Turbocharger actuator programmer

TurboProg

Version 1.08

User manual

Before using the device, read the operating instructions carefully. Improper use may result in damage to the device or components supported by it.

An updated version of this manual is available online:
https://dte.com.pl/download/manual/turboprog/

DeltaTech® Electronics

Contents

1. Tester specifications

Supply voltage	15V DC
Current consumption	80 mA (without turbo controller)
Maximum current draw	up to 4A (fused)
Type of control signal	PWM, CAN
Over-current indication threshold (ALARM)	depending on tested actuator

The tester is powered by the dedicated power supply attached to the electrical network. When supplying a tester from another source (e.g. power generator), remember to ground it!

2 Programmer application

TurboProg device can be used to read and program range of movement of electronic turbo actuators.

TURBO-PROG supports turbo actuator of diffent manufacturers. A detailed list of supported actuators can be found on the product page:

https://dte.com.pl/en/p/turboprog-programmer/

3. Programmer connection

Correct device setup is shown in Figure 3.1.

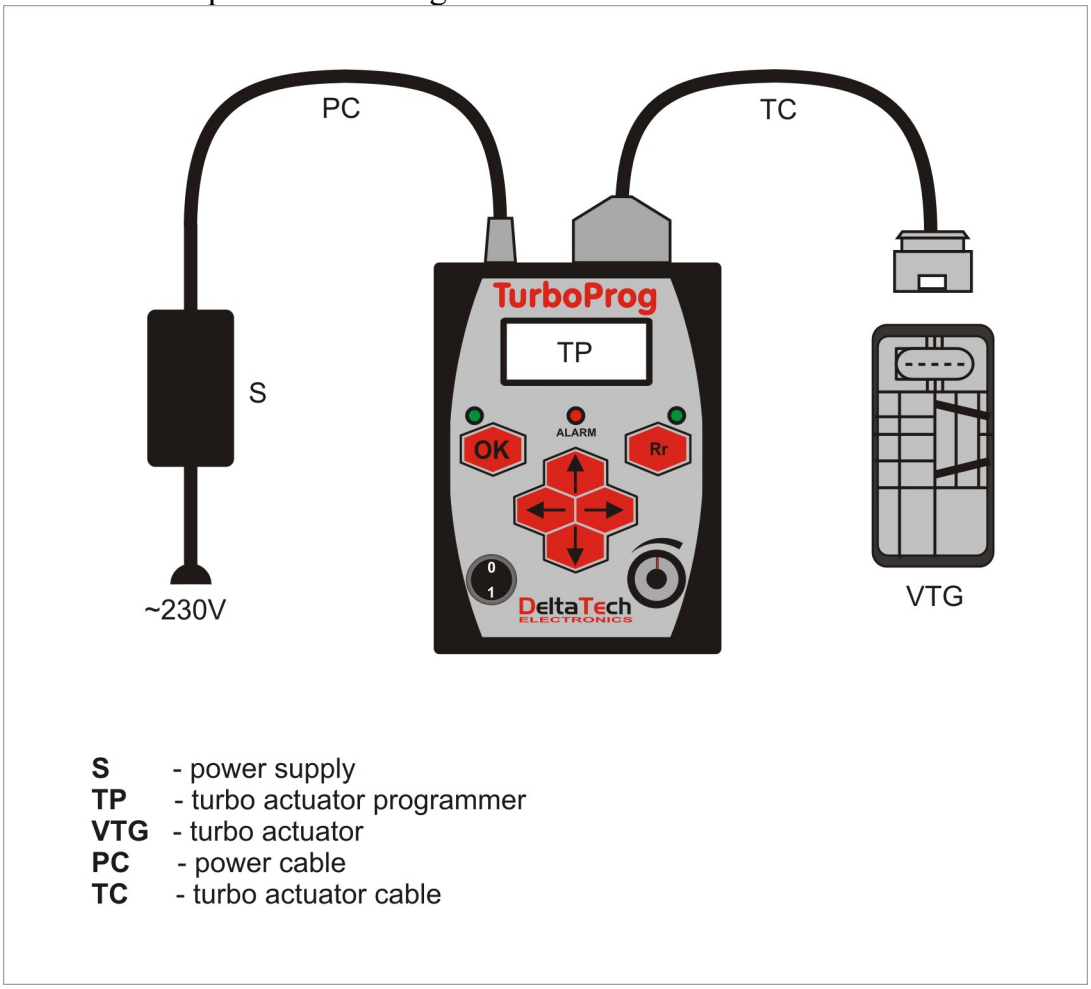


Figure 3.1

Connect the device to included DC power supply **S** using power cable **PC.**
Turbo actuators are connected with the **TC** cable. There are different versions of this cable for different actuator types. Details are included in Table 3.1.

