Multistage Battery Charger

User Manual

BC-1215HT / BC-2407HT

BC-1230HT / BC-2415HT

BC-1260HT / BC-2430HT

Design Features:

1. PFC function.
   – except BC-1215HT / BC-2407HT
2. LCD remote control.
3. Battery temperature sensor function.
4. Tri-LED color indicator for different charge stage.
5. With power supply function.
6. Prevent the battery overcharging, and extend the battery life.

ISO: TS16949

EMC tested | LVD tested

CE

MOCEP01

List of contents

Warning!
Before installing and using the charger, read all instructions and cautionary markings on the charger, the batteries, and all appropriate sections of this guide.

1. Important Safety Instructions

General Safety Precaution:

A. Do not expose the charger to rain, snow, spray, or bilge water. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the charger in a zero-clearance compartment. Overheating may result.

B. The charger is designed to be permanently connected to your AC and DC electrical systems.

C. Before using the charger, read all instructions and cautionary markings on the charger, the batteries, and all appropriate sections of this guide.

D. Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.

E. Do not disassemble the charger. Attempting to service the unit yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.

F. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

G. Children should be supervised to ensure that they do not play with the appliance.

H. The charger must be provided with an equipment-grounding conductor connected to the AC input ground.

I. To reduce the risk of electrical shock, disconnect both AC and DC power from the charger before attempting any maintenance or cleaning or working on any circuits connected to the charger. Turning off controls will not reduce this risk.

J. Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.

K. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the charger with damaged or substandard wiring.

L. Instructions for charging automobile 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 battery connection.

2. Installation Location: Physical requirements for installation

IMPORTANT

This product is best mounted in a Horizontal position.
If the unit is mounted in a vertical position,
The cooling fan must be at the bottom of the unit.

Condition	Description
Clean	Do not expose the charger to metal filings or any other form of conductive contamination. The presence of conductive contamination can cause damage and void your warranty.
Cool	For best performance, the ambient air temperature should be between 5°F (-15°C) and 113°F (45°C)- the cooler the better. At higher ambient temperatures, the output current will be automatically reduced to protect the charger from high internal temperatures.
Dry	The unit is intended for use in a dry location. Do not allow water or other fluids to drip or splash on the charger. Do not mount the charger in an area subject to rain, spray or splashing bilge water.
Maintenance	You should clean the exterior of the unit periodically with a dry cloth to prevent accumulation of dust and dirt. At the same time, tighten the screws on the DC input terminals.
Safe	Working in the vicinity of lead-acid batteries is dangerous. Batteries generate explosive gases during normal operation. It is safest not to install electrical equipment in these areas.
Ventilated	Allow at least 4 inches (10 cm) of clearance around all sides of the charger for air flow. Ensure that the ventilation openings on the unit are not obstructed. If mounting in a compartment, ventilate the compartment with louvres or cut-outs to prevent overheating.
Close to AC junction box	Avoid the use of extended wire lengths if possible.
Close to batteries	Avoid excessive cable lengths and use the recommended wire lengths and sizes. Undersized or overly long cables may affect charging accuracy.

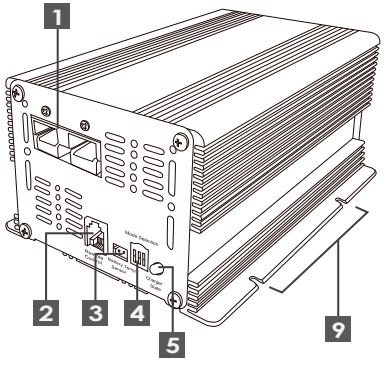
3. Overview

A. Product Introduction

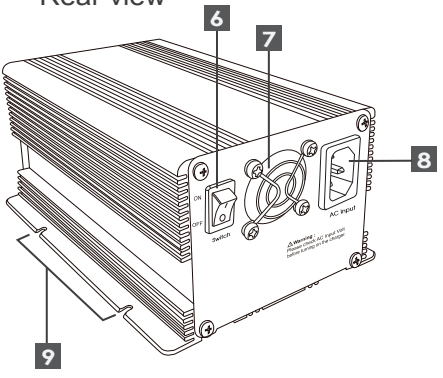
⚠ **Warning: Damage caused by wrong positive (+) and negative (-) connection is not covered by the warranty.**

BC-1215HT / BC-2407HT

Front view

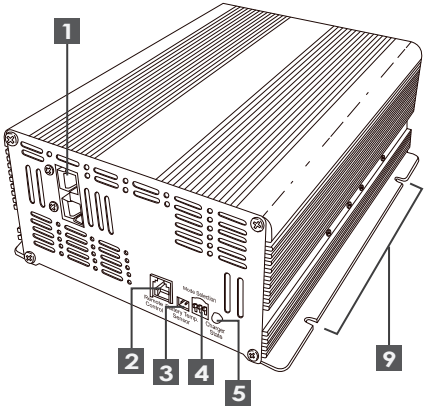


Rear view

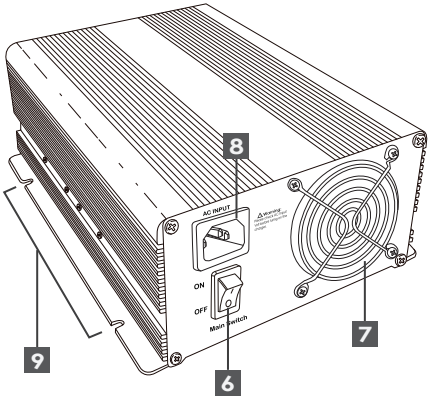


BC-1230HT / BC-2415HT

Front view

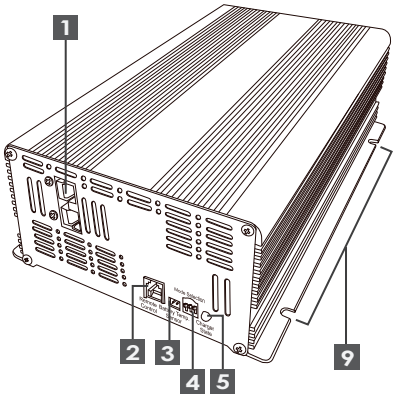


Rear view

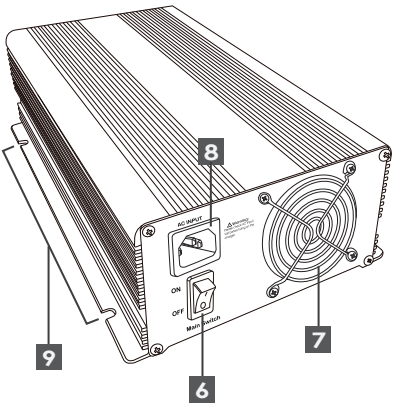


BC-1260HT / BC-2430HT

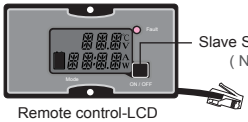
Front view



Rear view



1. DC OUTPUT :
   Check +/- before installation
2. Remote control-LCD

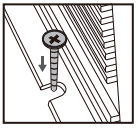


Remote control-LCD

3. Battery Temp. Sensor

Battery Temp. Sensor

4. Charging Mode Selection
   (Please refer to page 9)
5. Charging Status
6. Main Switch
7. Fan
8. AC Input
9. Bracket



Note 1:
The slave switch of the remote control just cuts out the output. If you want to turn off the charger completely, please switch off main switch of charger body.

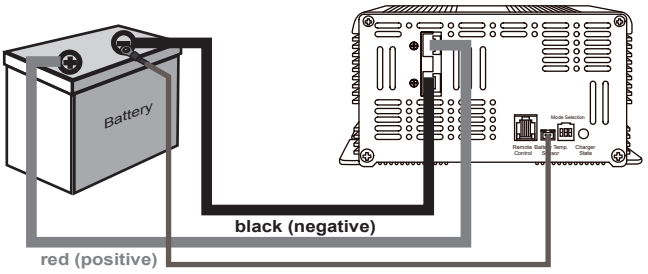
Battery Temp. Sensor: To detect the battery temp. While charging, please connect the wire sensor to the battery Negative (-) terminal.

When the battery (-) pole temp. reaches 65°C (+/-5°C) / 149°F (+/-41°F), the charger would stop output.

⚠ **DON'T connect the sensor to the battery Positive (+) terminal. It may damage the sensor & charger.**

⚠ **<u>Warning: Damage caused by wrong sensor cable connection is not covered by the warranty.</u>**

Note 2:



B. Accessory

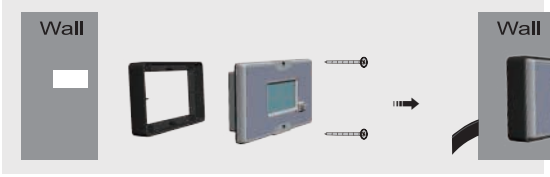
bracket - 2 parts : rear and frame.

How to instal?

FRONT VIEW

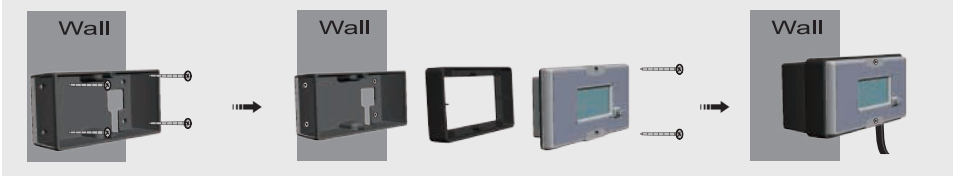
Rear

① With the frame only, if there's the hole on the wall for phone jack.



Frame

or ② With the frame and rear both, if the user just can screw the bracket on the wall, no hole for phone jack.

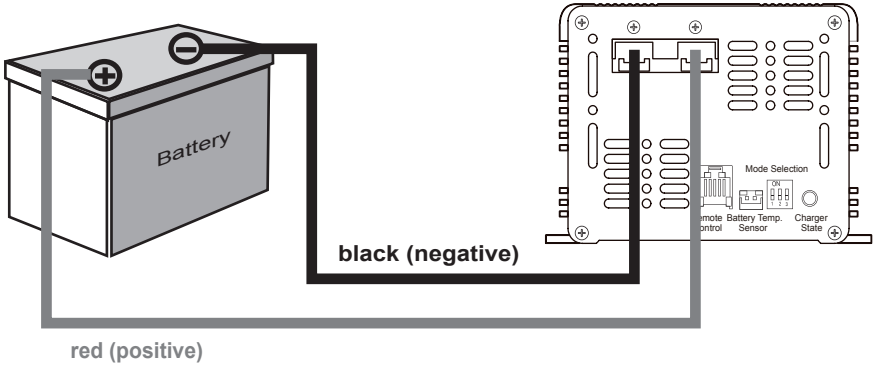


C . Isolated Design

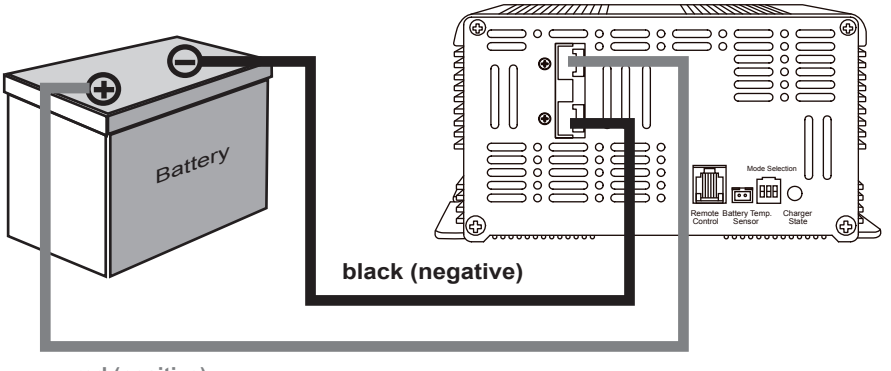
The DC battery charging circuits of this charger are galvanically isolated by a transformer from the AC power circuits. This feature reduces the risk of electric shock .

4. Installation Illustration

Before charging, read the instructions; for indoor use only. Disconnect the supply before making or breaking the connections to the battery.



BC-1215HT / BC-2407HT



BC-1230HT / BC-2415HT / BC-1260HT / BC-2430HT

⚠ WARNING

Explosive gases; Prevent flames and sparks; Provide adequate ventilation during charging. Include a warning against recharging non-rechargeable batteries. If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.

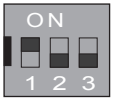
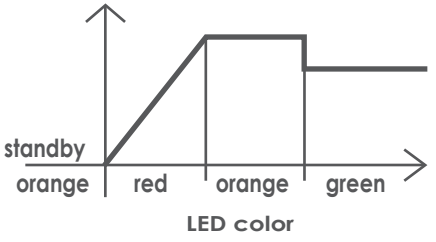
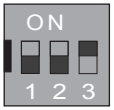
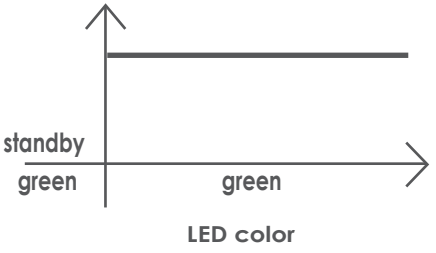
⚠ Explosive gas precautions

(1). The chargers have been approved as Ignition Protected. They may be installed in areas containing gasoline tanks and fittings which require Ignition Protected equipment. It is safest not to install electrical equipment in these areas.

(2). To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of the equipment in which the battery is installed.

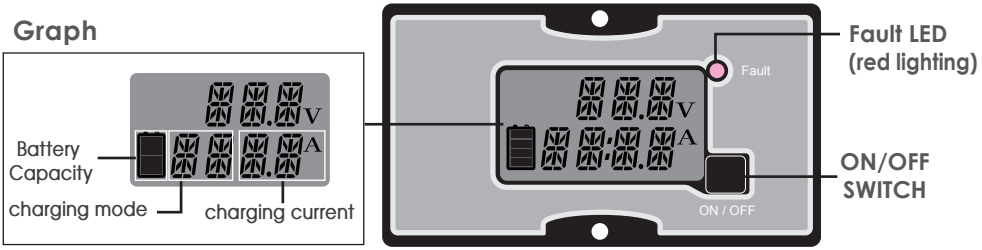
(3). Working in the vicinity of lead-acid batteries is dangerous. Batteries generate explosive gases during normal operation. Therefore you must read this guide and follow the instructions exactly before installing or using your charger.

5. Charging mode Selection & Volt Graph (0:OFF ■)

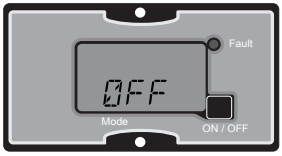
	Mode 1 (100)	Battery charger mode.	
	Mode 2 (003)	power supply mode. (DON'T charge the battery by this mode, would be over-charged. NOT cover bythe warranty.).	

6. Charger LCD Remote Control :

Graph

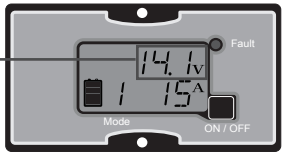


Display Content :

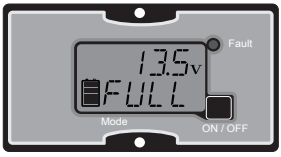


1. OFF

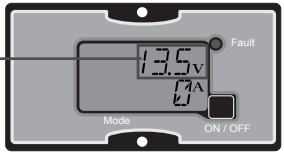
2. Mode 1: no battery connected.



3. Mode 1: while charging.

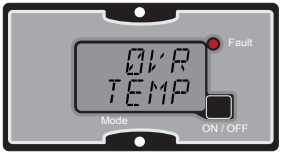


4. Mode 1: battery full.

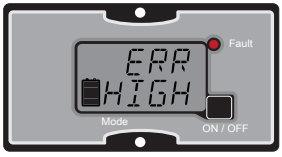


5. Mode 2: power supply mode.

**** If overload, the output volt would go down gradually, according to the load current. ****



6. Over temperature protection.



7. High battery volt protection.

Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.

This product must not be disposed together with the domestic waste.

This product has to be disposed at an authorized place for recycling of electrical and electronic appliances.

By collecting and recycling waste, you help save natural resources, and make sure the product is disposed in an environmental friendly and healthy way.

BC-1215HT / BC-2407HT specification

Model	BC-1215HT		BC-2407HT	
INPUT				
Voltage range	230Vac (180~240Vac).			
Frequency range	50/60Hz			
Efficiency	>=85%			
Power factor	0.5 at full load (±5%)			
Input socket	IEC plug			
OUTPUT				
Mode Selection	**Mode 1**	**Mode 2 *1**	**Mode 1**	**Mode 2 *1**
Bulk Stage	14.1V / 15A	13.5V / 15A	28.2V / 7A	27V / 7A
Absorption stage	14.1V / 15A max.	13.5V / 15A	28.2V / 7A max.	27V / 7A
Float stage	13.5V / 15A max.	13.5V / 15A	27.0V / 7A max.	27V / 7A
Aging (sulfated) battery	The battery <9V.		The battery <18V.	
	14.1V / 2A		28.2V / 1A	
Recommended battery capacity	45 ~ 150Ah (12V)		30 ~ 90Ah (24V)	
Leakage current from battery	<1mA		<1mA	
PROTECTION				
Over temperature	55°C±5°C (131°F±41°F)			
Overload	YES			
Output short circuit	YES			
Microprocessor check	YES			
ENVIRONMENT				
WORKING TEMP.	-15°C ~ +45°C (5°F ~ 113°F)			
WORKING HUMIDITY	20 ~ 90% RH non-condensing			
STORAGE TEMP., HUMIDITY	-30°C ~ +70°C (-22°F ~ +158°F) , 10 ~ 95% RH			
TEMP. COEFFICIENT	±0.05%°C (0°C ~ 50°C/32°F ~122°F)			
OTHER				
Remote Control	YES			
Dimension (L x W x H)	195 x 126 x 82.5mm			
Weight	2.1kgs			

*1 Mode 2: ⚠ DON'T charge the battery!

*2 The above spec. ±0.5V for 12V spec.; ±1.0V for 24V spec.; Amp. ±10% is acceptable.

⚠ Note: Specifications subject to change without notice.

BC-1230HT / BC-2415HT specification

Model	BC-1230HT		BC-2415HT	
INPUT				
Voltage range	100~240Vac			
Frequency range	50/60Hz			
Efficiency	>=85%			
Power factor	1.0 at full load (±5%)			
Input socket	IEC plug			
OUTPUT				
Mode Selection	**Mode 1**	**Mode 2 *1**	**Mode 1**	**Mode 2 *1**
Bulk Stage	14.1V / 30A	13.5V / 30A	28.2V / 15A	27V / 15A
Absorption stage	14.1V / 30A max.	13.5V / 30A	28.2V / 15A max.	27V / 15A
Float stage	13.5V / 30A max.	13.5V / 30A	27.0V / 15A max.	27V / 15A
Aging (sulfated) battery	The battery <9V.		The battery <18V.	
	14.1V / 4A		28.2V / 2A	
Recommended battery capacity	75 ~ 250Ah (12V)		45 ~ 150Ah (24V)	
Leakage current from battery	<1mA		<1mA	
PROTECTION				
Over temperature	55°C±5°C (131°F±41°F)			
Overload	YES			
Output short circuit	YES			
Microprocessor check	YES			
ENVIRONMENT				
WORKING TEMP.	-15°C ~ +45°C (5°F ~ 113°F)			
WORKING HUMIDITY	20 ~ 90% RH non-condensing			
STORAGE TEMP., HUMIDITY	-30°C ~ +70°C (-22°F ~ +158°F) , 10 ~ 95% RH			
TEMP. COEFFICIENT	±0.05%°C (0°C ~ 50°C/32°F ~122°F)			
OTHER				
Remote Control	YES			
Dimension (L x W x H)	235 x 179 x 90mm			
Weight	3.0kgs			

*1 Mode 2: ⚠ DON'T charge the battery!

*2 The above spec. ±0.5V for 12V spec.; ±1.0V for 24V spec.; Amp. ±10% is acceptable.

⚠ Note: Specifications subject to change without notice.

