Battery tester

DBT-12+

User manual

t.

DeltaTech® Electronics

Contents

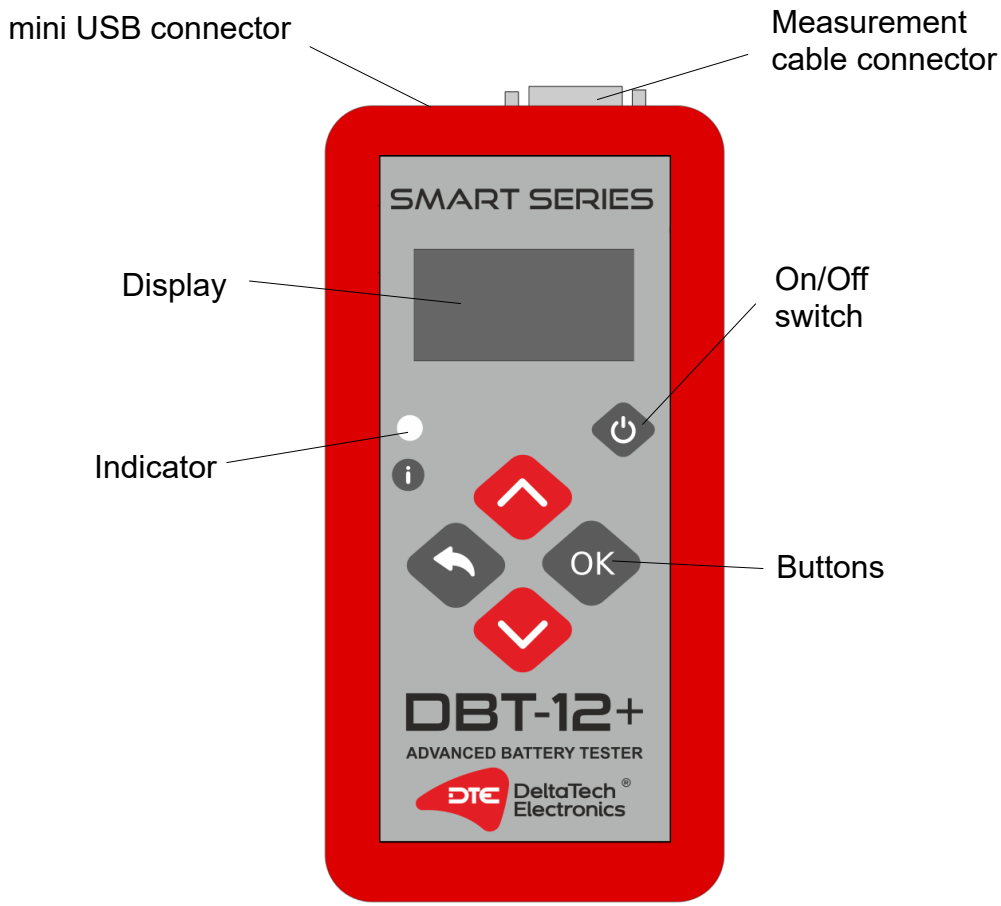
1. Specifications

Power supply:	internal Li-ion battery
Charging requirement:	5V, 500mA
Operating conditions:	temp. 0 – 40°C
Voltage measurement:	0 – 50V DC
Accuracy:	0,5% + 2 counts (voltage)
Tested batteries:	SLI (standard), EFB, AGM/VRLA
Rating systems:	EN, SAE, DIN, IEC
Battery range:	40 – 2000 A (EN)

Do not connect to sources of voltages higher than 50V, as this may cause damage to the tester.

Do not attempt to open the device. Careless handling can lead to damage or deterioration of accuracy and result in loss of warranty.

2. Appearance and connection



Measurement cable connector – connect here cable with two alligator clips: red (+) and black (-)

Mini USB connector – for charging internal battery and PC connectivity (result viewing, report printing).

[⏻] – switches the device on and off.

[►] Confirms menu or function selection, moving to the next stage of test.

[◄] Return from function to menu, return from submenu to menu, cancel selection.

[▲] – selects previous item in the list, increase modified value, displays another result screen.

[▼] – selects next item in the list, decrease modified value, displays another result screen.