Table 3.1

Actuator	***PV** Cable marking*
Hella 6NW 009 xxx	**HE01** (red/blue)
Hella 6NW 010 099-xx (where xx: 01, 02, 03, 07, 08, 21)	**HE08**
Siemens/VDO/Continental VW/Audi	**VD02** (blue/yellow)
Siemens/VDO/Continental Porsche	**VD03**
Siemens/VDO/Continental BMW	**VD01** (yellow)
Siemens/VDO/Continental Mercedes	**VD01** (yellow)
BorgWarner	**VD02** (blue/yellow)
Mando	**HE03** (green)
Kamtec	**VD02** (blue/yellow)
Kamtec	**KA01**

4. Device operation

The programmer is operated with the panel shown in Figure 4.1.

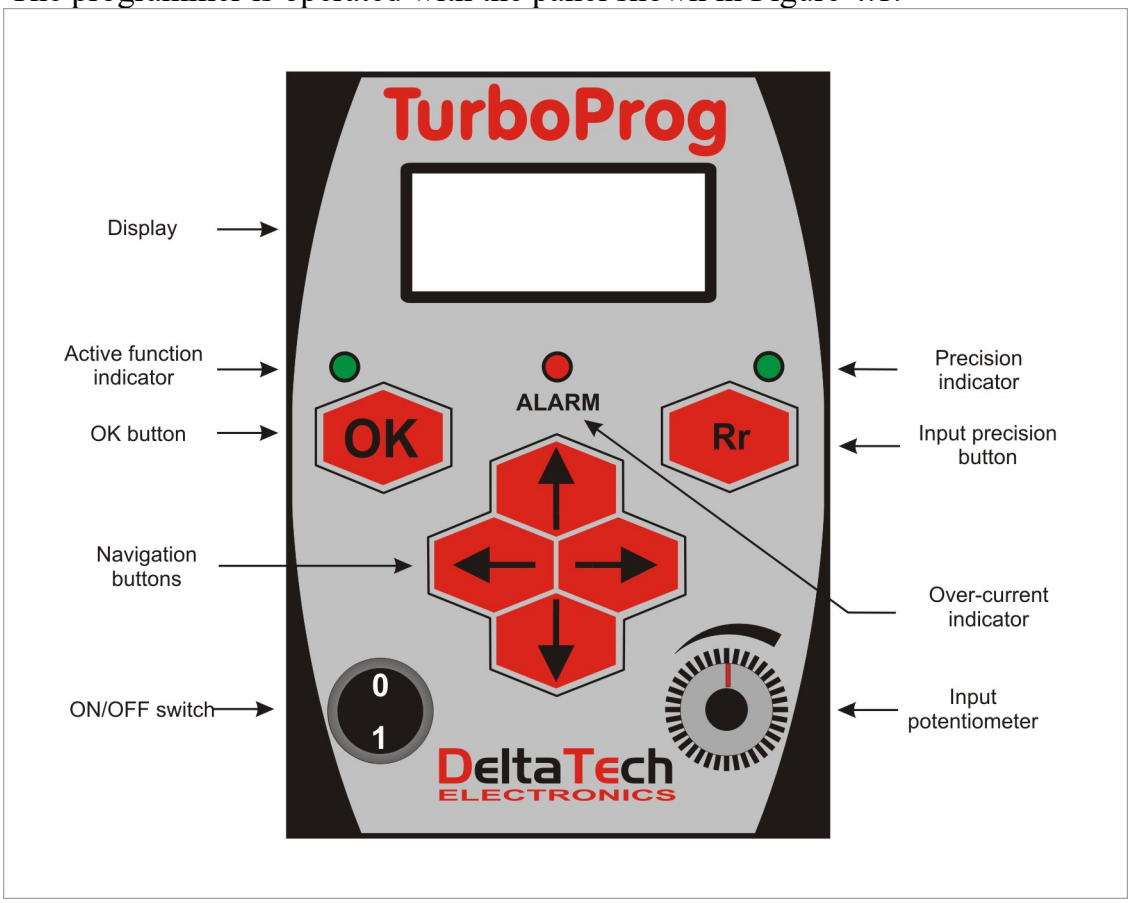


Figure 4.1

Display – provides information necessary to work with the programmer

Function active indicator - lights up when selected function is performed.

OK button – enables to start selected function.

Right arrow – confirm selection.

Left arrow – return from menu.

Up/down arrow – menu navigation, selection of subsequent characters of the controller name to change, selection of values to change.

ON/OFF switch – turns device ON and OFF.

Input potentiometer - used to change the set values. Depending on selected accuracy, changing the position of the control knob may cause small or large increases in the controlled value. The accuracy of adjustment changes is determined using the button. The knob is also used to select a character when entering a device name. You can also navigate through the menus using the knob.

Over-current indicator – lights up when the turbo actuator current exceeds maximum allowable value. The warning signal sounds during this state.

Input precision button – (coarse/fine) toggles on and off precise parameter adjustment.

Precision indicator – lights up when precise (fine) adjustment is made.

5. Programmer functions

5.1 Reading Hella actuator

To read currently programmed actuator parameters perform the following steps:

- Select *HELLA* from the main menu.
- Select *Read*.
- Press *OK* to start reading.

After successful reading of the parameters (approx. 10 seconds) the following options are available:

- **Parameters**
- **Save**
- **Program**
- **Range mod.**

5.1.1 *Parameters*

The option is used to display parameters read from the controller, such as:
For 6NW 009 xxx family actuators:
- Controller type,
- Gear number G,
- Version of the control program,
- Lever operating range.

For 6NW 010 099-xx family actuators:
- Control type (PWM / CAN)
- Frequency of the PWM signal
- Version of the control program
- Input range of the PWM signal (applies to actuators with PWM control)
- Lever operating range

Example:

```
 IDENTIFICATION
Typ:71212x G-277
Ver:A HV V
    4.04 24.03
```

```
OPERATING RANGE
Start :   20.2°
Stop  :   91.1°
Range :   68.9°
```

In the above example the parameters have the following meaning:
- actuator type: **71212x**, where 'x' means any number (in this example it can be actuator 712120),
- gearbox number: **G-277**
- firmware version: **AS HV V 4.04 24.03**
- starting point of lever movement: **20.2°** (**A** value on Figure 5.1)
- ending point of lever movement: **91.1°** (**B** value on Figure 5.1)
- lever operating range: **68.9°** (**C** value on Figure 5.1)

