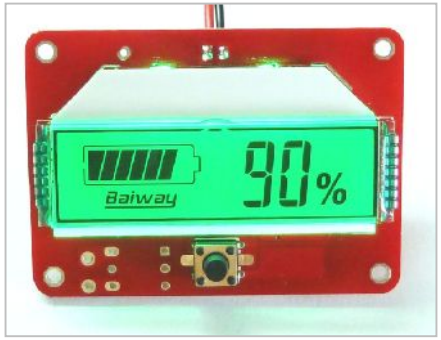
Ⅰ. Overview:

The LY5 is a universal residual capacity display module for the rechargeable battery, suitable for rapid battery capacity detection of the lithium battery, lead-acid battery on various instruments, measuring equipment, mobile equipment, cleaning machine, the balance car, the battery car and so on. The battery symbol displays intuitively and the percent accurately displays. A high contrast LCD screen is used and can display for a long time in the dark or bright light. The size is fully compatible with LYLCD.

Battery display bare board



The look with the panel

Ⅱ. Function features:

★ can set the battery specifications and functions;
★ can set the automatical turn-off backlight;
★ can choose the sleep function with the ultra low power consumption;
★ automatically turn on the backlight when the voltage changes;
★ press the key to activate display;
★ the input voltage range is wide;
★ buzzer alarm function (optional function, default no);
★ turn off the output signal when undervoltage(optional function, default no);

Note: This product has been set as the default battery specification in factory: lead 12V or lithium 3 strings 12V, please indicate the battery specifications before ordering. The user can modify it to other specifications, please see overleaf advanced settings. The default configuration has no the front keys, please indicate the height of the key if needed.

Special note: The lithium iron phosphate battery does not recommend to use this capacity display module, please use our company's TY5 or TF01N coulometer coulometer.

http://item.taobao.com/item.htm?id=17349165707

Ⅲ. Applicable battery specifications (Table 1)

Support the battery of the following nominal voltage specifications:

Code		Nominal voltage		Code		Nominal voltage
Pb1	plumbic acid	12V		Pb3	plumbic acid	36V
Pb2	plumbic acid	24V		Pb4	plumbic acid	48V

Code	Lithium battery strings	Nominal voltage		Code	Lithium battery strings	Nominal voltage
Li2	2	7.2V/7.4V/8.4V		Li9	9	33V
Li3	3	10.8V/11.1V/12V		LiA	10	36V
Li4	4	14.4V/14.8V/15V		Lib	11	41V
Li5	5	18V/19V/20V		LiC	12	45V
Li6	6	21.6V/22V		Lid	13	48V
Li7	7	24V/25.2V		LiE	14	52V
Li8	8	29.6V/30V		LiF	15	56V

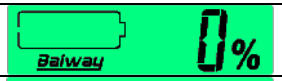
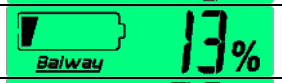
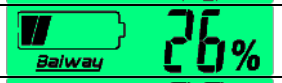
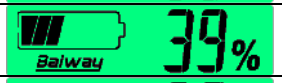
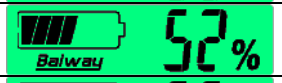
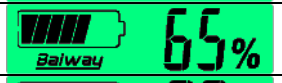
Note:

1. The numbers in the nominal voltage is the general name of the voltage by users, the same battery strings, may have different names.
2. The lithium battery is the general three elements or soft package/polymer lithium ion battery, not including phosphate (iron-lithium) battery.
3. "Code" means the the corresponding English character displayed on the LCD screen when selecting the specifications.

Ⅳ. Electrical parameter (Table 2)

Parameter	Min	Typ	Max	Unit
Working voltage range of 1 (conventional)	8.0	12.0	63.0	VDC
Working voltage range of 2 (low)	5.0	7.2	12.0	VDC
Working power consumption (the backlight is on and the LCD displays)	/	4.0	5.0	mA
Standby power consumption (the backlight is off and the LCD displays)	/	100	120	μA
Sleep power consumption (the backlight is off and the LCD doesn't display)	/	10	20	uA
Voltage accuracy		±1.0	±2.0	%
Backlight trigger voltage (F2 mode enable)		100	300	mV
Using ambient temperature range	10	25	+40	℃

Ⅴ. Voltage parameters: (Table 3)

