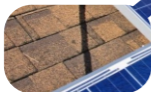




# Controllers (HP series)

HP2410/HP2420

User manual

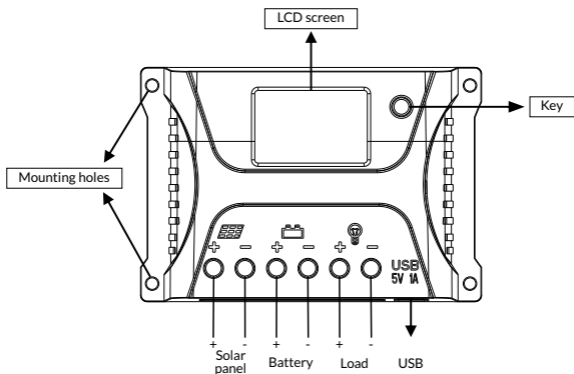


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## 1. Product features

1. 12 V/24 V system voltages are automatically recognized.
2. An upgraded 3-stage PWM charging algorithm is adopted. Application of an equalizing charging 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.
3. With temperature compensation employed, charging parameters can be automatically adjusted.
4. A wide range of load working modes facilitate the product's application to different types of load.
5. The product provides overcharge, over-discharge, overload protection, as well as short-circuit protection.
6. By virtue of an advanced load starting method, large-capacitance loads can be started smoothly.
7. The product provides a dot matrix graphic LCD screen and a human-machine interface with a key.
8. The user-friendly design of browser and dynamic interfaces ensure convenient and intuitive operations.
9. Boasting an industrial grade design, the product can function well in various tough conditions.
10. TVS lightning protection is adopted.

## 2. Panel structure



## 3. Installation instructions and precautions

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

### HP2410

External dimensions: 103×71×36 (mm)

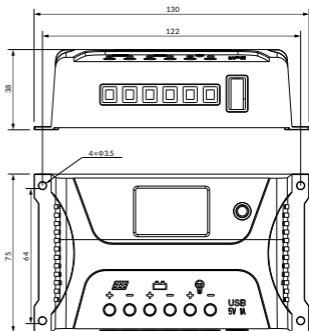
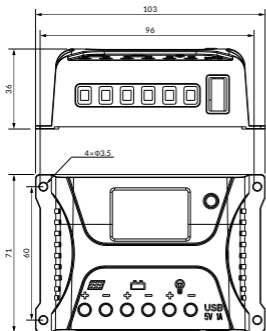
Installation dimensions: 96×60 (mm)

### HP2420/HP2420-S

External dimensions: 130×75×38 (mm)

Installation dimensions: 122×64 (mm)

## 2) Installation hole diameter: 3.5 (mm)



## 3) Operation instructions

- Step 1: Connect the battery. If the connection is correct, the controller screen lights up; otherwise, check whether the connection is correct.
- Step 2: Connect the solar panel. If sunlight is present and strong enough (the solar panel voltage is greater than battery voltage), the sun icon on the LCD screen is on; otherwise, check whether the connection is correct.
- Step 3: 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.

4) As the controller generates heat during operation, it is recommended that the controller be installed in an environment with good ventilation conditions.

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

6) The controller has a common positive pole inside. If grounding is needed, ground the positive pole.

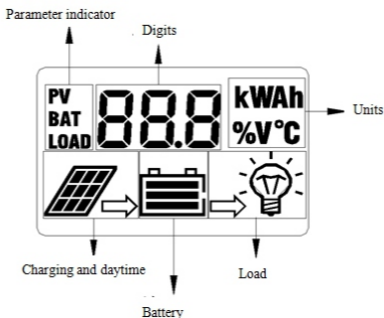
7) It's important to fully charge the battery regularly. At least once full charging every month is recommended, and failure to do that may cause permanent damage to the battery. Only when in-flow energy outpaces out-flow energy can the battery be charged fully. Users shall bear this in mind when configuring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

8) Check whether the controller's each connection terminal is tightened securely; if not, it may suffer damage when there is excessive current.




#### 4. Technical data sheet

| Model                           | HP2410  | HP2420         | HP2420-S |
|---------------------------------|---|----------------|----------|
| Rated current                   | 10 A  | 20 A           | 20 A     |
| Current display function        | No  | No             | Yes      |
| System voltage                  | Automatic recognition of 12 V/ 24 V                         |                |          |
| No-load loss                    | <10 mA/12 V; <12 mA/24 V                                    |                |          |
| Max. Solar energy input voltage | <55 V   |                |          |
| Max. voltage at the battery end | <35 V   |                |          |
| Over voltage protection         | 17.0 V; ×2/24 V;  |                |          |
| Equalizing charging voltage     | 14.6 V; ×2/24 V;  |                |          |
| Boost charging voltage          | 14.4 V; ×2/24 V;  |                |          |
| Floating charging voltage       | 13.8 V; ×2/24 V;  |                |          |
| Charging recovery voltage       | 13.2 V; ×2/24 V;  |                |          |
| Over-discharge recovery voltage | 12.6 V; ×2/24 V;  |                |          |
| Over-discharge voltage          | 11.1 V; ×2/24 V;  |                |          |
| Equalizing charging interval    | 30 days   |                |          |
| Equalizing charging time        | 1 H   |                |          |
| Boost charging time             | 2 H   |                |          |
| Temperature compensation        | -3.0 mV/°C/2 V  |                |          |
| Light control voltage           | Light control on 5 V, ×2/24 V                               |                |          |
|                                 | Light control off 6 V, ×2/24 V                              |                |          |
| Light control judgment time     | 1 minute  |                |          |
| Operating temperature           | -25 °C to +55 °C  |                |          |
| IP protection degree            | IP30  |                |          |
| Net weight                      | 100 g   | 160 g          |          |
| Protection functions            | Solar panel short circuit and reverse-connection protection |                |          |
|                                 | Over-temperature, overload and short circuit protection     |                |          |
| Dimensions                      | 103×71×36 (mm)  | 130×75×38 (mm) |          |

