

Product Manual



Lithium Ferro Phosphate (LFP) Battery **12V 50Ah and 60Ah Power Pack**



Part Numbers: GC12V-050LFP-SPP and GC12V-060LFP-SPP

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

Contents

1	INTRODUCTION	3
2	GENERAL INFORMATION	3
2.1	LIFE SUPPORT POLICY	3
2.2	GENZ ENERGY PTY LTD	3
3	SAFETY GUIDELINES.....	4
3.1	WEIGHT	4
3.2	RISK OF ELECTRIC SHOCK	4
3.3	STORED ENERGY.....	4
3.4	COMPETENT SERVICE PERSONNEL ONLY	4
3.5	SAFETY DATA SHEET (SDS)	4
4	SPECIFICATIONS.....	5
5	BATTERY OVERVIEW.....	6
5.1	BATTERY MANAGEMENT SYSTEM (BMS).....	6
5.2	CONNECTOR – 9 PIN WEIPU IP67 BAYONET.....	6
6	INSTALLATION	6
6.1	RECEIVING INFORMATION	6
6.2	INSTALLATION PLACEMENT	7
6.3	CHARGERS	7
6.4	USE OF A SINGLE BATTERY	7
6.5	PARALLEL CONNECTION OF BATTERIES.....	7
6.6	SERIES CONNECTION	8
6.7	INSTALLATION OF THE BATTERY	8
6.8	CONNECTING TO THE BATTERY	8
6.9	VENTILATION	9
6.10	BATTERY MAINTENANCE	10
6.11	CHARGING THE BATTERY	10
6.12	DISCHARGING THE BATTERY	11
6.13	STORAGE	11
7	TROUBLE SHOOTING	12
8	WARRANTY & SERVICE INFORMATION	13
8.1	RECORD OF PURCHASE	13
8.2	BEFORE CALLING FOR SERVICE	13
8.3	WARRANTY OR SERVICE	13
9	APPENDIX A – DIMENSIONS	14
10	APPENDIX B – VOLTAGE AND CAPACITY CURVES (0.2C AND 25°C).....	15

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

1 Introduction

Thank you for purchasing this Lithium Ferro Phosphate (LFP) Battery. It has been designed and manufactured to provide many years of trouble free service.

Please read this manual prior to installing the Lithium Ferro Phosphate (LFP) Battery. This product manual covers the following Battery models:

- GC12V-050LFP-SPP
- GC12V-060LFP-SPP

This manual provides important information that must be followed during installation, commissioning and maintenance of the Battery. Failure to follow these instructions may lead to you damaging the system it is being installed into and/or voiding your warranty. There are important safety and handling procedures that must be followed for your own safety and the safety of those around you.

This manual also contains information for customer support and factory service if it is required.

2 General Information

2.1 Life Support Policy

We do not recommend the use of this battery in 'life support' applications where failure or malfunction of the battery can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness.

2.2 genZ Energy Pty Ltd

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3 Safety Guidelines



3.1 Weight

Refer to the specification table for the weight of the particular model of genZ battery that you are using. Any time the Battery has to be handled be sure to use appropriate manual handling techniques. This is particularly important where the battery maybe being installed in a confined space.

3.2 Risk of Electric Shock

While this battery is 12 Volts DC, the charger or inverter connected to this battery may be operating at mains AC voltages. Also be aware that solar arrays can produce high DC voltages well in excess of 12V DC. Connecting any of our LFP batteries to any electrical system should only be carried out by suitably competent service personnel only.

3.3 Stored Energy

These Batteries can, especially if they are connected in parallel, produce high currents. Care should be taken to avoid shorting the +Ve and –Ve of connectors.

3.4 Competent Service Personnel Only

Battery replacement should be performed by competent service personnel only. This battery contains no user serviceable parts inside and is sealed.

3.5 Safety Data Sheet (SDS)

Refer to the SDS that was supplied with this battery in case of an incident.