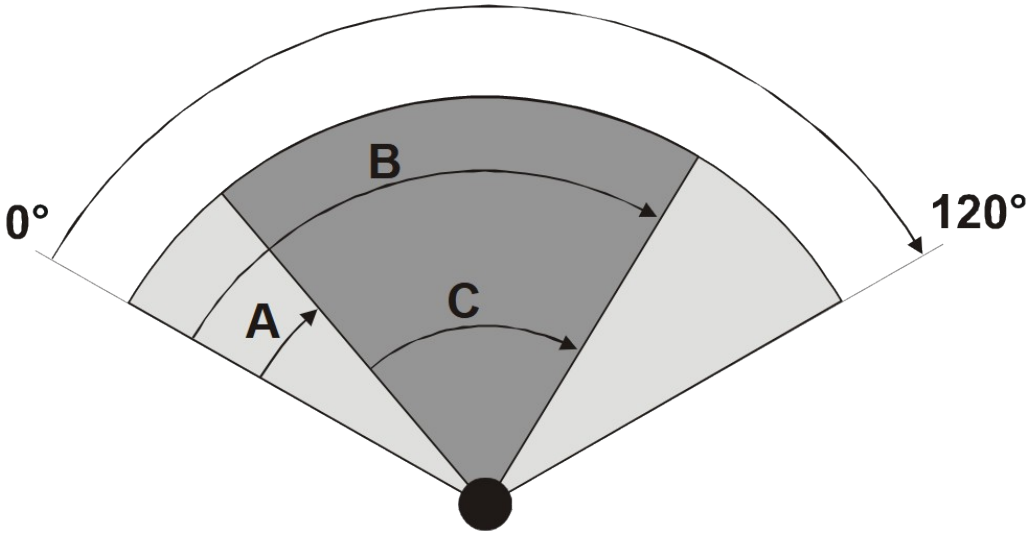


Figure 5.1

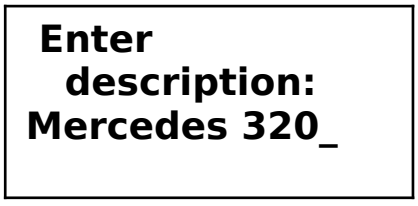
Figure 5.1 explains operating range of geometry lever. Maximum angle that can be achieved by moving lever is 120° (128° for Hella 6NW 010 099-xx). Actual operating range for specific actuator can be different.

A defines offset between 0° position and programmed starting point.
B defines offset between 0° position and programmed ending point.
C defines lever operating range.

5.1.2 *Save*

This will store actuator parameters in programmer internal memory for later use.

Each character of description is entered using input potentiometer (see Fig. 4.1). To change between characters use arrow buttons:  and  .



The parameters are saved into memory after pressing the ***OK*** button.

You can unsubscribe by pressing the ***left arrow*** button

5.1.3 *Program*

Select this option to program another actuator (of the same type) with the parameters currently read (actuator copying).

To program the controller parameters, perform the following steps:

- Select *Programming* from the menu.
- Press ***OK*** to start reading.
- In the first stage (approx. 10 seconds), the compatibility of the type of controller from which the data comes and the target controller to be programmed is verified. If there is a mismatch between the types of these controllers, you will need to confirm programming again with ***OK***.
- In the next stage (approx. 10 seconds), the controller's memory is properly programmed.

5.1.3 *Range mod.*

Use this function to adjust range of lever movement.

'Start' values refer to starting position of geometry lever (see value A, Fig. 5.1). First of the two values displayed is a new value (22.2°) while the second one (25.1°) is the currently programmed one.
Values referred as 'Stop' mean ending position of lever movement. To adjust value use input potentiometer (see Fig. 4.1). Currently adjusted value is indicated by the '**>**' symbol. To switch between the values use arrow buttons:  oraz  .

Saving a new set values is made by pressing 

button. To return to menu and discard changes use left arrow  button.

5.2 Programming Hella actuator

Before programming the actuator, select parameters from the available list.

- Select *HELLA* from the main menu;
- Select *Programming*;

• Select an item from the list of previously saved drivers
• Select Programming from the displayed menu.
• Confirm programming with OK.

After selecting parameters for programming, the following options are available:
• **Parameters** – displays the controller parameters
• **Program** - allows you to program the controller according to the selected position.
• **Delete** – allows you to delete a given entry from memory.
• **Range mod.** – changing the operating range of a given controller.
• **Save** – saving in the device's memory under a selected name.

The operation of the above functions is described in section 5.1.

5.3 Siemens/VDO/Continental/Mando/Kamtec/BorgWarner actuator programming

Programming range of geometry movement is done by performing actuator internal programming procedure. Before starting the procedure make sure that variable geometry is mechanically connected to the actuator.

To calibrate/program operating range of the actuator:
• Select the actuator brand from the main menu
• If you select a *Siemens VDO* actuator, you must also indicate the appropriate variant.
• Select *Program*.
• Select ***OK*** to start programming.
• When programming is completed, the programming completion information will be displayed.

5.4 Checking geometry movement range of Siemens/VDO/Continental/Mando/Kamtec/ BorgWarner actuator

This function enables checking range of geometry lever movement. The lever can be set in any position throughout the range.

To change lever position use input potentiometer (see Figure 4.1).

When this function is active the device displays the following parameters:

```
Pos :  35.0 [%]
Ret :  20.0 [%]
I   :  0.25 [A]
Imax:  1.50 [A]
```

Pos - position setpoint, changed by user. This is VTG lever position expressed as a percentage of the full range of lever movement. The user may change this value using input potentiometer. Acceptable values depend on actuator selected. Input precision can be set to 1.0[%] or 0.1[%].

Ret - position feedback, value returned by actuator. It specifies current position of the VTG lever expressed as a percentage of the full range of lever movement.

I - momentary value of actuator current draw.

