DeltaTech® Electronics

Innovations in every workshop

POWER Series

USER'S MANUAL

BLT600S

BATTERY LOAD TESTER

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Version: **BLT600S_EN_1.0**

BLT600S BATTERY LOAD TESTER USER'S MANUAL

Reading the user manual is a way to familiarize yourself with the innovative functions and to obtain information on how to handle the tester in various situations. It also allows you to use all the functions of the device.

Please pay special attention to the highlighted sections regarding the safety guidelines.

Note:
We are constantly working on improving our product. Improvements and additional functionality may cause the information, descriptions and illustrations in the user manual to differ depending on the version.

The manufacturer reserves the right to make changes to the instructions without prior notice.

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1. APPLICATION

BLT600S Tester

for 12V and 6V batteries

The BLT600S tester is an advanced tool for testing 6 and 12 V starter batteries. To obtain accurate results, it is necessary to recreate conditions similar to those occurring during engine starting. The tester uses a set of resistors that generate the appropriate load. This load is regulated by connecting additional resistors, which allows for precise matching of the test conditions to the specification of the tested battery. The device measures voltage regardless of polarity up to 16V.

The BLT600S tester allows you to perform key tests such as:

- **Battery voltage measurement:** Checks the idle voltage to assess the batter state of charge.
- **Load Test:** Simulation of starting conditions by connecting appropriate resistors, allowing evaluation of battery performance under load.
- **Cranking Test:** Analysis of voltage behavior during a simulated engine cranking to determine the battery's ability to deliver the required current in a short period of time.

When performing load tests, it is essential to properly connect resistors to provide the appropriate load to match actual starting conditions. Incorrect resistor selection can lead to erroneous results and an incorrect assessment of the battery condition.

The tester is made in accordance with the requirements of group B according to PN 866-06500.

2. SPECIFICATIONS

Parameter	Value
Voltmeter range	± 0,5 - 16,00 V
Resolution	0,01 V
Voltmeter accuracy	± 0,5% + 0,02V
Load current (for 12V battery)	-
Terminals off - BLT600S	200A
One clamp included - BLT600S	400A
Two terminals included - BLT600S	600A
Load current accuracy	± 20%
Allowable measurement time	6 sec
Permissible measurement frequency (for 12V battery)	-
• Within the first minute	2 measurements
• After the first minute	1 measurement per 2 minutes
Power supply	3V, 2x AA battery
Current consumption (depends on battery voltage)	typically 12 mA, in sleep mode about 10 µA

Working and storage conditions:

Working conditions:

- Ambient temperature: -20 to + 50 °C
- Relative humidity: <90%, non-condensing
- Vertical position: no restrictions

Storage conditions:

- Ambient temperature: -25 to + 50 °C (without batteries)
- Relative humidity: <80%, non-condensing

3. USAGE

When using the tester on circuits with voltages above 50V AC, do not touch the measuring tips.

Before starting the measurement:

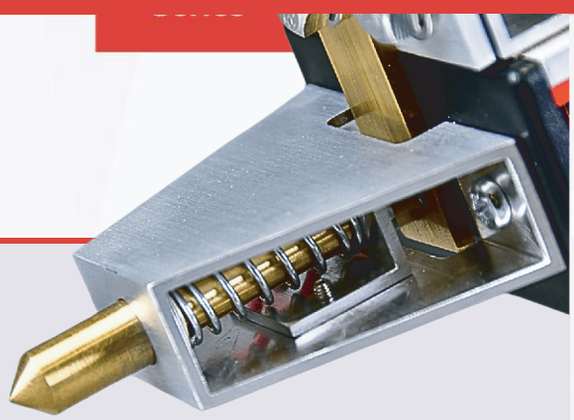
1. Clean the battery posts and the tester terminals.
2. Evaluate the technical condition of the device.
3. Make sure the battery is charged to the appropriate level,
4. Select the right load range (200, 400 or 600 A).
5. Connect the tester terminals to the battery terminals with any polarity
6. Take a measurement.

Note
Exceeding the temperature of 50 °C inside the device is associated with the risk of overheating. This condition is indicated by the tester displaying a thermometer symbol in the upper right corner of the LCD screen .

This symbol is displayed until the temperature drops
below 45 °C or the device is switched on again with a temperature below 50 °C. Ignoring the warning and working with a temperature above 50 °C may cause damage to the device.

Safety recommendations:

- Do not use the device in rooms where flammable substances are present.
- Do not expose the device to water or moisture.
- Keep the device out of the reach of children.
- Before each use, check the technical condition of the device.



4. READING THE RESULTS

The tester is equipped with a graphic LCD screen, which displays measurement results. The device will turn on automatically after detecting voltage on the measurement terminals. It is also

possible to turn it on manually using the button.
Operation is performed using two buttons – left and right.
Pressing them is signaled by a short beep.

