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TH PWM-30

SOLAR CHARGE CONTROLLERS



THPWM-30



THPWM-60

SAVE THIS INSTRUCTION MANUAL FOR FUTURE REFERENCE.

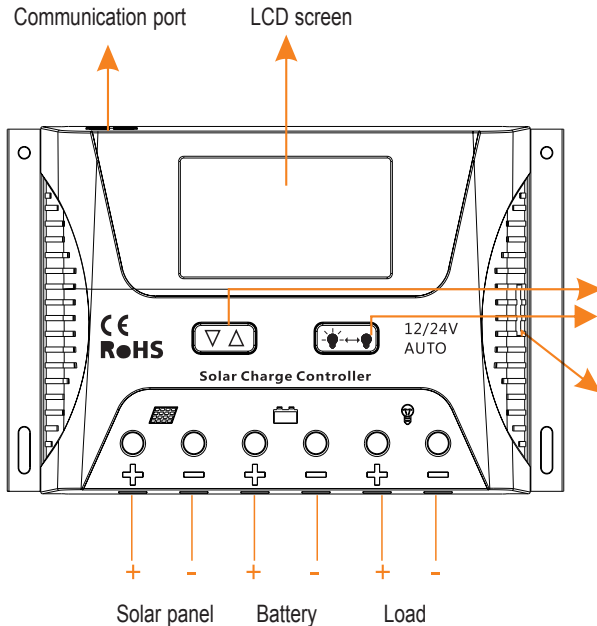
Instruction Manual
and Warranty Information

PRODUCT FEATURES














THPWM-30

1. Automatic system voltage identification
2. Charging program options for sealed, GEL and flooded lead-acid batteries and lithium batteries are available.
3. An upgraded 3-stage PWM charging algorithm is adopted. Application of an equalizing charge to the battery periodically or when over discharged, can effectively prevent the battery from non-equalization and sulfuration, thus extending the battery's service life (with the exception of GEL and lithium batteries).
4. With temperature compensation employed, charging parameters can be automatically adjusted (with the exception of lithium batteries).
5. The product provides overcharge, over-discharge, overload protection, as well as short circuit and reverse-connection protection.
6. A range of parameter settings and power-down saving functions are available, this requiring no repeated setting.
7. The user-friendly design of browser and dynamic interfaces ensures convenient and intuitive operations.
8. (An optional communication function) provides a RJ12 data port (output of TTL232 level or bluetooth signals), with the data adopting the standard Modbus protocol, can be used together with our upper computer monitoring software or mobile phone APP.
9. Boasting an industrial grade design, the product can function well in various tough conditions.
10. TVS lightning protection is adopted.

PANEL STRUCTURE



PANEL STRUCTURE

LCD Icon	Indicated Object	State	Meaning
	Day recognition	Steady on	Day time
	Night recognition	Steady on	Night time
	Solar panel	Steady on	Solar panel indication
BOOST	Charging state	Steady on	Boost charging
FLOAT		Steady on	Floating charging
EQUALIZE		Steady on	Equalizing charging
	Battery	Quick flashing	Battery overvoltage
		Slow flashing	Battery over-discharge
	Battery SOC	4 dashes	100%
		3 dashes	75%
		2 dashes	50%
		1 dash	25%
		0 dash	0%
	Load	Steady on	Load turned on
		Steady on	Load turned off
		Quick flashing	Overload or short-circuit protection

FIVE LOAD WORKING MODULES

1. Pure light control (0): When sunlight disappears and the light intensity drops to the starting point (light control off), the controller initiates a 10-minute delay (settable) to confirm the starting signal, and then switches on the load for operation. When sunlight emerges and the light intensity reaches the starting point, the controller initiates a 1-minute (fixed) delay to confirm the shutting down signal, and then shuts down the output to stop the load's operation.

2. Light control + time control (1-14): The starting process is the same as pure light control. After operating for a preset period of time (settable from 1 to 14 hours), the load stops operation automatically.




3. Manual Mode: (15): In this mode, the user can switch the load on or off by the keys, no matter whether it's day or night.

4. Debugging mode (16): When the solar panel voltage is higher than the "light control off" voltage, switch off the load immediately; when the solar panel voltage is lower than the "light control on" voltage, switch on the load immediately.