Indicator – it shows device operation status when device is on or charging status when charger is connected (red – charging, green – fully charged).

2.1 Internal battery charging.

The device is powered with a built in rechargeable battery. As a result, it will not drain tested batteries and can also be conveniently used as a voltmeter. Charging is done by connecting external charger (5V min. 500 mA) or during PC connection via USB. Charging duration depends on level of discharge and takes up to 3 hours. During this time the indicator lights red (when device is off), after completion lights green.

During charging do not connect the device to the battery, the vehicle wiring or other tested elements. Functions of the device are not available.

Do not leave discharged battery for a long time, as this can cause damage to the battery. When leaving the device for a long time without use, first fully charge a battery.

3. Device operation

Before first use, set the date and time in the device. Correct setting makes easier to use result memory.

During device operation, state of charge of the internal battery is indicated in the upper right corner of the screen by the battery icon ().

The status of the wireless connection (WiFi) is displayed to the left of the battery symbol. The antenna symbol  means the WiFi module is turned on, while the visible transmission symbol  indicates that the network has been successfully logged on.

After power up the device will go to the main menu. Use [▲] and [▼] buttons to select required function and press [OK] to proceed.

List of available menus:

3.1 Battery – perform battery test

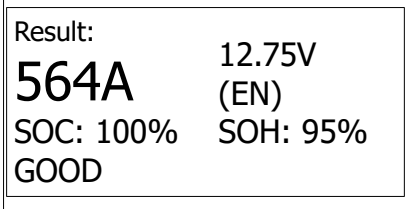
This menu allows the user to carry out a standard battery test outside or inside the vehicle. Connect alligator clips to a battery, observing polarity. Ensure that battery terminals are clean and connection is good. Follow these steps:

1. Choose whether to enter the registration number of the vehicle (or serial number).
2. If Enter was selected, specify the next characters of the number by using the [▲] and [▼] buttons, each subsequent character is confirmed by pressing [OK]. The dot means no character.
3. Select type of battery (*SLI (regular)* for standard maintenance or maintenance free flooded batteries, *EFB* for enhanced batteries used in Start/Stop systems. or *AGM/VRLA (sealed)* for maintenance free batteries without liquid electrolyte. Confirm selection by pressing [►] .
4. Select current rating norm according to the battery specifications: *EN, IEC, DIN, SAE, CCA*. Press [►] .
5. Set the nominal cold cranking current according to the label on a battery. Use the [▲] and [▼] buttons to change the value (long press means fast change). Confirm by pressing [►].
6. Determine the approximate temperature of the tested battery (only if manual temperature compensation is selected). Select one of the available options: *< -15°C*; *-15...-5°C*; *-5...5°C*; *5...15°C*; *15...30°C*; *30...50°C*. Press [►] to start a test.

When an unreliable connection is detected or low voltage is measured, the tester will prompt to check the connection. Unreliable connection can lead to a incorrect results. After making sure that connection is correct, press [►].

Even if temperature compensation is disabled, in certain conditions the device will ask the user whether the temperature is above or below 0°C. In such case, set appropriate answer using [▲] and [▼] buttons and press [►] button to resume test.

When the measurement is complete, the user may view the result, which consists of two screens (Use [▲] and [▼] buttons to switch).
The first screen shows measured cold cranking current and open circuit voltage of the battery with the assessment of the result.



When the *<MIN* appear in place of value, it means the result is below measurement range. *ERROR* indicates incorrect measurement (unreliable contact, excessive voltage or exceeded measurement range).

The second screen shows additional information:
SOC - state of charge of the battery in %,

SOH – expresses state of health of the battery in %.

SOC: 100%
SOH: 90%

To display the internal resistance of the battery select [▼], to return to the result evaluation display press [▲].

To return to main menu press [◄].

Interpretation of battery results:

Test result	*Comment*
Good	Battery is suitable for operation.
Replace	The battery result indicates it should be replaced.
Charge & Retest	Battery state evaluation is not possible, repeat the test after charging. If this message appears again after charging, the battery needs replacing.
Bad - replace	The battery needs to be replaced.

