ul. Marszałka Józefa Piłsudskiego 12, 38-200 Jasło, Poland

DELTABAT 30

USER MANUAL

(v3)

Reading the user manual is a way to familiarize yourself with the functions and to learn how to handle the tester in various situations. It also allows you to use all the features of the device. Please pay special attention to the highlighted cautions regarding safe operation.

Note: We are constantly working on improving our product, including hardware and software changes. 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.

An updated version of this manual is available online:

https://dte.com.pl/download/manual/deltabat30/

1. PURPOSE

The Deltabat 30 tester is a device designed to measure the actual capacity of batteries of various types and applications. The device can test both single cells and battery packs with a voltage of up to 30 V in a wide range of capacities. Thanks to the smooth setting of the load current, the device does not interfere with the operation of BMS systems and can be used to test them. The tester can be powered from the tested battery with a voltage of at least 6 V or from an external power supply.

The Deltabat 30 tester allows you to perform various tests, such as:

- **Capacity measurement during discharge with a given load.** Measurement of charge and energy obtained during battery discharge to a set voltage.
- **Charging test.** Measurement of the charging process to verify the charge being received by the battery or to test the charger.
- **Temperature measurement using an external probe.** Available during discharge and charge tests, it can be used to monitor the temperature of the battery or charger during the test.
- **Rint measurement.** Measurement of internal resistance under constant current load conditions.
- **PV measurement.** Testing of photovoltaic cells with rated voltage and power within the device's operating range - measurement of the maximum power point under actual load conditions

2. SPECIFICATIONS

Parameter	**Value**
Voltage range	0 – 30,00 V
Voltage resolution	0,01 V
Voltage accuracy	± 0,5% + 0,02V
Load current range	0,1 – 30 A
Load power range	1 – 400 W
Load current accuracy	± 1%
Compatible temperature sensor type	Pt1000
Temperature measurement range	-50 – 150°C
Temperature accuracy	1°C
Communication	USB WiFi (firmware version 1.02 or later)
Power supply (USB) – measurement modes unavailable	5 V; 0,1 A
Power supply (tested battery)	6 – 30 V, power < 10 W
Power (DC input)	6 – 30 V, power < 10 W

Working conditions:

- Ambient temperature: -20 to +40°C
- Relative humidity: <90%, non-condensing
- Position: horizontal or vertical operation (additional feet on the rear of the housing).
- Ensure free air flow around the device, do not cover the air outlet at the back of the housing.

Storage conditions:

- Ambient temperature: -25 to +50°C (not used)
- Relative humidity: <80%, non-condensing
- Store the device in a cool and dry place.
- If not used for a long time, check the date and time settings.
- Avoid direct sunlight.
- In the event of a sudden change in ambient temperature that could cause condensation of water vapour (taking the device from a colder to a warmer place), wait until the temperatures equalise and the condensed water evaporates.

3. USAGE

Caution! Do not connect the device to sources of voltage higher than specified (30 V DC).

Note! The main circuit of the device is protected by a fuse which should not blow during operation. If the fuse blows, the device must be serviced.

Before starting the measurement:

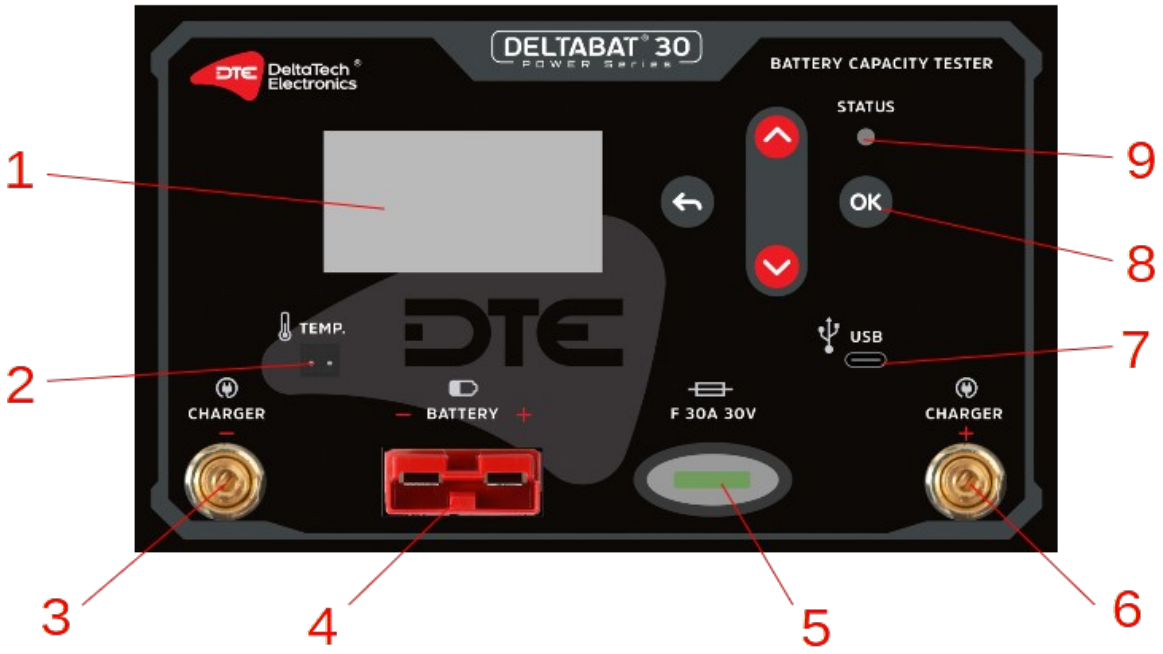
- Clean the battery poles and connection terminals.
- Check the technical condition of the device and proper air flow around it.
- Connect an external power supply if the battery voltage should drop below 6V during discharge.
- Connect the tester terminals to the battery terminals, maintaining the correct polarity (+ / -)
- Pay attention to the correct selection of the battery type and number of cells as well as the defined discharge end voltage - excessive discharge may damage the battery.
- Optionally, connect an external charger with a voltage of up to 30 V and a current of up to 15 A to the CHARGER+ and CHARGER- terminals for the charging test and for charging the battery after discharge.
- Configure and perform measurement according to the selected mode.