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

4 Specifications

Part Number	GC12V-050LFP-SPP	GC12V-060LFP-SPP
Chemical Composition	Lithium Ferro (Iron) Phosphate (LiFePO ₄)	
Nominal Voltage	12.8V (12V)	
¹ Nominal Capacity	50AH	60AH
Charge Current	10A	
Max Discharge Current	30A	
Charge/Discharge Cycles	6000 @ 80% DoD, 25°C	
² Operating Temperature	-20° to 60°C	
Operating Relative Humidity	Up to 85%	
Ingress Protection (IP)	IP65	
Size Standard (L x W x H) GC12V-XXXLFP-SPP	178±1mm x 127±1mm x 240mm	
Size Optional (L x W x H) GC12V-XXXLFP-SPP-1	165±1mm x 127±1mm x 240mm	
Connector	WEIPU WS28 9pin IP67 Signal Power Connector, Aviation 'bayonet style' socket (female) with protective dust/ moisture cap.	
Connection, DC and Temperature (standard)	Weipu 9-pin IP67 harness, 600mm red/black cable terminated with JST VLP02 power connector and JST PHR-3 temperature connector.	
³ (Optional Parallel)	Weipu parallel harness with temperature sensor connection for connecting double stacked batteries together	
Weight (not including harnesses)	7.5kg	
BMS Over Volt/charge Cut Off	15.6V	
⁴ BMS Under Volt Cut Off	10V	
BMS Short Circuit Cut Off	140±30A (20mS Trip)	
BMS Over Temp Cut Off	65°C	
BMS Cell Protection	Automatic cell balancing	
BMS Communications (Optional)	Contact info@genz.com.au for further details on MODBUS RTU, CANBus and Bluetooth interfaces for this battery type	
Charge Time	Approx. 5 hours at 10A	
Storage Temperatures (°C)	Min	-5°C
	Max	50°C
Relative Humidity	Up to 85%	
⁵ Self Discharge	14% per annum	
Warranty (Standard)	5 years from date of purchase	
Extended manufacturer warranty (Optional)	Contact info@genz.com.au	

¹Also available in even higher capacities utilising an optional taller case

²It is not recommended to charge the battery where ambient temperatures are below -5°C

³2 x Right Angle connectors in parallel to facilitate double stacking of 2 battery packs

⁴Where solar regulators require a lower under volt cut-off, a genZ 'solar boost module' can be supplied either integrated within the battery or as a separate field service kit.

⁵While the batteries can be safely stored for up to 3 years, the batteries should be fully charged after any storage period beyond 6 months

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

5 Battery Overview

5.1 Battery Management System (BMS)

This battery is fitted with (contained within the battery case) a sophisticated BMS. The BMS is designed to provide user safety and protect the battery cells from:

- Over voltage charging.
- Under voltage discharging.
- Operation beyond a safe temperature.
- Short circuit protection.

Should the BMS activate to protect the battery, the BMS will automatically reset once a normal operational condition is detected by the BMS.

5.2 Connector – 9 pin Weipu IP67 Bayonet

This battery is fitted with 9 pin bayonet connector. Supplied with the battery will be the standard harness that permits electrical connection to the battery DC as well as the internal temperature sensor contained within the battery.

The battery is also fitted with a cap that should be used whenever there is no mating connector attached to the battery. Use of this cap will prevent ingress of contaminants to the connector.

6 Installation



Failure to follow these guidelines may void the warranty and cause potential damage to property or serious injury.

6.1 Receiving Information

Once you receive the product it should be visually inspected for damage that may have occurred during shipping. Immediately notify the carrier and place of purchase if any damage is observed. The packing materials that the product was shipped with has been designed to minimize any shipping damage. In the unlikely event that the product needs to be returned to the manufacturer, use the original packing material. Since the manufacturer is not responsible for shipping damage incurred when the product is returned, the original packing material is inexpensive insurance.

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

6.2 Installation Placement



The Battery must be installed such that it is not exposed to:

- Sources of radiant heat.
- Extreme cold where the ambient temperature is expected to regularly fall below -10°C.
- Direct and prolonged sunlight.
- Direct and prolonged rain or places where it can become submerged in water.
- Corrosive and explosive atmospheres.

6.3 Chargers

While most lead acid chargers should work with this battery, it is recommended that chargers that comply with the LFP batteries charge profile are used.

The same applies to solar chargers that are either PWM or MPPT.

It should be noted that should the LFP battery be discharged to the point where the batteries BMS reaches the low voltage cut off limit, some battery chargers will NOT then charge the battery. To overcome this, the charger should be placed into 'power supply' (13.8V) mode (if available) and allowed to charge the battery until a terminal voltage greater than 11 Volts is observed at the battery terminal. Alternatively a specialised genZ "Solardrive LV LFP Boost Module" can be added to the battery internally or as an external module to assist with certain solar chargers.

