SXC 1011

OBDII/EOBD Diagnostic Scanner

Manufacturer:
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1. General information

1.1 Specifications:

Dimensions (without a diagnostic cable harness)	: 101 mm ÷ 204mm
Power supply (from the vehicle's system via the OBD connector)	: 12V ± 25%
Operating temperature	: 0ºC ÷ 70ºC
Protection class	: IP40

1.2 Intended use and principle of operation

The scanner is a garage tool designed to communicate with the on-board diagnostic systems compliant with the OBDII/EOBD standard. Thanks to the easy-to-read display, the scanner facilitates installation of STAG-OBD Adapter as it indicates the way it should be connected to the vehicle's diagnostic interface.

Using standard transmission protocols, SXC 1011 communicates with an electronic control unit of vehicles equipped with OBDII/EOBD. To enable connection and transfer of data from the vehicle's diagnostic system, it has to support appropriate digital communication interface. The following digital communication interfaces are used in OBDII/EOBD systems:

Standard	Symbol	Notes
ISO 14230	KWP2000	European vehicles
ISO 9141	ISO (K-line)	European vehicles and the majority of Asian vehicles, GM and Ford for Europe
ISO 15765	CAN	European vehicles (newer models)
SAE J1850	VPW	Vehicles for the USA market (GM), some Toyota and Lexus models
SAE J1850	PWM	Vehicles for the USA market (Ford)

SXC 1011 supports transmission in all digital communication interfaces dedicated to OBDII/EOBD systems.

When correctly connected, the device provides the following information:

- current values of the powertrain parameters measured by the system at a given moment
- stored trouble codes
- pending trouble codes
- Freeze Frame Data
- vehicle's identification data
- OBDII/EOBD interface type and STAG-OBD adapter connection diagram

Having reviewed the trouble codes reported by the system, the user can clear them from the memory of the electronic control unit.

1.3 Connecting the scanner

OBD connector

OBD Tester
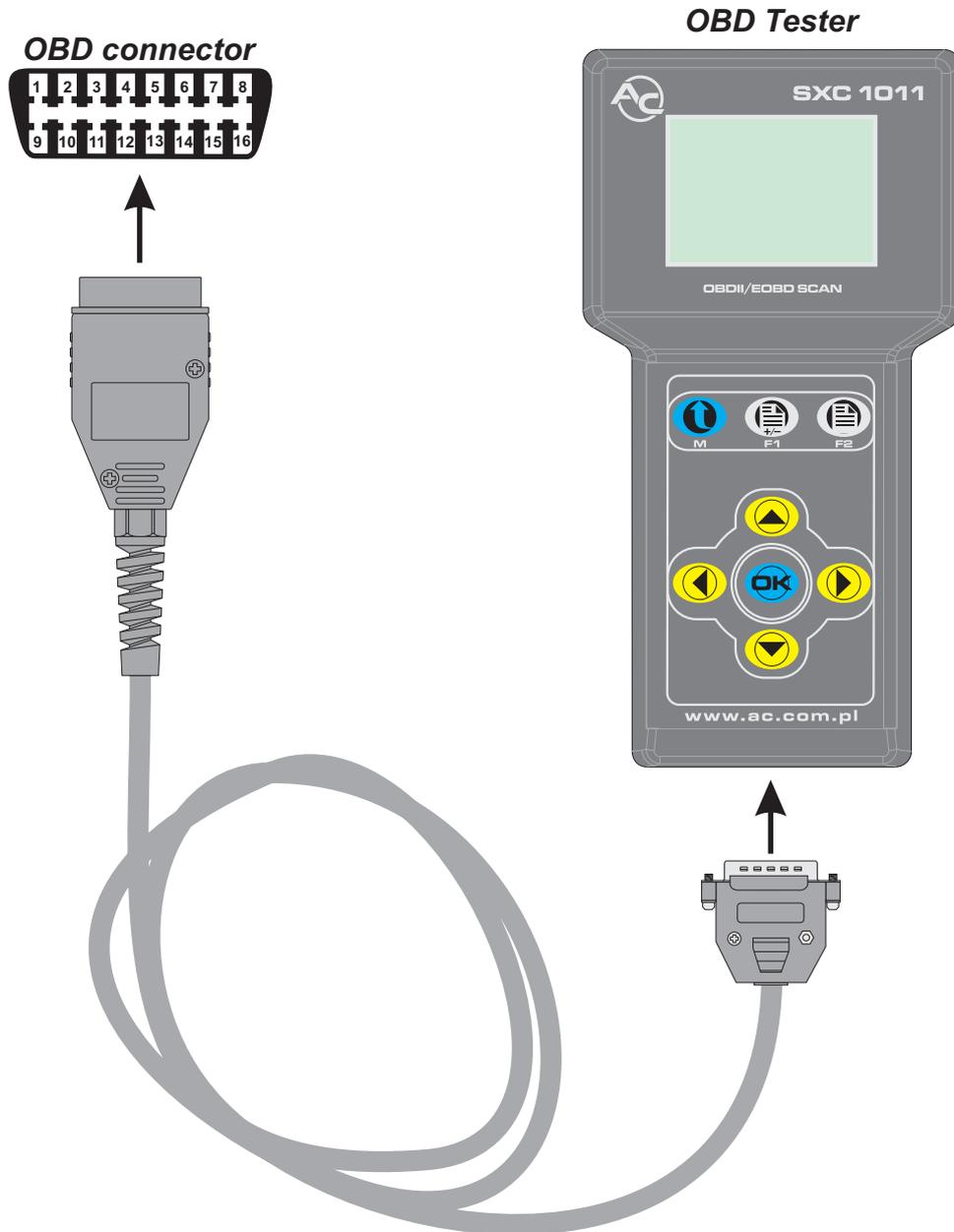
Locate the vehicle's 16-pin diagnostic connector. The connector should be located in the vehicle's cab on the driver's side or in the passenger compartment.