BC-1260HT / BC-2430HT specification

Model	BC-1260HT		BC-2430HT	
INPUT				
Voltage range	100~240Vac			
Frequency range	50/60Hz			
Efficiency	>=85%			
Power factor	1.0 at full load (±5%)			
Input socket	IEC plug			
OUTPUT				
Mode Selection	**Mode 1**	**Mode 2 *1**	**Mode 1**	**Mode 2 *1**
Bulk Stage	14.1V / 60A	13.5V / 60A	28.2V / 30A	27V / 30A
Absorption stage	14.1V / 60A max.	13.5V / 60A	28.2V / 30A max.	27V / 30A
Float stage	13.5V / 60A max.	13.5V / 60A	27.0V / 30A max.	27V / 30A
Aging (sulfated) battery	The battery <9V.		The battery <18V.	
	14.1V / 8A		28.2V / 4A	
Recommended battery capacity	180 ~ 600Ah (12V)		90 ~ 300Ah (24V)	
Leakage current from battery	<1mA		<1mA	
PROTECTION				
Over temperature	55°C±5°C (131°F±41°F)			
Overload	YES			
Output short circuit	YES			
Microprocessor check	YES			
ENVIRONMENT				
WORKING TEMP.	-15°C ~ +45°C (5°F ~ 113°F)			
WORKING HUMIDITY	20 ~ 90% RH non-condensing			
STORAGE TEMP., HUMIDITY	-30°C ~ +70°C (-22°F ~ +158°F) , 10 ~ 95% RH			
TEMP. COEFFICIENT	±0.05%°C (0°C ~ 50°C/32°F ~122°F)			
OTHER				
Remote Control	YES			
Dimension (L x W x H)	328 x 179 x 90mm			
Weight	4.0kgs			

*1 Mode 2: ⚠ DON'T charge the battery!

*2 The above spec. ±0.5V for 12V spec.; ±1.0V for 24V spec.; Amp. ±10% is acceptable.

⚠ Note: Specifications subject to change without notice.

7.Charging Formula

(A) . Charging Time

Formula Charging time will depend on the capacity of your battery and on how deeply it is discharged. The following equation calculates an approximate charging time.

$$\text{Charging time} = \frac{\text{CAP x DOD}}{\text{CC x 80\%}}$$

where:

Charging Time:	Battery recharge time in hours
CAP:	Battery capacity in amp-hours
DOD:	Battery depth of discharge in per cent. A fully discharged battery has 100% DOD
CC:	Charge current, the rated current output of the charger in amperes
80%:	Typical charging efficiency forlead-acid batteries

Example A Group size battery rated at 100 amp-hours is 40% discharged, that is, it has a DOD = 40. Charging time with a C-15L-12 unit is calculated as follows:

$$\text{Charging time} = \frac{\text{100Ah x 40\%}}{\text{15A x 80\%}} = 3.3 \text{ hours}$$

(B) . Discharging Time

To achieve 50% cycling you should calculate your Amp-hour consumption between charging cycles and use a battery bank with twice that capacity. To calculate Amp hour consumption, first look at the rating plate on your AC appliance or tools.
Each appliance or tool will be rated in either AC Amps or AC watts or AC VA(Volts-Amps) apparent power.

Use one of the following to calculate the DC Amp-hour draw for a 12 Volt system:
(AC Amps x 10) x 1.1 x hours of operation = DC Amp-hours
(AC watts/12) x 1.1 x hours of operation = DC Amp-hours
(AC VA/12) x 1.1 x hours of operation = DC Amp-hours

In all formulas, 1.1 is the factor for inverter/charger efficiency.
Calculate the above for every AC appliance or tool you intend to use on your inverter. This will give you the total number of Amp-hours used between recharges. Size your battery bank using this number as a guideline. A good rule to follow is to size the battery bank about 2 times larger than your total Amp-hour load requirement. Plan on recharging when 50% discharged. Many electric motors have momentary starting requirements well above their operational rating. Start up watts are listed where appropriate. Individual styles and brands of appliances may vary.

NOTICE: Lead-acid battery is recommended for inverter/charger models, also the LiFePO4 battery.