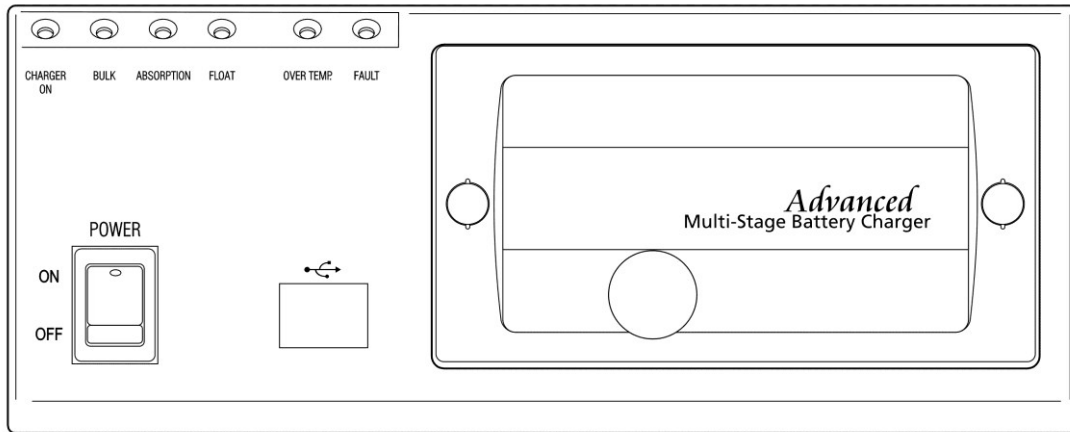




BC-1240P-1AP

12V 40A Multi-Stage Battery Chargers

User Manual



Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions for correct use of the battery charger. Read through the manual and pay special attention to the markings and labels of the charger, battery and equipment connected to the battery system.

Pay special attention to these two types of notices used in this manual.

WARNING:

Failure to heed this warning may cause injury to persons and damage to Equipment.

CAUTION:

Failure to observe this warning may result in damage to equipment and improper functioning of the Charger.

WARNING:

- The charger is designed for in-door use. Protect the charger from ingress of water.
- This charger is made to charge only properly sized lead acid batteries.
- Don't recharging non-rechargeable batteries.
- Charging other types of battery or under-sized lead acid batteries may cause fire or explosion.
- Install the charger in accordance with all local codes
- Do not use the charger if it has been dropped or damaged.
- Do not remove casing of the charger, there is no user serviceable parts inside.
- Do not charge the battery on boats. Remove the battery and charge on shore.
- Never attempt to charge a frozen battery
- Never attempt to charge a damaged battery.
- Wear protective goggles and turn your face away when connecting or disconnecting the battery.
- Never place the charger on top of a battery.
- Never smoke, use an open flame, or create sparks near battery or charger during normal charging operation as batteries may give out explosive gas.
- Do not charge batteries in an enclosure (box- in) due to possible explosion of entrapped explosive gas.
- Use of accessory not recommended may cause risk of fire, electric shock.
- Disconnect the mains supply before connecting or disconnecting the links to the battery.
- If the charger does not work properly or if it has been damaged, unplug its AC and DC connection.

CAUTIONS:

- Refer to battery manufacturer's specific recommended values for battery type settings and float voltage setting.
- Ensure all ventilation ports are not obstructed for efficient fan cooling, keep loose soft material or paper off at the bottom of the charger.
- During charging, the battery must be placed in a well ventilated area.
- If longer output charging cord is required, make sure the diameter is adequate for the current in given cable length.

Introduction

Congratulations on purchasing our new Multi-Stage (IU0U) Switching Mode Battery Charger.

This series of advanced chargers use Micro-Processor to control the charging profiles and protective functions. The special charging programs are designed to charge both stand alone battery and battery with connected loads.

Innovative charging profiles blend in with the ever changing “state of charge” of the batteries to give just the right amount of current and voltage so your batteries will not be under or over charged. There are 8 sets of selectable charging profiles specifically designed for a wide range of Wet, Gel, AGM, LiFePO4 and Calcium-Calcium lead acid batteries. There are two user programmable charging profiles for the professional users through USB port by personal computer. In addition, the programmed maintenance charge provides a timely Equalization charge for the Wet lead acid battery and refreshing charge to the sealed batteries.