Imax - maximum value of an actuator current during the test (since enabling control).

5.5 Checking compatible cables

To check which cable is intended for the selected controller, select *Cable* from the menu available after selecting the actuator.

6. Tester update.

TurboProg allows for remote firmware update. Simply connect the device to PC computer using USB cable provided and run software update. The computer must have Internet access.
Update software can downloaded here:

https://dte.com.pl/download/software/updater/

Software update procedure consist of two stages:
Stage 1. USB driver installation (performed only during first update).
Stage 2. Verification and device programming using Updater tool.

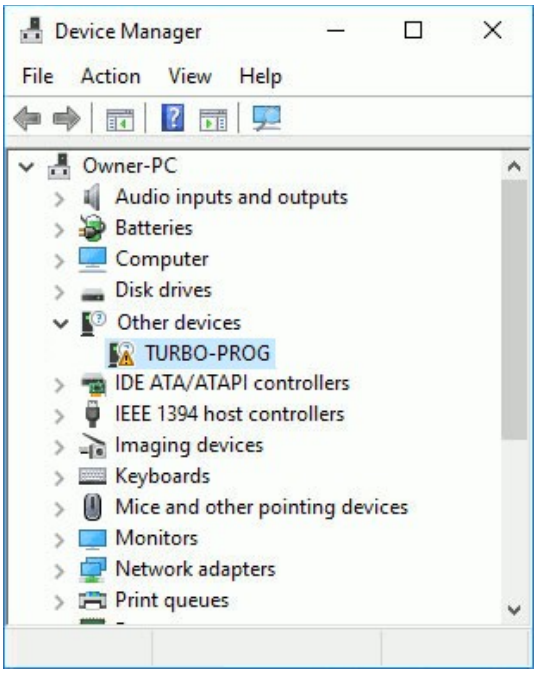
6.1 Driver installation (Windows 8/10/11)

To install driver properly in Windows 8/10/11, it is necessary to start the computer in special mode (64-bit versions).
Perform the following steps:

1. Display power options:
   - Windows 8/8.1: Move cursor over the top or bottom right corer of the screen and the Charm Bar will appear. Click *Settings* (gear icon) and then click *Power*.
   - Windows 10/11: Click *Menu Start* and then *Power*.
2. While holding *SHIFT* key click *Restart* button.
3. When an option screen will display, click *Troubleshoot*, then *Advanced options*, and then, *Startup settings*.
4. The system will display list of options available. Click *Restart*.
5. System will restart into startup settings mode. On the list displayed select number 7 (Disable driver signature enforcement) by pressing F7 key.

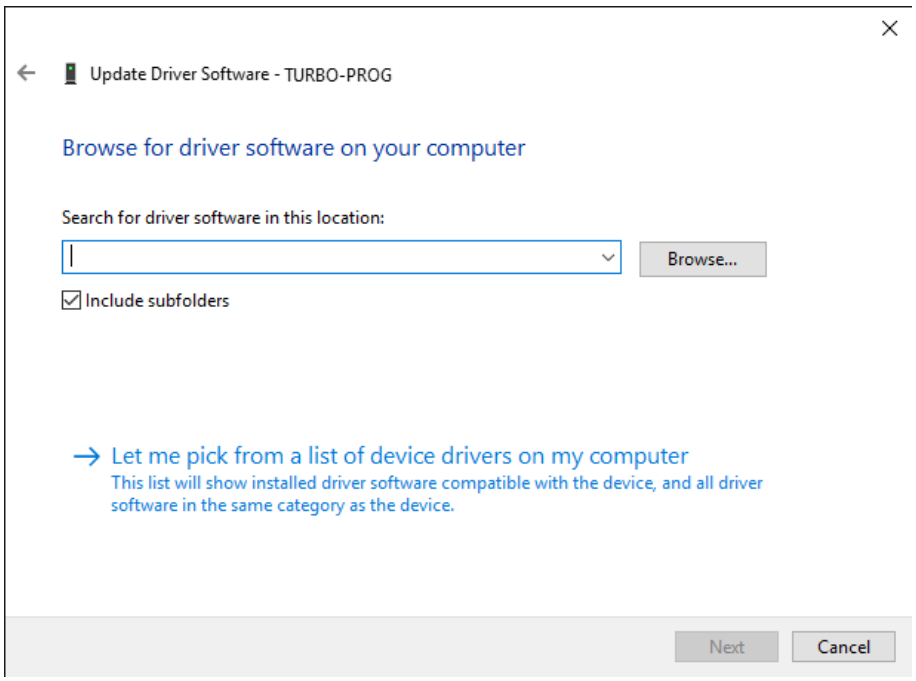
After performing all the steps connect the device to the computer using included USB cable.