6.4 Use of a Single Battery

Ensure that the following is considered prior to installing:

- Use only good quality cable connectors that mate with the supplied harness or original Weipu connectors.
- The correct size of cable to the battery connector is used.
- That the polarity of the connection is observed.

6.5 Parallel Connection of Batteries

In addition to the guidelines for a single module, when connecting in parallel, the following additional considerations apply:

- As the connection of these modules in parallel can result in high currents and stored energy, the design of such a system should be made by a competent person or persons only.
- All Batteries should be fully charged prior to installation as the batteries may have different states/levels of charge. Refer to the "Charging the Battery" section of this manual for charging guidelines.

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

- Use only the genZ paralleling harness for connecting up to two batteries in parallel
- Do NOT connect a fully discharged Battery with a fully charged battery
- Do NOT install a fully charged Battery with a fully discharged battery
- Do NOT mix these Batteries with other battery chemistry types without prior engineered testing.
- Do NOT mix these Batteries with LFP batteries from other manufacturers.
- Consider the use of a suitable fuse(s) to protect from the high currents that can be achieved when these batteries are connected in parallel.
- Parallel connections involve connecting the POSITIVE (+) connection of one battery to the POSITIVE (+) connection of the next battery. The same goes for the negative side; NEGATIVE (-) of the first battery connects to the NEGATIVE (-) of the next battery.

6.6 Series Connection

These Batteries are NOT designed for connecting in series. Connecting in series will void your warranty.

6.7 Installation of the Battery

Be sure to read these instructions in conjunction with the “Installation Manual”. Consider the battery placement and associated cautions before installing the Battery. Select a location, which will provide good air circulation for the Battery. Route cables so they cannot be walked on, pinched or damaged in any way. Where the battery is to be used in a mobile application, ensure that a suitable hold down clamp is used to prevent the battery moving or vibrating.

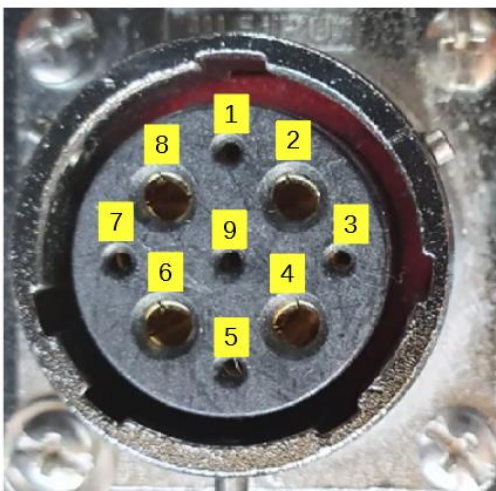
These Batteries can be used in any orientation EXCEPT upside down. Upside down is where the terminals are facing downwards.

Place the Battery in the final desired location and complete the rest of the installation procedure.

6.8 Connecting to the battery

Note: The Weipu bayonet connector is ‘keyed’ to ensure correct mating of the connector pins