Plug the cable harness with OBD connector to the vehicle's diagnostic connector. The cable harness transmits data in all supported OBDII/EOBD interface types and supplies power to SXC 1011.
NOTE: The ignition has to be on for the scanner to communicate.

1.4 Using the scanner.

1.4.1 Turning on

To turn the scanner on, connect the scanner to the vehicle's diagnostic connector using OBD cable (included), turn the ignition on and press [MENU] button.
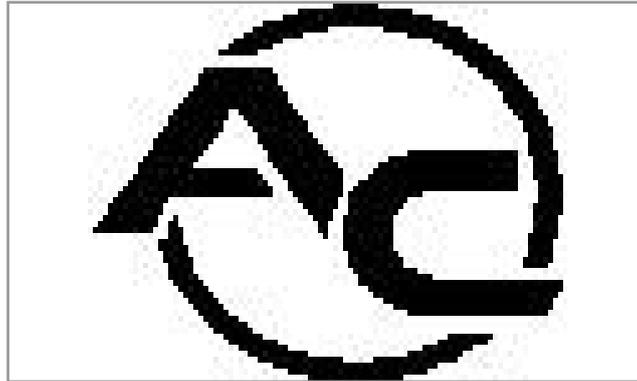
Fig. 1.4.1.1: Welcome screen.

If the scanner is turned on for the first time (or if the default settings are reset), the language selection screen will be displayed (see Fig. 1.4.1.2).

Fig. 1.4.1.2: The scanner turned on for the first time – language selection.

Press [▲] or [▼] button to select language.

Press [OK] button to confirm.

Other language versions are currently developed. They will be available on AC S.A. website (http://www.ac.com.pl).

1.4.2 Turning off

Press and hold [MENU] button for 2 seconds.

1.4.3 Button description

Button	Name	Function
	MENU	Turns SX1011 on/off. Return to the main menu
	F1	Adds/deletes current parameters to/from the favourite parameter list
	F2	Displays the favourite parameter list
	Up/Down arrows	These buttons are used to move the cursor on the screen and to scroll through data
	Left/Right arrows	These buttons are used to move to the previous/next screen
	OK/Enter	Confirms a selection and displays detailed description of certain elements

Table A. Description of SXC 1011 functional buttons

1.4.4 Moving through the menu

Press [▲] or [▼] button to move through the menu items. Press [OK] button to activate a selected element (function).

If the content covers more than one screen (e.g. when current parameters are displayed), use [►] or [◄] button to view additional data.

1.4.5 Resetting to default settings.

If during operation it is necessary to reset the scanner to its default settings, follow the steps below:

- connect SXC 1011 tester to the vehicle's OBD connector,

- press and hold [OK] button,

- press [MENU] button when holding [OK] button.

Contrast, highlight and keytone settings will be overwritten by the default settings.

2. Using the device.

2.1. Connecting to the vehicle's Electronic Control Module (ECM).

When the tester is turned on, it automatically starts to search for a diagnostics interface.
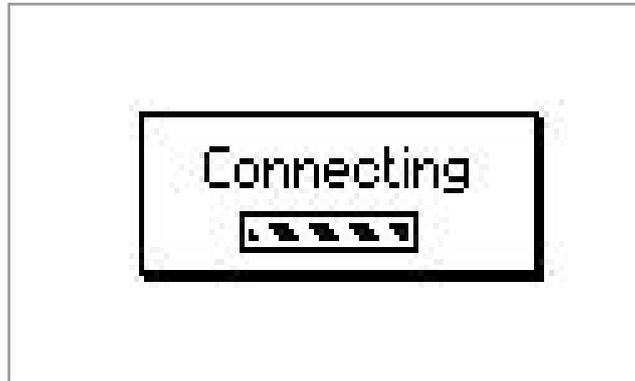
Fig. 2.1.1: Connecting to ECU

(NOTE: this operation can take maximum 30 seconds).

