

Multifunction Electronic Load (EBC-A10H)



1. Features

1.1 Battery capacity test

The tester is designed for charging and discharging a wide range of batteries/battery banks, like NiMH, NiCd, LiPo, LiFe and Pb and it supports capacity tests.

1.2 Portable Power Bank Test

This tester supports charging and discharging of portable power banks, as well as testing their capacities.

1.3 Power Performance Test

This tester supports performance and aging tests of various kinds of DC power supplies.

2. Specifications

1) Power Supply: DC 19-24V, 4A or above

2) Voltage Setting Range: 0-30.00V, stepper 0.01V (During charging, the maximum voltage is limited to power voltage -2V)

3) Current Setting Range:

for charge, 0.05-5.00A, stepper 0.01A (current adjusted automatically when power exceeding limits)

for discharge, 0.05-10.00A, stepper 0.01A (maximum current should be power current-0.5A)

4) Charging mode:

- 2 Standard Charging: Support NiMH, NiCd, LiPo, LiFe and Pb batteries
- 2 CHG-CV: Current and voltage can be set at a constant voltage (only for batteries) during discharging

5) Discharging mode:

- 2 DSC-CC: Discharging batteries at a constant current, support testing battery capacity or current of power supplies
- 2 DSC-CP : Discharging batteries at a constant power, for constant power equipment-like use or testing power

6) Automatic Charging/Discharging: The tester supports “charging-discharging-charging” circles for capacity tests.

7) Voltage accuracy: between 0-4.5V, 0.003V, $\pm 0.5\%$, between 4.5-30V, 0.01V, $\pm 0.5\%$.

8) Current accuracy: 0.05-10.00A, 0.005A, $\pm 0.5\%$.

9) Capacity detection: < 10Ah,0.001AH; 10-100Ah,0.01Ah; > 100Ah,0.1Ah

- 10) Four lines: voltage and current channels separated for high test accuracy
- 11) LCD display: voltage, current, time, capacity, and etc.
- 12) PC connection: the tester can connect to a computer through a designated USB-TTL cable for more functions, like graphs, calibration, firmware upgrade, and test circulation.

3. Connecting patterns

3.1 Testing Ports



The tester has four banana jacks which connect with A+/V+/V-/A-. A+ and A- ports are connected with the positive and negative ends of the test objects, working as the current channel in charging and discharging. V+ and V- ports are connected with the positive and negative ends of the test objects, working as the voltage channel in voltage tests. This way of using four individual cables will help eliminate the effect of wires on the test result and improve the test precision.

3.2 PC Connection

The tester can be connected with a computer through a designated USB-TTL cable.

3.3 Input Power:

The tester works on a power supply of DC 12-19V, 4A or above and interface specification of 5.5/2.1 (inside positive and outside negative).

4. Display and setting

4.1 Buttons

4.1 Buttons

SET — setting knob (rotate to left/right and press)

ON — start

4.2 Testing interface

```
CC 00.00V 0.000A
OFF 0000 0000mAh
```

The first line shows testing mode, voltage and current. Testing modes include:

- 2 CC – constant current discharging
- CP – constant power discharging

- 2 Ni – NiMH/NiCd charging
- 2 Li – LiPo/LiFe charging
- 2 Pb – plumbic acid battery charging
- 2 CV – CC-CV charging

The second line shows working state (it shows OFF when the tester stops working and it turns DSC or CHG at working. It reads ATI when you choose automatic charging-discharging-charging mode, and 1 refers to current working step), working time (minutes) and capacity (automatically switches between 0000mAh, 00.00Ah and 000.0Ah).

A short press on the “SET” button can switch between power (W) and capacity.

```
CC 00.00V 0.000A
OFF 00.0 0000mWh
```

In the automatic “charging-discharging-charging” mode, you can check testing result of each step by rotating the “SET” knob.

```
Auto Test:
AT2: CC 2600mAh
```

Open the testing interface and press “ON” button to start testing and press again to stop it. In the halted state press “SET” knob for two seconds or longer to open the setting interface (this function disabled when the tester connects to a computer).