12V plumbic acid	24V plumbic acid	36V plumbic acid	Lithium battery 3 strings	Lithium battery 4 strings	Lithium battery 7 strings	The LCD display contents	specification
10.5V	21.0V	31.5V	10.2V	13.6V	23.8V		Low voltage
10.9V	21.7V	32.6V	10.5V	14.0V	24.5V		13% remained
11.2V	22.4V	33.6V	10.8V	14.4V	25.2V		26%remained
11.6V	23.1V	34.7V	11.1V	14.8V	25.8V		39%remained
11.9V	23.8V	35.7V	11.4V	15.2V	26.5V		52%remained
12.3V	24.5V	36.8V	11.7V	15.6V	27.2V		65%remained
12.6V	25.2V	37.8V	12.0V	15.9V	27.9V		78%remained
13.0V	25.9V	38.9V	12.2V	16.3V	28.6V		91%remained
13.2V	26.4V	39.6V	12.5V	16.6V	29.1V		full

1. The input voltage parameters are the theoretical value, the actual product may have a bias, the absolute deviation maximum range: ± 2.0%, the relative deviation range between gears: 0.5%;
2. Customized special battery specifications is available for the large quantities of users , please provide the charging and discharging characteristic curves of battery or the correspondence table of the battery voltage and the percentage.

Ⅵ. Instructions for use:

1. Solder the attached two-core cable (the red and black wires) to the positive and negative electrode of the battery, the red is connected to the positive end, and the black is connected to the negative; note: the connection shall not be reversed, the reverse voltage above 15V may burn the electricity board!
2. The back of the electricity display module has a two-core socket, insert the white terminal of the two-core cable into the socket, pay attention to the socket direction; the electricity display module should work normally, the backlight keeps on. If it cannot display, you should immediately cut off the power and check to exclude the problem; if the electricity is always 0% or 100%, please confirm whether the specification of battery and the electricity display module match.
3. The seven battery icons on the left of the electricity display module LCD screen represents the battery capacity from low to high; at the same time the percentage shows on the right;
4. When the voltage is lower than the minimum value, the percentage is 0%, while the backlight off, enter the power-saving low consumption state;
5. The buzzer alarm function, when the battery is less than 5%, the buzzer on the back of module will produce a beep in interval, and the lower the percentage is, the more pressing the sound is, the backlight turns off when the battery is less than 0% , the buzzer stops alarm. (this function is optional);
6. The output turns off when undervoltage, when the battery >10%, it outputs signals, but when the battery is less than 0%, there's no output signal. The output signal should be connected to the electrical relay or other power devices to achieve power expansion. (this function is optional)
7. To display the capacity accurately, read the data under the no-load state. If the charging and discharging current is large or the battery internal resistance is large, the residual capacity displayed by the electricity meter may be inconsistent with the actual capacity. If the electricity display module cannot correctly display, please use the TY5 or TF01N coulometer (http://item.taobao.com/item.htm? Id=22831228556).
8. Under the always being on conditions, there is some current power consumption, when the battery capacity is less than 30Ah, or the equipment has requirements for the turn-off power consumption current and the standby power consumption, it's not recommended to power the electricity display module for the long term, you can use the keys on this product to view function, e.g., to press the front key to display the electricity capacity, see F1/F2 function.
9. When the nominal voltage is above 30V, if the electric display module is powered on for a long time, the back heat is a normal phenomenon. If an ignition or fire occurs while using, power it off and identify the cause of the problem.
10. To prevent components on the PCB board from the equipment leakage damage , special attention is payed to the instrument or metal casing which is not exposed to any metal part of the PCB board, including the liquid crystal pin. In addition, the back of the electricity display module should not touch any metal parts in case of short circuit; try not to touch the PCB board element with bare hands.

Ⅶ. Advanced settings:

A. Press keys instructions

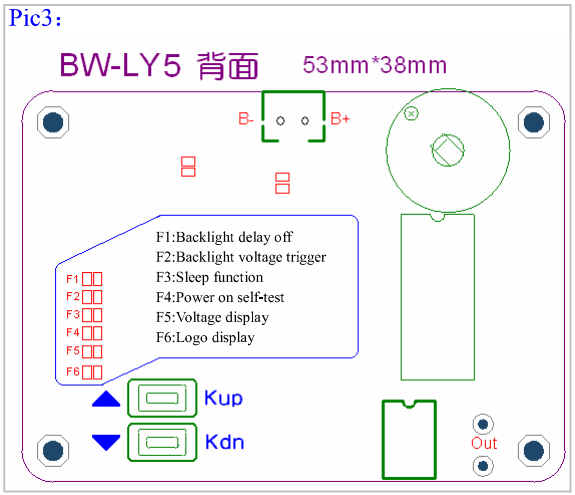
1. The front key on the electricity module is the “OK” key, used for lighting backlight or waking up. Note the height of the key is different, if the panels has been installed, the key should be 2mm higher. The default configuration is without the switch.
2. The back of the electricity display module has two white keys, ↑Kup and ↓Kdn are used to select battery types.

