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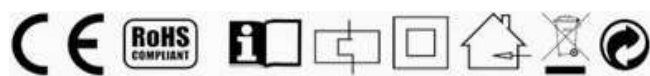
ATEK 4000

6/12V – 4Amp

Smart Charger with LCD



Read this material before using this product. Failure to do so can result in serious injury. SAVE THIS MANUAL



Specification :

Operation Voltage	220V – 240V
Operation AC Frequency	50 Hz
Max Charging Current	4Amp
Charging stages	4 Stages
Battery Voltage	6V / 12V
Battery Capacity	5Ah - 120Ah
Charging stage memory time	12 Hours
Operation Temperature	0 – 40 °C
IP rating	IP65

1. Product Introduction

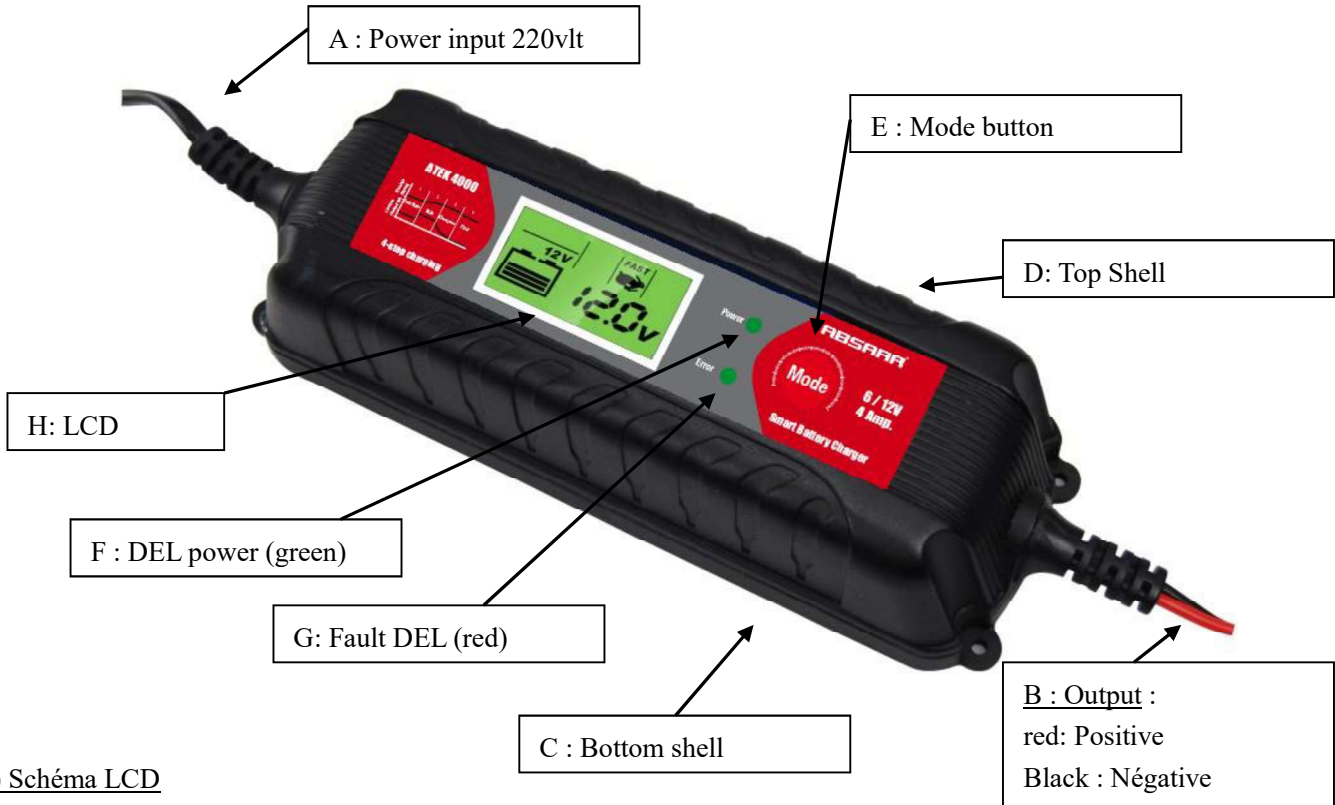
ATEK 4000 is a smart charger based on the PWM high frequency switching power supply (AC-DC) technology and MCU (with 12bit ADC) control, featuring high efficiency, low loss, small size, light weight, LCD display interface, and complete protection function. It is the best choice for car, home and industrial battery charging and has the following features:

- Identify 6V/12V batteries automatically.
- Adopt 4-stage smart charging principle: pre-charge → constant current → constant voltage → float charge;
- Four charging modes are available: 6V/1A (slow), 12V/1A (slow), 12V/4A (fast), 12V/4A (low temperature)
- LCD display: analog graph, figure & character display, ensuring more intuitive, clear and simplified operation;
- Wrong battery prompt, reverse polarity prompt and protection, over temperature protection, power-down memory, short circuit protection,
- Separate button is available to select charging mode.

2. Appearance and LCD Diagram

1) Product structure

Fig. 1 LCD diagramm



2) Schéma LCD

Fig. 1 Structure Diagram

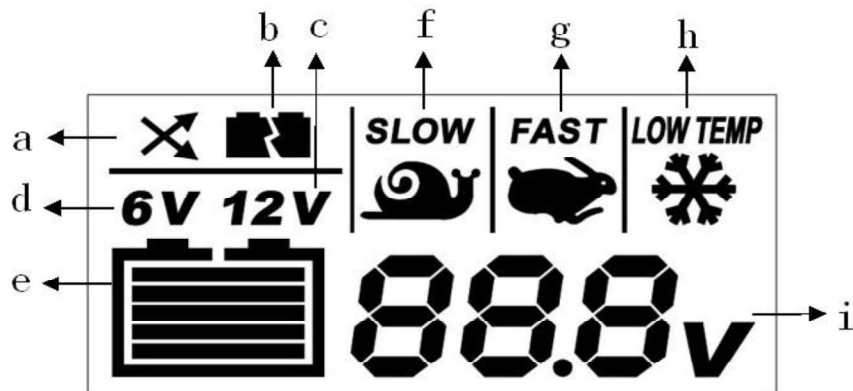


Fig. 2 LCD Diagram

- a: reverse polarity icon
- b: wrong battery icon
- c: 12V battery icon
- d: 6V battery icon
- e: analog battery icon

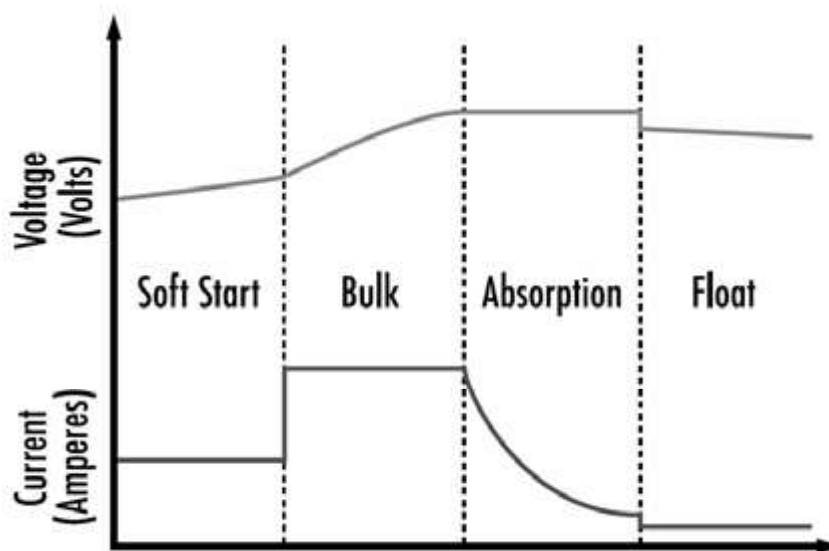
- f: slow mode icon
- g: fast mode icon
- h: LowTemp mode icon
- i: Digit/character icon

3. Charging Features and Electrical Parameters

This product provides a 4-stage charging mode: pre-charge, constant current, constant voltage, and float charge, and the features are as follows:

- i) **Pre-charge:** identify the battery voltage before charging; if the battery voltage is lower than the reference voltage, the battery will be pre-charged in order to avoid damage to the battery.
- ii) **Constant current:** the main charging phase; the battery will be charged with the maximum current, 70%~85% of the electricity is charged in this stage
- iii) **Constant voltage:** in the process of constant voltage charging, the battery voltage will be higher and higher, and the current will be smaller and smaller; when the charging current drops to 0.5C, the constant voltage charging ends, and then enters next stage; the constant voltage charging stage is the boost charge, and the battery is almost fully charged at the end of the stage;
- iv) **Float charge:** it is a maintenance charge, and allows for a longer time of safe charge. Through trickle charge, the battery can be charged to nearly 100%. Too small current is insufficient to cover the self-discharge of the battery, and too large current will lead to over-charge and dehydration. Long time charging with a small current can eliminate the vulcanization of the negative electrode plate.

Fig. 3: Current & Voltage Charging Curves



1) Power-down memory function: in the charging process (constant current and follow-up stage), the product can remember the current charging mode after power outage, and restores the original state when the grid resumes; the maximum time is 12h with battery connection.

In power-down memory state, the Power LED is on, the LCD doesn't display, and the backlight is off;

2) Charging mode: identify 6V/12V batteries automatically; for 6V batteries, only 6V/1A SLOW mode is available; for 12V batteries, three charging modes are available, as follows:

- 6V 1A /SLOW charging mode (default)
- 12V 1A /SLOW charging mode
- 12V 4A /FAST charging mode
- 12V 4A /LOW TEMP charging mode (**Environment temperature <10°C**)

The minimum voltages for automatic identification of 6V&12V batteries are 3V and 7.4V respectively.

3) Protection:

- Short circuit protection: keep or return to the initialization interface.
- Reverse polarity protection: the LCD displays reverse polarity signal
- Overheating protection
- IP65 dustproof and waterproof

4) LCD display function

The product integrates LCD, as shown in Fig. 2. It displays the analog battery status, charging mode, charging state, real-time voltage, and error message, and integrates LED indicators. The specific LCD states are shown in Fig. 4

below:

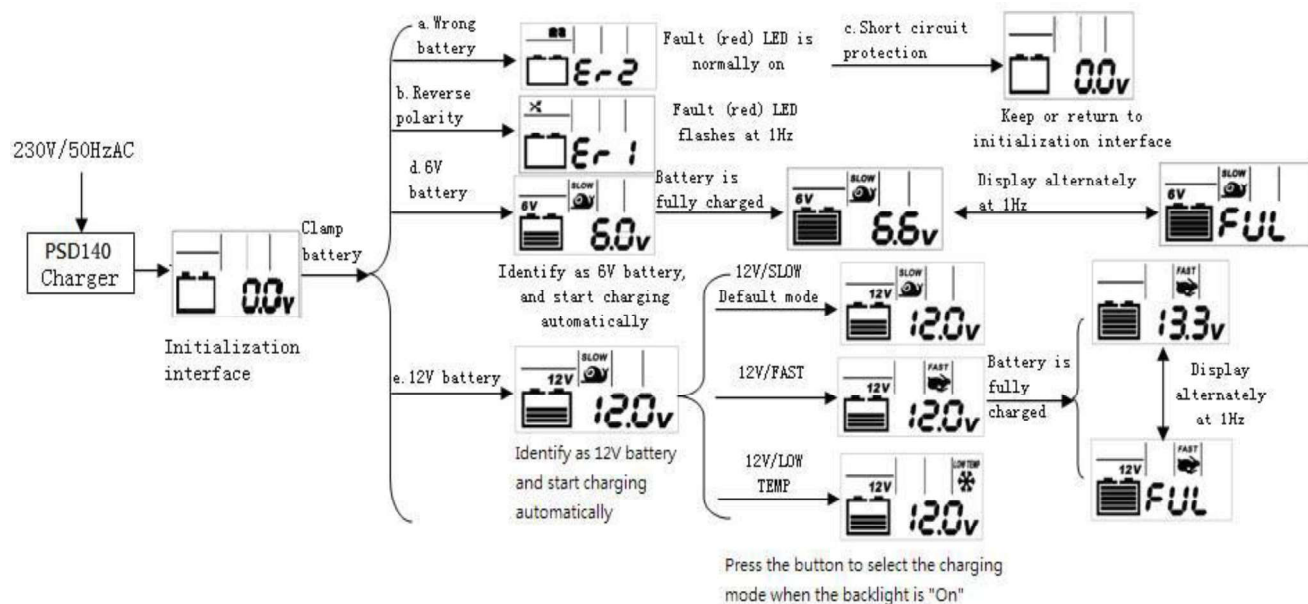


Fig. 4 LCD Charging Block Diagram

Remark: i) 6V: When the battery voltage is between 3.5V–5V, the charger will work at 6V/Slow mode. LCD flashes the real time battery voltage at 1Hz frequency and the battery icon scrolls. Press the button to pause/resume the charging process. The battery icon stops scrolling when it is “pause”.

After charging the battery by 2 minutes, if battery voltage is still <4.5V, LCD flash at 1Hz frequency to display “Lo” and “real time voltage” alternatively. Red LED light keeps “ON”

ii) 12V: When the battery voltage is between 7.4V and 10V. The charger will work at 12V/Slow mode. Press the button and change the mode to “Fast”, “Low Temp” or “Pause” the charging process respectively. The battery icon stops scrolling when it is “pause”.

After charger the battery by 2 minutes, if battery voltage is still <9V, LCD flash at 1Hz frequency to display “Lo” and “real time voltage” alternatively. Red LED light keeps “ON”

In these 2 cases, please press the button to detect/check the battery status and start the charging process again.

Don’t need to disconnect the AC power and battery cable clamp

Keep charging the battery 4 hours (6V mode)/9 hours (12V mode) and the battery voltage is still below the correct level, LCD displays Er3. Red LED light keeps “ON”.**In this case, you must to disconnect the battery cable clamp, or need to disconnect the power.**

Please refer to below Fig. 5 and Fig.6.

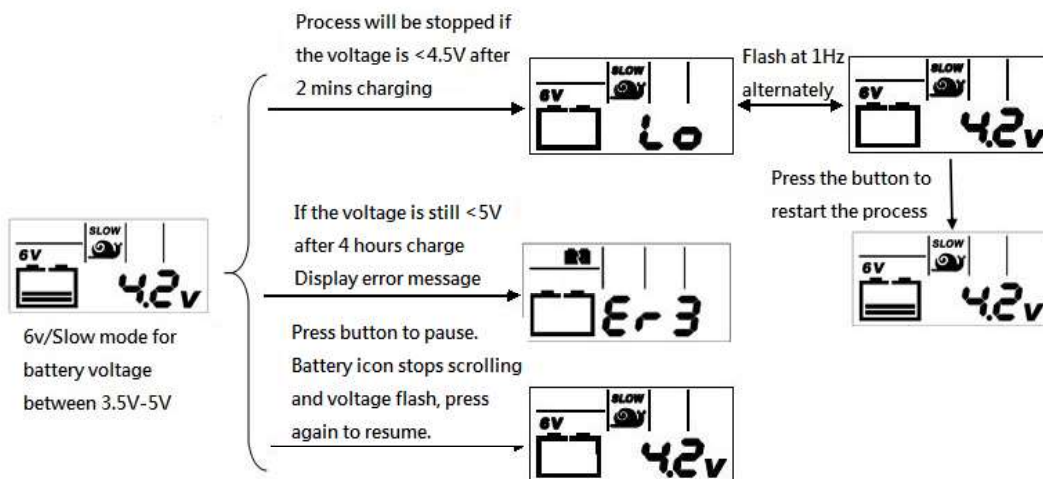
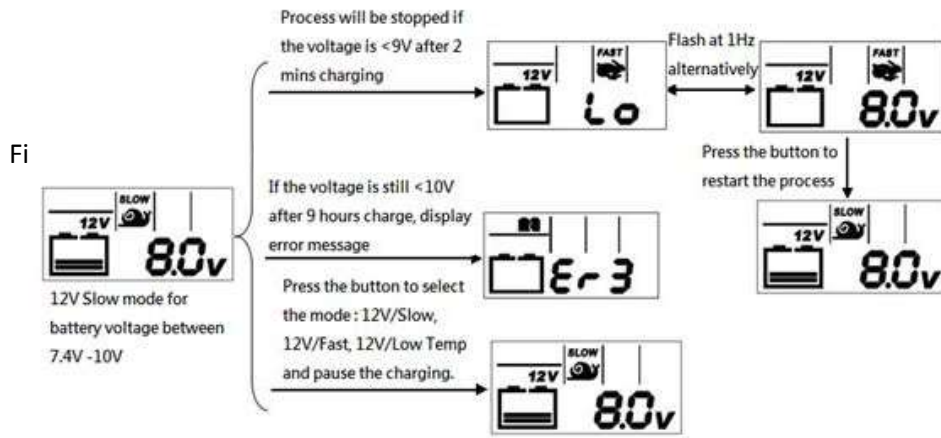


Fig. 5: 6V LCD charging block diagram



LCD charging block diagram

Precautions and Operating Instructions

1) Precautions:

- a. The supply voltage of the product is 220~240VAC; please make sure that the mains voltage meets the specifications of the product before using;
- b. The charger is suitable for 6V/12V regular and Gel batteries with 5Ah ~ 120Ah capacity;
- c. Clamp the battery anode with the red clip of the output line, and clamp the cathode with the black clip; it will report error if the polarity is reverse;
- d. The working environment of the product is 0°C~40°C; do not use beyond this range of temperature;
- e. Before charging the battery, in order to prevent the equipment connected to the battery from damage or unnecessary influence, disconnect the battery and the equipment before charging the battery;

2) Operating instructions:

A. Connection and reverse polarity: select the battery to be charged, confirm the input voltage and then insert the power plug, enter into the initialization interface as follows Fig. 7; clamp the red clip of the output side to the anode of the battery, and clamp the black clip to the cathode; if the polarity is reverse, the red (Fault) LED flashes at 1Hz, and LCD displays as shown in Fig. 8

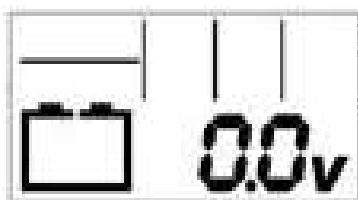


Fig. 7

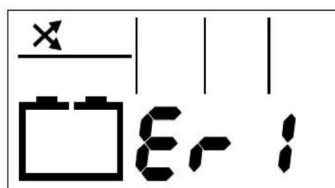


Fig. 8

B. Pre-charge, constant current & constant voltage charging: clamp the output terminal to the battery to identify 6V or 12V battery; for 6V battery, it will start charging in 6V/slow mode immediately; for 12V battery, it enters 12V/slow mode by default; you can press the MODE button to switch among the three modes sequentially(Slow/Fast/Low Temp), each time you press the button, the backlight is turned on for 10 seconds; the display effect is shown in Fig. 9;

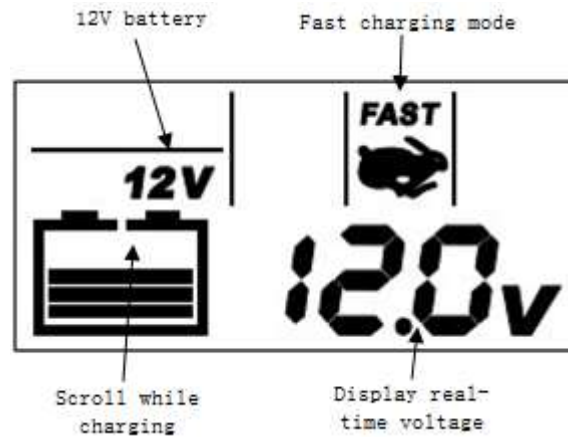


Fig. 9

C. Float charge: enter the float charging state, the battery icon shows full, and the real-time voltage and FUL characters display alternately at 1Hz frequency. In this stage only the backlight will be “ON” when you press the button; no mode selection is possible during the float charge, as shown in Fig. 10 below:



Fig. 10

D. Power-down memory: in the charging process, unplug the power plug or in case of power outage, the product will save the original charging mode as long as the battery voltage exceeds 5V; the LCD screen doesn't have display but the “power” LED (Green) will be “ON, the maximum memory time is 12 hours; when the power resumes, it will continue to charge in the original state;

E. Charging completes: unplug the power plug, and then remove the clips from the battery.

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