Pressing [OK] on the results screen will get the following options:
Exit - returns to the menu
Print - allows printing on the default printer attached to the computer (requires WiFi network on and active connection with the PC application).
Confirm - allows you to repeat the test.

3.2 Quick – perform rapid battery test

In this mode it is possible to perform a measurement by a single press of button [OK]. After the test, the result are available as in normal mode but without battery state of health and test assessment (because nominal value is not specified in this mode).
Test parameters as type of battery and rating system are set according to defaults set (see section 3.7 Settings).

3.3 System – car electric system test

For an system test, connect the device directly to the vehicle's battery terminals. If the system has two batteries, connect to the first one. Before starting the system test, select rated system voltage: 6V, 12V or 24V. It is possible to test 24V systems powered by two 12V l batteries (trucks) or 12V systems powered by two 6V batteries (some agricultural tractors).

The system test consists of three stages:

I Battery test

The test may include one battery (6V and 12V systems) or two batteries (24V or 12V installations with 6V batteries). If a second battery needs to be connected, a message will appear.

Full battery test - see section 3.1.
Normal battery test – see section 3.1 Battery.

II Starting test

Battery state affects the performance of starting and charging subsystems. Before performing the following measurements make sure that battery is good and fully charged.

In case of power supply from two batteries in a serial system, before starting the installation test, a request for connection to the system voltage will be displayed. After making the connection, go to the test with the [OK] button.
The engine start command will be displayed. Please start the engine, the results will be displayed after the start-up.
The results screen contains the following data: measurement evaluation, average voltage during start-up, minimum starting voltage and duration of start-up.

Start:
NORMAL
Voltage: 10.8V
Minimum: 9,5V
Time: 0,20s

Interpretation of results:

Test result	*Comment*
Normal	Starting performance is good. No actions are required.
Low voltage (red)	Possibly excessive starter current consumption. This may be associated wit the wear of a starter.
Low voltage (yellow)	Battery state may impair starting. For proper evaluation of starting performance, retest after charging or replacing the battery.
Low minimum	Short-term excessive voltage drop. Possible increased starter current consumption. Such voltage drops can in some cases cause problems with vehicle electronic systems.

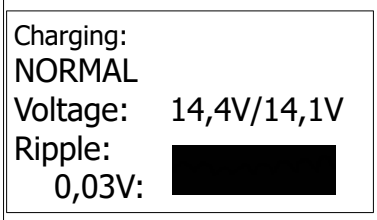
III Charging test

After completing starting test press [OK] to begin charging test. Before that, make sure that major receivers such as ventilation, radio, lights, heated windows, etc. are off. Then follow these test according to the instructions on the screen:

- ***Engine idle****, loads OFF*– major receivers are off.
- *Gradually increase RPM* – increase RPM to about 2000.
- ***Engine idle,*** *loads ON*. Return to idling and enable major electric device such as headlamps or rear window heating.
- *Gradually increase RPM* – increase RPM to about 2000.

The test is completed when result are displayed.

The results include: measurement evaluation, voltage values without load and with load, as well as the value of alternator voltage pulsation along with a fragment of the pulsation graph (a fuller graph can be seen after connecting to a computer and on the printout).



Ripple waveform can be helpful when diagnosing the alternator. High value (then battery result is good) may indicate alternator problem. Repeating of characteristic waveform pattern indicates potential damage to the alternator.

Single irregularities in the waveform, even of significant amplitude do not indicate a fault. These are normal effect of operation of many electrical components of the car.

Examples of ripple waveforms

Waveform	*Comment*
	Correct
	Correct
	Correct
	Incorrect (diode failure)

	Incorrect (phase failure)

Interpretation of charge result:

Test result	*Comment*
Normal	The charging system works properly.
Low voltage	Alternator does not provide sufficient voltage. Check condition of the driving belts and alternator wiring. Check main ground connections in vehicle. In the next step check alternator itself.
High voltage	Charging voltage is too high. Voltage regulator fault – alternator needs immediate replacement. After that, check battery performance and electrolyte level (if applicable).
Ripple high	Excessive voltage ripple. Check alternator.

Pressing [OK] on the result screen will get the following options:
- Exit - returns to the menu
- Print - allows printing on the default printer attached to the computer (requires WiFi network on and active connection with the PC application).
- Confirm - allows you to repeat the test.

