REMCO®
renewable energy manufacturing company

Lithium Deep Cycle XTRA

Installation & User Guide

12V Super Slim Lithium Series

Contents

1.0 Introduction

Congratulations! You have purchased a state-of-the-art lithium battery and we hope you enjoy many years of trouble-free life. This Installation and User Guide describes how to connect and safely operate the Super Slimline range of 12V batteries.

This User Guide covers the following SL 12V battery range:

RM12-110LFPXSL

RM12-110LFPXSLDC

As with all batteries, you should consider the mechanical and environmental conditions that you intend to operate the battery in to maximise overall performance and achieve the longest battery life. These general guidelines; however, you should seek our advice or that of a qualified electrical tradesperson if you are in doubt.

2.0 Do's and Don'ts

This battery contains lithium iron phosphate (LFP) cells. While LFP cells are the safest Li-Ion chemistry, the stored chemical energy represents a risk of fire, burns or explosion if misused.

Avoid injury to yourself and others, adhere to the warnings in this Guide.

- Avoid mechanical shock
- Do not expose to fire
- Do not pierce battery
- Do not disassemble
- Do not drill into enclosure
- Do not short the terminals
- Do not allow water to enter
- Do not charge battery below 0°C
- Do not store battery below -20°C or above 60°C

To ensure a long and safe life from your battery, please ensure you consider the following:

2.1 Ensure the battery is physically secure

Even though lithium batteries are light weight in comparison to lead acid, they can still become a dangerous projectile in a moving vehicle, RV, cart or boat if not secured. Ensure the battery is safely secured before travel. If in doubt seek our advice and consider making use of mounting brackets to safely secure the battery.

2.2 Do not penetrate the battery enclosure

You may be tempted to drill into the aluminium enclosure to secure mounting brackets. Doing so may inadvertently penetrate one of the cells which could cause thermal runaway and vapour emissions. Do not under any circumstances drill or penetrate the enclosure. Use only existing mounting holes in the battery and short screw lengths no greater than 13mm.

We strongly recommend the mounting kit with screws and brackets that are designed to safely attach to the battery; alternatively use strapping and clamping to secure the battery in place.

2.3 Maintain an acceptable temperature range

Like all batteries, operate and perform the best, as well as last the longest, in a cool and stable temperature environment of between 10°C and 25°C. The maximum window of acceptable operation is 0-45°C.

If you regularly operate outside of this suggested range, you should consider changing the battery location or actively cool or heat the environment in order to preserve battery life. If the ambient temperature that the battery operates in is greater than 60°C you should cease use immediately. Operating outside of these guidelines diminishes the life and performance of the battery and voids the warranty.

2.4 Avoid repeated shock and vibration

Whilst the battery is robustly constructed and protected in an aluminium enclosure, it is not designed to operate continuously in high shock or high vibration environments. Normal use in a 4WD environment is acceptable and the battery has been designed in accordance with these expected conditions. However, dropping the battery or exposing the battery to a high number of excessive vibrations may lead to a fault or failure of the battery.

2.5 Avoid exposure to water or salt spray

Whilst the battery is mechanically protected, the enclosure is only IP20 equivalent and is not designed for a wet environment. Do not submerge the battery in water or expose the battery to direct water spray. If it is likely that a water will be on the floor where the battery is located, ensure the battery is facing upwards with the terminals (and electronics) on the top, so that any water that gets into the bottom can drain out again without touching the electronics.

Avoid exposing the battery long term to salty water spray such as in a marine environment to avoid corrosion. Salt laden air may also cause corrosion in the long term; therefore, minimise exposure by installing the battery in a protected hatch or compartment.

2.6 Do not short circuit the battery

Whilst the BMS will protect the internal cells from short circuit, it is highly recommended to avoid short circuiting the battery. The MEGA Fuse on the external positive terminal of the battery also provides over-current protection; if voltage is not present on the +Fused terminal, check for voltage on the +Unfused terminal to check if the fuse has blown.

Pay attention when using metallic tools in the vicinity of the terminals, as accidentally contacting the positive and negative terminal with a metallic object like a spanner will cause a short circuit and spark. Always keep the plastic caps screwed on when not using the terminals.

Always perform work on passive wiring first and connect the live battery as the last connection. If you must work on live circuits exercise due care and use insulated tools where possible. If you are unsure how to install the battery, seek advice from us or a suitably qualified electrical tradesperson.

2.7 Mounting orientation

The Super Slimline batteries can be mounted flat with the labels facing up, or on its side with the writing the right way up.

It is not recommended to mount the battery on its side with the writing upside down. In this configuration the internal cells are upside down and is not preferred.

3.0 Longevity & Depth of Discharge

One of the advantages of lithium batteries over lead-acid batteries is longevity. If you want to realise the long life potential out of your lithium battery, then consideration must be given to depth of discharge.

A battery lifespan is rated by the number of cycles before the original capacity has reduced by a certain amount; a cycle is defined as discharging from fully charged, to a percentage Depth of Discharge (DOD), and then charging back to full again. So, DOD describes what percentage of the battery capacity is being used each time.

Note: DOD is different to State of Charge (SOC, also known as Charge Level); in fact, they add together to 100%. So, 80% DOD equates to 20% SOC.

The less DOD you use each cycle, the longer the battery will last.

This fact should be considered when choosing the battery Amp hour capacity. You will have a higher return on battery investment if there is enough capacity at hand such that you are not heavily discharging the battery on every cycle. Extra capacity ensures lower DOD, extended life and a higher financial return on your investment.

Batteries have a cycle life of 5,000 at 50% and 2,000 at 80% DOD.

4.0 Battery Management System

Your battery comes with a Battery Management System (BMS) mounted internally.

The BMS is an electronic solid-state circuit board which manages the cells and protects the battery across a range of scenarios which primarily includes over charge and over discharge protection. Unlike lead acid batteries, over charging or over discharging a lithium battery may lead to a hazardous scenario. Therefore, the BMS is the heart and soul of a lithium battery.

The Super Slimline battery BMS is a highly reliable solid-state device which is primarily designed to keep the cells safe and the overall pack from being damaged by excessive voltage or excessive discharge event.

5.0 Installation

5.1 Stowage

The Super Slimline battery is likely to be stowed in a car, RV or 4WD or as a portable battery for camping. An important part of the battery installation is securely fixing it down or safely stowing it away during transport so that it does not become a projectile in an accident.

The primary benefit of the super slim battery is that it can tuck away behind or under a seat in a vehicle. Too often space is at a premium and the slim shape and design of the battery means it can be hidden away.

As with all battery installations, ensure it is securely strapped down or secured in place before heading out on the road.

5.1 Connecting

The RM12-110LFPXSL model contains two (2) convenient grey Anderson plug connectors accessible from the side of the battery as shown in Figure 3. Both can be used as input and outputs for charging and running loads. Or one plug could be used to charge the battery and the second plug used for loads.

Charge sources could include:

- External AC charger with grey Anderson connector.
- External (regulated) solar charger with grey Anderson connector; or - External DC-DC charger with grey Anderson connector.

Figure 3 – Dual Grey Anderson Plugs

For connected chargers and devices, a grey Anderson plug must be used. Check to ensure the Anderson is correctly wired (positive and negative) and do not attempt to use any coloured Anderson other than grey.

NOTE – There are no internal fuses inside the battery so an external fuse must be used for each Anderson connector, 100A maximum. The internal BMS is designed for up to 100A continuous charge and 100A continuous discharge. Please consider this when connecting charging devices and loads.

5.2 Connecting the DC Model

The RM12-110LFPXSLDC model contains one (1) grey Anderson plug connector and one (1) blue Anderson plug connector, accessible from the side of the battery as shown in Figure 4. The grey connector can used as input and output for charging and running loads.

NOTE – There are no internal fuses inside the battery so an external fuse must be used for the grey Anderson connector, 100A maximum, to ensure never to exceed the BMS 100A continuous charge and discharge rating. The cable to the blue Anderson connector should be protected by an external fuse (at least 20A, rated for the cable size), as close as possible to the vehicle battery/alternator.

Charge sources to the grey Anderson connector could include:

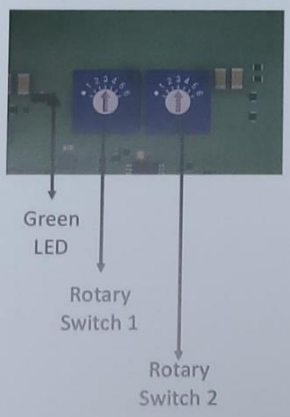
- External AC charger; or
- External (regulated) solar charger.

The blue connector is reserved for a DC input, to make use of the internal DC-DC charger. The DC-DC charger is rated for 20A input from a vehicle alternator or start battery.

Figure 4 – DC Model Anderson Connectors

5.3 Tuning the DC-DC Charger

Next Generation – DCS Charger



The DC-DC charger is factory set in Voltage Sensitive Relay (VSR) Mode at setting 5 which is to turn on (latch) at 13.7V and turn off (de-latch) at 12.7V with a delay off of zero.

If you want to use your DC-DC charger in a different mode then you need to turn the 2 rotary switches to the correct position.

