HiTech Power Solutions

Specialists in RV Electrical & Electronic Components

3 In 1 Direct Flow DC Type Charger

Technical Specification

HT- ADS31

AC to DC - 40A, DC to DC - 60A, MPPT SOLAR 60A

Please read this operating instruction carefully proper use.
Please remember to read the "Safety Precautions" before you use to ensure the safety.

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PREFACE

Thank you very much for using our product, for your safety, please read the following carefully before use.

Warning failure to follow the instructions may lead in personal injury or

Note that failure to follow the instructions may cause damage to the

WARN !

1. Please do not disassemble or transform the product at will.
   Otherwise, it may cause fire or personal casualties.
2. Please check whether the wiring is correct before power on.
   Otherwise, it may cause a fire.

ATTENTION !

1. This product must be installed in a ventilated environment.
   Otherwise this product life.
2. Please strictly follow the rated specification parameters of the product.
   Otherwise it will damage this product and may cause fire.
3. Please do not install this product in flammable and explosive, high temperature and high humidity, high corrosion, vibration, strong electromagnetic interference occasions.
   Otherwise, it will affect the performance of the product, and it may cause a fire.
4. When using, the fuse of appropriate current size must be connected on the input and output line.

CATALOGUE

Chapter 1: The controller is introduced

1.1 Main functions

- Support 4 different battery types of charging management (default lead acid), the maximum charging current is 60A;
- 2 independent input source interface: 1 solar panel, 1 DC source;
- Intelligent dual-input function, the two inputs can provide electricity for charging at the same time;
- Support fast charging mode and slow charging mode, better compatible with large capacity battery and small capacity battery charging;
- The solar panel input interface has the maximum power tracking (MPPT) function;
- With perfect protection functions: over pressure protection, undervoltage current limiting, over temperature current limiting, over temperature protection, etc.;
- Rich expansion functions: Bluetooth matching, LCD wire controller selection;

1.2 Technical specifications

- Solar panel interface input working voltage: Max.26V
- DC source interface input working voltage: Max.24V
- Battery interface input working voltage: Max.24V
- Fast charging mode maximum input current: 66A
- Fast charging mode maximum charging current: 60A
- Max input current: 33A
- Slow charging mode maximum charging current: 30A
- Standby current: <15 mA
- Operating temperature: -20℃ ~45℃
- Storage temperature: -40℃ ~65℃
- Relative humidity: 0%~90% (no condensation)

Chapter 2 Description of keys and indicator light

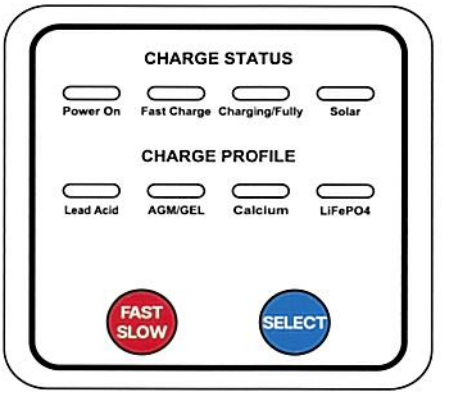

Figure 2.1 Schematic diagram of the surface paste

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name	POWER ON	Fast Charge	Fully Charged	Solar Charging
	Power-on status indicator light	Quick charge indicator light	Full of indicator lights	Solar panel power supply indicator light
description	Solar panel or DC input is satisfied, the light is on See the description in section 3.1-3.5 for more details	The light is on in the fast charge mode	Slow flash when the charging is not full; Full full bright; flash when activation	When solar panel power supply light on, lights off when DC power supply

name	Lead Acid	AGM / Gel	Calcium	LiON
	Ordinary lead battery charging mode	AGM and Gel, type lead battery charging mode	Type Calcium battery charging mode	Lithium-battery charging mode
description	The indicator light is on when this mode is selected	The indicator light is on when this mode is selected	The indicator light is on when this mode is selected	The indicator light is on when this mode is selected

2.1 Fast charging and slow charging selection

Long press Fast / Slow for 3 seconds to enter fast charging mode and slow charge mode selection. This operation has a power-off memory function.

2.2 Battery type selection

Long press the 'Select' key for 3 seconds to switch to the battery type. This operation has a power-off memory function.

Chapter 3: Charging control

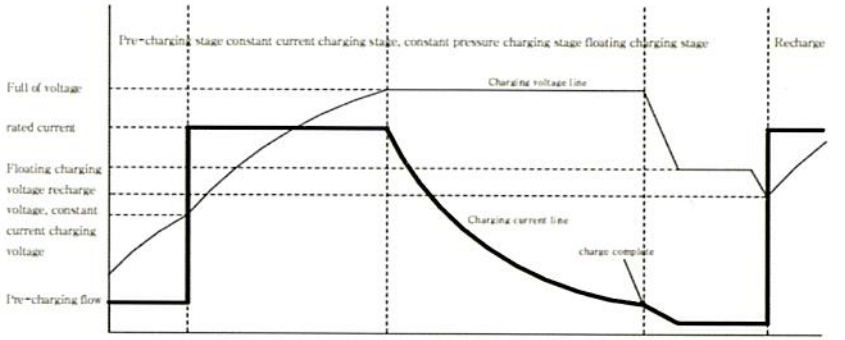

Figure 3.1 Schematic diagram of the charging stage

The current charger adopts the standard four-stage charging control. When the battery voltage is lower than the constant current charging voltage, a small current is charged. When the battery voltage is higher than the constant current charging voltage, the maximum current is charged. When the battery voltage reaches the constant voltage charging voltage, conduct the constant voltage charging. At this time, the charging current gradually decreases. When the charging current lasts for 30 seconds and the charging current is less than the preset value, it indicates that the charging has been completed. When the voltage is lower than the floating charge voltage, conduct the floating charge. When floating charge when the battery

When the voltage is lower than the recharge voltage, it enters the normal charging process.

Once the battery is connected for the first time, the battery is charged if the voltage is not charged. When the input meets the charging conditions for the first time, the battery voltage is not fully charged.

When DC port input charging, every 100 seconds, the controller will actively stop to detect whether the input source is undervoltage. See Section 3.2 for voltage. When the charging current is less than 5A, no stop for detection.

3.1 For DC to input the boot conditions

ACC voltage	>8.5V	<8V
DC input voltage	>12V	>13V
cell voltage	>7V	
operative mode	starting up	

3.2 Use for DC to input the shutdown conditions

ACC voltage	>8.5V	<8V
DC input voltage	<11.3V	<12.7V
operative mode	shut down	shut down

3.3 DC input charging current decrease amount

DC input voltage	<11V

To prevent high current charging, DC port voltage undervoltage. The controller automatically limits the current for charging. For charge current <2A, shutdown.

3.4 Solar panel input startup conditions

Solar panel input voltage	>13V
cell voltage	>7V
operative mode	starting up

When the solar panel is input, the controller actively tracks the maximum power point to obtain the maximum charging efficiency. When the full indicator light is turned out, the battery voltage is <fully charged voltage.

When the full indicator light is on, the battery voltage <recharge voltage, allowed to charge.

3.5 Solar panel input for shutdown conditions

Solar panel input voltage	<12V
operative mode	shut down

Shutdown for the charging current of <0.5A.

3.6 Intelligent dual-input function

When the DC input meets the start-up conditions, and the solar panel voltage is greater than the DC voltage, the solar panel and the DC port can output electricity to the rechargeable battery at the same time. Greatly reduce the fuel consumption of the driving charging process. At this point, the solar panel cell voltage will be consistent with the DC port voltage.

3.7 Maximum power point tracking function

When the solar panel is input, the controller can track the maximum power point of the solar panel in real time. When the solar panel is in weak sunlight or blocked, the charging current is <2A, and the controller tracks the fixed voltage of 15V. When the charging current is> 3A

To restore the maximum power tracking function.

Chapter 4: Battery type

4.1 Lead Acid to charge

charging stage	cell voltage	Fast charging flow	Slow charging flow
trickle charge	< 10V	≤20A	≤10A
constant-current charging	12.0V ~14.4V	≤60A	≤30A
constant-voltage charging	14.4V	≤60A	≤30A
be filled with	14.4V	DC input: <6A Solar energy input: <1A	DC input: <3A Solar energy input: <1A
Floating charge	13.6V	≤30A	≤15A
Recharge	13.2V	≤60A	≤30A

- Trickle charging stage: Trickling charging is performed when the battery voltage is <10V. End the trickle charging when the battery voltage is> 12.0V.
- Constant current charging stage: When the battery voltage is <14.4V, the charging current is allowed to reach the maximum limit value.
- Constant voltage charging stage: when the battery voltage rises to 14.4V, the charging current gradually decreases, and maintain the battery voltage constant at 14.4V.
- Full: During the constant voltage charging stage, the charging current is more than 30 seconds and less than the preset value.
- Floating charge: when the battery voltage is <13.6V, conduct the floating charge. The minimum floating charge current is 0.5A. When the battery voltage is below the recharge voltage, enter the normal charging.
- Recharge: When the battery voltage is <13.2V, recharge the battery.

4.2 AGM / Gel charging

charging stage	cell voltage	Fast charging flow	Slow charging flow
trickle charge	< 10V	≤20A	≤10A
constant-current charging	12.0V ~14.7V	≤60A	≤30A
constant-voltage charging	14.7V	≤60A	≤30A
be filled with	14.7V	DC input: <6A Solar energy input: <1A	DC input: <3A Solar energy input: <1A
Floating charge	13.6V	≤30A	≤15A
Recharge	13.2V	≤60A	≤30A

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- Trickle charging stage: Trickling charging is performed when the battery voltage is <10V. End the trickle charging when the battery voltage is> 12.0V.
- Constant current charging stage: When the battery voltage is <14.7V, the charging current is allowed to reach the maximum limit value.
- Constant voltage charging stage: when the battery voltage rises to 14.7V, the charging current gradually decreases, and maintain the battery voltage constant at 14.7V.
- Full: During the constant voltage charging stage, the charging current is more than 30 seconds and less than the preset value.
- Floating charge: when the battery voltage is <13.6V, conduct the floating charge. The minimum floating charge current is 0.5A. When the battery voltage is below the recharge voltage, enter the normal charging.
- Recharge: When the battery voltage is <13.2V, recharge the battery.

4.3 Calcium to charge

charging stage	cell voltage	Fast charging flow	Slow charging flow
trickle charge	< 10V	≤20A	≤10A
constant-current charging	12.0V ~15.4V	≤60A	≤30A
constant-voltage charging	15.4V	≤60A	≤30A
be filled with	15.4V	DC input: <6A Solar energy input: <1A	DC input: <3A Solar energy input: <1A
Floating charge	13.6V	≤30A	≤15A
Recharge	13.2V	≤60A	≤30A

- Trickle charging stage: Trickling charging is performed when the battery voltage is <10V. End the trickle charging when the battery voltage is> 12.0V.
- Constant current charging stage: When the battery voltage is <15.4V, the charging current is allowed to reach the maximum limit value.
- Constant voltage charging stage: when the battery voltage rises to 15.4V, the charging current gradually decreases, and maintain the battery voltage constant at 15.4V.
- Full: During the constant voltage charging stage, the charging current is more than 30 seconds and less than the preset value.
- Floating charge: when the battery voltage is <13.6V, conduct the floating charge. The minimum floating charge current is 0.5A. When the battery voltage is below the recharge voltage, enter the normal charging.
- Recharge: When the battery voltage is <13.2V, recharge the battery.

4.4 LiON charging

charging stage	cell voltage	Fast charging flow	Slow charging flow
trickle charge	< 10V	≤20A	≤10A
constant-current charging	12.0V ~14.4V	≤60A	≤30A
constant-voltage charging	14.4V	≤60A	≤30A
be filled with	14.4V	DC input: <6A Solar energy input: <1A	DC input: <3A Solar energy input: <1A
Recharge	13.2V	≤60A	≤30A

- Trickle charging stage: Trickling charging is performed when the battery voltage is <10V. End the trickle charging when the battery voltage is> 12.0V.
- Constant current charging stage: When the battery voltage is <14.4V, the charging current is allowed to reach the maximum limit value.
- Constant voltage charging stage: when the battery voltage rises to 14.4V, the charging current gradually decreases, and maintain the battery voltage constant at 14.4V.
- Full: During the constant voltage charging stage, the charging current is more than 30 seconds and less than the preset value.
- Recharge: When the battery voltage is <13.2V, recharge the battery.

Chapter 5: Automatic activation function of lithium battery

When the user chooses the lithium battery mode, if no battery voltage is detected (<3V), the lithium battery is considered in the undervoltage protection state and automatically activated. Note that the load of the connected battery must be disconnected on activation. Lithium battery activation function is also supported

V, recharge the battery.

DC port and PV port input. After the charger is powered on, it starts automatically after 3 minutes. On activation, Charging indicates a flash flash (400ms). The activation initiation period was 100S. The maximum output current of the fast charge mode is 30A and the maximum output current of the slow charge mode is 15A.

Reminder: Must ensure that the battery connection port is not reversed when the lithium battery is activated, and the controller will be damaged.

Chapter 6: Protection function

6.1 Input reverse protection

Solar panel input interface and DC source input interface have input anti-reverse connection protection function. Charging is not turned on during the reverse connection.

6.2 Input overvoltage protection

When the solar panel input interface voltage exceeds 26V or the DC source input interface voltage exceeds 24V. The buzzer sounds an alarm for 3 minutes. The buzzer stops the call. The Power On'indicator flashes once and stops for 3 seconds.

6.3 Output reverse protection

The output port (battery port) has the input anti-reverse connection protection function. Charging is not turned on during the reverse connection. The protection will be closed when the lithium battery mode is automatically activated, noting that the battery can not be backconnected!

6.4 Battery overvoltage protection

At the battery input interface voltage> (full voltage + 0.4V). The buzzer sounds an alarm for 3 minutes. The buzzer stops the call. The battery type indicator flashes once and stops for 3 seconds.

6.5 Over-temperature protection

When the circuit board temperature exceeds 70℃, the charging current automatically decreases. Charging stops when the circuit board temperature exceeds 80℃. The buzzer sounds an alarm for 3 minutes. The buzzer stops the call. Charge is resumed until the temperature is below 68℃. The Power On'indicator flashes twice and stops for 2 seconds.

6.6 Charging timeout protection

When the constant current charging phase time is> 12 hours, the charging is stopped and the buzzer emits an alarm sound, lasting for 3 minutes. The buzzer stops the call. The battery type indicator light flashes 2 times and stops for 2 seconds. Troubleshooting.

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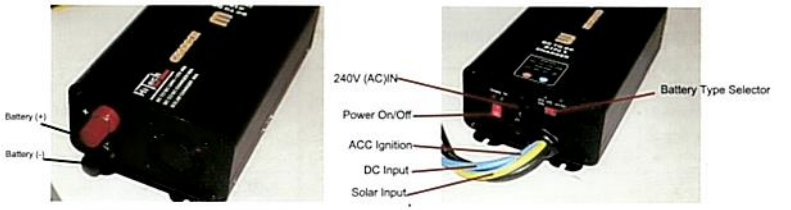
7.1 Display screen description

The AC charger part	
Rated input voltage	180VAC-260VAC
Constant current charging current	60A±2A
Constant voltage charging voltage	Lead-acid battery 14.6VDC lithium iron phosphate 14.4V
floating charge voltage	Lead-acid battery 13.7A±0.1V lithium iron phosphate 13.2V±0.2V
The red light is on	Charging (fan turns)
Green light	Full charge (the fan stops turning)
Output terminal short-circuit protection function	Have protection
Lead-acid battery + AGM and lithium iron phosphate battery selection	Switch switch selection
Transtransformer temperature protection	Charge the current by half of the charge

7.2 Wiring instructions



1. Anderson interface in the picture: yellow and black line is connected to solar energy input, yellow is + pole, black is-pole.
2. Anderson interface in the picture: the blue and black line is connected to the car generator input, the blue line is the + pole, and the black line is the-pole.
3. The thin blue line is: connected to the car ignition switch
4. opposite wiring row: red RV battery pack + pole, black connection pole.
5. Micro dial switch: dial to the left is the AC charger to charge the lead-acid battery, dial to the right is to charge the 4 string of lithium iron phosphate battery.
6. Yellow+Black:Solar In Put. Blue+Black:Dc In Put. Blue(Thin):Acc Ignition

7.3 Description of the protection message tone

1: Front stage overload protection: 6 short drops, 1 long drop.
2: Underpressure alarm: continuous drops.
3: undervoltage protection: 2 sound short drop, 1 sound long drop.
4: Over-pressure protection: 5 sound short drop, 1 sound long drop.
5: Over-temperature protection: 3 sound short drop, 1 sound long drop.
6: short circuit protection: 1 sound short drop, 1 sound long drop.

Chapter 8. Fan control

After the charger is powered on, the fan runs for 5 seconds to determine whether the fan is working normally:

When any temperature sensor detects a temperature value> 45℃, the fan opens. The fan is turned off when both temperature sensors detect temperature values <40℃.

Chapter 9. Troubleshooting

failure indication	cause	terms of settlement
The 'Power On' indicator light	Solar panel or DC source input connection	Re-connect the solar panel and DC source
Blink once and stop for 3 seconds	Abnormal (input overpressure)	ligature
The Power On'indicator flashes twice and stops for 2 seconds	The recharger temperature is too high	Install the recharger in a well -ventilated environment
The Power On'indicator flashes 3 times and stops for 1 second	Charger self-test is abnormal*	Restart the charger. If the fault is still there, please replace the charger. The fault will be locked and require a power off for restart.
Battery type indicator light Blink once and stop for 3 seconds	Abnormal battery connection (battery overvoltage, overcurrent)	Reconnect the battery line correctly.
Battery type indicator light Blink for 2 times and stop for 2 seconds	Charging time is too long*	Check whether the battery capacity is too large, or whether the battery is abnormal. The fault will be locked and require a power off for restart.

Note: The fault with * number cannot be restored. After troubleshooting the fault, the power off still needs to restart for recovery.

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edition	date of issue	description
V1.0		The first edition was released