3.4 Recorder – voltage logging

Voltage recording mode is intended for long-term recording of battery voltage. Is is helpful in many situations such as:
- Examining system voltage while parking. The measurement can detect unexpected events, for example activating the alarm or other current consuming devices.
- Checking automatic chargers – analysis of voltage during charging and after its completion.
- Battery measurement – detection of excessive self-discharge.

Before starting the recording, select one of level detection threshold values. The device will save average voltage every minute along with additional information about measured voltage higher or lower from the average from the previous minute (this is later displayed as a percentage of time voltage being in higher or lower value than the previous minute).
After selecting the threshold (*Normal* is default) and starting the recording with the [OK] button, voltage recording will continue until it will be stopped.
During this time, display backlight is off and the voltage value is displaced on the top of display. Ongoing recording is also indicated by the indicator blinking red every second.
To turn on the backlight for a few seconds, press [▲] or [▼].
To stop the recording, press [OK] or [◄] and then confirm by pressing [OK].

Turning the device off is only possible after stopping the recording.

3.5 Results – display last results

This menu allows you to access last 20 measurements. When this menu is selected, a list

appears that shows last results marked with date and time. Abbreviations indicates measurement type:
Bat. - battery test
Sys. - system test
Rec. - voltage recording

To return to main menu press [◄].
After selecting the result with [▲] and [▼] press [OK] to display it. Viewing the results is done the same way as after the measurement.
Use the [▲] and [▼] to switch between screens and [OK] to move to the next phase of system test.
To return to list of last results press [◄].

Viewing voltage recordings are not available. To read the data and view or print the results, connect the device to a computer and use dedicated software.

3.6 Settings – enter settings menu

Language

The menu allows you to select the language of the device interface. Use the [▲] and [▼] keys to change the value. The [OK] button confirms the selection, [◄] returns to the previous setting.

WiFi

The menu allows you to enable or disable WiFi connectivity. Use the [▲] and [▼] keys to change the value. The [OK] button confirms the selection, [◄] returns to the previous setting.

To connect to a WiFi network, you need to set up a connection. To set up a WiFi connection, connect the device to the computer using a USB cable, then select Menu → WiFi and enter the necessary parameters.

Date/Time

It allows the user to set device date and time. Press [►] to select the next item. Use [▲] and [▼] to adjust value of the element selected. After adjusting last value press [►] to save settings.
To cancel date and time adjustment press [◄].

If you use PC computer software, it is convenient to set date and time using software or to set automatic time and date adjustment according to PC every time device is connected.

Temperature

It is possible to enable or disable manual temperature compensation. If this function is activated, the device will ask for the temperature of the battery being tested. Using this feature increases the credibility of the results by matching criteria to the test conditions.
When temperature compensation is disabled, the device can sometimes ask for the battery temperature. However, this will be limited to determining whether temperature is above 0°C or below 0°C.

Defaults

This enables to select default parameters of the battery during testing (menu *Battery*). When using *Quick* mode these parameters will be automatically selected (except for current rating that remains unused in this mode).

Erase results

Use this to erase the measurement memory of the device. Once selected, follow the directions on the screen by confirming the intention twice using [OK]. To cancel memory erase and return to menu press [◄].

Auto power off

Allows you to set a timer that will automatically turn off the device after a period of inactivity (default 10 minutes). It is possible to disable this function (the device will turn off only when the battery is discharged). After selecting the option, confirm the selection with [OK].

Alternator test

Use to select how the charging test is to be carried out. The *Stages* option suspends the transition between the test stages until the [OK] button is pressed. If *Quick* is selected, the transition between stages is automatic.

LCD contrast

Lets you choose to adjust the display contrast setting for maximum readability. Use the [▲] and [▼] keys to change the value. The [OK] button confirms the selection, [◄] returns to the previous setting.

Version

Displays software version of the device. Press [◄] to return.