## 5. LCD screen illustration



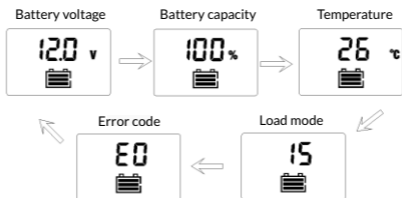
## 6. State indicators

| LCD Icon  | Indicated object               | State                    | Remark                      |
|---|--------------------------------|--------------------------|-----------------------------|
| <b>PV</b>   | Solar panel data               | Steady on                | This data only for HP2420-S |
| <b>BAT</b>  | Battery data                   | Steady on                |                             |
| <b>LOAD</b>   | Load discharge data            | Steady on                |                             |
|    | Daytime or charging            | Steady on                |                             |
|   | Night recognition              | Steady off               |                             |
|  | Load short circuit or overload | Quick flashing           |                             |
|   | Load switched on               | Steady on                |                             |
|   | Load switched off              | Steady off               |                             |
|  | Normal battery                 | All on                   |                             |
|   | Over discharge                 | Only the outline flashes |                             |
|   | Over voltage                   | 3 dashes flashing        |                             |

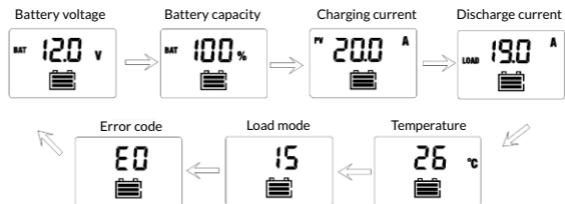
## 7. Browsing menu on LCD screen

The following menus are shown in an automatic cycle on the screen, with an interval of 3 s.

1) The figure 1 is for the model HP2410 and HP2420.

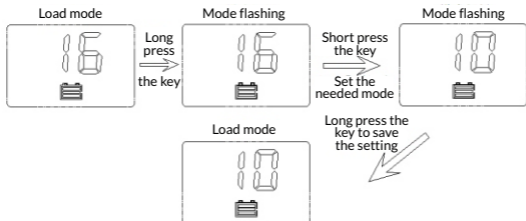


2) The figure 2 is for the model HP2420-S. (Adding charging and discharging current display).



## 8. Setting menu on LCD screen

Long press the key in any mode to enter the load mode setting interface, and the load mode begins to flash. Short press the key to adjust the load mode, and long press the key again to save and exit mode setting or wait for 10s to let the system save and exit automatically.



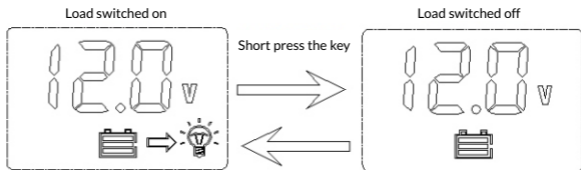
## 9. Five load working modes

- 1) Pure light control (0): When sunlight disappears and the light intensity drops to the starting point, the controller initiates a one 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 one minute 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 to 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 key, no matter whether it's day or night.
- 4) Debugging mode (16): In cases of 6V with light signals, the load will be shut off. In cases of 5V (varies according to the preset light controlled voltage and system voltage) without light signals, the load will be switched on. This mode enables fast check of the correctness of system installation during installation and debugging.
- 5) Normal on (17): The energized load keeps in output state.

| LED display | Mode   |
|-------------|--|
| 00          | Pure light control mode                      |
| 01-14       | Light control + time control (1 to 14 hours) |
| 15          | Manual mode (default)                        |
| 16          | Debugging mode                               |
| 17          | Normal on mode                               |

## 10. Manually switching on/off load

When the load mode is set to 15 (manual mode), short press the key (non-setting mode) in any interface to switch on or off the load.



### Note:

As load start is a type of soft start, display of the load icon on the LCD screen will be delayed after the load is switched on.

## 11. Overload and short circuit recovery

Overload and short circuit automatic recovery time: 5 s at the 1st time; 10 s at the 2nd time; 25 s at the 3rd time; 30 s at the 4th time; 30 s at the 5th time, or automatic recovery the next day.

## 12. Error code list

| Code on LCD screen | Corresponding error                    |
|--------------------|--|
| E0                 | No error                               |
| E1                 | Battery over-discharging               |
| E2                 | Battery over voltage                   |
| E4                 | Load short circuit                     |
| E5                 | Overload                               |
| E6                 | Controller inner temperature over heat |

## 13. Common problems and solutions

| Symptoms  | Causes 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.<br>Check whether the solar panel voltage falls below the battery voltage. |
| The battery icon flashes quickly, and there is no output. | System over voltage. 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. |
| Other symptoms  | Check whether wiring is sound and reliable, and system voltage is correctly recognized.   |



# Warranty card

## Solar charge controller



### Customer information

Name:

Address:

Tel:

E-mail:

### Product and fault information

Serial number:

Model number:

Date of purchase:

Date of installation:

Load type and load power:

Time of product failure:

Product failure description:

#### The following situations are out of warranty:

- 1) Warranty card or serial number is missing
- 2) Human error
- 3) Warranty expired
- 4) Damage or loss caused by external causes due to force majeure
- 5) Disassemble or modify without authorization from the supplier
- 6) Violation machine operation / terms of use (such as continuous overloading, wrong battery input voltage)

Customer signature:

Date: