to run the program. These are also summarized in Appendix B of this guide. After clicking the **Next** button new window will appear; select target directory and click **Continue**. We strongly recommend using default filepath.

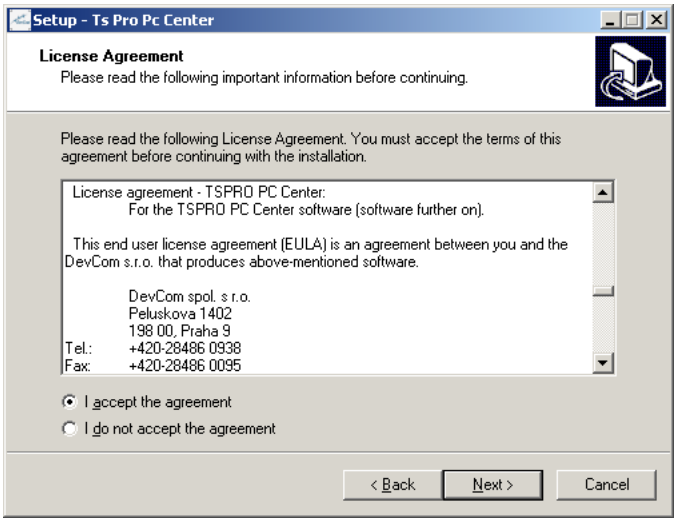


Figure 3

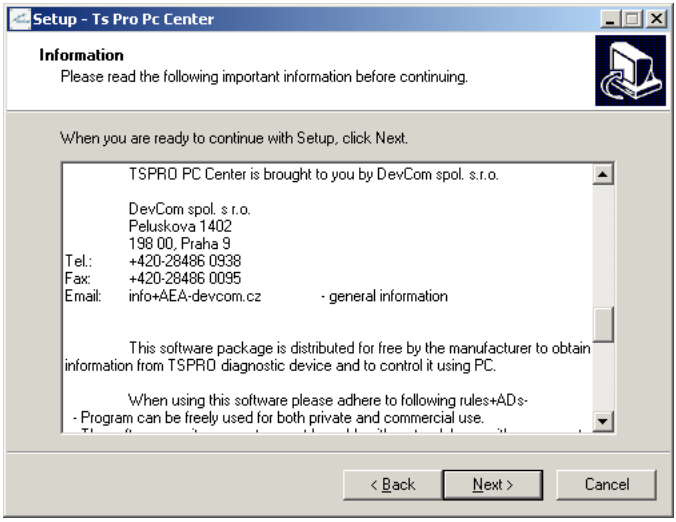


Figure 4

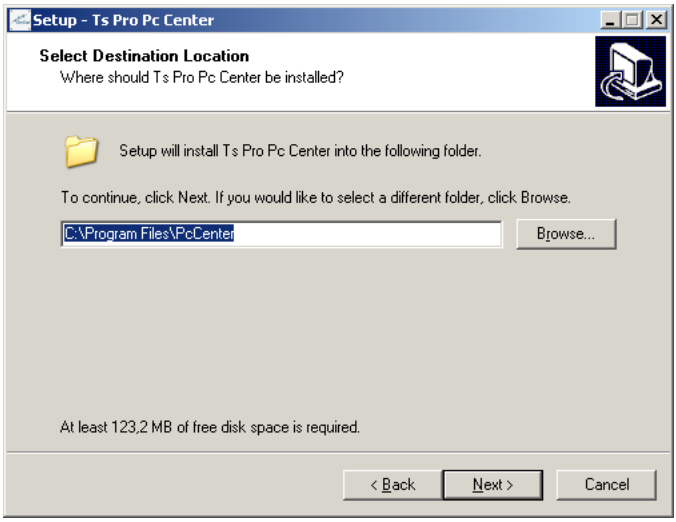


Figure 5

In window displayed in figure 6 enter the folder name in Start menu or choose different pathway. Default pathway is ***Programs*** folder in the Start menu. To continue click on the **Next** button.

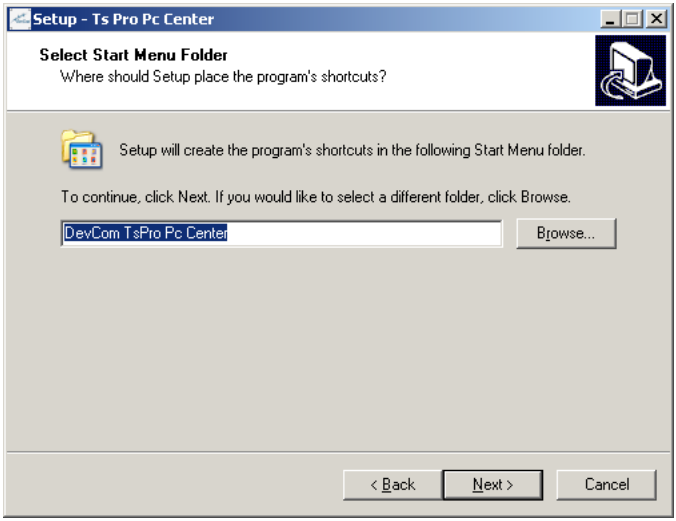


Figure 6

In following window (shown in figure 7) you have an option to place shortcut to TS*PRO* PC Center to Desktop and ***Quick Launch*** bar. The Quick Launch bar is disabled by default in Windows XP but can be turned on. This is done by right clicking on the ***Taskbar*** and in the menupanelu Toolbars check the ***Quick Launch*** bar. To continue click on the Next button.

Window displayed in figure 8 summarizes installation settings, installation will start by clicking on the **Install** button.

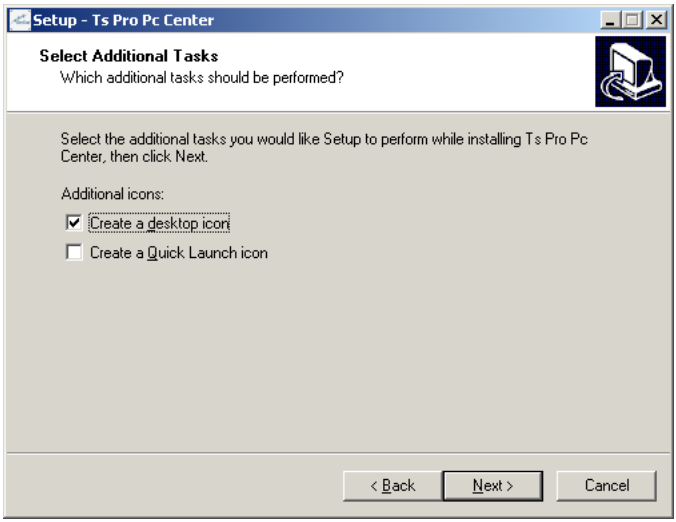
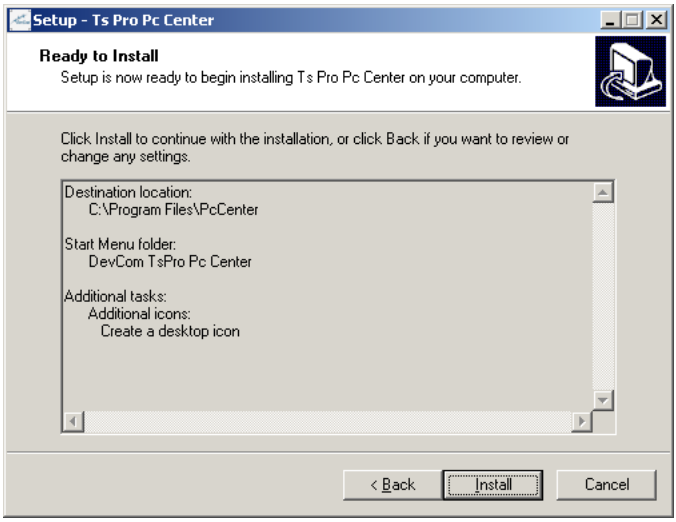


Figure 7

Install summary will be presented after copying the files is complete. This window is shown in figure 9. It also reminds to perform particular settings before running the program. Continue by clicking on the **Next** button.



Obrázek 8

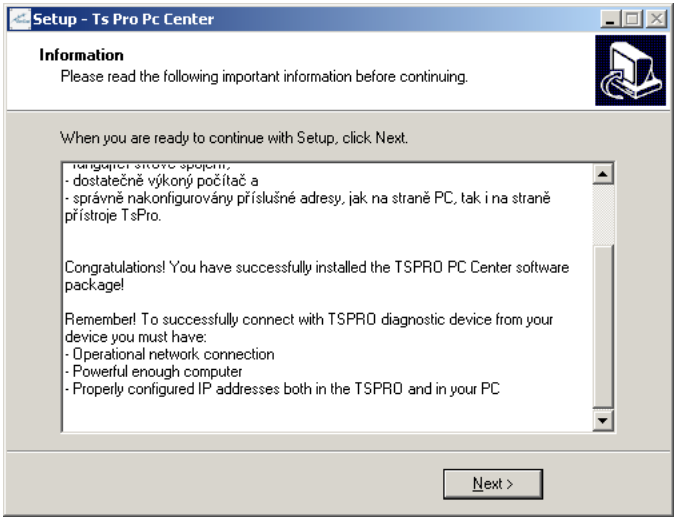


Figure 9

TS*PRO* PC Center installation

Window displayed in figure 10 is the last window of the installation program. If you want to run TS*PRO* PC Center software immediately check the ***Run TSPRO PC Center box*** and click on the **Finish** button.

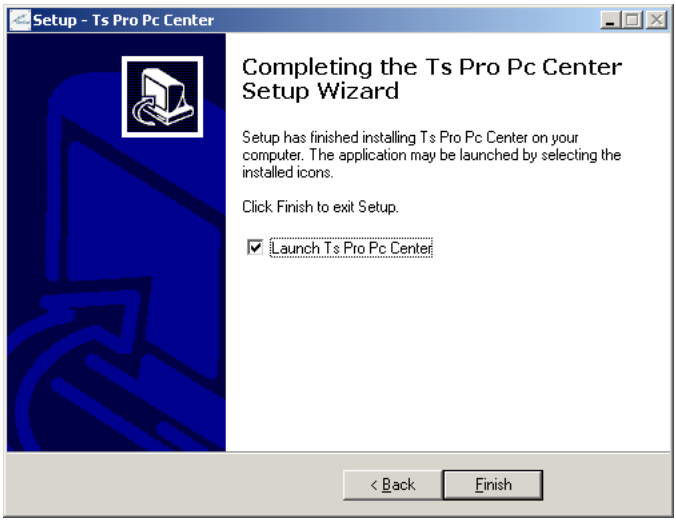


Figure 10

TS*PRO* PC Center uninstall

If for any reason you decide to uninstall TS*PRO* PC Center follow these steps:

In the ***Control panels*** click on the ***Add or Remove programs***; select TS*PRO* PC Center and click on **Remove**.
To get to ***Control panels*** click on the **Start** button, then choose the **Settings** option and from newly opened menu select ***Control panels***.

Uninstall program will require you to confirm the removal (see figure 11).

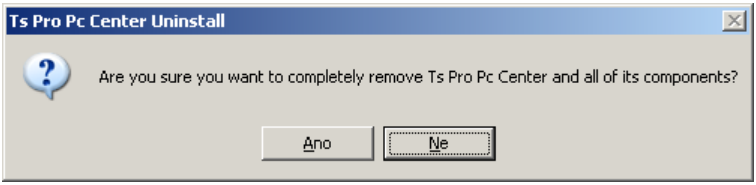


Figure 11

By clicking on Yes you agree to the removal, TSPRO PC Center will be removed from your computer. After the process is done you will be notified (figure 12).

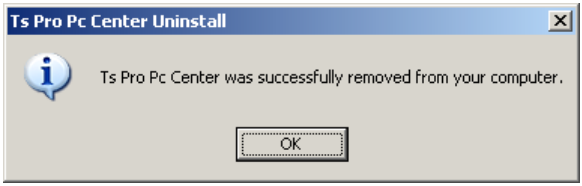


Figure 12

TS*PRO* PC Center configuration

On previous pages the installation procedure was explained, now we will focus on program configuration so that you can start working with the program.

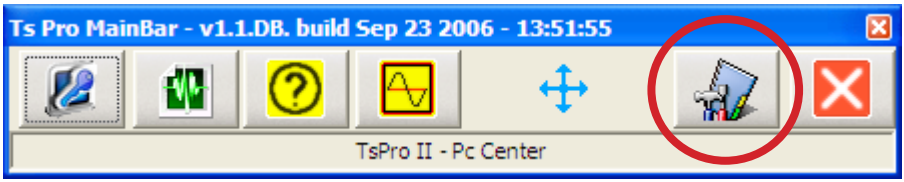


Figure 12

When the TS*PRO* PC Center program is started main window will appear (see figure 12). To select **Settings** click on the emphasized icon (figure 12).

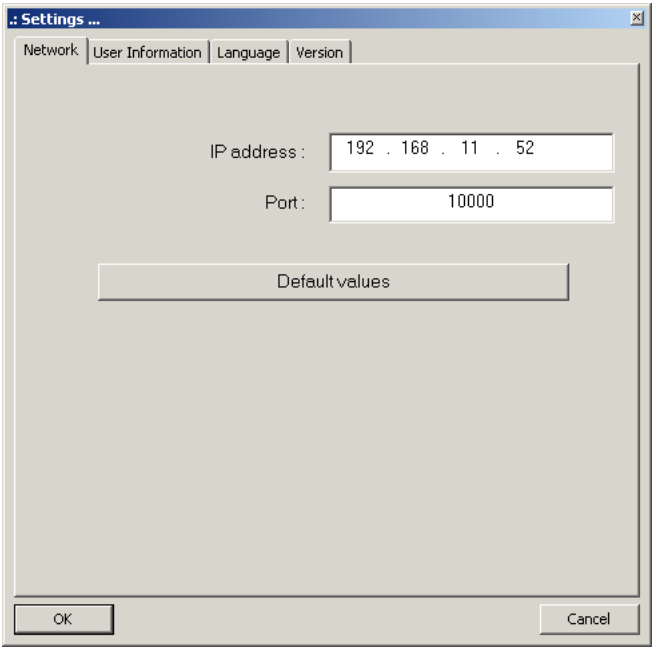


Figure 13

When clicked on the icon the ***Settings*** window will appear (see figure 13). First bookmark is the ***Network*** bookmark. Here the TS*PRO*'s IP address is set. Please check that a correct address is set - how to configure it is explained in detail in chapter 2. How to change your PC's IP address is described in appendix C.

On the next bookmark - ***User information*** fill in information about yourself or your company, these will be used when printing etc. (see figure 14).

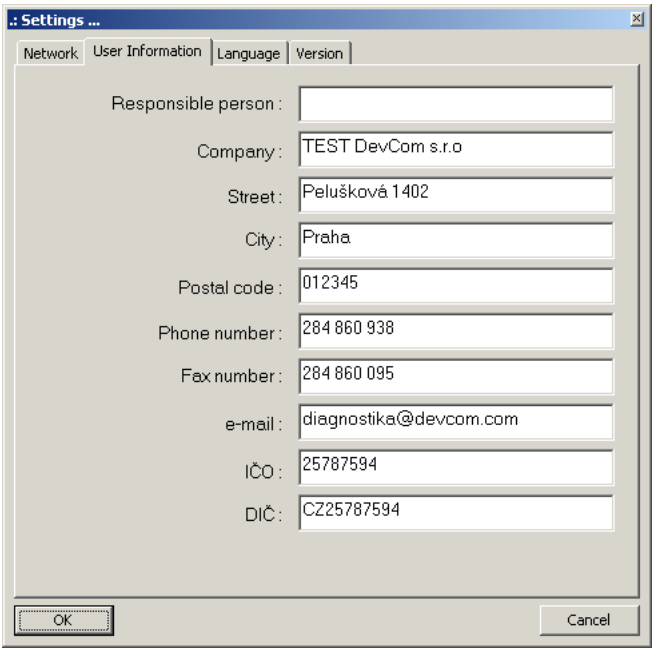


Figure 14

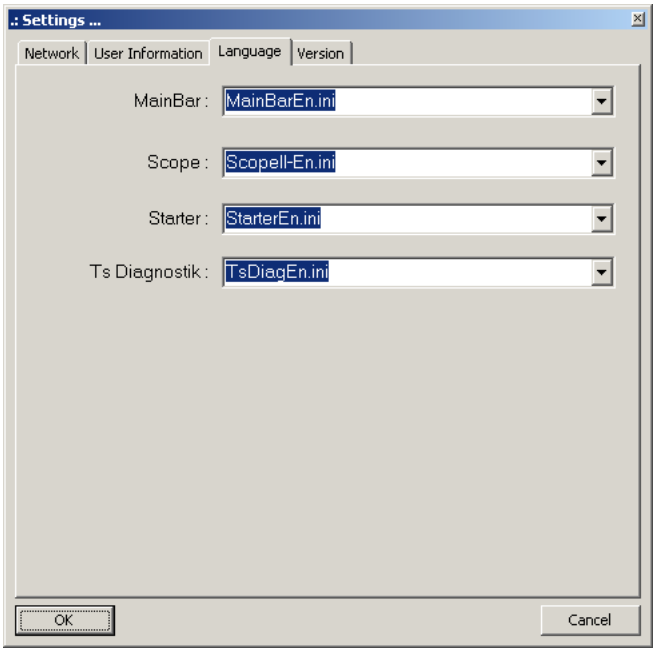


Figure 15

Next bookmark is named ***Language*** and the language in which the program will communicate is set here (figure 15). Currently English and Czech languages are supported.