If the connection fails, appropriate messages will be displayed.

Fig. 2.1.2: Connection was not established.

It can be impossible for the scanner to connect to ECU if the vehicle does not support OBD-II/EOBD protocols or the ignitron is not turned on. If the vehicle is equipped with a diagnostic connector it does not mean that it is ready to support this standard. SXC 1011 will retry to communicate after 3 seconds.

If the scanner manages to communicate with at least one vehicle's control unit, it will be displayed:

```
Number of ECU:  2
Adress   [PIDs]
10h       18
17h        3
```
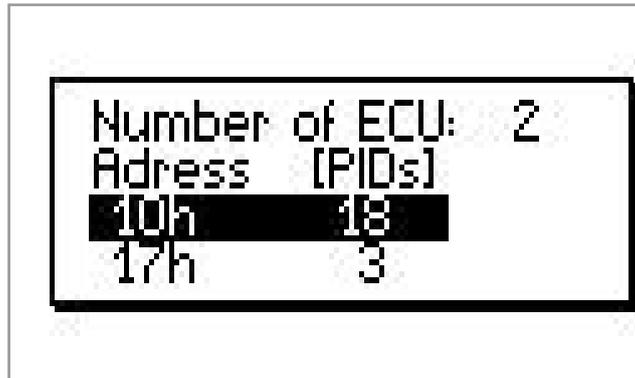
Fig. 2.1.3: List of found ECUs

The above dialog box (Fig. 2.1.3) shows a list of units which can communicate with SXC 1011 and which were found during the scanning procedure. It also shows their addresses on the bus and approximate number of current parameters supported by each of them. Press [▲] or [▼] button to select an address of the unit on OBD bus with which the scanner will communicate.

In the example shown in Fig. 2.1.3 the unit with the address "10h" supports 18 current parameters and the unit with the address "17h" only 3 current parameters. Therefore, the user should select the first unit as it can provide much more data.

Press [OK] button to confirm a selection of ECU. It will be stored in the volatile memory. The user can change the address of the unit by restarting the tester.

2.2. SXC 1011 main menu.

The main menu offers the following functions (see Fig. 2.2.1):
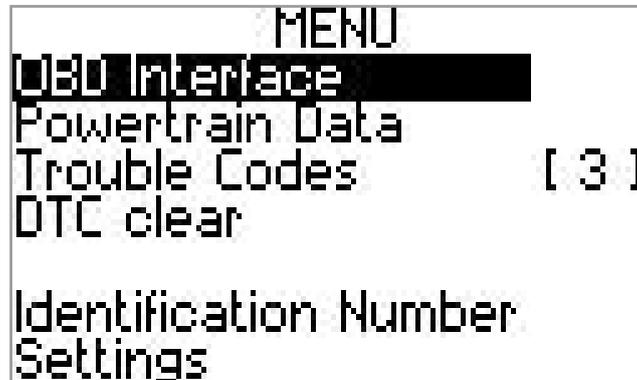
Fig. 2.2.1: SXC 1011 main menu

- **OBD Interface –** a graphic presentation of the way cables and other devices communicating with the vehicle's OBD-II system should be connected.

- **Current parameters (Powertrain Data) –** engine operation data recorded by a selected ECU.

- **Vehicle Identification Number –** a unique Vehicle Identification Number stored in ECU memory.

- **Trouble Codes –** retrieval of stored and pending trouble codes from the control unit memory. SXC 1011 reads these data each time the user enters the main menu. The number of stored and pending trouble codes is displayed in square brackets. This function also enables the user to read Freeze Frame Data associated with the recorded trouble codes.

- **Trouble Code clear –** sends a request to the vehicle's control unit to clear trouble codes from the memory.

- **Settings –** this function makes it possible to adjust LCD contrast and backlight, turn the keytone on/off and change language.

2.3. OBD Interface

Press [▲] or [▼] to select "OBD Interface" as shown in Fig. 2.3.1. Press [OK] button to display detailed information on the OBD-II bus type installed in the vehicle.
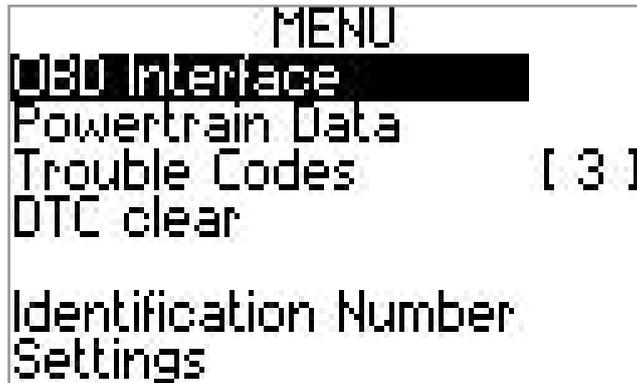
```
          MENU
OBD Interface
Powertrain Data
Trouble Codes      [ 3 ]
DTC clear

Identification Number
Settings
```
Fig. 2.3.1:

"OBD Interface" function helps the installer to connect additional equipment, e.g. STAG-OBD Adapter, to the vehicle's OBD-II bus.
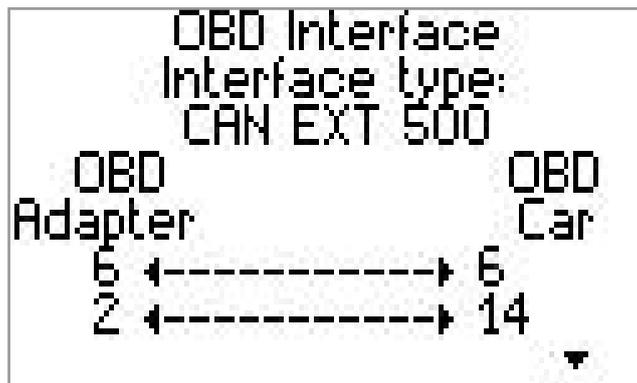
```
     OBD Interface
    Interface type:
     CAN EXT 500
  OBD              OBD
Adapter            Car
    6 ◄---------► 6
    2 ◄---------► 14
                     ▼
```
Fig. 2.3.2: Connection to OBD-II bus

Fig. 2.3.2 shows the screen with the most important information on the type of OBD-II interface used in the vehicle: colloquial name and pairs of cables in the cable harness of the vehicle's diagnostics connector and STAG-OBD Adapter plug which have to be connected in order to ensure digital communication between a gas control unit, e.g. STAG-300 Premium, and the engine.

Press [▼] to move to the screen (see Fig. 2.3.3) showing graphically the pairs of pins in OBD-II connector and STAG-OBD Adapter harness which have to be permanently connected. Depending on the type of the interface installed in the vehicle by its manufacturer, it is necessary to connect one or two digital communication cables.
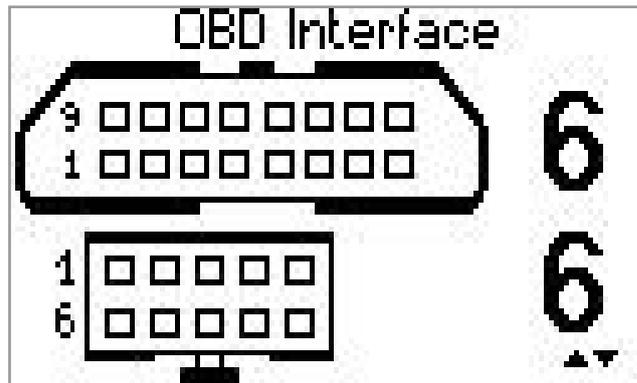
Fig. 2.3.3: Sample connection between STAG-OBD Adapter and CAN bus (1 of 2)

NOTE: The view of connectors shown on the tester display corresponds to the view from the CABLE HARNESS SIDE. The user is notified about this once when he moves from the abridged view to the graphic view.

Arrows in Fig. 2.3.3 indicate that it is possible to view the second pair of pins necessary to ensure STAG-OBD communication (see Fig. 2.3.4).
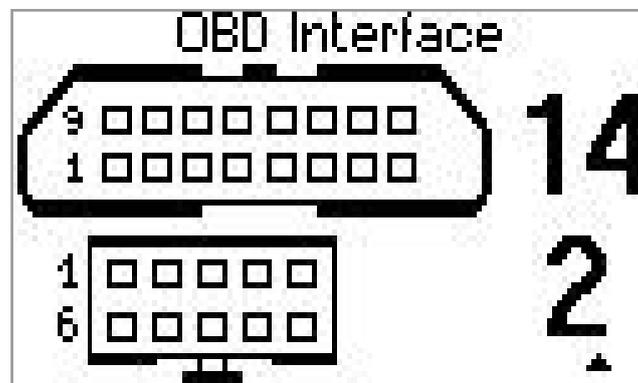
Fig. 2.3.4 Sample connection between STAG-OBD Adapter and CAN bus (2 of 2)

Press [MENU] button to return to the main menu.