Safety recommendations:

1. Do not use the appliance near flammable substances.
2. Do not expose the device to water or moisture.
3. Keep the device out of the reach of children.
4. Before each use, check the technical condition of the device.

4. OPERATION OF THE DEVICE

The tester is equipped with a graphic LCD screen and four control buttons for navigating the menu and setting the required values.



Panel elements:

1. LCD display
2. Temperature sensor connector
3. External charger terminal (minus)
4. Measuring cable connector
5. Fuse
6. External charger terminal (plus)
7. USB Type-C connector
8. Control keys
9. Test status indicator light

5. WORKING MODES

5.1 Discharge Test "Quick Test"

Quick test is a simplified method of performing the test. All parameters such as discharge voltage or current will be selected based on a defined template. When selecting an item from the list, pay attention to the number of cells in the series and the corresponding nominal voltage.

The device is supplied with a set of 16 templates of typical measurement templates that can be freely modified using the BSI software (details in section 7).

During the discharge, the following parameters will be displayed on the screen:

- ***U*** – current battery voltage [V]
- ***I*** – current load current [A]
- ***C*** – actual or estimated (for currents other than C/20) capacity [Ah]
- ***P*** – power [W]
- ***E*** – energy [Wh]
- ***p*** – percentage of reaching the set nominal value.
- ***Time*** – duration of the measurement.
- ***Cycle x/y*** – current cycle / set number of cycles.

Once the test is complete, a summary screen will be displayed which includes the following information:

- ***Battery type*** – according to the selected type
- ***Capacity*** – actual or estimated (for currents other than C/20) based on the selected discharge current.
- ***Efficiency*** – the percentage of the obtained capacity in relation to the rated capacity
- ***Pass/Fail*** – reaching the set performance threshold.
- ***Time*** – duration of the measurement.

5.2 Discharge Test "Advanced"

In this mode, you can define all the test parameters. These are:

- ***Battery type*** indicates the type of cells used.
- ***Voltage/Cells*** defines the voltage based on the number of cells in the series. The tester adjusts the displayed voltage to the cell type.
- ***The rating parameter*** specifies the type of rating – twenty-hour capacity (C/20), ten-hour capacity (C/10), five-hour capacity (C/5), or capacity expressed in watt-hours (Wh).
- ***The nominal value*** is the value from the battery label given according to the selected parameter.
- ***Test Type*** defines the load. The user can choose from: load with a given current value (Current A), load with current as a multiple of capacity (Current xC), load with constant power in watts (Power). For lead-acid batteries, a reserve capacity measurement specified by the EN standard for starter batteries (RC min EN) is also available.
- ***Discharge*** specifies the numerical value for the selected load.

- ***Termination voltage*** is the voltage to which we want to discharge the battery. The tester will initially set a typical value corresponding to the selected battery type and number of cells.
- ***Charging*** (enabled/disabled) allows you to charge the battery immediately after the test is completed. A charger appropriate for the type of battery with an operating voltage not exceeding 30 V and a current of up to 15 A should be connected to the CHARGER+ and CHARGER- terminals. If the charging mode is selected, several additional parameters should be set as shown below.