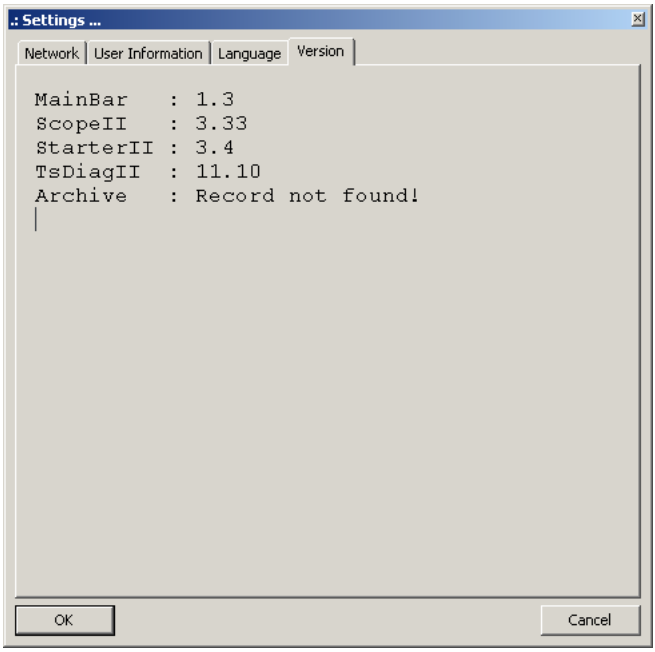


Figure 16

The last bookmark is Version; here you get information what versions of modules are installed. This information is also required when contacting technical support, please have them ready when contacting our support.

Now you have successfully ended installation and configuration of the TS*PRO* PC Center program on your computer. Different operating modes are described in detail in this User guide, consult table of contents.

TS*PRO* Pc Center directory tree

After installation following directory tree will be created in the PCCenter folder. All program related files are saved here by default. This tree is displayed in figure 17.

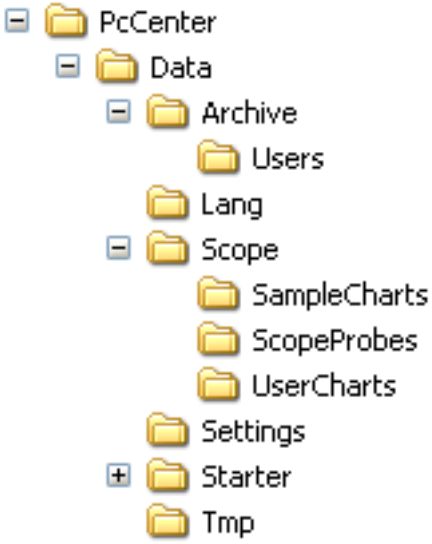


Figure 17

Depending on settings during installation the name PcCenter may differ, the subdirectory hierarchy will however be always the same.

Archive

Logs performed in the diagnostic module are saved in this folder by default. How to store logs is described on chapter 3; let us describe their structure now.

To store data CSV (Comma separated values) files are used, first line of the file always contain column description and depends on which parameters were selected to be logged.

Following lines contain measured values, every line starts with time marker. Let us have a look at an example:

2006:06:21	Engine rpm/1/min	Batt volt./Nm	Lambda voltage/V
17.55.13:218	0	0.0	384
17.55.13:656	0	0.0	384
17.55.14:140	0	0.0	384
17.55.14:625	0	0.0	384
17.55.15:109	0	0.0	384

When the file is loaded by a spreadsheet editor such as MS Excel values can be plotted in graphs.

In the *Users* folder user data are stored. These data are acquired during install and can be changed later in the TS*PRO* Pc Center program. We do not recommend editing these files outside TS*PRO* Pc Center.

Scope

In the *Scope* folder all data relevant to Oscilloscope folder are saved. This accounts for saved signal plots and probe files.
Measured signals saved by users are located in the *UserCharts* subfolder in the sdf format.

Scope, new probe definition

If you wish to use other probe than the one delivered by the manufacturer you will need to create a configuration file for it. This is done simply by placing configuration file in the *ScopeProbes* folder (see figure 17). When the TS*PRO* PC Center program is run again the added file will appear in the ***Probe*** option (see chapter 4 for details)

Lets have a look at the initialization file in detail. Following template is the same for all initialization files.:

[PROBE]
Name=CA 60 1-10
Units=A
Ratio=0.1
HiLimit=0
LoLimit=1
AlowedChannels=01

All initialization files must start with **[PROBE]** otherwise file will not be considered as an initialization file.