2.4. Current parameters (Powertrain Data)

The Powertrain Data box provides information about the engine operation, fuel system, external conditions etc. The number and type of parameters which can be read depends on the software of the control unit with which the scanner communicates.
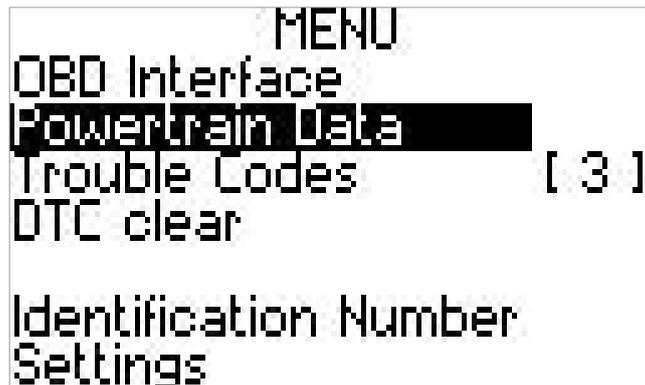
```
         MENU
OBD Interface
Powertrain Data
Trouble Codes      [ 3 ]
DTC clear

Identification Number
Settings
```
Fig. 2.4.1

Press [▲] or [▼] button to select Powertrain Data as shown in Fig. 2.4.1. Press [OK] button to confirm. Powertrain Data will be displayed.
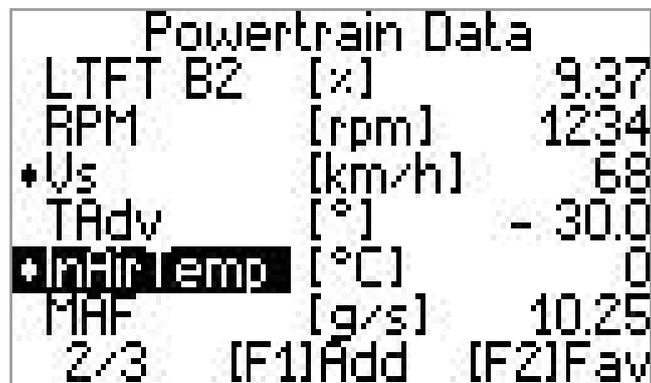
```
      Powertrain Data
LTFT B2    [%]       9.37
RPM        [rpm]     1234
◆Vs        [km/h]      68
 TAdv      [°]     - 30.0
◆InAirTemp [°C]         0
 MAF       [g/s]    10.25
  2/3    [F1]Add   [F2]Fav
```
Fig 2.4.2: Powertrain Data box

The Powertrain Data box is divided into 3 columns:

- **Abbreviated name of the parameter [left column] –** e.g. LTFT B2, i.e. Long Term Fuel Trim, Bank 2. Press [OK] button to get a detailed description of the parameter along with its full name.

- **Unit of measure of the parameter [central column] –** e.g. [%] for the Long Term Fuel Trim (in the case of parameters without units of measure this field remains blank).

- **Parameter value [right column] –** SXC 1011 does not make direct measurements of the parameters displayed on the screen but it calculates them on the basis of data retrieved from the vehicle's Electronic Control Module. The speed of updating the displayed values depends on the type of OBD-II interface and software installed in the vehicle.

In the case of ECUs with more than 6 parameters, SXC 1011 divides the parameters into groups in the sequence corresponding to OBD-II specification. The number of groups (pages) depends on the number of supported parameters and in the case of the discussed example it is 3. Fig. 2.4.2 shows the second of three pages, about which the user is informed in the last line of the display. Press [►] or [◄] button to move to the next or previous page.

Press [▲] or [▼] button to move to the previous or next line.

Press [MENU] button to return to the main menu.

2.4.1 Current parameters (Powertrain Data) – single parameter.

Press [OK] button while the Powertrain Data are displayed to move to the single parameter mode. In this mode only one parameter (highlighted in the Powertrain Data box) is displayed. Thus, (particularly in the case of slower interfaces) it is possible to diagnose the vehicle more effectively. Moreover, the displayed data are easier to read.

Fig 2.4.3: Powertrain Data box – single parameter

Press [▲] or [▼] button to move to the previous or next parameter (the sequence is the same as in the case of the main Powertrain Data list).
Press [MENU] button to return to the main Powertrain Data list.

2.4.2 Current parameters (Powertrain Data) – a list of favourite parameters.

When using SXC 1011 it can be necessary to observe current parameters which due to their position on the list can not be displayed simultaneously. The "List of Favourite Parameters" solves this problem. The user can create his own list with parameters (maximum 6) selected from all the current parameters supported by a given vehicle.

Press [F1] button in the main Powertrain Data menu to add the highlighted parameter ID to the list of favourite parameters. A graphic symbol on the left side of the parameter abbreviated name indicates that the parameter has been added to the list of favourite parameters (see Fig. 2.4.2).

Having added the selected parameters to the list, press [F2] button to display the list. The sequence of favourite parameters on the list corresponds to the sequence of adding them to the list of favourite parameters.

Press [MENU] button to return to the main list of favourite parameters.