B. Type selection:

1. First power off the electricity display module, press and hold the Kdn key on the back, then power on the electricity display module, release the Kdn key, the English sign: "Pbx" or "Lix" is shown on the right (Pb stands for lead-acid, Li for the lithium battery, X for the battery string number), press the Kup or Kdn key to sequentially display the following types:

Pb1: Pb12V lead-acid battery
Pb2: Pb24V lead-acid battery
Pb3: Pb36V lead-acid battery
Pb4: Pb48V lead-acid battery
Li2: 2 strings of lithium battery
Li3: 3 strings of lithium battery
Li4: 4 strings of lithium battery
Li5: 5 strings of lithium battery
Li6: 6 strings of lithium battery
...
Li9: 9 strings of lithium battery
LiA: 10 strings of lithium battery
Lib: 11 strings of lithium battery
LiC: 12 strings of lithium battery
Lid: 13 strings of lithium battery
LiE: 14 strings of lithium battery
LiF: 15 strings of lithium battery

Pic3:



2. Power off the electricity module after finding the corresponding type, re-power it and it can function normally.

C. Function settings:

1. Use the pointed iron (20W) to connect the corresponding F1-F6 connection points in the function setting, you should operate in power-off condition, and make the adjusting effective after re-powering.
2. The back is not connected in the factory default, functions: the backlight keeping on, the percentage display, no sleep state, no self-inspection, no Logo.
3. The following is the connected F1-F6 points function: (See Pic3)

F1: the backlight delay turn-off function; enter the low-power state (100uA) after displaying 10 seconds , the LCD displays but the backlight turns off. Press the OK key and the backlight turns off again after 10 seconds’ lighting. This mode needs the OK key.

F2: the backlight voltage trigger function; enter the low-power state (100uA) after displaying 10 seconds , the LCD displays but the backlight turns off. When the voltage changes,the backlight automatically lights on for 10 seconds, or press the OK key and the backlight turns off again after 10 seconds’ lighting. This mode needs the OK key.

F3: sleep function; enter the ultra low-power state (<20uA) after displaying 10 seconds , the LCD and the backlight turns off. Press the OK key and the backlight turns off again after 10 seconds’ lighting. This mode needs the OK key.

F4: power-on self-inspection; every time the electricity module is powered on, the LCD displays strokes for 2 seconds, and then displays the selected battery type for 1 second, finally displays the electricity capacity.

F5: voltage display; the current battery voltage is displayed only on the right, the battery symbol on the left is still in accordance with the selected type.

F6: the LCD shows the Logo on the lower left.

Note:

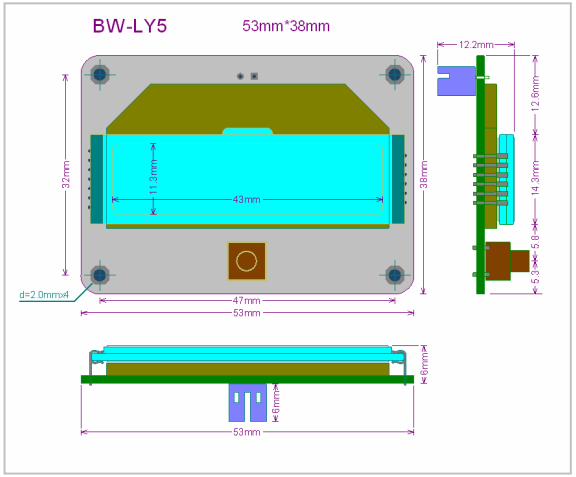
1. The F1-F3 functions need the front key, the default is without this key.
2. If there’s no OK key on the front, the positive and negative electricity pole should be connected to the back of the equipment switch, it always works after you switch on the equipment;
3. If there’s a OK key on the front, the positive and negative electricity poles should be directly connected to battery poles, then choose F1/F2 or F3 function on the back to realize the automatic backlight off function or auto sleep function.