6.8.1 Pinout – Battery Connector



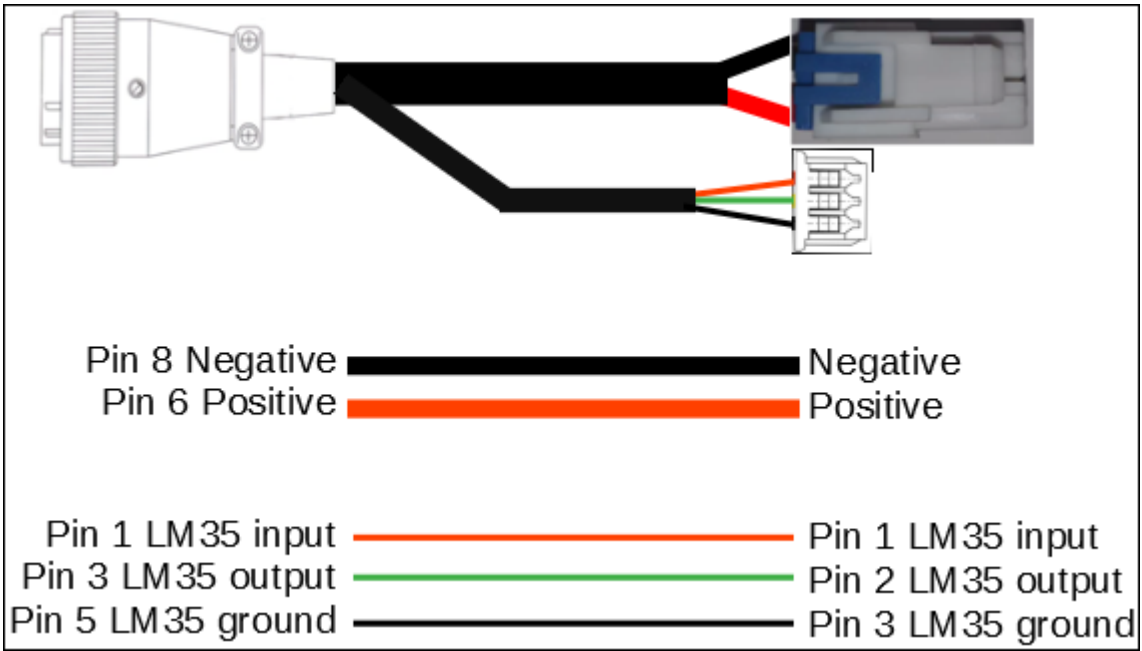
- 1 – Temperature sensor (Red) 4-20V supply
- 2 – Battery POSITIVE (RED) connected internally to pin 6
- 3 – Temperature sensor (Green)
- 4 – Battery NEGATIVE (BLACK) connected internally to pin 8
- 5 – Temperature sensor (Black)
- 6 – Battery POSITIVE (RED) connected internally to pin 2
- 7 – No connection
- 8 – No connection
- 9 – No connection

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

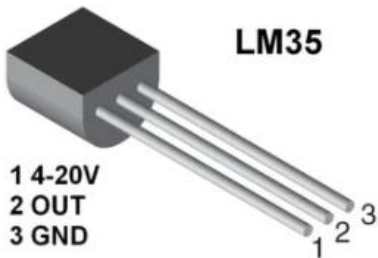
6.8.2 Standard Harness schematic

The battery will be supplied with a standard harness this harness will consist of the following connectors:

- 1. 1 x Weipu 9-pin male IP67 straight bayonet connector
- 2. 1 x ST VLP02 2 pin power connector
- 3. 1 x JST PHR-3 3 pin LM35 temperature connector



6.8.3 Temperature Sensor – LM35



Refer to Texas Instruments website for technical details

6.9 Ventilation

Unlike deep-cycle flooded/wet lead acid batteries which release small amounts of gas during usage, particularly during the charging process, genZ batteries do not release these harmful and potentially explosive gases. However, some form of ventilation is still recommended.

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

6.10 Battery Maintenance

GenZ batteries do not require any checking of the battery internals and there are NO USER SERVICEABLE parts within the battery case.

The genZ battery is essentially 'maintenance free' and no attempt should be made to open the case. Doing so will void any warranty and may lead to a potentially dangerous short circuit situation.

However, depending on the environment and type of use the genZ battery has, the following is recommended:

1. Examine the outside appearance of the battery, particularly the top of the battery and connectors. They should be clean and dry, as well as free of dirt and corrosion.
2. Check battery cables and connections. Replace any damaged cables.

6.11 Charging the Battery

Ideally these batteries should only be charged by a charger that is designed to charge LFP chemistry, at the correct voltage, current and charge profile.

Refer to "CHARGE SETTING" Appendix at the end of this manual

The charging profile described below is designed to achieve **maximum number of cycles/life** of the Battery.

6.11.1 Ambient temperature of 20C

An ambient temperature of 20 Celsius is the ideal temperature for the operation of the battery.

6.11.2 Commence a charge cycle where the current is limited (Constant Current or CC) at 0.2C

0.2C is equal to 10 Amps for the models of battery, but, can be charged at a lesser current if required.

6.11.3 Hold Voltage at 14.0 to 14.4 Volts for 2 hours

Charge the Battery at a Constant Current of 10 Amps until the battery voltage reaches anywhere from 14.0 to 14.4 Volts DC.

Continue charging at a constant voltage for up to two (2) hours or until the charge current drops to less than 1 Amp. This will then allow the battery internal cells to 'balance' their terminal voltage.

6.11.4 Remove charge voltage

After two hours or when the charge current drops to less than 1 Amp, the charging voltage can be removed (or placed onto a float charge) as the battery should now be fully charged.

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

6.11.5 Float charge at 13.8 Volts

At the completion of the above charge profile, the battery can either be stored or placed on a float charge of 13.6 to 13.8 Volts.

6.12 Discharging the Battery

The discharge characteristics described below are to achieve the maximum number of cycles/life of the Battery.

6.12.1 Battery discharge current

The ideal discharge current for the battery is maximum 20 Amps.

6.12.2 When to charge a discharged battery

While the Battery is protected by the BMS to prevent excessive battery discharge, it is recommended to recharge the battery as soon as practical following a discharge event. This will ensure long life for your battery as well as providing a fully charged battery for when it is required.

6.13 Storage

The Battery should be stored, fully charged in an area that is protected from the elements and at an ideal temperature of 20C and low humidity. It should be stored in its original packing. The battery discharges at approximately 14% per annum. It is recommended that the battery be recharged every 12 months to maintain maximum life as well as a fully charged battery.

If storing a battery for an extended period of time, reference should be made to the “Self Discharge” characteristics as indicated in the table of specifications.

It should also be noted that, a battery that has been stored for an extended period of time may exhibit a loss of capacity when it is first placed into service. This ‘loss of capacity’ can normally be corrected by cycling the battery at least three times.

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

7 Trouble shooting

SYMPTOM / FAULT	POSSIBLE CAUSE	POSSIBLE SOLUTION
NO OUTPUT VOLTAGE AT BATTERY TERMINALS	BMS UNDER VOLTAGE, IN PROTECTION MODE	RECHARGE THE BATTERY AND RECHECK FOR CORRECT OUTPUT VOLTAGE
	BMS OVERCURRENT, IN PROTECTION MODE	CHECK FOR SHORT CIRCUITS OR EXCESSIVE CURRENT DRAW
	BMS OVER VOLTAGE, IN PROTECTION MODE	CHECK FOR CHARGING CIRCUIT SUPPLYING EXCESSIVE CHARGE VOLTAGE
	BMS OVER TEMPERATURE, IN PROTECTION MODE	CHECK AND INVESTIGATE REASON FOR HIGH TEMPERATURE
	OTHER	RETURN TO GENZ FOR SERVICE
SYMPTOM / FAULT	POSSIBLE CAUSE	POSSIBLE SOLUTION
BATTERY FAILING TO CHARGE OR HOLD CHARGE	INSUFFICIENT CHARGE VOLTAGE/CURRENT	CHECK FOR FAULTY CHARGER, POOR CABLING OR LOOSE CONNECTIONS
	SOLAR OR OTHER CHARGER NOT CONFIGURED CORRECTLY	REFER TO THE MANUFACTURER OF THE SOLAR OR MAINS CHARGER
	BATTERY CHARGER MAY WELL BE FAILING TO START A CHARGE CYCLE. THIS MAY OCCUR WITH SOME SMART CHARGERS THAT REQUIRE SEEING AT LEAST SOME VOLTAGE FROM A BATTERY	CHECK WITH CHARGER MANUFACTURER OR SUBSTITUTE THE CHARGER FOR A DIFFERENT TYPE OR USE A DC POWER SUPPLY SET TO THE CORRECT CHARGE VOLTAGE AND CURRENT
	OTHER	RETURN TO GENZ FOR SERVICE

LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

8 Warranty & Service Information

8.1 Record of Purchase

It is important that you maintain a record of your purchase details, the model number and serial number of the Battery.

8.2 Before Calling for Service

Verify that the charger and load are operating correctly. Refer to the “Trouble Shooting” section of this manual.

If you believe that the battery is not delivering it's rated *capacity (refer to Specifications) the battery may be considered faulty if it fails to deliver less than 70% of it's rated capacity during the warranty period.

*Note: Some chargers/inverters display the capacity of a battery module or the battery system. These calculated values can be inaccurate for a number of technical reasons and as such should not be relied on.

Refer to the genZ website at www.genz.com.au for full details of the warranty on this product.

8.3 Warranty or Service

In the unlikely event that you believe the battery is faulty, contact the place of purchase or the dealer/distributor first. If you cannot reach your dealer, or if they cannot resolve the issue please visit the genZ web site at www.genz.com.au for contact details for technical support.

Please ensure that you have the following information available:

- a) Where and when the battery was purchased.
- b) The model number.
- c) Serial number of your battery.
- d) Information on the nature of the failure.