2.5 Trouble codes (DTC).

OBD-II systems currently installed in vehicles can detect faults in the powertrain, communication buses etc. "Trouble Codes" function makes it possible to view stored and pending trouble codes.
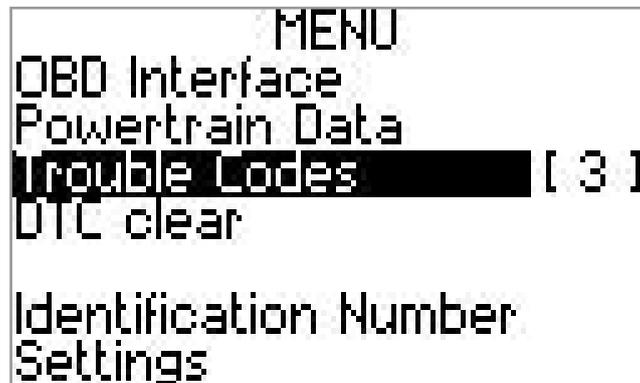
Fig. 2.5.1

The total number of pending and stored trouble codes (if saved in the control unit memory) is displayed in the main menu on the right side of the "Trouble Codes" item (Fig. 2.5.1).

Press [▲] or [▼] button to select "Trouble Codes" as shown in Fig. 2.5.1. Press [OK] button to recall functions related to the vehicle's diagnostics.
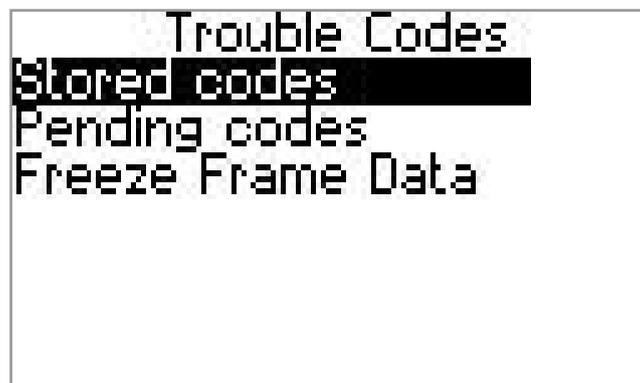
Fig. 2.5.2: Trouble code selection box

Press [MENU] button to return to the main menu.

Press [▲] or [▼] button to select the category of Trouble Codes (Stored codes/Pending codes/Freeze Frame Data). Press [OK] button to confirm.

SXC 1011 reads trouble codes from the vehicle's control unit memory. When the operation is completed, a trouble code report box is displayed (see Fig. 2.5.3).
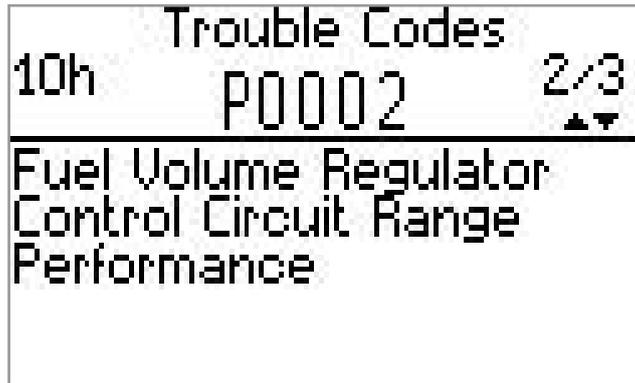
Fig. 2.5.3: Description of a trouble code recorded in the control unit memory

The database imbedded in the microcontroller unit controlling SXC 1011 includes extensive trouble description data. Trouble descriptions are displayed below the trouble code (e.g.: "P0002 – Fuel Volume Regulator Circuit; Range/Performance"). In the case of trouble codes which are not included in the tester database (e.g. trouble codes unique to specific vehicle manufacturers), "No description" message is displayed; however, the trouble code is correct.

Press [▲] or [▼] button to move to the previous or next trouble code.

If no trouble codes are detected in the ECU memory in a given category, "No Trouble Code" message is displayed (Fig. 2.5.4).
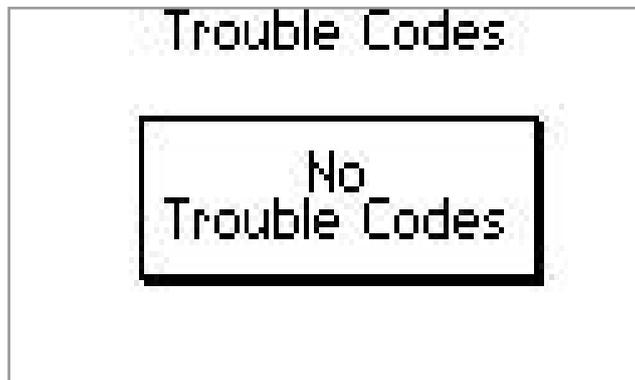
Fig. 2.5.4: No trouble codes in selected category.