5. Normal on (17): The energized load keeps the output state.

LCD Display	Mode	LCD Display	Mode
0	Pure light control mode	9	Light control + time control 9 (hours)
1	Light control + time control 1 (hour)	10	Light control + time control (10 hours)
2	Light control + time control (2 hours)	11	Light control + time control (11 hours)
3	Light control + time control (3 hours)	12	Light control + time control (12 hours)
4	Light control + time control (4 hours)	13	Light control + time control (13 hours)
5	Light control + time control (5 hours)	14	Light control + time control (14 hours)
6	Light control + time control (6 hours)	15	Light control + time control (15 hours)
7	Light control + time control (7 hours)	16	Light control + time control (16 hours)
8	Light control + time control (8 hours)	17	Light control + time control (17 hours)


LOAD WORKING MODE SETTINGS


In the load mode menu, press  for 2s and the number (e.g. 15) will begin to flash. Press  to adjust the mode (from 0-17), and then long press  again for 2s to complete and save the setting.


Note:


1. After parameter adjustment, if  is not pressed and held long enough for exiting, the system exits to the main menu after 12s, and the parameter that was set is not saved.
2. When the system is saving data, the screen may shake slightly. This is normal and the user may ignore it.

SAFETY ADVICE

 **CAUTION:** When connected to a 24V system, the solar panel terminal voltage may exceed the limit for human safety. If operation is to be performed, be sure to use insulation tools and keep your hands dry.

 **CAUTION:** If the battery is reversely connected, the controller itself won't be damaged, but the load end will have a negative voltage output, which may damage your load device. Take care not to let this happen.

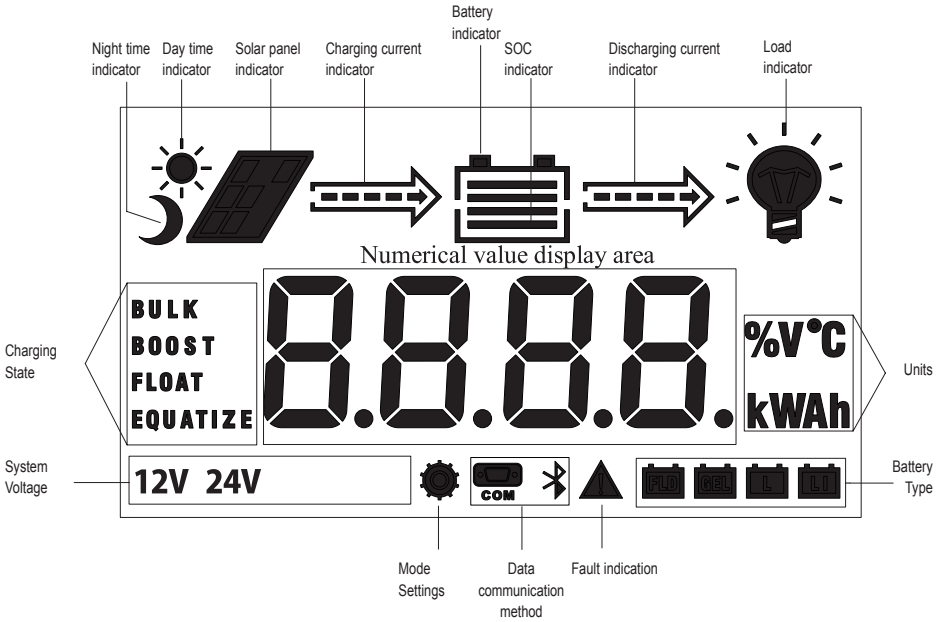
 **CAUTION:** The battery contains large amount of energy. Therefore, in no cases should the battery be short circuited. It's recommended that a fuse be serially connected to the battery.

 **CAUTION:** Keep the battery away from fire and sparks as the battery may produce flammable gas.

 **CAUTION:** Keep children away from the battery and controller.

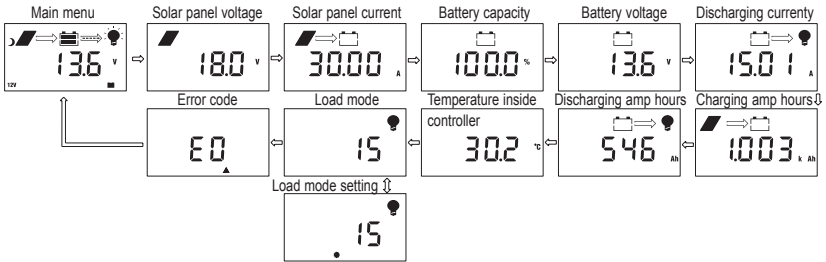
 **CAUTION:** Follow the safety advice provided by the battery manufacturer.

LCD SCREEN ILLUSTRATION



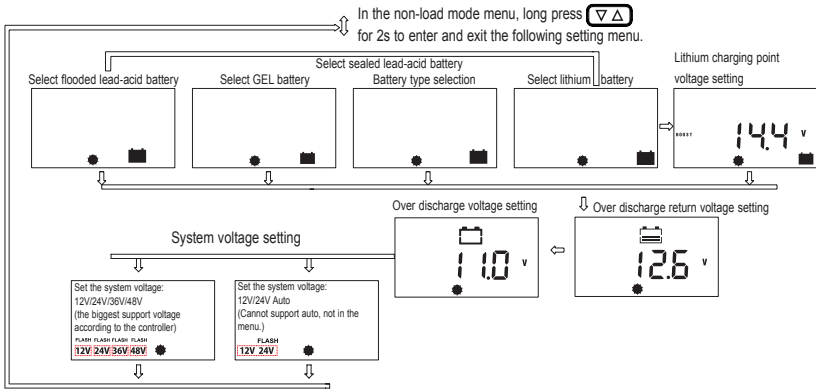
BROWSING MENU ON LCD SCREEN

1). Continuously press ∇/Δ , the screen will display the following order: "main menu"---"solar panel voltage"---"solar panel current"---"battery capacity"---"battery voltage"---"discharging current"---"charging amp hrs"---"discharging amp hrs"---"temperature inside controller"---"load mode"---"load mode settings"---"error code", and then back to "main menu". If the keys are not operated for 12s, the system will automatically return to display the "main menu".



BROWSING MENU ON LCD SCREEN

1). When "load mode" is displayed, long press $\nabla\Delta$ to enter into the load mode setting. Press $\leftarrow\rightarrow$ to adjust the mode, and hold for 2s $\nabla\Delta$ to save and exit; or else, the system will not save the setting that was just made and automatically exists the setting after 12s.



BATTERY TYPES, CHARGING VOLTAGES (LITHIUM BATTERY), OVER -DISCHARGE RETURN AND OVER DISCHARGE VOLTAGE SETTINGS

In the non-load menu:

- 1) When $\nabla\Delta$ is long pressed, the first interface entered is for battery type setting, and the flashing one is the battery type currently selected. Press $\leftarrow\rightarrow$ to select among FLD/GEL/SLD/LI.
- 2) After selection, short press $\nabla\Delta$ to enter into over-discharge return and over-discharge voltage settings; or the first to enter charging voltage setting menu for lithium battery.
- 3) After parameters have been set, long press $\nabla\Delta$ for 2s to save and exit.

Parameters shall be set according to the following rule: over-discharge voltage over-discharge return voltage = under-voltage warning floating charging voltage boost charging return = equalizing charging voltage overcharge voltage; and two adjacent values shall have a difference of greater than 0.5V.

CHARGING AND DISCHARGING OVERLOAD PROTECTION AND RECOVERY TIME

In the charging and discharging overload protection mechanism, the relation between overload current and protection time is as follows: An overload current 1.25 times of the rated current initiates a delay of 30s before starting protection; similarly, 1.5 times, 5s and 2 times is 1s.

Overload recover: Automatic recovery after 1 minute.

LOAD SHORT CIRCUIT AND RECOVERY

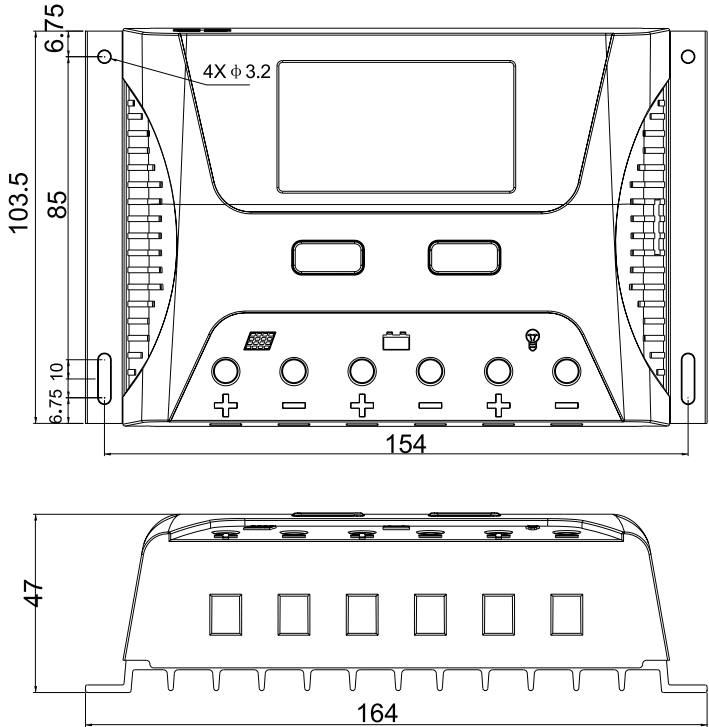
Short-circuit automatic recovery time: 1st time, 5s; 2nd time, 10s; 3rd time, 15s; 4th time, 20s; 5th time, 4 hours or automatic recovery the next day; or long press to make the load resume output.