Run *Device manager.* The fastest way to do this is to press *WinKey + X* on the keyboard and select *Device manager*. Alternatively, you can search for Device Manager in start menu.



Right-click on the *TURBO-PROG* item and then select the *Update driver* option.

Select the second option displayed - *Browse my computer for driver software*.



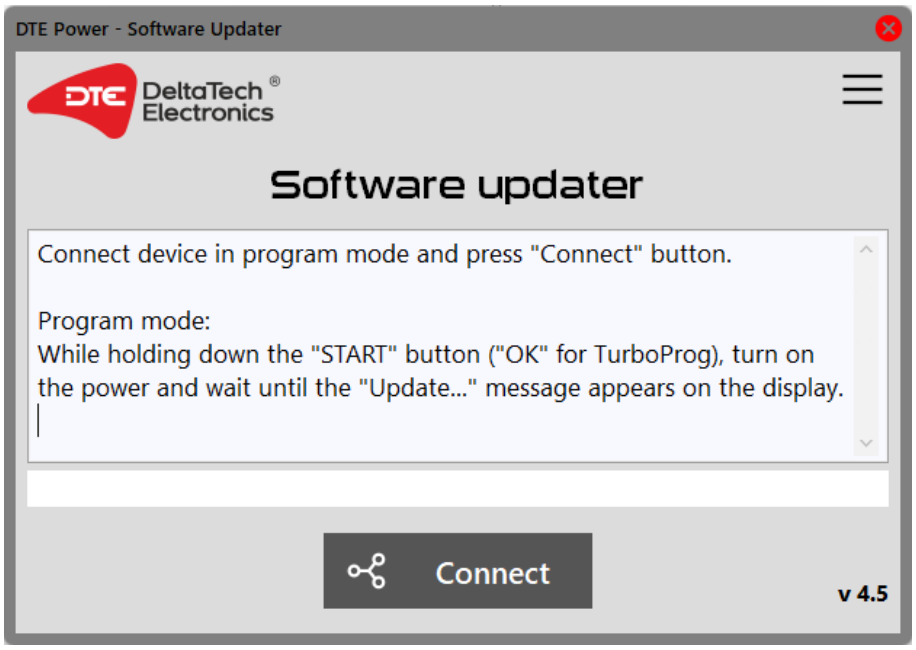
Click *Browse* and then select the folder where the drivers are located - this will be the folder with the content of the downloaded software to be updated. Confirm by clicking Next.

In the next step, Windows will display a warning that the driver vendor cannot be verified. To install the driver, click Install driver software anyway. After a while, the installation should be completed.

6.2 Software updater

This application is intended to update firmware of DeltaTech Electronics tester devices.
To perform firmware upgrade connect device to USB port and use update tool to update device.
During first run of *Updater* the language selection prompt will display.

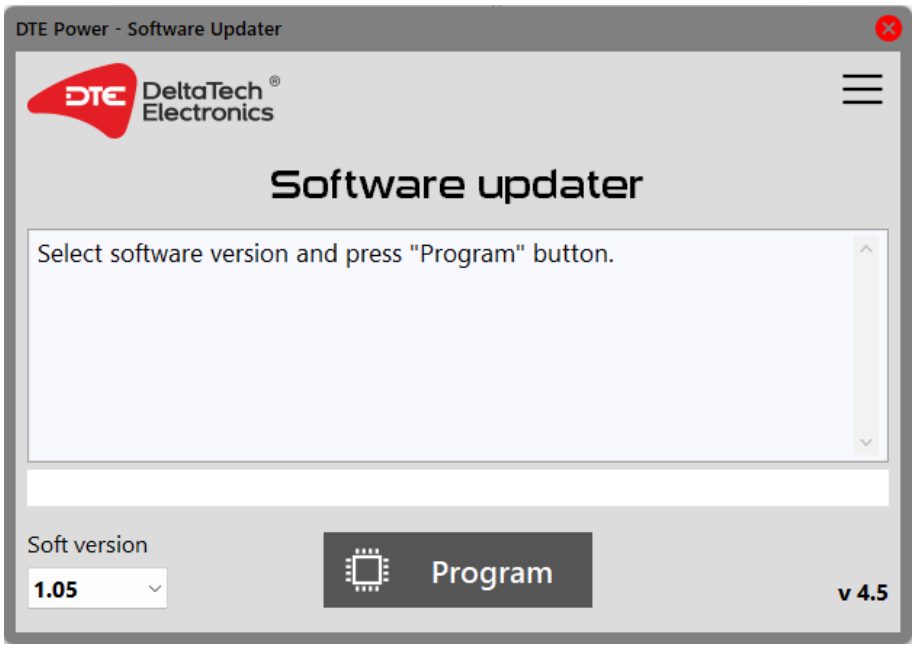
After selecting application language the main window will appear.