Press [MENU] button to return to the category selection menu.

2.6 Freeze Frame Data.

If the vehicle's electronic control module detects a fault from a given group, e.g. an emission-related fault, it can (but does not have to) record values of the most important parameters in the Freeze Frame Data. It is a set of parameters of a high diagnostic value as they reflect the condition of the powertrain operation at the moment when a fault has occurred. These are values assigned to a specific trouble code.

Select "Freeze Frame Data" in the "Trouble Codes" menu. Press [OK] button to confirm.

```
┌─────────────────────────────┐
│       Trouble Codes         │
│ Stored codes                │
│ Pending codes               │
│ ███████████████████████████ │
│ █Freeze Frame Data█         │
│                             │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```
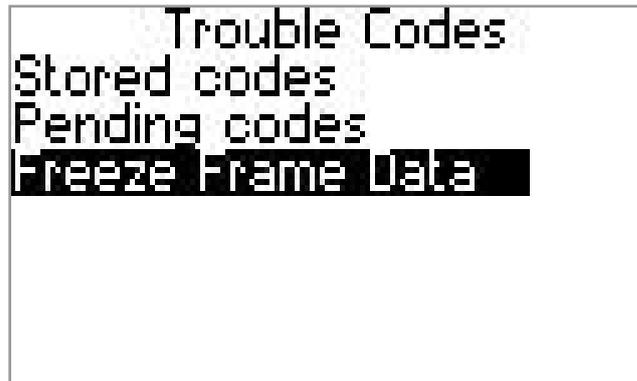
Fig. 2.6.1: Engine operation parameter values recorded at the moment when a fault has occurred.

If any of the stored trouble codes is accompanied by the Freeze Frame Data, SXC 1011 will display a list of trouble codes to select from. Press [▲] or [▼] button to select the desired code and press [OK] to confirm.

```
┌─────────────────────────────┐
│     Freeze Frame Data       │
│ ████████████                │
│ █1: P0300█                  │
│                             │
│                             │
│                             │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```

Fig. 2.6.2: Freeze Frame Data list

Freeze Frame Data are presented in the same way as the Powertrain Data. It is possible to read the description of each parameter as well as the description of a fault which caused the Freeze Frame to be recorded.

2.7 Trouble Code clear.

If a fault detected by the on-board diagnostic system is repaired, it can be deleted from ECU memory. To delete trouble codes from ECU memory, use the "DTC clear" function.
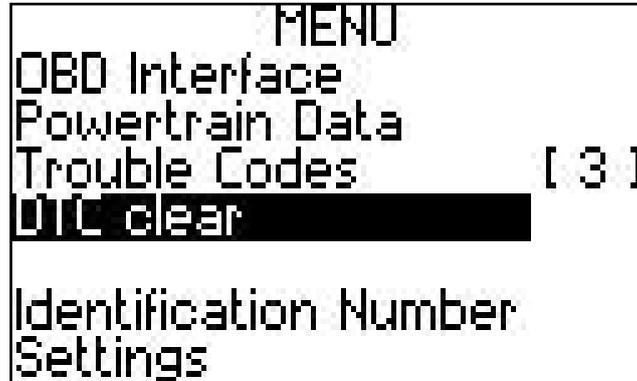
```
        MENU
OBD Interface
Powertrain Data
Trouble Codes      [ 3 ]
DTC clear

Identification Number
Settings
```
Fig. 2.7.1

Press [▲] or [▼] button to select "DTC clear" as shown in Fig. 7.0. Press [OK] button to start the procedure of clearing stored trouble codes from the memory.

NOTE: Before clearing, make sure that the engine IS NOT RUNNING. Using this function when the engine is running can damage the engine.

```
      DTC clear

     Make sure
       engine
       is not
      running
```
Fig. 2.7.2: Warning message which is displayed before clearing.

Press [OK] button to clear all trouble codes from the control unit memory. It applies also to Freeze Frame Data which accompany the trouble codes.

Press [MENU] button to stop the clearing procedure – SXC 1011 returns to the main menu and trouble codes are not cleared.

2.8   Vehicle Identification Number.

The "Identification Number" function retrieves a unique vehicle's code (if available) from the Electronic Control Unit. The code consists of seventeen alphanumeric characters (letters and numbers).

```
                        MENU
OBD Interface
Powertrain Data
Trouble Codes           [ 3 ]
DTC clear

Identification Number
Settings
```
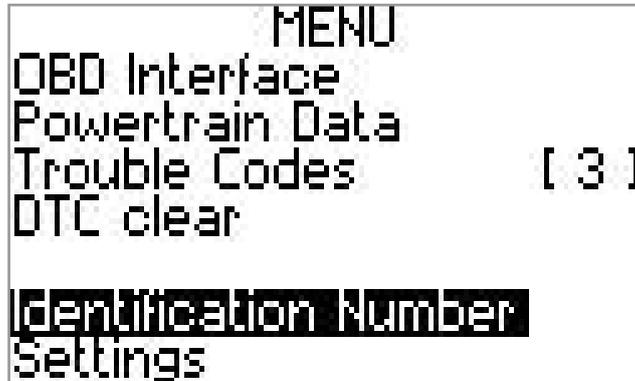
Fig. 2.8.1

Press [▲] or [▼] button to select the "Identification Number" function as shown in Fig. 2.8.1. Press [OK] button to read the Vehicle Identification Number.

```
        Identification Number
                 VIN

        1YVHP80D265M41957
```

Fig. 2.8.2: Unique Vehicle Identification Number – example

When VIN is successfully retrieved (not all vehicles support this function), it is displayed in the way shown in Fig. 2.8.2. If the scanner fails to retrieve VIN, a special message is displayed.

Press [MENU] button to return to the main menu.

3 Setting up and updating

3.1 Settings

Use the "Settings" function to change SXC 1011 operation parameters such as language or display settings.
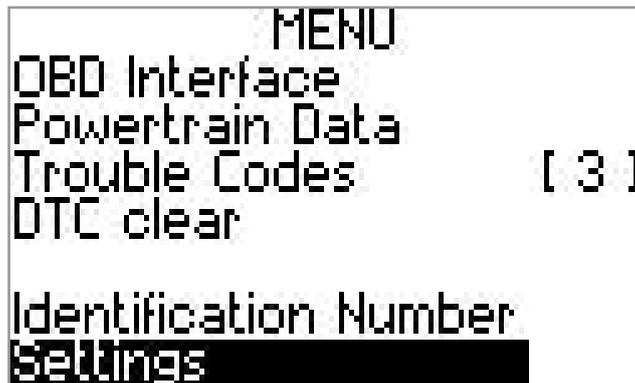
```
         MENU
OBD Interface
Powertrain Data
Trouble Codes      [ 3 ]
DTC clear

Identification Number
Settings
```
Fig. 3.1.1

Press [▲] or [▼] button to select "Settings" as shown in Fig. 3.1.1. Press [OK] button to change the tester settings.

```
        Settings
Contrast          ◄─  ─►
Backlight         ◄─  ─►
Keytone           ◄ on
Language          ENG►


SXC1011 ver. 1.0.76
```
Fig. 3.1.2 Changing the LCD contrast.

Press [▲] or [▼] buttons to select "Contrast" (see Fig. 3.1.2).

Press [◄] and [►] buttons to adjust contrast. The display contrast can change when there are considerable fluctuations in the ambient temperature in which SXC 1011 is used.

Fig. 3.1.3 Changing the LCD backlight intensity.

Press [▲] or [▼] to select "Backlight" (see Fig. 3.1.3). Press [◄] and [►] buttons to adjust backlight intensity to the user requirements.

Fig. 3.1.4: Turning the keytone on/off.

Press [▲] or [▼] button to select "Keytone" (see Fig. 3.1.4). Press ([◄] or [►]) button to turn the keytone on/off.

Fig. 3.1.5a: Changing the user interface language.

Press [▲] or [▼] button to select "Language" (see Fig. 3.1.5a). Press ([◄] or [►]) button to select Polish (Fig. 3.1.5b) or English (Fig. 3.1.5a).

Fig. 3.1.5b: Changing the user interface language.

Press [MENU] button to return to the main menu.

The settings will be automatically saved in the non-volatile memory and will be used during scanner operation even after it has been disconnected from the power supply.

3.2 Updating

The memory installed in SXC 1011 makes it possible to change the software which controls SXC 1011 operation. New software versions will be available on AC S.A. website.

To update the software, use the included USB cable and software package available on a CD and at http://www.ac.com.pl.

Before SXC 1011 is connected, install AC – USB interface drivers and update software.

To update SXC 1011 software, follow the steps below:

1. Disconnect OBD cable harness from the scanner and replace it with the USB cable.
2. Connect the scanner to a USB port in your computer.
3. Drivers will be installed if the scanner is connected to the computer for the first time.
4. SXC 1011 will be automatically turned on in the service mode.
5. Run SXC 1011-PC update program on your PC. Connection will be established automatically.

The software includes two modules: the system module and communication module. Each of these modules is updated separately.

6. Left-click the software package which is to be sent to SXC 1011.
7. Click "UPDATE" button.

The software is updated automatically. Upon completion of the software update procedure, a message is displayed confirming that the software has been successfully updated. By repeating steps 6 and 7, you can update more than once or update both modules one after another.

When the update procedure is completed, close SXC 1011-PC program and disconnect USB cable from your computer.