The **Name** parameter influences displayed probe name. This name appears in the Scope module. Using the **Units** parameter you can set units in which measured values will be displayed.
The **Ratio** parameter affects ration between measured and displayed unit and real voltage.

How to create a initialization file?
In ***Start*** - ***Programs*** - ***Accessories*** choose the **Notepad** application. Fill in all required information and save the file. To save file click on ***File*** and choose ***Save As***.. It is necessary to save the file in *ScopeProbes* folder.

Probe settings
We will show probe settings on an example: for the CA 60 1-10 probe the ratio between measured current and voltage on output clamps is 1mV to 10mA. From this one can see that for every measured 1A 0.1V will appear on the oscilloscope screen and therefore RATIO=0.1
In other words this calculation means that displayed current when the probe file is loaded will be 10x bigger than voltage displayed without this probe file loaded. The equation then would be *RATIO=voltage/current*.

VIVID Workshop

The VIVID Workshop software is the biggest available automobile technical data database in Europe. System contains technical details about automobiles, parameter values and electrical and mechanical schematics. It also contains information about procedures during inspections and repeairs.

When working with TS*PRO* PC Center you can load VIVID Workshop by clicking on proper button. This is shown in figure 18.

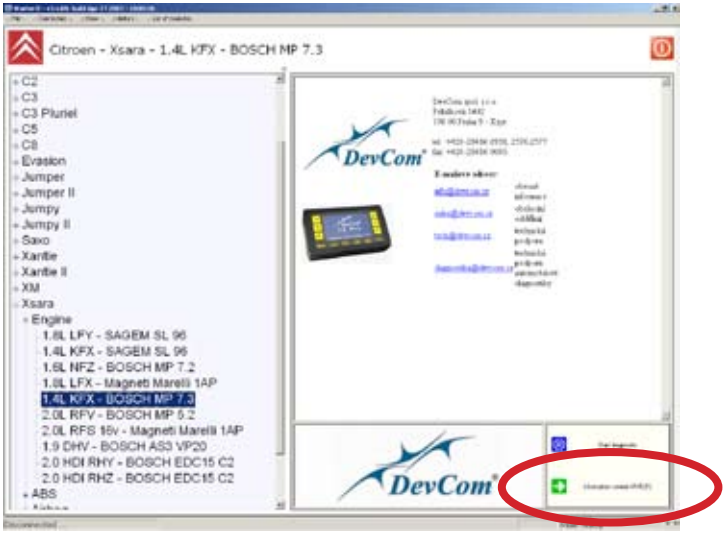


Figure 18

Full version of VIVID Workshop is not included in the price. A demo version is included which is working for 30 days. To order full version click on the ***Licence information*** icon (see figure 19) and go to ***Order form*** bookmark (figure 20).