In the next step run the tester device in update mode. To enable program mode perform the following steps:
- Turn off the tester;
- Press ***OK*** button;
- While holding ***OK***, turn on the tester;
- After 3 seconds of start-up screen, the device will display *Update...*;
- Now release ***OK*** button.

After these steps click ***Connect.*** A window will appear requesting the password.

Password information is included as a separate page in this manual.
After typing the password click ***OK***.



After successfully connecting to the device, you can click ***Program*** to update to the newest available version. There is possibility to downgrade by selecting older version that is currently installed.

The software updater will ask the user to confirm firmware update.
After selecting ***Yes*** the update will begin. Update process may take several minutes to complete.

After the update the user may close the application.

7. Data backup

This procedure enables to copy all actuator data from TurboProg internal memory to a PC. These data can be later restored to the original device or transferred to any other TurboProg device.

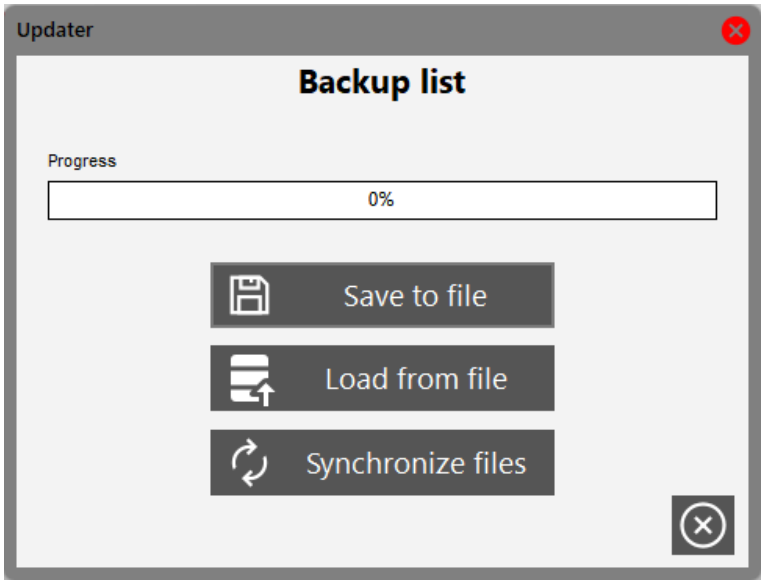
1. Connect the TurboProg to a PC computer (driver installation is described in the previous section of this manual).
2. Run the TurboProg in special mode. To do that, perform the following steps:

- turn off the TurboProg,
- press the button,

- while holding down the button turn on the TurboProg and wait for a few

seconds until the display shows **Backup list**.

3. Run the **Updater** and press the **Menu** button. Select **Lista Backup** option. (this option is available only if TurboProg is correctly connected to the computer).



4. To save the list of actuator to a file on your computer, press **Save to file** button**.**

5. To copy saved to a file list of drivers to another device TurboProg follow the steps of the points 1, 2 and 3, and next press **Load from file**.

6. To synchronize two files (merge the list of actuators from both files into one file), press **Synchronize files.**

Warning !!!

DeltaTech Electronics Company has do their most in order to write this manual properly, but can not guarantee that it does not contain any errors. During any workshop activities please always refer to vehicle service manuals, local regulations and laws, applicable workplace and fire safety rules.