TK15 Battery Parameter Instrument

Overview: The TK15 is a new type of the high precision current collection capacity indicating parameter instrument, which is compatible with lithium batteries, lithium iron phosphate batteries, lead-acid batteries and nickel-metal hydride batteries, hereinafter referred to as coulometer. It can collect the working state of the battery at anytime. It has various features, such as a wide range of operating voltage, low power, high accuracy in indicating. It can set the payload capacity and other parameters of batteries arbitrarily, and with automatic memory function when power down.

Display contents:
1. Residual capacity of battery (Ah or mAh);
2. Capacity percentage and totem pole display;
3. Battery voltage;
4. Battery current;
5. Power output;
6. Remaining time of charge and discharge.

Features:
1. The empty and full voltage of battery can be adjusted;
2. The backlight automatic open when using;
3. Automatic memory function when power down;
4. Fast response rate;
5. Low power consumption, automatic wake-up.

Basic parameters:

Parameter	Min	Type	Max	Unit
Working voltage range of 1 (conventional)	8.0	12.0	60.0	VDC
Working voltage range of 2 (high voltage)	12.0	70.0	80.0	VDC
Working power consumption		8.0	10.0	mA
Standby power consumption		0.5	0.8	mA
Sleep power consumption		50	60	uA
Voltage acquisition accuracy		±1.0		%
Current acquisition accuracy		±1.0		%
Using ambient temperature range	0	+20	+35	℃
Backlight on current		40	50	mA
Backlight off current		30	40	mA
Battery capacity setting value	0.1		590	Ah
Built-in sampler working current		5.0	10.0 (instant)	A
External normal sampler working current		30.0	50	A
External big sampler working current		50.0	100	A
Overall Size	66(length)×40(width)×10(height)			mm
Display area size (Panel hole size)	32(length)×23(width)			mm
External normal Sampler Size	23(length)×18(width)×5mm(height)			mm

Attention: The min voltage of the battery pack should higher than the min working voltage of the coulometer.

The sampler has three specifications: built-in sampler, external normal sampler and external big sampler. Please select them according to the current of the battery. Three samplers corresponding three type of coulometer (same size and function, different software parameter), please don't be confused.

Built-in sampler: The max current of charge or discharge is less than 5.0A (suitable for batch products, and connection method is different with external sampler);

External normal sampler: The range of charge or discharge current is 5.0A to 50.0A;

External big sampler: The range of charge or discharge current is 50.0A to 150.0A;

Connection method:

1. Connect B-
2. Connect P-
3. Connect B+
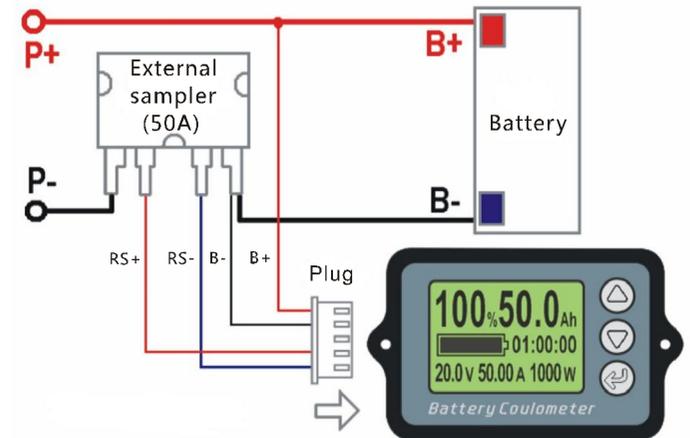
Operating instructions:

1. After connection is completed according to the diagram, the LCD screen should display the voltage of battery and the initial capacity (not the actual capacity of battery). In order to get the actual capacity of battery, please charge the battery after a complete discharge, then the capacity displayed is the real capacity; if the screen does not display, you should check whether the circuit is connected correctly and re-power.
2. Connect to the load, make the loop current is greater than 50mA. The current value will display on the bottom center. The backlight on (if the backlight blinking, then the RS+ and RS- are inversely), indicate that the load is discharging. Besides, the time displayed on the right center of the screen is the remaining time under the current at present.
3. Break the load, and connect the charger. The backlight blinking (if the backlight on, then the RS+ and RS- are inversely), indicate that the load is charging. The time displayed on the right center of the screen is the remaining charging time under the current at present. If the load current fluctuated greatly, the time will also fluctuate, that is normal.
4. When charging or discharging, the coulometer must be at work; otherwise the capacity of the battery will not be accurate.
5. When charging or discharging, the coulometer must be at work. When the current is less than the light-on value, the backlight off, and the coulometer will memory the capacity.
6. If the payload capacity of battery is unknown, discharge the battery fully; enter the project mode and set the payload capacity as large as possible. Charge the battery fully and record the capacity value, then enter the project mode and set the record value as payload capacity, so the capacity of battery will be accurate.
7. Because of high sensitivity, when the coulometer is under the standby state (battery has no input or output current), if it is interfered by electromagnetic radiation (open or close inductive loads, such as the motor) nearly, the backlight will shortly open, that is normal.
8. The RS+ and RS- must connect to the negative circuit, it is strictly forbidden to connect to the positive circuit!
9. For anti-interference filtering delay of the sampling circuit, the acquisition in occasions where the current changes frequently may produce error, thereby affecting capacity accuracy.