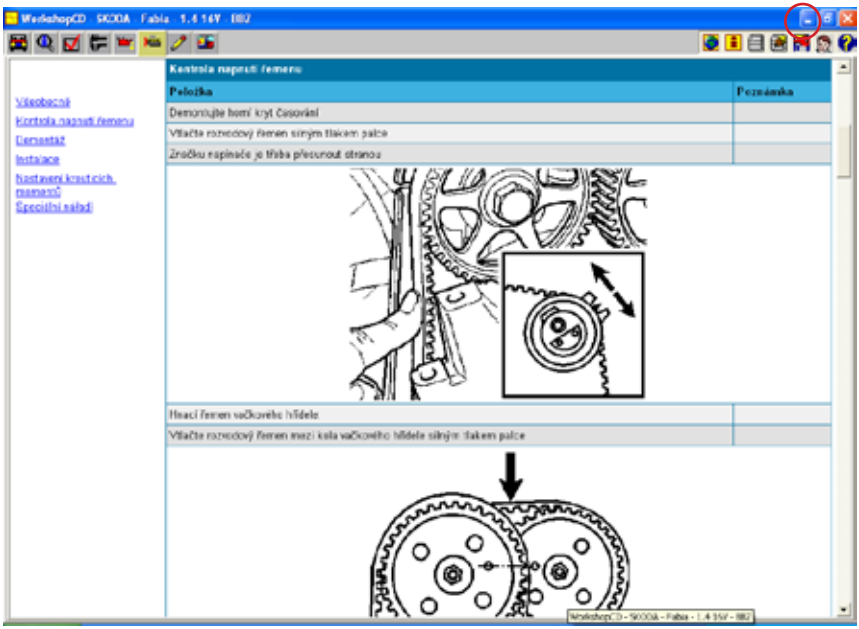


Figure 19

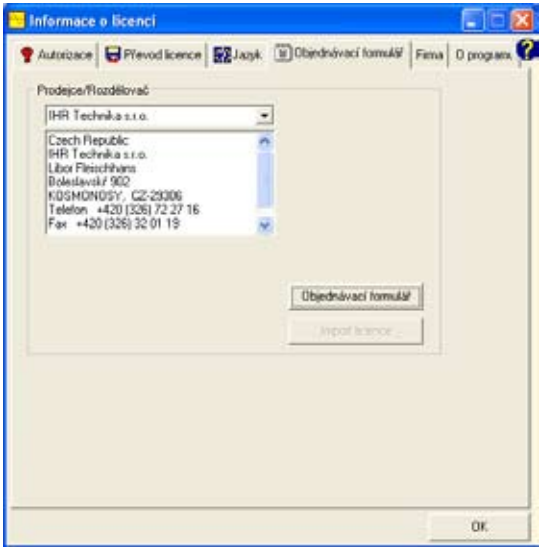


Figure 20

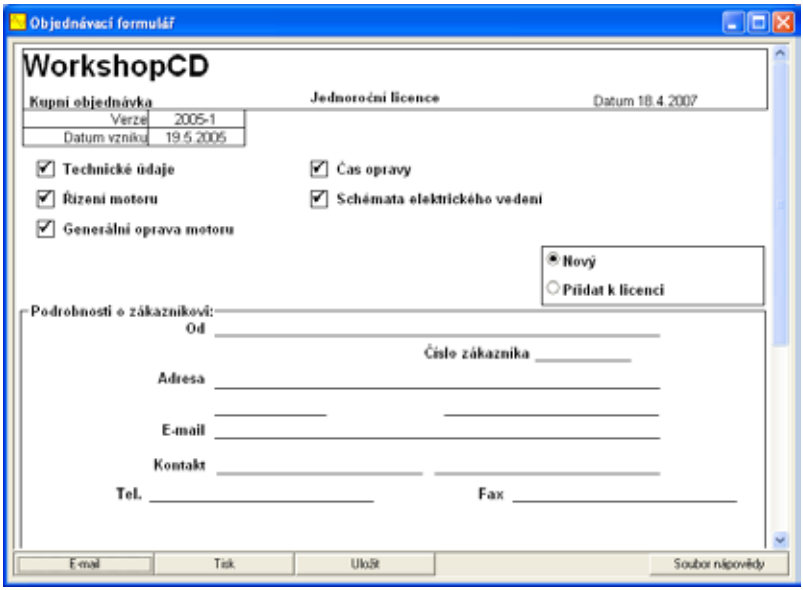


Figure 21

Print the form after filling it in (figure 21) and send it to us by fax. If any questions arise you can contact us via e-mail or on our phone support.

TS*PRO* PC Center installation

E

Appendix
What to do if...?

This appendix summarizes troubleshooting tips and tries to help solving problems with the TS*PRO* diagnostic tool.

I have problems connecting to PC

If your PC to TS*PRO* connection is not working check these first:

- Is TS*PRO* and PC properly connected with UTP cable?
- Is the used network cable damaged?
- Are IP adresses both in TS*PRO* and PC correctly set?
- Do you use proper cable?

When connecting directly to PC it is necessary to use so called **cross-over** cable, if connecting via hub/switch you need to use **straight through** cable (see figures 1 and 2).

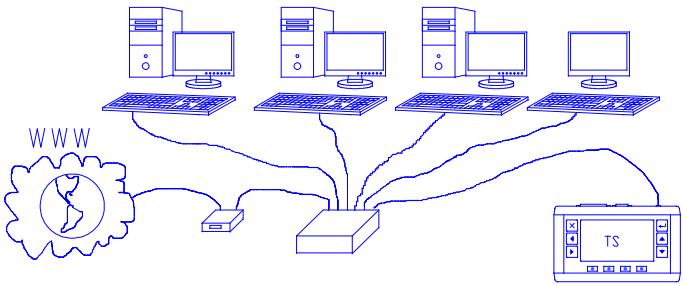


Figure 1

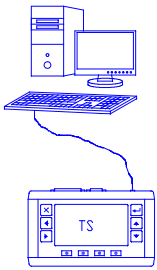


Figure 2

To verify connection status a **PING** command can be used in Windows, to run it click Windows ***Start*** button and choose the ***Run*** option. A new window ***Run*** will open. If you enter the command in following manner:

```
PING 192.168.13.1
```

computer will try to contact device at IP address 192.168.13.1. If the device is unreachable program will inform you with "Destination host unreachable" message.