4. DBT-12+ PC software

4.1 Software installation

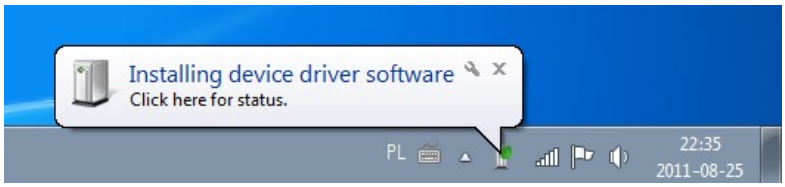
After inserting the CD into the drive the installation program window should appear (if not, run *Start.exe* from the CD-ROM).

To install DBT-12+ software click *Install*. In the next steps you must accept the license agreement, specify the destination folder, and choose whether you want to create a desktop icon. Each wizard step should be confirmed by clicking *Next*.
During installation a database engine setup will display. It is necessary to install database engine for DBT-12+ software to work properly.

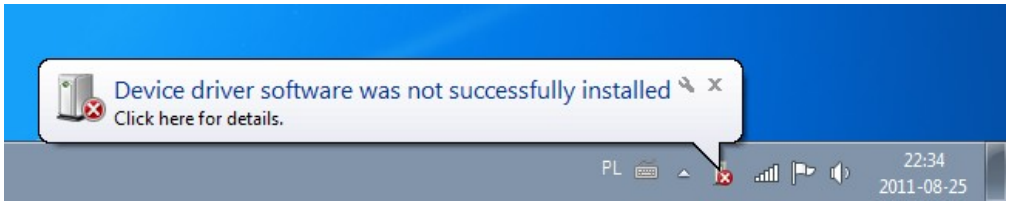
4.2 Driver installation (Windows 7)

Warning!
Users of 64-bit versions of Windows should make additional step before proceeding. Restart system and press F8 ahead of system loading begins. On the list that should appear select *Disable Driver Signature Enforcement* and press ENTER. Then perform the following steps just as in case of 32-bit version of operating system.

1. Connect the device to the USB port. Notification will appear in the lower right corner of the screen.



After a while the warning will display as the driver will not install automatically:



2. Right-click the *Computer* and select *Properties.* Click *Device manager*, this will invoke the list of devices. Among other devices there should be *DeltaTech Electronics DBT-12+* on the list. Right-click *DeltaTech Electronics DBT-12+* and select *Update device driver* from the pop-up menu.

3. Choose *Browse my computer for driver software* and specify the driver path:
Select *Driver* folder on the installation CD-ROM (drive letter may differ) and click *Next*.

4. The system will display untrusted publisher warning. Select *Install this driver software anyway.* After a while installation should be completed.

4.3 Driver installation (Windows 8/8.1)

To install driver properly in Windows 8/8.1 (64 bit version), it is necessary to start the computer in special mode.
Perform the following steps:

1. Display power options: 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*.
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 run Device manager. The fastest way to do this is to press *WinKey + X* on the keyboard and select *Device manager*.
After opening device manager proceed as in Windows 7 (see previous section of this Manual).

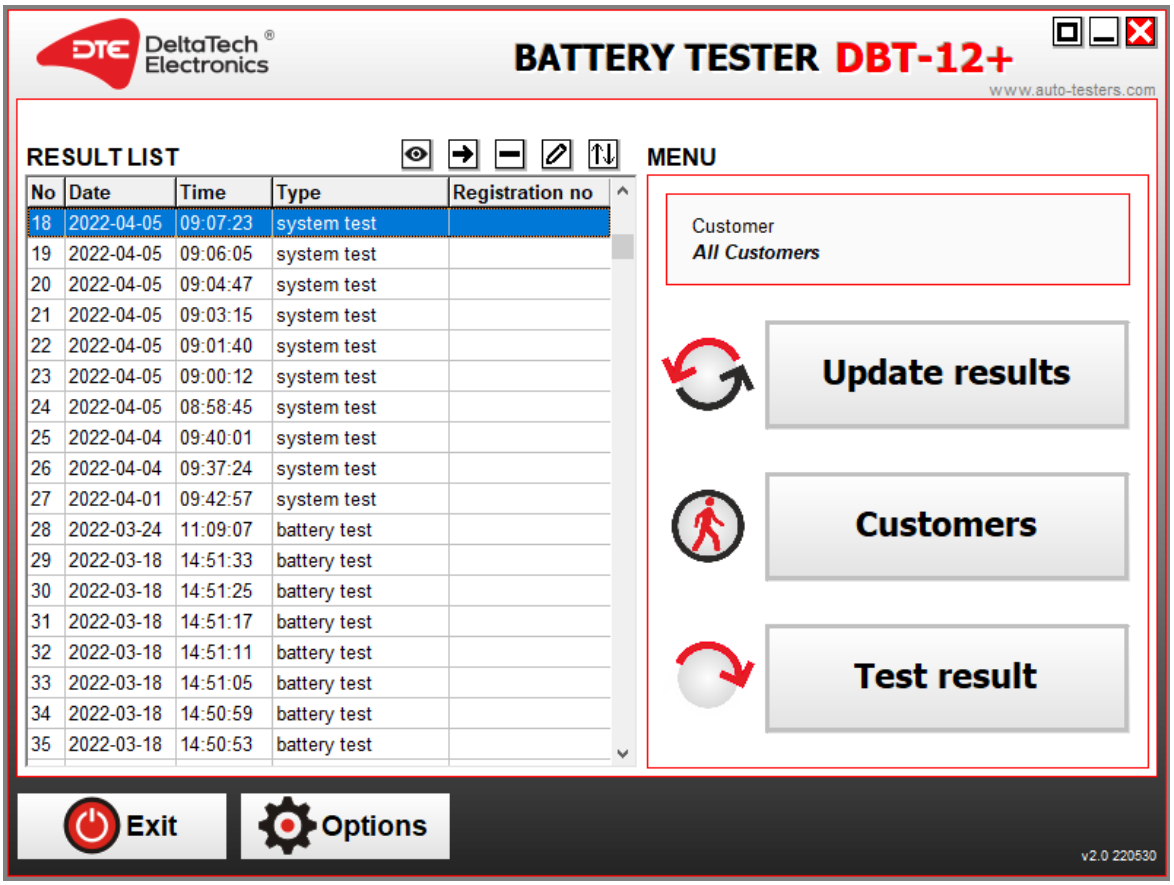
4.4 Driver installation (Windows 10/11)

When using Windows 10/11, there is no need to install additional drivers. Connect the device to the USB port and the system will load the driver automatically. The device is visible to the system as a serial (COM) port.

4.5 Software operation

To connect to a computer the device must be turned on and connected via the included Mini USB cable.

Application main window:



Buttons description:

Update results – reads measurement data from the device.

Customers – opens customer database window.

Test result – displays the results of selected measurement.

 - enables to assign the measurement to a specific customer.

 - deletes the selected measurement.

 - it allows the user to enter additional data such as: comment, model, serial number of a tested battery.

 - allows the user to change how the list is sorted.

Exit – closes application.

Options – displays options menu.

Options menu list:

- WiFi - allows you to set up a wireless connection.
- Program language - allows you to change the program language
- Workshop data - used to set the workshop data visible on printouts

- Delete measurement list - deletes all measurements from the computer.
- Tester date and time - allows you to set the clock time on your device.
- Device status - displays the connection status, date and time of the device and version information.