4.3 Setting interface

The cursor sets automatically on the testing mode and you can move it to the option you want to change. One press on the “SET” knob to move one step to right. Rotate “SET” to left and right to change the parameter. The parameter will change automatically if parameters set exceed limitation. Press the “ON” button to switch to next setting option.

1) Discharging at a constant current – DSC-CC

The first line shows testing mode and discharging current.

The second line shows cut-off voltage (testing stops automatically when voltage reaches below the set parameter) and the testing time (0-999 minutes, no limitation when it's set 0).

```
DSC-CC 0.00A
00.00V 000Min
```

2) Discharging at a constant power – DSC-CP

```
DSC-CP 00.0W
00.00V 000Min
```

The first line shows testing mode and discharging power.

The second line shows cut-off voltage (testing stops automatically when voltage reaches below the set parameter) and the testing time (0-999 minutes, no limitation when it's set 0).

3) Standard charging – CHG

```
CHG-NiMH 0.00A  
01 000Min NOR
```

The first line shows testing mode and charging current. Modes include: NiMH, NiCd, LiPo, LiFe, Pb.

Second line: batteries numbers (for plumbic acid batteries, each battery counts 2V), charging time (no time limit if being set 0) and auto mode setting:

- 2 NOR – normal mode, testing stops when charging completes.
- 2 AUTO – automatically finish the “charging-discharging-charging” process.

When cursor is on AUTO, a long press on “ON” and you will move to the second step of automatic discharging and it allows you to set discharging parameters.

```
AUTO Discharge  
0.00A 00.00V 00
```

The first parameter: discharging current; the second parameter: cut-off voltage; the third parameter: waiting time between step switches (a 5-10 minute waiting time is suggested between charging and discharging to cool the battery).

After completes settings, press “SET” knob for a long time to save data and return to the upper-level interface.

3) CC-CV charging

```
CHG-CV 0.00A  
00.00V 0.00 NOR
```

The first line shows testing mode and charging current.

The second line shows constant voltage, cut-off current (charging stops automatically when current reaches below the set parameter, it can be above 0.06A) and the automatic mode setting (same as in the standard charging).

During setting a long time press on the “SET” knob allows you to save data and returns to the testing interface. Press the “ON” button to start testing.

4.4 Setting examples

1) Setting steps

- 1) Turn on the battery tester.
- 2) Connect battery and you can read the battery voltage on the testing interface on the screen.
- 3) Press “SET” knob for more than two seconds to open the setting interface.

- 4) Set testing parameters.
 - 5) Press “SET” knob for more than two seconds to return to testing interface.
 - 6) Press “ON” button to start testing.
 - 7) When testing completes rotate the knob to left and right to read test results.
 - 8) Remove the battery and turn off the tester.
- 2) Setting discharging at a constant current (discharging 3.7V LiPo to 2.8V at 2A):

```
DSC-CC    2.00A  
02.80V    000Min
```

- 3) Setting discharging at a constant current (discharging 12V power for 60 minutes at 1.5A):

```
DSC-CC    1.50A  
00.00V    060Min
```

- 4) Standard charging (charging 3.7V LiPo to 4.2V at 1A):

```
CHG-LiPo  1.00A  
01 000Min NOR
```

- 5) CC-CV charging (charging 3.7V LiPo to 4.2V at 1A, cut-off current set at 0.08A)

```
CHG-CV    1.00A  
04.20V 0.08 NOR
```

- 6) Automatic charging-discharging-charging (charging 3.7V LiPo at 1A and then discharging at 2A, waiting time is 5 minutes)

```
CHG-LiPo  1.00A  
01 000Min AUTO  
AUTO Discharge  
2.00A 02.80V 05
```

5. Precautions

- 1) Positive and negative connections should not be reversed.
- 2) Always use the tester within the allowed range.
- 3) The maximum charging voltage should be set below power voltage– 2V.
- 4) For batteries with a voltage larger than 10V, the maximum charging current should be lower than power current-0.5A.
- 5) PC connection software: EB Tester Software, download it from www.zkotech.com.
- 6) PC connection: follow EB Tester Software User Manual.
- 7) Technical support: zke2006@163.com; QQ: 2353976901
- 8) Taobao store: zke2006.taobao.com

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