Some internet safety control programs such as Norton Antivirus, Kerio Personal Firewall etc. can block communication with TS*PRO*, try temporarily disabling them in case the communication is not working. If it will start to work you have to adjust their settings and create an exception for the TS*PRO* device. How this is done is described in detail in according user manuals and/or technical documentation.

I need help from tech support

If you have a question and cannot find the answer in this guide, try to check our web pages first at www.devcom.cz you will find there diagnostic socket locations on various vehicles, channel setting for diagnostics and other interesting information.

Our tech support will be happy to help you on phone and on email. To ease our communication please obtain following information first:

- What module version do I use?
- Which version of TS*PRO* PC Center have I installed?

Module list and its versions can be obtained from TS*PRO*s ***Main menu*** (see figure 2).

What to do if...?

How to get proper information is described in detail in chapter 2.

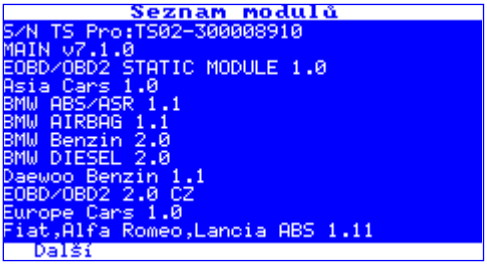


Figure 2

TS*PRO* PC Center program version is displayed in its main window. After starting the program the information is displayed in upper section of the window. (see figure 3).

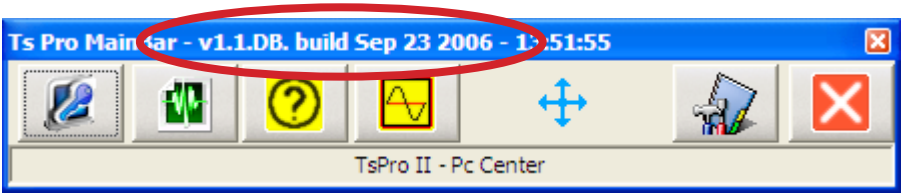


Figure 3

I have problems with serial diagnostics

To maximally speed up the process of solving your problem with the TS*PRO* diagnostic device it is crucial for our technical support team to obtain detailed information about the error state you encountered. As you would guess, error report stating that: "*It didn't work with that red Skoda!"* will probably not help much in solving the issue.

Innformation which are useful during the troubleshooting process:

- ***diagnosed car model and manufacture year, engine type***
- ***manufacturer and model of diagnosed ECU*** (try to gather as much information as possible - good start is manufacturing label on the ECU or upon connecting to the ECU in the ***Identification ECU*** menu, see page 19 for details)
- ***used diagnostic module type and version*** (for example: Opel bensin 1.5)
- ***error state description*** (describe as detailed as possible the error state the device ends in, what lead to this state - for example during communication or when specific diagnostic function is selected)
- ***possible error states:***
    - error during establishing communication with ECU
    - communication lost
    - device outputs wrong parameters (which?)
    - device not responding to key press
    - diagnostic function not performed and the device out puts a message (what?)
    - etc...

What to do if...?

Declaration of conformity

To whom it may concern,

We certify that the multifunctional diagnostic tool

TS*PRO*

manufactured by: DevCom spol. s r. o. IČO 25 78 75 94

was inspected and quality controlled and comply fully with safety standards set by laws of the Czech republic.

The device was tested by:
TESTCOM, IČO 00003468

which issued protocol nr. 23/06

When inspected, the test results were compared to following harmonized Czech technical norms:
ČSN EN 61000-2-2:2000, ČSN EN 61000-4-2:1997, A1:1999; Z1:2001, ČSN EN 61000-4-3:1997; A1:1999; Z1:2001, ČSN EN 61000-4-4:1997, Z1:2001, ČSN EN 61000-4-6:1997, Z1:2001, ČSN EN 55022:1999 class A

Guarantee card

Device name	TS*PRO*
Serial number	
Dispatch date	
Dispatched by	
Warranty	24 months
Date of purchase	
Reseller	
Owner/User	

Notes

Issued by DevCom spol. s r. o. in 2007 as 1st print