Parameter display and setting:

80%**12.0**Ah
▬▬▬ 01:12:00
20.0 v 50.00 A 1000 W
Battery Coulometer
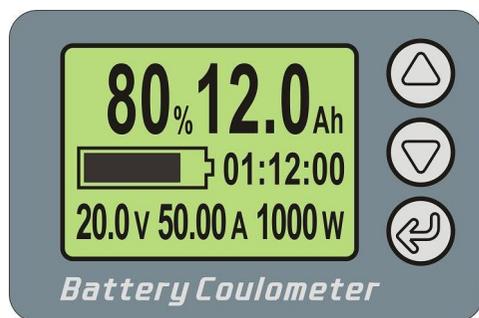
**Main interface description:**
1. The percentage of the residual capacity is displayed on the left corner;
2. The current actual residual capacity (Ah/mAh) is displayed on the upper right corner;
3. The battery symbol is on the middle left, the residual capacity ratio of battery is displayed as a visualized totem;
4. The charging or discharging time remaining is on the middle right; the maximum display value is 99:00:00;
5 The bottom respectively displays the voltage, current, power.

12%**999**mAh
▬ 00:06:00
20.0 v 50.00 A 1000 W
*Battery Coulometer*
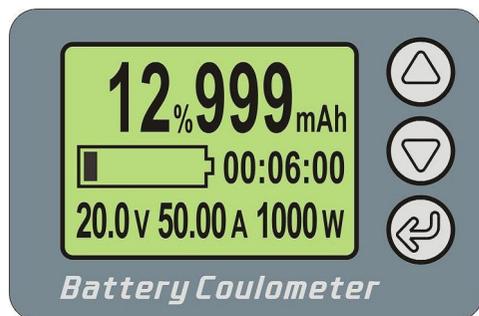
Basic operating instructions:
1. When the charge and discharge current value < 40mA, it's under the standby low power state, the backlight is off, the remaining capacity and voltage are displayed;
2. When the discharge current value > 50mA, the backlight automatic on, and it starts to calculate the battery capacity consumption, displays the remaining working time;
3. When the charging current value > 50mA, the backlight flashes, and it starts to calculate the battery capacity charged, and displays the time required to a full charge;

CAP :500.00Ah◄
FULL U:030.0V
ZERO U:010.0V
Battery Coulometer
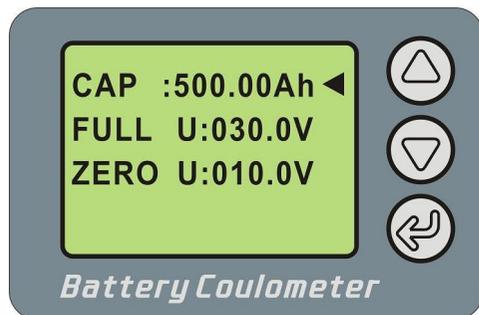
Battery capacity setting:
1. Press the "↵" key for 3s,enter setting interface;
2. Press the "△" or "▽" key to select item;
3. Select "CAP" and press "↵" key to enter capacity setting;
4. The set bit of capacity value flicker, press the "△" or "▽" key to plus and minus the value; press the "↵" key can set other bits;
5. Press the "↵" key for 2s to finish setting;
6. Press the "△" and "▽" key at the same time to exit;

CAP :500.00Ah◄
FULL U:030.0v
ZERO U:010.0v
Battery Coulometer
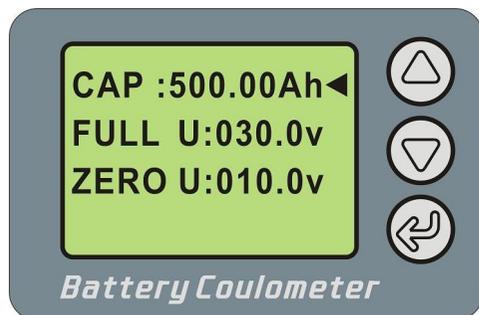
Battery empty and full voltage setting:
1. Press the "↵" key for 3s,enter setting interface;
2. Press the "△" or "▽" key to select item;
3. Select "FULL U" or "ZERO U" and press "↵" key to enter voltage setting;
4. The set bit of voltage value flicker, press the "△" or "▽" key to plus and minus the value; press the "↵" key can set other bits;
5. Press the "↵" key for 2s to finish setting;
6. Press the "△" and "▽" key at the same time to exit;

P-
Rs+   External normal Sampler (50A)
Rs-   23×18×5mm.
B-
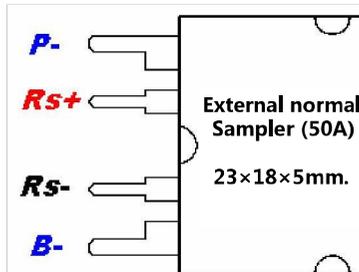
The use of external sampler:
1. The Rs+/Rs- wires between sampler and the coulometer are signal lines, you can use the safety line 22/24# to lengthen. If more than 50cm or the electromagnetic interference environment is relatively strong, please use twisted pair line of the shielded cable.
2. B- is the large current line, connected to the negative battery B-; P- is also a current line, connected to the load and the charging cathode. Usually the external sampler and the battery are connected nearby.
3. In the application where the current is above 20A, the external sampler should be mounted on a good radiating metal (the back of the sampler is metal insulated).

Battery capacity returning to zero and full:
1. In some cases, you should operate the current memory capacity to zero or full power;
2. In the main interface state, long press the "△" key to the full power, the capacity will be max value 100%; press and hold the "▽" key to clear the memorized battery capacity to zero; note that the above operations will not recover to the memorized capacity before;

Sleep mode wake up operation:
1. When the battery voltage is lower than the turn-off voltage value, it will enter the extreme low power sleep state. Press any key to see the capacity if needed, the coulometer will be woken up and displays for 5 seconds, if the battery voltage does not rise to the normal value, it will once again enter the sleep state. If the coulometer is needed in the sleep state, when the battery voltage rises over normal value in 20 seconds or let the battery into the charging or discharging state in 10 seconds, it will be auto wake up.

Version history:

1.2015-8 : V1.0 Draft   BW-TK15 V1.PCB