The left button is used to invoke the following functions:

1) short press (less than 0.8s):
a) turning on the device,
b) activation of semi-automatic mode,
c) activating voltmeter mode

2) long press (about 1s):
a) enable voltage averaging mode

The right button is used to invoke the following functions:

1) short press:
a) preview of data recorded in semi-automatic mode,
b) return to semi-automatic mode

2) long press:
a) turning off the device.

After starting, a quick test of the internal circuitry is performed. The test should end positively with the message:
SELF-TEST: ☑
Additionally, this fact is signalled by two short beeps.

Note
The self-test may end with a negative result. Then the message will be: **AUTOTEST**: [X] ☒ .
The number in square brackets "x" between the text and the symbol indicates the error code.
In such a situation, the device will not allow further operation. Additionally, this fact is signaled by a sound.
Contact the manufacturer, providing the error number.

After the self-test, one of three messages regarding the battery status may appear. The first is the symbol indicating a discharged battery that is still operable. The second is information about the discharged battery to such an extent that it is not possible to use the tester any longer. The third is information about the detection of an unusual battery. The last two symbols indicate that further operation is impossible. This causes an audible signal and the device switches off. In the above situations, the measured battery voltage is also displayed next to the symbol on the left side of the screen.

The basic mode is voltage measurement given in the form of numerical indications - **voltmeter mode.**

NOTE

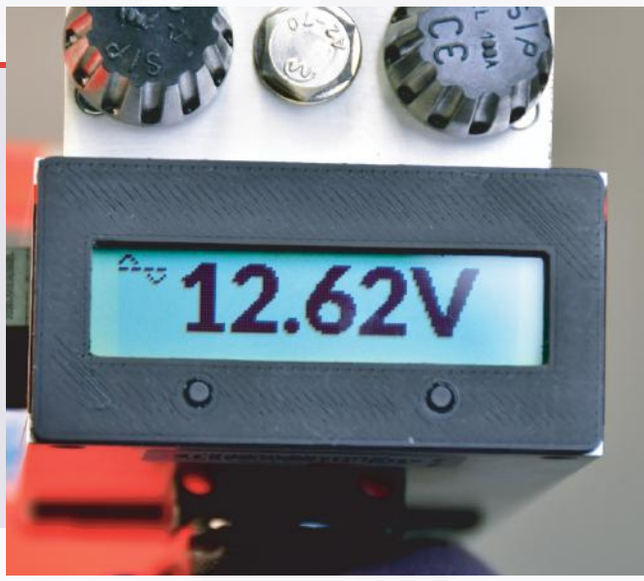
The voltage measured in the range of 0.5 - 16V is given as a number, e.g. 12.71V or - 12.54V. Values -0.5 to 0.5V are indicated by the symbol . It may also appear during the semi-automatic test. Most often, it will mean a bad contact between the tip and the post or a heavily worn out battery that does not supply voltage.

On the other hand, exceeding the measurement range >16V or <-16V is indicated by the message "- OL -".

There are two settings for displaying results.

The first is the "fast" mode, which shows the actual voltage value 8 times per second. The second mode is averaging 4 measurements, which results in displaying the result 2 times per second. This mode is used for pulsating voltage measurements - the main application is measuring the battery during charging by the alternator.

Changing modes is done by long pressing the left button in voltmeter mode. This function is indicated in the upper left corner by the symbol



More informations on page .6

Note
The averaging on/off mode is remembered by the tester.

The second mode is a semi-automatic measurement of voltage drop in 6 seconds. It is activated by pressing the left button.

It should be remembered that before activating this mode, the tip of the device must be connected to one battery post and the crocodile clip must be attached to the other.

Note
Before enabling semi-automatic mode, the tester must measure voltage and provide stable readings.

Turning on this mode changes the appearance of the screen by adding an additional field at the bottom, which contains a bar counting down 6 seconds of measurement. On the left side of the screen there is an icon symbolizing a clock . Next to it, on the right side, there is a counter of elapsed time.

The time measurement starts after switching on (detection of a sudden voltage drop) the previously selected load. Then the time elapsed icon changes every 0.5 s to creating an animation of a moving clock.

Every 1 s, a short beep is heard. The device records the first 6 seconds of voltage measurement after switching on the load. The expiry of this time is signaled by a long beep.

The condition for ending the time countdown after 6 s is a voltage loss (disconnection of the tip from the post).

NOTE

After exceeding 9 seconds of continuous measurement with load, an audible alarm is activated. It is switched off after disconnecting the measured voltage (disconnecting the load is not enough, the tip must stop contacting the post). The maximum time countdown is 30s.

After completing the measurement in semi-automatic mode, you can see a graphical interpretation of the voltage and read additional data. To do this, press the right button.

Note
Pressing the left button will erase the last measurement. Pressing the right button when the semi-automatic test has not been performed will display the message .

The measurement data preview screen contains two parts.

1

The left one is for a graph of voltage changes during 6s of measurement with load.

Depending on whether a 12V or 6V battery was tested, the graph scaling is different:

- For a 12V battery, the upper limit of the graph is 12.7V and the lower limit is 6.3V.
- For a 6V battery, the upper limit of the graph is 7.5V and the lower limit is 1.1V.

Note
Voltages higher and lower than the graph scaling ranges are drawn as pixels at the bottom or top – this ensures that the graph has no empty spaces.

2

On the right side of the LCD there is a table. The first line contains two important parameters: the maximum and minimum voltage recorded during the first 6 seconds of the load test.

Note: The max and min values are displayed without the "-" sign when the polarity is reversed.

The second row of the table displays alternately the measured voltage drops marked with the graphic symbols U_I and U_{II}.

These values are calculated as:

- U_I → difference of measured voltages (voltage at the start of measurement minus minimum voltage)
- U_{II} → difference of measured voltages (voltage 0.5s after starting the measurement minus the minimum voltage)

In the vast majority of the tested batteries, the voltage at the start of the measurement is equivalent to the maximum voltage. Thus, U_I is the difference between the maximum and minimum voltage at the time of measurement. This value largely represents the internal resistance of the battery. On the other hand, U_{II}

is calculated similarly but from a sample 0.5 s after the start of the measurement. This result allows to ignore interference from switching on the load. Its interpretation allows to determine the battery's ability to give off the test current. Its value can be even at the level of 0.1 V or less in large and high quality batteries (e.g. spiral AGM).

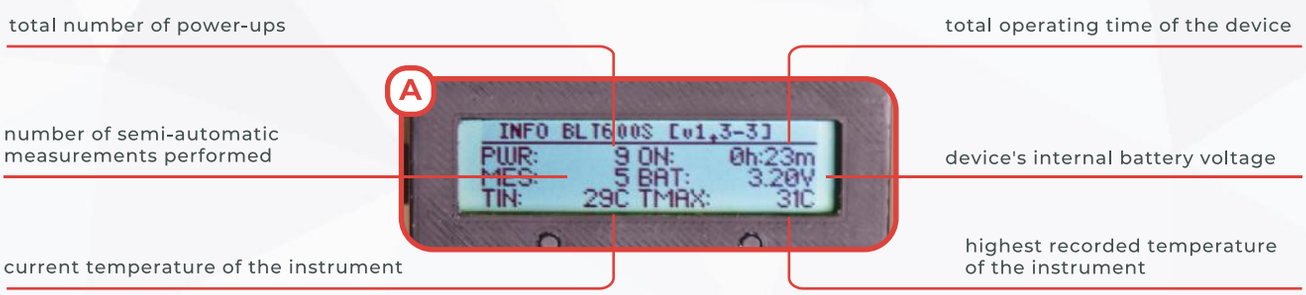
The tester will turn off automatically 4 minutes after the last pressing of any of the buttons (so-called APO function – Automatic Power Off)..

Note: If the min or max is outside the measured range (>16 or <0.5V) the tester signals this condition with the message "--.--". Then the calculated drops cannot be displayed accurately and this fact is also indicated with the same message.

Note

15 seconds before switching off, the symbol will appear, as well as a short beep informing about the lack of activity and the upcoming automatic switch-off of the device. Afterswitching off, the device does not remember the result of the last measurement.

The device can be turned off manually by holding the right button for a longer time. Each time the device is turned off (manually or by APO) a statistical data table of 7 values is displayed .



The data presented in the table are 4 lines with parameters:

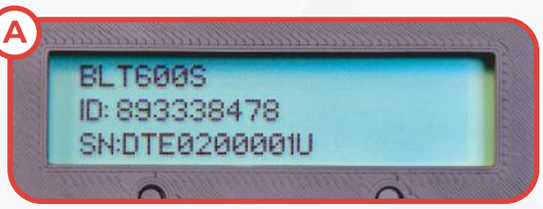
- 1 line – text "INFO BLT600S [va.b-c]" where a and b are numbers indicating the software version number, c is the hardware version number
- 2nd line: PWR – number of tester starts, TON – total operating time (hours and minutes)
- 3rd line: MES – number of tests in semi-automatic mode; BAT – battery voltage (e.g. 3.15V)
- 4th line: TIN – current temperature inside the device; TMAX – maximum temperature recorded during the tester operation

5. SERVICE INFORMATION.

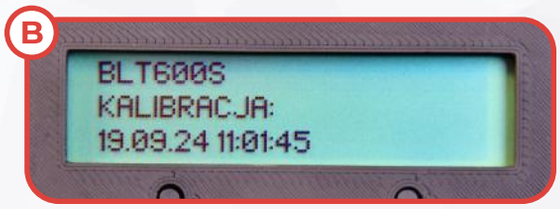
Additionally, turning on the left button while holding the right button will bring up a menu that provides information about the identification number, serial number and date and time of the tester calibration.