<http://www.genz.com.au>

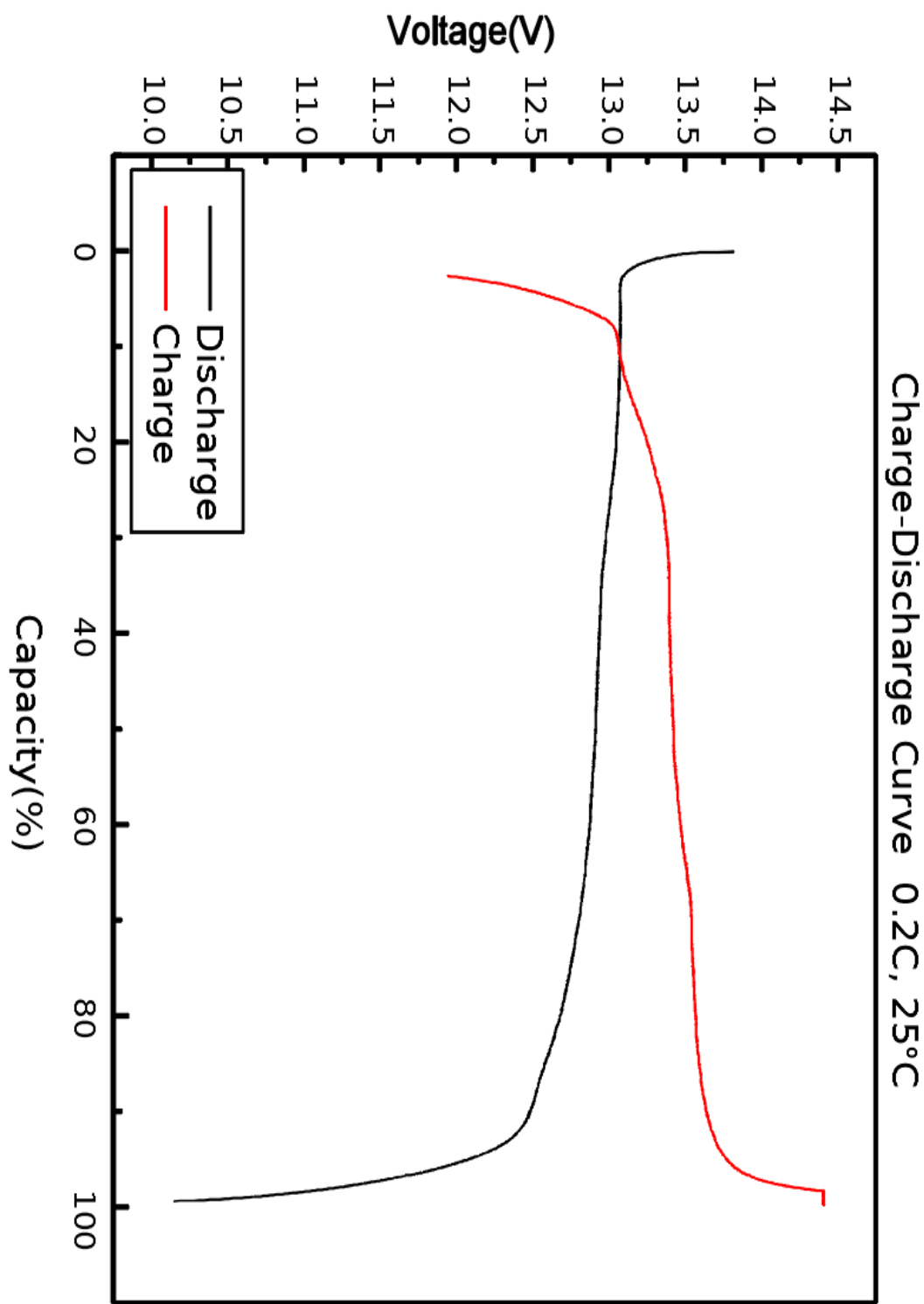
LFP Battery GC12V- GC12V-0XXLFP-SPP Product Manual

9 Appendix A – Dimensions

Part Number	GC12V-050LFP-SPP	GC12V-060LFP-SPP
Size Standard (L x W x H) GC12V-XXXLFP-SPP	178±1mm x 127±1mm x 240mm	
Size Optional (L x W x H) GC12V-XXXLFP-SPP-1	165±1mm x 127±1mm x 240mm	



10 Appendix B – Voltage and Capacity Curves (0.2C and 25°C)



Notes:

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