INSTALLATION INSTRUCTIONS AND PRECAUTIONS

1. The controller shall be installed securely and its dimensions are as follows:

External dimensions: 164.0 x 103.5 x 47mm
Installation dimensions: 154 x 85mm

2. Installation hole diameter: 3.2 (mm)



PRECAUTIONS

⚠ CAUTION: If it is a 12V system, the bottom left corner of the LCD display will show '12V', '24V' system will show 24V.

⚠ CAUTION: The first step is to connect the battery. If the connection is made correctly, the controller screen will light up; otherwise, check whether the connection is correct.

⚠ CAUTION: The second step is to connect the solar panel. If sunlight is present and strong enough (the solar panel voltage is greater than the battery voltage), the sun icon on the LCD screen is on; otherwise, check whether the connection is correct. (It's recommended that the operation be performed under the debugging mode).

⚠ CAUTION: The third step is to connect the load. Connect the load leads to the controller's load output terminal and the current shall not exceed the controller's rated current.

⚠ CAUTION: As the controller will generate heat during operation, it's recommended that the controller be installed in an environment with good ventilation conditions.

⚠ CAUTION: Choose cables with large enough capacity for connection, in case too much loss incurred on the lines causes the controller to misjudge.

⚠ CAUTION: The controller has a common positive pole inside. If grounding is needed, ground the positive pole.

⚠ CAUTION: It's important to fully charge the battery regularly. At least one full charging every month is recommended and failure to do so may cause permanent damage to the battery. Only when in-flow energy outpaces the out-flow energy can the battery be charged fully. Users shall bear this in mind when configuring the system.

⚠ CAUTION: Check whether the controller's connection terminals is tightened securely; if not, it may suffer damage when large amounts of current pass through.

ERROR CODE LIST

Code on LCD screen	Corresponding error
E0	No error
E1	Battery over discharge
E2	Battery over voltage
E3	Undervoltage warning
E4	Load short circuit
E5	Load overload
E6	Temperature too high inside controller
E8	Charging current too high
E10	Solar panel input voltage is too high

COMMON PROBLEMS AND SOLUTIONS

Symptoms	Cause and Solutions
LCD screen does not light up.	Check whether the battery is correctly connected.
Incomplete display or no renewal on LCD screen.	Check whether the ambient temperature is too low and whether the display recovers when the temperature rises.
No charging with sunlight present.	Check whether the solar panel is correctly connected and contact is good and reliable. Check whether the solar panel voltage falls below the battery voltage.
The sun icon does not light up while the solar panel icon does. The battery voltage is normal but there is no output.	The load will be switched on automatically after 10 minutes (set by the user)
The battery icon flashes quickly and there is no output.	System overvoltage. Check whether the battery voltage is too high.
The battery icon flashes slowly and there is no output.	The battery is over-discharged and will recover after recharged adequately.
The load icon flashes quickly and there is no output.	The load's power exceeds the rated value or the load is short-circuited. After the problem is solved, long press the key or wait until it recovers automatically.
The load and the encircling light ring stays lit and there is no output	Check whether the power-consuming device is connected correctly and reliably.
Other symptoms	Check whether wiring is sound and reliable and system voltage is correctly recognized.

SPECIFICATIONS

Model	THPWM-30	THPWM-60
Rated current	30A	60A
System Voltage	Automatic recognition of 12 V / 24 V	
Rated power	12V/ 450W	12V/ 600W
No-load loss	< 13mA/12V; < 15mA/24V	
Max. solar energy input voltage	<55V	
Max. voltage at the battery end	<34V	
Battery Type	Flooded, Sealed SLD	
Overvoltage protection	16V	
Equalizing charging voltage	14.8V	
Boost charging voltage	14.6V	
Floating charging voltage	13.8V	
Charging recovery voltage	13.2V	
Over-discharge recovery voltage	12.5V (Settable with the keys)	
Over-discharge voltage	11.0V (Settable with the keys)	
Equalizing charging interval	30 Days	
Equalizing charging time	1 H	
Boost charging interval	2 H	
Temperature Compensation	-3.0mV/C/2V	
Light control voltage	Light control on 5V, light control off 6V (light control on plus 1V)	
Light control judgement time	10 minutes	
USB function	Yes	Optional
Bluetooth function	Optional	
Operating temperature	-25C ° to +55C °	
IP protection degree	IP30	
Net weight	.85Lbs / 390g	1.43Lbs / 650g
Protection Functions	Battery plate reverse connection protection, battery reverse connection protection, charging battery board short circuit protection, charging the battery open circuit protection, charging over current protection, overload protection, load short-circuit protection, controller and over temperature protection.	
Dimensions	6.46 x 4 x 1.85" 164x103.5x47(mm)	7.45x5x2.1" 189.27x127.2x54(mm)

