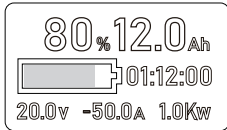


TF03H Series Current Battery Capacity Display
Coulomb counter

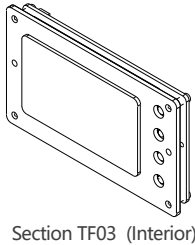
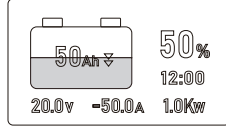
USER MANUAL

Series TF03

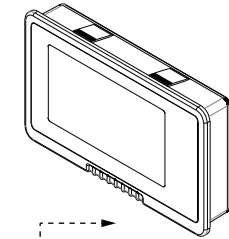
Section A Interface



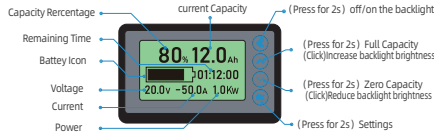
Section B Interface



Section TF03K (Exterior)



Schematic Diagram



Product Introduction

This product is a high-precision battery power meter (also called Coulometer) based on current acquisition type. It can accurately detect the voltage, current, power, real capacity and remaining time of the battery pack etc. The working status of the battery is obtained accurately at any time.

This product is suitable for Touring car, wheeled litter, electric vehicles, emergency power supplies, energy storage power supplies, measuring equipment, medical equipment, various instruments and so on.

Applicable Battery Specifications

This product is suitable for lithium batteries, lithium iron phosphate, lead acid, nickel hydrogen and other battery packs with working voltages from 8V to 120V. Note that this product must be used with the sampler.

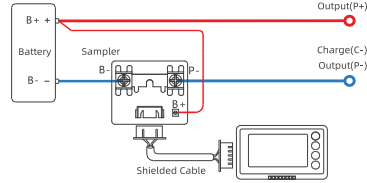
First use method

- Wiring and checking the current:
After completing the connection according to the [wiring method], power on and the screen should be able to display. If there is no display, power off and check if the connection is correct. Then discharge or charge the battery and check whether the displayed current value or power value is consistent with the actual value. If the error is large, please check again whether the wiring is correct (**Make sure that all current flowing through the battery passes through the sampler.**)
- Detection and Setting of Battery actual Effective Capacity:
The actual effective capacity (CAP value) of the battery should be set correctly when the battery is used for the first time or replaced, see [Usage Settings].
If the effective capacity value of the battery is known, complete the effective capacity setting according to the [use settings], and set it to full when the battery is fully charged, see [Capacity homing].
If the effective capacity of the battery is unknown, you need to follow the steps below:
A. Enter the capacity setting interface and set the capacity value as large as possible. (For example, it is set to 30Ah if the estimated value is 20Ah.)
B. Empty the battery pack and at the same time clear the capacity value to 0%, and then charge the battery pack;
C. After full charge, set the displayed capacity value to the CAP effective capacity value of the electricity meter.
- Capacity Homing (The battery capacity is cleared or full capacity setting.):
A. Press and hold the button [OK] after the battery is discharged (empty) and the capacity value is cleared to 0%;
B. Or Press and hold the button [Left] after the battery is fully charged and the capacity value is set to 100%.

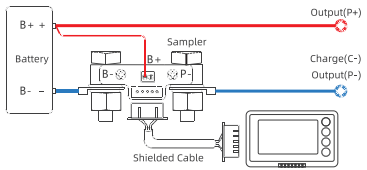
Wiring method

- The sampler supplied with this product must be connected in series to the negative circuit of the battery pack. The B- of the sampler is connected to the negative B- of the battery pack, and the P- is connected to the negative P-/C- of the charge and discharge.
- Take a red wire(20-22AWG) and connect the positive battery to the sampler B+ for power supply to the electric meter.
- Use a shielded cable to connect the sampler to the meter. After confirming that it is correct, power on.
- Wiring principle: **Make sure that all current flowing through the battery passes through the sampler.**

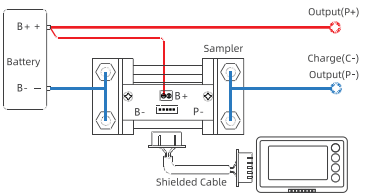
★ Wiring method of 50A sampler:



★ Wiring method of 100A/350A sampler:



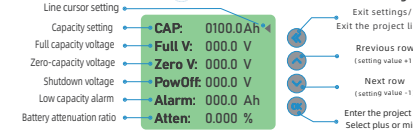
★ Wiring method of 500A sampler:



Note: Please wire strictly as shown. The sampler must be connected in series with the negative circuit of the battery. It is strictly forbidden to connect the positive circuit. Shielded wires cannot be extended by yourselves.

Usage Settings

Press and hold the button [OK] for 2 seconds to enter the settings.



- CAP** Effective capacity of battery: It is the initial capacity at the factory. Please set according to the actual effective capacity of the battery pack, otherwise the capacity percentage display will be incorrect;
Full capacity voltage: The capacity value is automatically set to 100% after the voltage is exceeded (Fill up);
 - FULL V** Zero capacity voltage: The capacity value is automatically set to 0% if below this voltage. The voltage value will flash, and the buzzer will alarm once per 10s if the discharge continues (Zero clearing);
 - ZERO V** Shutdown voltage: Backlight and LCD off and no display if below this capacity;
 - PowOff** Low capacity alarm: The percentage and battery symbol will flash, and the buzzer will sound per 10s if below this capacity.
 - Alarm** Battery attenuation ratio: After the battery capacity cumulatively once per cycle, the capacity value is automatically changed according to this ratio.
- Precautions: Do not set Full V and Zero V without understanding the voltage characteristics of the battery pack (full voltage and vent voltage). The factory default of Full V and Zero V is 0V, which is invalid.