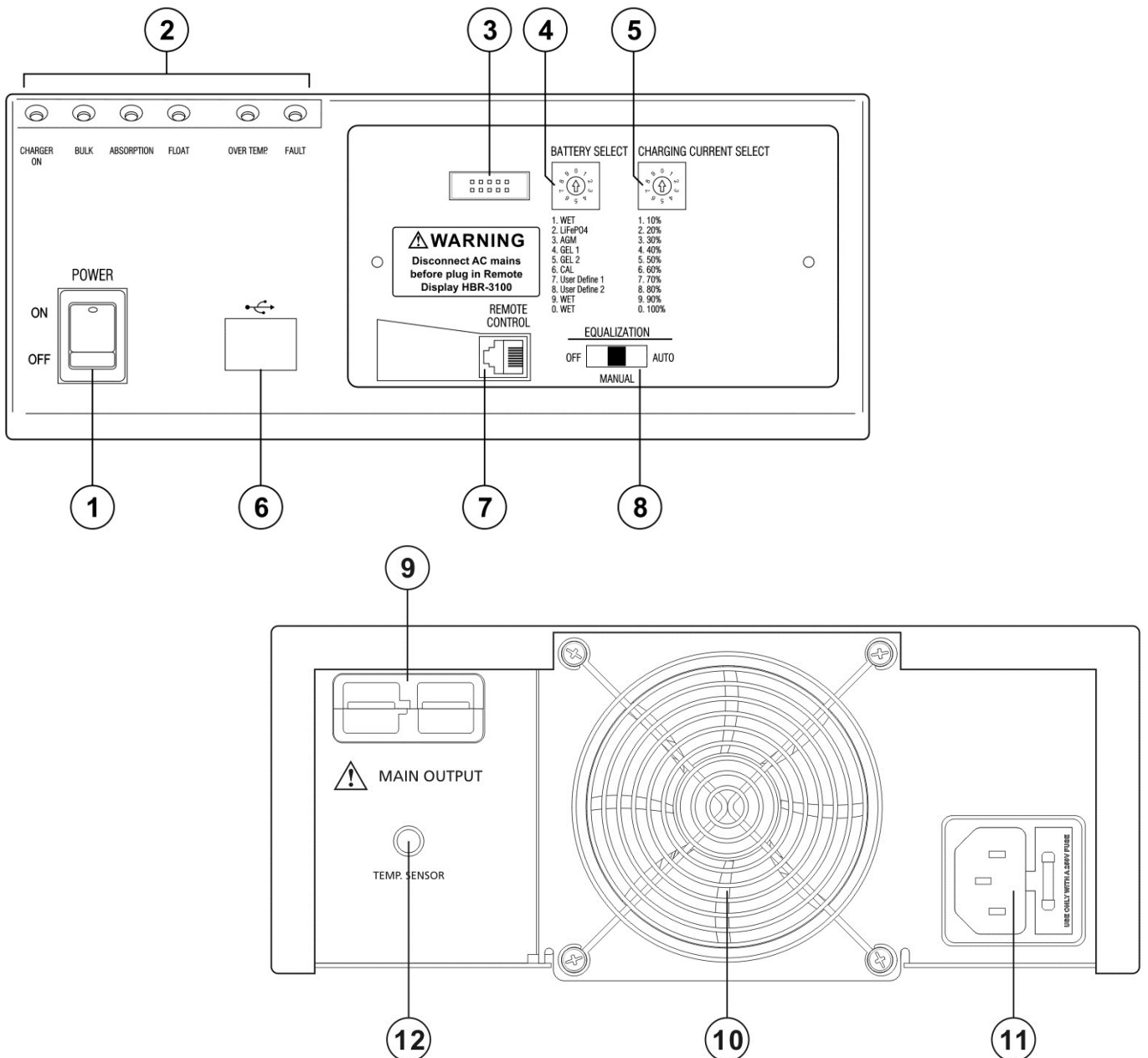
Almost all the protections are controlled by the Micro-Processor. On start-up, the charger run a series of self-tests on the protective functions, displays and critical components like the cooling fan.

The optional detachable Remote Control Panel provides exceptional monitoring of the batteries, charger output, protection status, hours of operation and etc.

Intended Use:

All Automotive, Marine, Mobile Home, Electric Scooters, Golf Carts, Solar, Deep Cycle, UPS Standby, Industrial & Commercial Applications.

A. Control and Indicators



1. Power Switch
To turn ON and OFF AC power to charger
2. Charger status LED display

Charger ON LED (Green)	: Lights up when power ON
Bulk LED (Red)	: Bulk charging with constant max. current
Absorption LED (Orange)	: Absorption charging with preset constant max. voltage
Float LED (Green)	: Float charging with preset constant voltage
Over Temp LED (Red)	: Lights up when over temperature protection, Flashing when current de-rating
Fault LED (Red)	: Charger malfunction (overload, output short circuit, reverse polarity, output over voltage protection)
3. Programming Port
Factory use only
4. Battery selection switch
For AGM, GEL, LiFePO4, Calcium-Calcium, 2x user define & WET (Flooded) batteries (default at GEL P-1)
5. Charging current selection switch
Current can be selected from 10% to 100%. Details please see the table on front panel. (Default at 100%)
6. USB port
Connect charger to computer for charger user define setting
7. Remote display Port
Connect to accessory HBR-3100 remote display
To remote display the charging voltage & charging status and remote control the charger output ON/OFF & Equalization.
8. Equalization mode selection switch
Can be selected by Manual or Auto
9. Charging Banks
KST Terminal
10. Ventilation Fan
11. Inlet AC socket with fuse holder
12. Temperature Sensor Socket
Connection to optional accessory temperature sensor
Sensor to increase / decrease charging voltage at low/ high battery temperature

B. Using the charger

1. Check the three supplied accessories:
AC cord, remote temperature sensor, one set of KST socket & pins, and the CD are with the package.
2. Remove the magnetic dummy remote control panel on the front of the charger to select the battery type and the max. output (charging) current, you may need to pry it open to get a hold the edge of the panel in order to lift it out .
3. Battery Type Selection
Check against the Absorption and Float Voltage with the battery type and specifications given in section **N**.
Make sure the charger is power OFF.
Use a small slot type screw driver to select the battery through Battery Selection Switch (4).

AGM/GEL	: Sealed type (VRLA), AGM-GEL, Maintenance Free, Automotive or Deep Cycle lead acid batteries
WET	: Flooded Type lead acid batteries (to which water can be added) Automotive or Deep Cycle
Calcium-Calcium	: Sealed type (VRLA) Lead Acid batteries with Calcium content Automotive or Deep Cycle
LiFePO4	: Sealed type Lithium Iron Phosphate batteries

The selected battery type can be viewed at the optional remote panel.

C. Power Level adjustment

End user can set the maximum output (charging) current so to make the charger can suitable for different capacity battery and loading condition.

Make sure the charger is power OFF before adjust the power level.

Use a small slot type screw driver to select the maximum output current through the Charging Current Selection Switch (5).

The adjusted max. output current can be viewed at the optional remote panel .

1. Position 0: 40 Amp
2. Position 9: 36 Amp
3. Position 8: 32 Amp
4. Position 7: 28 Amp
5. Position 6: 24 Amp
6. Position 5: 20 Amp
7. Position 4: 16 Amp
8. Position 3: 12 Amp
9. Position 2: 8 Amp
0. Position 1: 4 Amp

Recommended Battery Capacity 15AH to 400AH

The extended range of 15 to 400 AH capacity is based on the appropriate charging current selection 10% to 100%.

Some battery type can take higher charge current.

When in doubt check with battery manufacturer for recommended charging current.

D. Testing the charger with output open circuit (nothing connected to the output terminal)

On power up, the charger will do a self check during which all the LED indicators are on and fan in full speed for a few seconds. Then the Charger On and the Absorption LED are on if charger is checked out OK.

After 5 minute the Float LED will be on and Absorption LED off.

Remark:

You can connect a load to the output terminal and the charger will provide a constant DC source voltage according to the battery type and available output power (current) selected as given in section B3 and C.

This feature is handy for caravan installer to check the operation of connected powered appliance or connections.

E. Battery Charger Installation and Connection

Observe the warnings & safety precautions before rushing to install and operate the charger.

Check battery condition, fill up cells for wet battery, clean battery poles.

Secure the battery charger in a well ventilated place, make sure the mounting surface is flat and without soft covering material or loose paper sheet. The air intake is at the bottom and air outlet at the back. Make sure both intake and outlet are not blocked.

Never place charger on top of battery.

Plug in the AC mains and turn on Power Switch. All the indicators on the front panel will lit up, cooling fan spins at full speed for 10 seconds by means of Self-Testing.

Charger ON LED and the Float LED should be on green indicating Charger is in good order for charging lead acid battery.

Before connecting or disconnecting the charging cable, turn off the Power Switch and unplug AC cord from the mains.

First connect the Red cable to Positive + terminal of charger and the battery Positive + Pole. Then connect the Black cable to the Negative – terminal and the Negative – Pole of the battery.

Make sure all the connections are secured and well tighten up, double check on the correct polarity.

Double check again for correct selection of Battery Selection Switch (4) for battery type (default at GEL P-1) and Charging Current Selection Switch (5) for output current setting (default at 100%)

When install in caravans and similar vehicles, the connection to the supply mains is to be in accordance with national wiring rules.

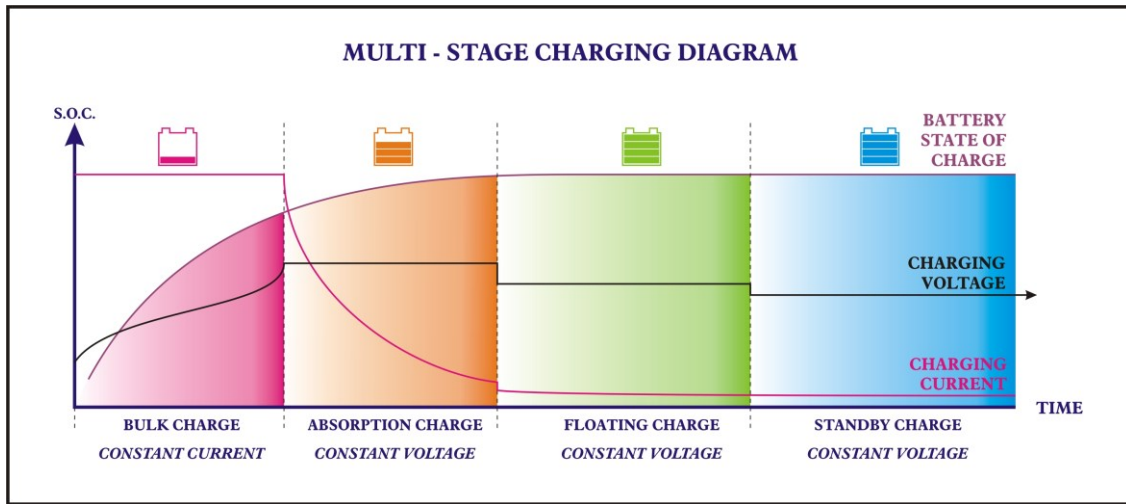
When charging automotive batteries:

- The battery terminal not connected to the chassis has to be connected first. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains;
- After charging, disconnect the battery charger from the supply mains. Then remove the chassis connection and then the battery connection.

F. Normal 4-Stage (IUoU) Charging Operation

The 4-stage IUOU charge algorithm ensures fast, complete and at the same time gentle charging of the lead acid battery.

Charging Profile



Stage 1. THE I-PHASE. The constant current charging, Bulk LED is ON.

Normally the battery is charged at constant maximum current until it rises to the selected Absorption voltage level. The charging voltage changes with the battery voltage.

Soft-Start Bulk Charging:

If at the initial bulk charging, the battery voltage is at less than 12.3V, the bulk charge current is reduced to half of the maximum until battery voltage rises to 12.8V. This soft start charging is set for 10 minutes and will repeat until battery voltage rises to 12.8V. At the end of 2 hours battery voltage cannot reach 12.8V, alarm will sound and output is cut off.

Remark:

If the battery keeps the charger at Bulk mode for 12 hours, the charger will automatically goes to Float mode.

Stage 2. THE UO-PHASE. The constant voltage charging, Absorption LED is ON.

Battery Type Selection: Gel P-1: 14.1V / Gel P-2: 14.3V/ AGM: 14.3V / LiFePO4: 14.6V/ Wet: 14.4V / Calcium: 15.1V
When the battery voltage rises to the selected Absorption voltage level, the charging switches to Constant voltage charging and absorption charging current will decrease gradually to a set value at which the charger automatically switches to Float Stage. The max. absorption time is also controlled by the time in Bulk charge, and battery type selected.

Stage 3. THE UO-PHASE. The constant voltage charging, Float LED is ON.

In Float stage, the battery is full and only takes in the amount of current necessary for maintaining the capacity.

The float voltage is preset by factory according to the type of battery selected by the user.

In case of the charger keeps at this mode with charging current less than 5A for over 72 hours. The charger will go into the Standby mode.

Stage 4. THE UO-PHASE. The constant voltage charging, Float LED is ON.

In Standby stage, The charging voltage at this mode will be 4% less than the Float voltage only for maintaining the capacity. This lower charging voltage level reduces drying out of electrolyte liquid, prolongs the life of inactive battery.

New Cycle Charge every 21 days

Charger will start a new cycle charging of bulk to absorption to float every 21 days in either standby or float mode. This new cycle of charging will refresh the battery to prevent separation of the electrolyte & keep the electrode plates in good condition. The standby auto new cycle charge per 21 days are designed to keep the battery in good working condition during long period of resting of the caravan or back up battery application.

Remark:

Charger can give out full selected max current in Float or Standby mode, if battery voltage drops to 12.5V for about 10 minutes in Float and Standby mode. The charger will start a new cycle of charging.

G. STORAGE

If the vehicle is in storage for an extended period of time and no solar panels are available to charge the battery, we suggest the following:

- Leave the AC mains permanently connected to your vehicle.
- Or disconnect the battery charger from the vehicle battery if the AC Mains is disconnected.

Leaving the AC mains permanently connected to your vehicle is advisable, as there is a certain rate of self discharge of the battery and that will eventually lead to a flat battery.

The charger has an automatic Standby Charge Mode and a 21 day New Cycle charge to take care battery in storage.

H. User Define Charging Profiles

There are two user define can be preset by end user, Battery Selection Switch (4) set to position 7 or 8.

Connect the charger to personal computer through USB port (6) then you can set your own charging configuration.

I. Equalization Charging for wet type battery only

Wet lead acid battery requires periodic high voltage charging (about 10% overcharge absorption voltage) to balance the voltage of each cell, reverse the high concentration of electrolyte at the bottom and clear up large sulfate crystals on the plates. You can use the Equalization Selection Switch (8) to perform the manual equalization through optional remote display or Auto equalization by charger itself.

Once Auto it is selected, the charger will start Equalization automatically if charger keeps at Float mode for over 21 days.

After entered into this mode, the Absorption indicator will flash. This will put the charger keep Equalization for 240 minutes.

The charger will go to Float once completed.

- Remark:
1. This mode only can be operated at Flooded battery selected (Battery Selection Switch (4) set to positions 1, 9 or 0)
 2. During this mode, operator can press the FUNC button (optional remote display) for 5 seconds to force the charger to Float mode anytime.
 3. Take special precautions as battery will emit explosive gas during equalization charge.

J. Temperature Sensor

Warning:

The temperature sensor must be installed at the Negative Terminal of the battery terminal, wrong connection to the Positive Terminal will damage the charger and the sensor.

The temperature sensor (accessory) is used to optimal charging over wide ambient temperature range.

Fix the temperature sensor in a position on the battery which is not affected by other cooling or heating source.

Plug in the temperature sensor before switch on the charger to activate the temperature control function, Never plug in the charger during charging.

Compensation voltage for this temperature sensor is 20mV/C, the higher the battery temperature, the lower the charging voltage. When battery temperature reaches 60°C, the charger will shutdown, Fault and OTP indicator will light up.



K. Cable Size Selection

Wire Size (AWG)	Area (mm ²)	Maximum one-way distance (feet) for 2% Voltage loss (30A)	Maximum one-way distance (feet) for 2% Voltage loss (40A)	Maximum one-way distance (feet) for 2% Voltage loss (60A)
10	5.26	3.8	2.8	1.6
8	8.37	6	4.5	2.5
6	13.3	9.5	7.2	3.6
4	21.2	15	11.2	6.8
2	33.6	24	18	11
1/0	53.5	38	27.5	17.7
2/0	67.4	48	36	22
4/0	107	76	58	34

Table: Selection of cable size and length versus current

L. Fault Indications

PROTECTIONS & FAULT INDICATIONS WITH CAUSES

PROTECTION / FAULT	FAULT LED	OTP LED	CHARGER OUTPUT: OFF= No Output	REMOTE CONTROL UNIT & LCD Fault Display	REMARKS
Output power decreases due to high operating ambient temperature	OFF	Flashing	ON At reduced power in 25% step leading to output off high temperature protection see next row	no specific indication for high temperature decreased output	Auto return to full set power gradually as unit temp cools down
charger over heat, OTP protection on	Solid ON	Solid ON	OFF Manual power on off reset after fault cleared	Alarm flash & Buzzer on " Charger High Temp "	
Charger preset to reduced output power	OFF	OFF	ON At reduced output power as selected	Indicates " xx% Power Set "	This is not a fault!! So no specific indication
Battery over heat detected by remote temp sensor at (60°C)	Flashing	Solid ON	OFF Manual power on off reset after fault cleared	Alarm flash & Buzzer on " Bat Over Temp "	
Fan not working or stuck	Flashing	Flashing	OFF Manual power on off reset after fault cleared	Alarm flash & Buzzer on " Fan Fault "	
Output Over Voltage Protection when output voltage is 4% higher than it should be for the battery type and charge stage	Solid ON	OFF	OFF Manual power on off reset after fault cleared	Alarm flash & Buzzer on " Output V High "	To protect battery and load connected.
Overload/ Over Current Protection when output current is 10% higher than the rated maximum level	Solid ON	OFF	OFF Manual power on off reset after fault cleared	Alarm flash & Buzzer on " Overload "	To protect charger
Short Circuit for > 20 sec	Solid ON	OFF	OFF Manual power on off reset after fault cleared	Alarm flash & Buzzer on " Output Shorted "	
Short Circuit for < 20 sec	OFF	OFF	ON Charger returns to normal after fault cleared		
Reverse Polarity Protection (Thermal Fuse)	Solid ON	OFF	OFF Manual Power on off reset after correct fuse replaced	Alarm flash & Buzzer on " WRONG POLARITY "	

M. Trouble Shooting

PROBLEM	INDICATIONS	POSSIBLE CAUSES	SUGGESTED SOLUTION
Charger does not work	Indicator lights not turn on	No AC power AC input socket fuse blown	Check AC connections are correct Replace with correct AC fuse by qualified electrician
No DC output	Charger - On LED is not on, Float and Fault LEDs are on	Output short circuit Over temperature protection triggered Severe over loading charger Reverse polarity connection DC fan locked by foreign object or malfunction	Check DC connections between charger and battery. Charger can auto reset if remove the fault within 20 seconds. Check air intake vent at bottom of charger is blocked or not. Check charger ambient ventilation. Check battery AH capacity within recommended range Check for correct polarity, replace car blade fuse (6) Check DC fan
Battery does not get full charge	All indicator LED work normally and sequentially OTP LED flashing	Bad battery connection Battery type select switch in wrong setting Battery capacity too large Ambient temperature too low Battery has damaged cell or battery is too old Wrong set the lower power level	Check for loose contact, right cable size, cable integrity Recheck battery type and change to correct battery selection Make sure charger rating matches battery capacity Move battery to a room temperature location, or get an optional temperature sensor Replace battery Recheck the current selection switch (5) to correct right setting
Long charging time, float light does not come on even after 12 hours charging time.	Absorption light remains on all the time	Charger internal fault	Return the charger to distributor to repair
Bulk LED is on all the time	Bulk light remains on all the time	Wrong battery type selection Battery is excessively depleted and the soft charging is triggered Battery temperature too high	Check charged battery label and change battery type selection to correct setting Recharge the battery after a day, if bulk light remains after several hours, the battery is most likely damaged and cannot accept charge. Replace battery. Use accessory temperature sensor

N. Specifications

Model		BC-1240P-1AP	
Output	Output (Charge) Voltage Selections	Absorption	Float
	WET	14.4V	13.5V
	LiFePO4	14.6V	13.6V
	AGM	14.3V	13.2V
	GEL 1	14.1V	13.7V
	GEL 2	14.3V	13.8V
	CALCIUM	15.1V	13.8V
	User Define 1	12V - 16V	
	User Define 2	12V - 16V	
	Equalization	15.5V	
	Maximum Output Charging Current (Continuous)	40A	
	Recommended Battery Capacity Range	15 – 400AH	
	Soft Start Bulk Charge		
	Battery Voltage to Trigger (cut-in) Soft Start Bulk Charge Mode	<12.3V	
	Soft Start Bulk Charge Current (Current Limit)	1/2 of the charging current	
	Ripple and Noise (Peak to Peak)	<200mV	
Efficiency at Maximum Power (230V)	>83%		
Dual Bank Charging (Battery must be of same type)	Yes		
Input	AC Voltage Range	200 – 240V 50Hz~	
	AC Current at Full Load (230V)	3.5A	
Protection	Overload	90-110% Rated Output Current or 50% Rated Output Current (Soft Charge) Protection Type: Constant Current Limiting, recovers Automatically after Fault Condition is Removed.	
	Short Circuit	Recovers Automatically if Fault Condition is Removed within 20 seconds Otherwise the charger will shutdown until re-start the charger again	
	Reverse Polarity	Car Blade Fuse	
	Over Temperature	Protection Type: Shut Down	
	OVP Output Over Voltage	Yes	
Cooling	Cooling Method	Thermostatic, Variable Speed Fan	
Indicators	4-Stage Battery Charger	Yes	
	Charge Phase Bulk / Absorption / Float	Yes	
	Fault Mode	Yes	
	Over Temp	Yes	
	Charger ON	Yes	
Fuses	AC Fuses at IEC AC Power Socket	T4A	
	DC Car Blade Fuse at Front Panel	30Ax2	
Accessories	Supplied Accessories	Remote Temperature sensor, ac cable, spare ac fuse at socket, one set of KST PLUG & PINS	
	Optional Accessory	Remote Control Panel (Model:HBR-3100)	
Approvals	Safety : CE: EN 60335 SAA: AS/NZS 60335.1, AS/NZS 60335.2.29 (Include clause 21.102 : vibration Test)	Yes	
	EMC: CE EN 55014; EMF: EN50366	Yes	
Others	Dimensions and Weight	200x80x260mm ; 3.2kg	
Remarks	All values are based on the standard ambient temperature 25°C and pressure 0.1Mpa.		

O. Optional Remote Display HBR-3100

Warning:

AC mains supply must be disconnected completely from the battery charger before plugging in of the Remote Display HBR-3100. Otherwise the charger will be damaged.

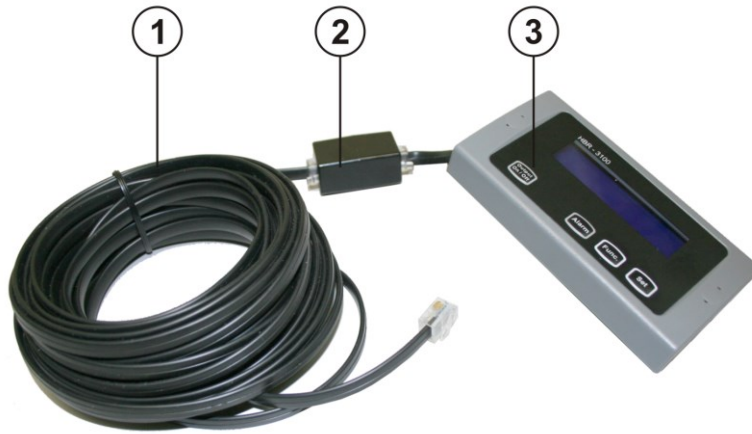
I. Introduction

The Remote Display comes with 10m extension cable with interconnector.

When the optional remote HBR-3100 is installed, it will display the real time charging stage, voltage & amperage, battery type set, max. power level set, type of fault with alarm, etc and can remote control the output terminal On/OFF, trigger the Equalization charging for wet battery and force charger to float mode.

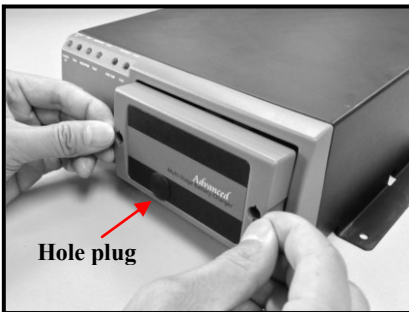
It can be mounted on BC charger by replacing the dummy cover on the front panel or remotely mounted with 10m extension cable going through the unplugged hole at the front of the dummy panel.

II. Connection



1. 10 Meters Phone Cable
2. In Line Coupler 6P6C
3. HBR-3100 Remote Display Module

- a. Take out the dummy remote panel from charger and remove the black hole plug from the dummy remote panel.



- b. Remote cable through the dummy remote panel's hole.



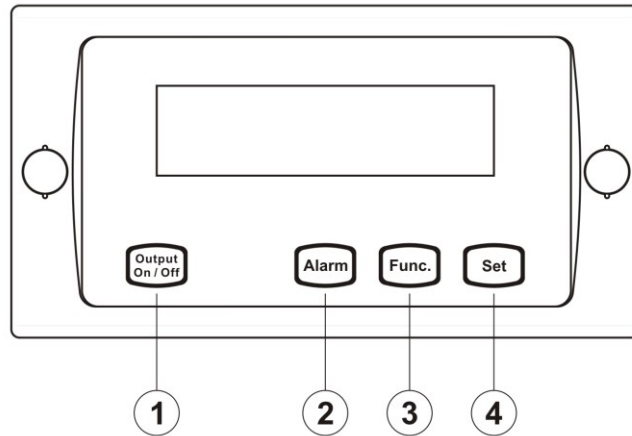
- c. Plug in the remote cable into the charger remote socket.



- d. Mount back the dummy remote panel on the charger panel.



III. Control and Indicator



1. Output ON/OFF : To switch the charger output ON and OFF. Green LED is illuminated when output is ON.
2. Alarm : Can be silenced or audible by toggling this button, default is audible.
Red LED will illuminate when fault occurred
3. Func. : To toggle charger setting Menu and select scrolling to make display continue to scroll all setting
(See optional remote programming section)
4. Set : To confirm the chosen feature you selected.

IV. Programming using the optional remote

- A. Pressing Func. Button to display “Scrolling” or until any setting you want to display
- B. Pressing Set button to confirm

Remote Panel “Scrolling” Menu Options

1. Charger Name	Display charger model
2. Charger Status	Display Bulk / Absorption / Float
3. Battery Type	Display the battery type selected
4. Fault	Display the “No Fault Found” or Type of fault
5. Bat. Bank 1	Display the charging voltage and current of Bank 1
6. Bat. Bank 2	Display the charging voltage and current of Bank 2 for other models in this series
7. Bat. Bank 3	Display N.A as no Bank 3 for this series of charger
8. Total Run Time	Display units total run time
9. Output Power Level	Display current output level
10. Software Version	Displays the current control software version

Remote Short cut

- 1. Press and hold the SET button for 5 seconds and release the button to enter Equalization mode. (Equalization selection slide switch on main unit should be selected at manual position)
- 2. Press and hold the Func. button for 5 seconds and release the button to force the charger to Float mode.

V. Fault Indication

- 1. Charger High Temp : Charger over temperature
- 2. Bat Over Temp : Battery temperature over 60°C as detected by remote sensor
- 3. Output V High : Output over voltage
- 4. Overload : Overload (OCP)
- 5. Output Shorted : Output short circuit
- 6. Wrong Polarity : Output reverse polarity
- 7. Fan Fault : Fan stuck or not working

P. HBC SOFTWARE INSTALLATION

PLEASE REFER TO THE USER MANUAL IN THE CD FOR INSTALLATION AND APPLICATION PROCEDURE