This data is displayed alternately (A) (B).

A



B



The serial number can also be found on the bottom of the housing.

Note
Exiting this mode is done differently than turning off the tester - by briefly pressing the left button or waiting 4 minutes. Exiting this menu always results in turning off the device.

Replacing the battery requires sliding the support on the handle to access the battery compartment. This procedure may require considerable force.

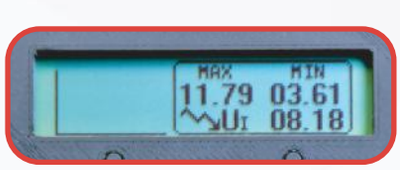
Interpretation of results in semi-automatic mode:

Depending on the condition, type and manufacturer of the battery, the waveform presented in semi-automatic mode may have different shapes.

- For a good battery with adequate performance, the sample waveform is:

- For a worn-out battery, there is a noticeable drop in voltage and its continuous decrease:

- A battery that has good resting voltage but is unable to supply current and its condition indicates irreversible internal damage:



6. STORAGE

- Store the device in a cool and dry place.
- If the device is not used for a long time (months), remove the batteries from the device.
- Avoid direct sunlight.
- In the event of a sudden change in ambient temperature that could cause condensation of water vapour (bringing the device from a colder to a warmer place), wait until the temperatures equalise and the condensed water evaporates.

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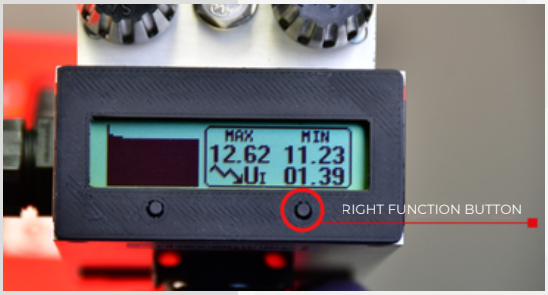
INSTRUCTION

PERFORMING A BATTERY TEST AND GENERATING A REPORT FOR THE MEASUREMENT PERFORMED WITH THE BLT600S-QR DEVICE

Performing a battery test and generating a QR code from the measurement:

- Press the left button on the voltmeter. A time bar will appear on the display below the battery voltage, measuring 6 seconds, which will begin to fill after the tester is pressed down.
- Press the device against the terminal.
- Observe the voltage measurement on the display. The tester will apply the declared load to the battery and will sound a double beep to indicate the test is complete.
- Stop pressing the resistor – you can disconnect the connection to the terminal of the tested battery.
- After pressing the right button, the battery tester's display will show a graphical voltage waveform, the maximum and minimum measured voltage, and the measured voltage difference.
- The load test lasts 6 seconds – after this time, the tester will inform you that the data collection stage has ended.
- After 9 seconds, an audible alarm is activated.
- To generate a double QR code with the measurement data, press the right function button.



Creating a report from a QR code generated from a battery measurement with the BLT600S-QR tester:

- To scan the QR code and generate a measurement report, download the BLT-QR app from the Google Play Store and install it on your phone (you can also enter BLT-QR Power in the search field). The app is designed for Android.
- Then scan the QR codes using the app.

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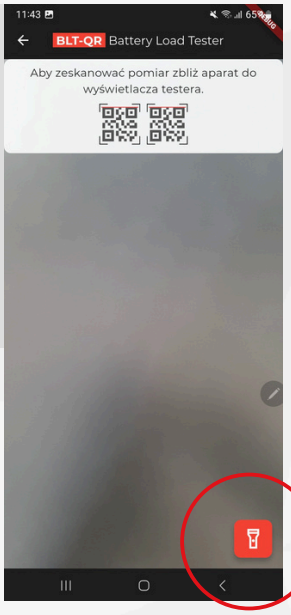

If lighting conditions make it difficult to scan QR codes, use the dedicated flashlight button in the app.

In the app, set the following parameters:

- details of the service center performing the battery diagnostics
- after scanning the code with the measurement (before saving the report), enter the required parameters of the battery being tested.

You can share and print the report directly from your printer.

If you want to send it, simply click the share button and then use any messaging app or the email account configured on your phone.

An additional option is to export the report to a specially designed service tool, **BSI** (Battery Service Integrator). **This desktop application integrates reports from SMART Series and POWER Series** devices dedicated to battery maintenance.

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