Note! In case of charging after a discharge test, a charger is required which will be able to automatically start charging after connecting to the battery.

Charging parameters:

- ***Charge termination*** determines when charging is considered complete, the charger is disconnected, and the device can proceed to the next cycle or consider the test as complete. Available options: end when a preset voltage level is reached (Voltage), end if the charging current drops below a preset (Current), end after a preset charge (Ah), end after a preset energy input (Wh), or switch off after a preset time (Time)
- ***Termination value*** defines a value according to the previously selected criterion.
- ***The number of cycles*** refers to the consecutive discharge and charge cycles. Up to 10 cycles can be defined, which will be performed automatically.

Once the discharge is complete, charging will begin. During charging, the screen will alternate between the discharge test results and the charging parameters. To go to a specific screen (results / charging), use the arrow buttons.

5.3 Charging test

To perform a charging test, connect a charger appropriate for the given battery type with an operating voltage not exceeding 30 V and a current of up to 15 A to the CHARGER+ and CHARGER- terminals.

The charging mode is configured in a similar way to the discharge test, but an additional criterion for ending the charging must be specified (see previous point).

The charging mode differs from the others in that the recording starts with charging (we assume that a discharged battery is connected.

During the discharge, the following parameters will be displayed on the screen:

- ***U*** – current battery voltage [V]
- ***I*** – current charging current [A]
- ***C*** – actual charge introduced into the battery [Ah]
- ***P*** – power [W]
- ***E*** – energy introduced into the battery [Wh]

- ***Time*** – duration of the measurement.
- ***Cycle*** x/y – current cycle / set number of cycles.

Once the test is complete, a summary screen will be displayed which includes the following information:

- ***Battery type*** – according to the selected type
- ***Charge*** – the measured charge introduced into the battery during charging
- ***Max Volt*** – the maximum voltage reached during charging.
- ***Max Current*** – maximum current recorded during charging.
- ***Time*** – duration of the measurement.

5.4 Rint measurement

This is an auxiliary measurement of internal resistance under constant current load conditions. Select the maximum test current (value 1, 2, 5, 10, 20 A), and the device will measure and display values for currents from the minimum to the selected one.

The accuracy of the obtained results is limited due to possible errors in compensating the resistance of the measuring leads. Using measuring leads other than the original ones from the set will also significantly worsen the quality of the results.

The internal resistance readings under a DC load will usually be higher than those obtained with a conductivity tester (AC measurement). They will also vary with current (for a typical lead-acid battery, the higher the current, the lower the corresponding resistance).

5.5 PV-Test

This is an additional measurement mode for photovoltaic panels. You must connect the panel to the battery terminals and then set it in specific lighting conditions.

Panels with a voltage higher than 30 V should not be connected to the device, and the power should not exceed 400 W.

The tester will load the panel with the current selected for the highest power. If this criterion is met, "MPPT" will appear on the display next to the measurement results.

The mode can be used to compare panel parameters or their performance under specific conditions of sunlight, temperature or panel position.

Thanks to the actual load, the panel can be examined using a thermal imaging camera to assess the performance of individual cells.

5. VIEWING RESULTS.

After selecting the Results option from the main menu, the device will display a list of the 12 most recent discharge (D) and charge (C) measurements. The results are marked with the nominal capacity and the date and time of the test.

After selecting the selected measurement and then pressing OK, the device will display a measurement summary screen where the most important test parameters will be shown.

A complete list of measurements and a detailed test report can be obtained using the compatible BSI application.

6. SETTINGS

Available setting items:

- ***Language*** – The language of the device interface;
- ***Date/time*** – ability to set the current time;
- ***WiFi*** - option to enable/disable WiFi communication;
- ***LCD Contrast*** – Adjust the contrast of the display;
- ***Temperature*** – option to set the charge/discharge termination temperature and make test temperature measurement with an external sensor;
- ***Sound*** – enable/disable the audible signal;
- ***Peukert constant*** – manual setting of the Peukert coefficient for individual cell types;
- ***Pass/fail threshold*** – setting the level at which the capacity test is considered passed (default 60%);
- ***Version*** – firmware version information.

7. COMMUNICATION WITH THE DEVICE

BSI software is designed to operate the device, including downloading results and generating reports. The current version can be downloaded here:

https://dte.com.pl/en/product/battery-service-integrator-bsi-software/

The device has the following interfaces for exchanging data with the application:

- **USB-C**. Using USB communication does not require installing additional drivers in the system. For the purpose of exchanging data with the BSI application, the device can be powered only from the USB port.
- **WiFi**. The device has a built-in WiFi module that allows you to log in to a selected WiFi network. Wireless connection configuration is possible using the BSI application connected via USB.

8. STORAGE

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