Ⅷ. Notes:

1. The LCD screen surface has a protective cover, which should be torn off before being fixed, so as not to affect the LCD contrast and beauty;
2. The LCD screen surface is made of glass, which is fragile, so it shall not be subject to sharp shock!
3. The LCD screen is sensitive to ultraviolet light, so it can not be exposed in the sun for a long time or in the environment with large amounts of ultraviolet radiation (such as electric welding machine, argon arc welding), otherwise it will shorten the life of LCD.
4. The electricity display module can not be exposed in the sun for a long time or in the environment with large amounts of ultraviolet radiation when using or storing, particular in winter (-20℃) and summer (>60℃), otherwise it will shorten the life of LCD.
5. The LCD screen changes significantly with the environmental temperature, the contrast may reduce and the the display may be lighter at low temperature (<10℃), the display may be darker at high temperature (>50℃), but the display recovers itself at normal temperature.

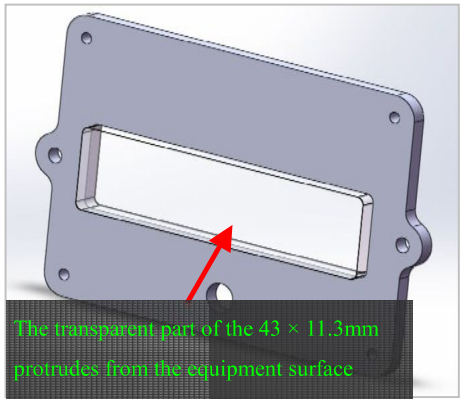
Ⅸ. The size of the electricity board

1. The size of the PCB: (mm)
2. The height between the LCD and the PCB: 6.0mm
3. The front total thickness when the panel is not installed: 9mm
4. The total thickness when the panel is installed: 13mm

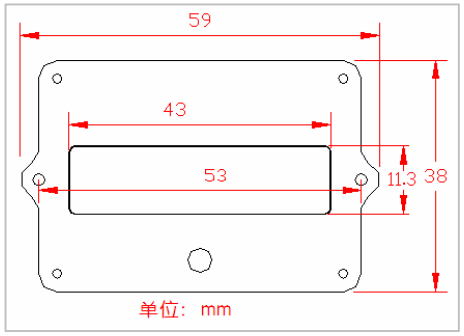


Ⅹ. Optional: organic glass panel

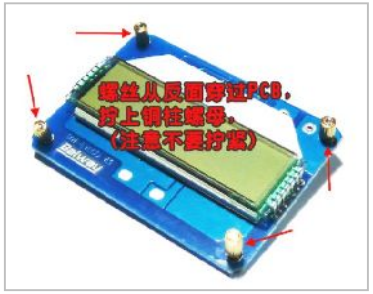
1. This panel is optional, we provide the following parts for the client to install:
   One panel
   Four screw
   Four copper cylinder
2. The panel bracket shape is on the right, the size is as the right bottom figure;



3.The intermediate part of 43*11.3mm is the protuberant transparent window, when it is installed on the panel of the equipment, cut out the opening according to this size, and expose the transparent display window.



4. The panel bracket is made of organic glass, both sides are covered with the protective paper cover, remove the transparent window and the black box of flat side of the protective cover, put the protuberant transparent surface of the middle of the panel bracket on the desktop; put the four screws (2.0mm) through the holes on the four sides of the electricity display module board, screw on the copper nut; (note that do not tighten);



5. Note that you should assemble the key first before the panel is installed if you need the front key.

6. Put the electricity board with the screws and the copper nuts tightened upside down on the panel bracket uncovered, align the screw holes with four angles, using a screwdriver to tighten the screws,if it is not tight, please turn the copper nut and tighten;

The look with a panel: (total thickness after installation: 13mm)
The height of the key is slightly higher than the panel, if it needs to protrude from the panel, select the suitable height keys.

Ⅺ. The fixing between the electricity panel and the equipment panel

1. The glue fixation: use the glue to fix the panel bracket and the equipment panel ;
2. The screw fixation: there are two 53mm spacings fixed holes on the panel bracket, the diameter is 2.2 mm; you can use the 2.5mm self-tapping screws to fix, and pay attention to the length of the screw; if you screw the 3mm screws, use the 2.4-2.7mm drill reaming before installation;

Ⅻ. Product version history:

Modified Date	Version after modified	The description of the modified content	Approval	Whether to keep
2014-5-1	Ver1.0	The first edition		
2014-6-7	Ver1.1	Changed the logo display mode in the specification		
2014-7-2	Ver1.2E	English version		