Instructions for use

- The coulombmeter must be in working condition when charging or discharging, otherwise the battery capacity cannot be accurately calculated. It's designed for low power consumption. When the backlight is not bright (standby), the power consumption is very low. Don't connect the power supply B+ behind the power switch, (always keep the power on).
- When connect the load. The backlight turns on (the sampler's B- and P- are reversed if the backlight flashes) indicating that the battery is discharging when the discharge current > the backlight turn-on current. And display the discharge current and the remaining discharge time. If the load current fluctuates greatly, the time will also fluctuate, which is a normal phenomenon.
- Disconnect the load and connect the charger. When the charging current > the backlight turn-on current, the backlight flashes (if the backlight is always on, it means that the B- and P- of the sampler are connected reversely), indicating that the battery is charging. And display the charging current and the remaining charging time.
- It will enter low power consumption and the backlight will be turned off when the charge or discharge current < the backlight turn-off current.
- If the percentage and capacity values deviate after a period of use, it can be reset (see [first use method] → [capacity reset]). If the deviation still occurs, the battery capacity may decay, and the battery capacity needs to be corrected again (see [first use method] → [detection and setting of battery effective capacity]).
- This product has a power-off capacity memory function.
- A certain error may occur in the case where the current changes drastically, which affects the capacity value.

Low power dormancy / shutdown

When the battery current is less than the turn-on current, the battery enters a low power sleep state, the backlight turns off, and the electric meter does not work but the battery parameters are still displayed; If the shutdown voltage is set and the battery voltage < the shutdown voltage, it will enter the shutdown state.

The following states can wake-up or exit shutdown:

- When the battery current > turn-on current or pressing anykey, the electricity meter will wake up automatically and the backlight will light up
- When battery voltage > shutdown voltage, battery current > turn-on current or pressing anykey, it will exit shutdown status.

Turn on/off backlight adjust backlight brightness

- Press and hold the [Left] button to turn off the backlight
(The backlight will not light up during work).
- Press and hold the [Left] button again to turn on the backlight
(The backlight will flash during charge, and the backlight will light up during discharge).
- Click [Up] or [Down] button to increase or reduce backlight brightness.

Communication Function

This product can be customized with serial communication function based on TTL level, and upload the meter parameters to PC. The meter parameters are sent once every second, and the internal opto-coupler isolation method adopted is safe and reliable.

For details, see "TF03 Coulometer TTL Serial Communication Protocol".

Output Control Function

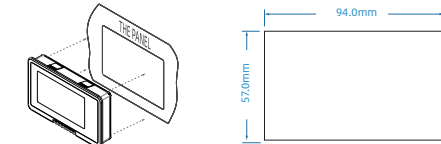
This product can be customized with output control function. It can be connected with an extended relay, a high-power alarm, etc., and the output is turned on at low voltage or low capacity. Opto-coupler isolation is adopted.

For details, see "TF03 Coulometer Output Function Description".

Installation Method

This product is divided into two types according to the installation method. The external model: TF03K, internal model: TF03.

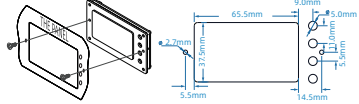
- External Model TF03K:
Open a hole in the panel to be installed, install the monitor from the front and clamp the meter to the panel as shown below.



(Note: The panel is not a product accessory and is not included in the product.)

- Internal Model TF03:

Open a hole in the panel as shown in figure. Install the meter from the inside to the outside. The 3mm self-tapping screws are fixed to the panel from the front as shown below.



(Note: The panel is not a product accessory and is not included in the product.)

Technical Parameters

Parameter	Min.	Regular	Max.	Unit
Working voltage	8.0	50.0	120.0	v
Working Consumption		8.0	12.0	mA
Static Consumption		1.0	2.0	mA
Power off Consumption		50		μA
Accuracy of Voltage Collecting		±1.0		%
Accuracy of Current Collecting		±1.0		%
Accuracy of Capacity Collecting		±1.0		%
Backlight on current(50A specifications)		50		mA
Backlight on current(>50A specifications)		100		mA
capacity detection range	0.1	100	9999.0	Ah
50A Sampler Current	0	50.0	75.0	A
100A Sampler Current	0	100.0	150.0	A
350A Sampler Current	0	350.0	500.0	A
500A Sampler Current	0	500.0	750.0	A
Temperature Range In Application Environment	-10	20	60	°C
Weight (50A/100A/350A/500A)		210/270/420/700		g
TF03K (external model) Size		100×61×17		mm
TF03 (internal model) Size		94×55×20		mm

Note: This product needs to be used with the sampler (the internal parameters of the meter are different), and the sampler of different specifications and the meter are forbidden to be mixed.

The sampler is a heat-generating component, and it should be installed in the air circulation as much as possible. Always keep ventilation and heat dissipation when using the maximum current for long periods of time.

Precautions and warranty

This product cannot be exposed to sunlight for a long time, and cannot be exposed to extreme conditions below -10 °C and above 50 °C for a long time, otherwise it will shorten the life of the LCD.

The warranty period is within one year from the date of purchase. It can be repaired free of charge when non-human quality problems occur.

This product may be technically improved or updated, if the product you purchased differs from the appearance and technical parameters described in the Product User's Guide, please refer to the actual product or website.