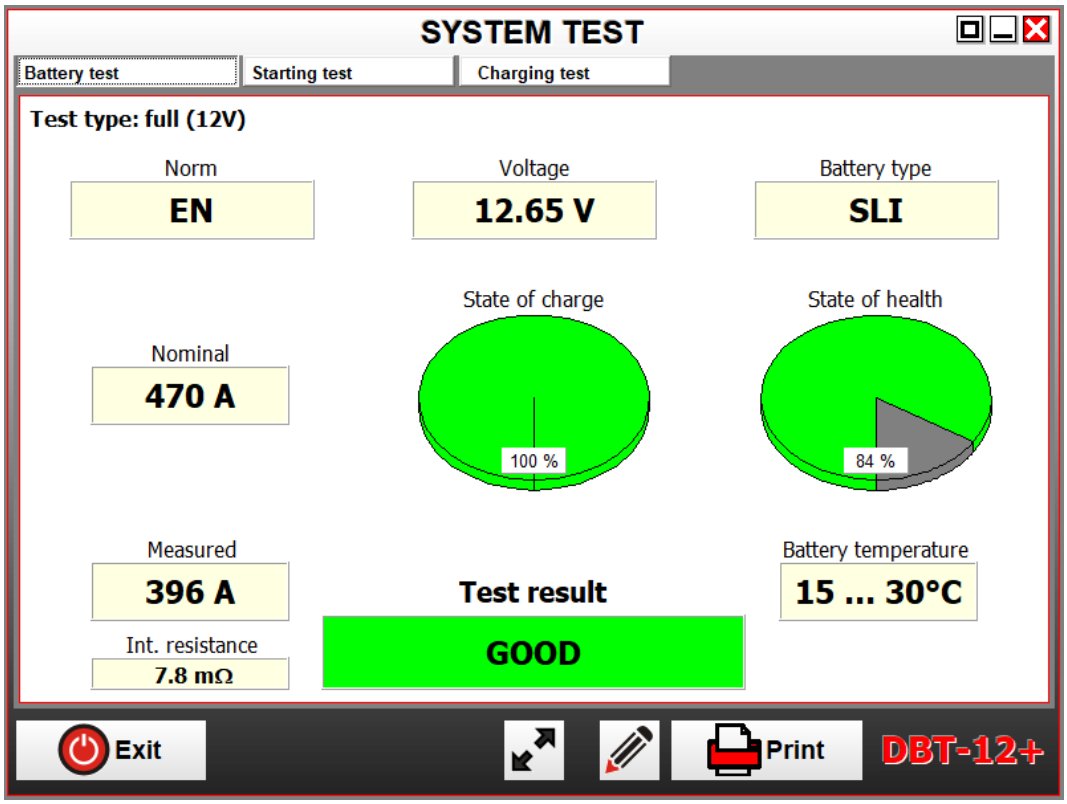
Result display

After reading the data from the device (*Update results* button) and selecting specific item from the list click *Test result* to show the results. There are different screens depending on the type of measurement made (in system test mode you can switch between available screens by clicking on the buttons at the top of the window):

- Battery test
- Starting test
- Charging test
- Voltage recorder

Details on the interpretation of results can be found in the previous section – see section 3 device operation.

The following screen shows an example of the results displayed on a computer:



Close - closes an open measurement.

 - allows to complete the measurement data.

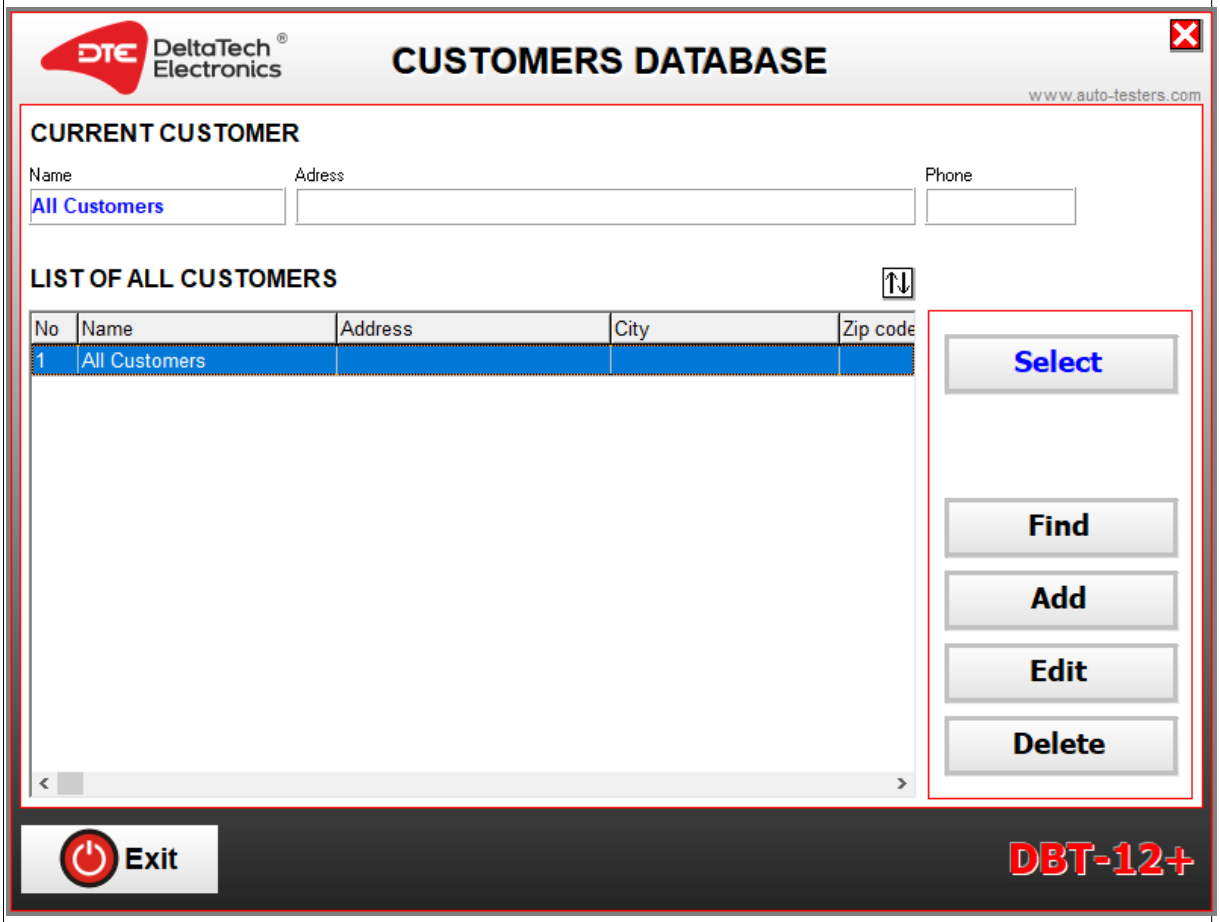
Print - prints the open result report.

Result printing

When displaying the results it is possible print a test report. To do this, click *Print*.

Customer database

The software allows the user to create customer database. This makes possible to assign measurements to specific customers.



Select - after selecting the customer, selects it for assignment to measurements

Search - searches in the database

Add - add a new customer.

Editing - editing customer data.

Delete - deleting customer data from the program database.

WiFi configuration

After selecting Options → WiFi the wireless connection configuration window will be displayed. Enter the network name (SSID) and password to connect to the selected network.

When Automatic configuration is selected, the device will obtain an IP address using DHCP. If the Manual configuration option is selected it is possible to give a static IP address.

Ensure that port 7050 (TCP) is available for the DBT-12 + program. To do this, check your firewall configuration - see the security software manual for details.

5. Troubleshooting

Problem	*Suggested actions*
The device does not turn on. Indicator does not light up when connected to suitable charger.	Make sure battery is charged by leaving the device connected to a charger for long time. If this not help, the battery may be faulty.
The device works for short after charging and/or charging ends soon when connected to suitable charger.	The battery is faulty and needs replacement.
The device does not measure voltage.	Check the connection. Measurement cable may be damaged.
The device measures voltage correctly, but each battery test ends with “ERROR”	Check the connection. Measurement cable may be damaged. Make sure the engine is off during the measurement. Testing two 12V batteries in series is not possible.
Results of battery test are not repeatable.	Perform test out of vehicle, with the battery disconnected from any other equipment. Make sure that battery is charged (low state of charge can make results less stable).
The device cannot be switched off and does not respond to buttons.	To reset the device disconnect and connect again battery connector. For this purpose unscrew two screws securing battery cover on the bottom of the device. After resetting, it is required to set device date and time again.
The device fails to connect to a computer.	Make sure that device is on and proper driver is installed (see sections 4.2 – 4.4 of this manual). Pay attention to disabling driver enforcement in some 64-bit systems.
The device fails to connect to the computer via WiFi	1. Make sure WiFi is turned on and the device and computer are logged into the same local network. 2. Configure your firewall software so that port 7050 (TCP) is available for the DBT-12 + application

If the above suggestions does not help your problems or the problem is not listed, please contact device manufacturer for help.

Warning !!!

DeltaTech Electronics company is liable up to the amount paid for the device and is not responsible for any damage and consequences of misuse.

In case of device failure please contact manufacturer. Do not try to modify or repair the device by yourself as this will void the warranty. If returning the product for warranty repairs please include purchasing document (or copy) and device accessories, such as power supply, cables, etc.

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, workplace and fire safety rules.