As you look at your battery there is cut out window with tan LED and 2 rotary switches

1. Green LED which will illuminate when the DC-DC charger is ready to charge.
2. Rotary Switch 1 on the left called Voltage Switch
3. Rotary Switch 2 on the right called the Delay Switch / Ignition Trigger

There is also an external Ignition Trigger Input. A Red Plug on the front face of the battery. Please consult your auto electrician to discuss a suitable place to connect an ignition trigger input to in your vehicle. The Ignition Trigger requires only a single 12V Positive signal and uses the common ground of the battery.

The Next Generation – DCS Charger tables give some suggested settings for the various modes that the charger can be used in.

Next Generation – DCS Charger

Factory Set for Traditional Alternator & No Delay
5 - 0

Connection to Ignition Trigger on a Smart Alternator
0 - 6

Voltage Switch Position	ON Level – OFF Level
0	11.0 – 10.0
1	12.0 – 11.0
2	13.0 – 12.0
3	13.3 – 12.3
4	13.5 – 12.5
5	13.7 – 12.7
6	14.0 – 13.0

Delay	Delay Off Time
0	0
1	30s
2	1 min
3	1.5m
4	3 min
5	5 min
6	Ignition Signal Input

6.0 User Guide

Once the battery is securely installed and electrically connected it will automatically be available for use. The internal BMS will actively ensure the battery is always protected and operating safely. The battery requires no user interface or intervention under normal conditions.

The Super Slimline lithium battery voltage can be monitored by installing an external display, such as our remote voltage monitor shown right.

Note that unlike lead acid batteries, lithium batteries hold their voltage over the cycle, dropping off only when the battery is ~90% discharged, as indicated in Figure 6 for illustrative purposes.

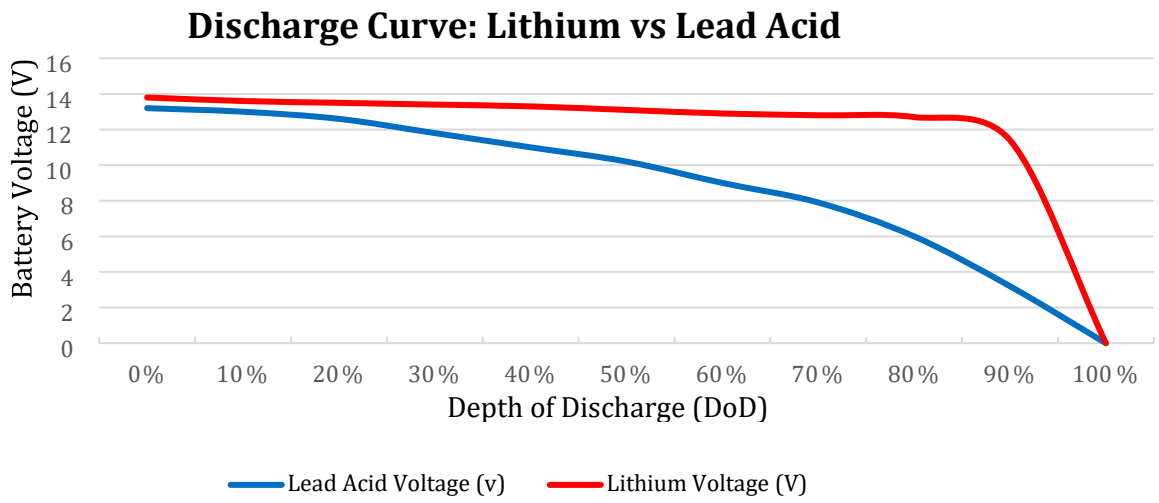


Figure 6 – Volt Curve Lead Acid vs Lithium

The Super Slimline battery voltages below are a useful guide:

1. A normal full battery open circuit voltage (Voc) with no load rests at 13.3V to 13.6V.
2. Depending on the load voltage may dip 0.5V below the Voc.
3. Below 13V Voc the battery is low and should be charged to promote a long lifespan. 4. Below 12V Voc the battery is close to empty and should be charged straight away.
5. Low Voltage Disconnect (LVD) is set at ~10.5V.

7.0 Specifications

	DC Input Max Charge Current	Battery Max Charge Current	Max Discharge Current Cont/Surge		Battery Weight	Op. Temp (Charge)	Op. Temp (Disch)	Dimensions (mm)			
	A	A	A	A	kg	°C	°C	Length	Depth	H1*	H2*
RM12-110LFPXSL		100	100	200	11	0-45	-20 to 60	635	265	50	50
RM12-110LFPXSLDC	20	100	100	200	11	0-45	-20 to 60	635	265	50	50

Figure 7 – Super Slimline Specifications

8.0 Contact Us

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