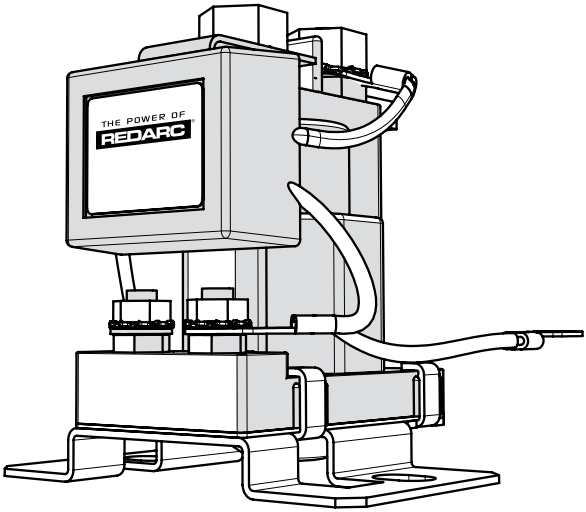
THE POWER OF

REDARC®

Low-Voltage Load Disconnect Isolator

SBI12-LLD



AUSTRALIAN DESIGNED

AUSTRALIAN BUILT

TWO YEAR WARRANTY

WARNING & SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS - THIS MANUAL CONTAINS IMPORTANT SAFETY INSTRUCTIONS FOR THE SBI12-LLD BATTERY ISOLATOR.

DO NOT OPERATE THE ISOLATOR UNLESS YOU HAVE READ AND UNDERSTOOD THIS MANUAL AND THE ISOLATOR IS INSTALLED AS PER THESE INSTALLATION INSTRUCTIONS.

⚠ WARNING

RISK OF EXPLOSIVE GASES:

WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.

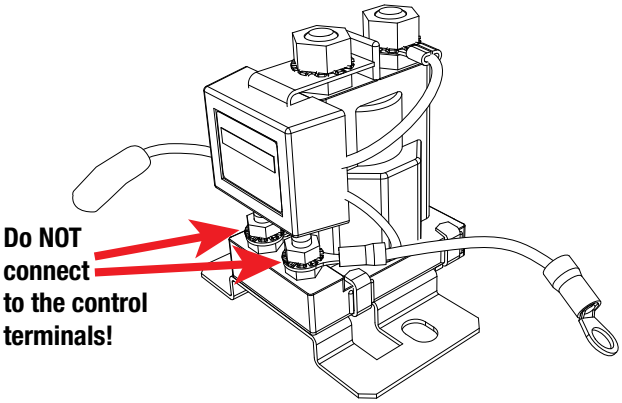
⚠ CAUTION

1. NEVER smoke or allow a spark or flame in vicinity of battery or engine. This may cause the battery to explode.
2. Be extra cautious so as to reduce the risk of dropping a metal tool onto a vehicle battery. Doing so might cause the battery to spark or might short-circuit the battery or other electrical parts that may cause an explosion.
3. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
4. A spark near a battery may cause the battery to explode. To reduce the risk of a spark near a battery when connecting the battery installed in a vehicle to the isolator, always do the following:
   a. Position DC cords to reduce the risk of damage by the vehicle hood, door, or moving engine part.
   b. Stay clear of fan blades, belts, pulleys and other parts that can cause injury to persons.
   c. Determine which post of the battery is grounded (connected) to the chassis. If the negative post is grounded to the chassis (as in most vehicles), see (e). If the positive the post is grounded to the chassis see (f).
   d. For use in negative-grounded vehicles only. Connect the POSITIVE (RED) terminals from the Battery Isolator to the POSITIVE (POS, P, +) of the auxiliary battery. Connect the NEGATIVE (BLACK) lead to a metal part of the frame or the vehicle chassis, away from the battery. Do not connect the connect to the carburettor or fuel lines.
5. Personal safety precautions to assist with safely working with Batteries:
   a. Consider having someone close by to come to your aid when you are working with the Battery.
   b. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
   c. Wear complete eye protection and clothing protection. Avoid touching eyes while working near a battery.
   d. If battery acid contacts your skin or clothing, remove the affected clothing and wash the affected area of your skin immediately with soap and water. If battery acid enters your eye, immediately flood the eye with running cold water for at least 10 minutes and seek medical assistance immediately.

WARNING & SAFETY INSTRUCTIONS

NOTICE

1. Over discharge risk. Ensure that the Turn OFF voltage is suitable for the specifications provided by the battery manufacturer.
2. The SBI12-LLD is designed for controlling loads from an Auxiliary battery. Using the SBI12-LLD to isolate from a start battery will result in a state of charge too low to start the vehicle.
3. The SBI12-LLD will achieve best results when proper battery maintenance is regularly performed. This includes but is not limited to checking water and specific gravity levels of the battery. Refer to the battery manufacturers manual for more details.
4. Fuses or Circuit breakers of appropriate rating must be installed to protect the vehicle system.
5. Fuses must be installed as close as possible to the battery.
6. **IMPORTANT!** Do NOT make any connections to the control terminals found on the front of the unit. Ensure that connections are not accidentally bridged between terminals whilst tightening. Connecting to the control terminals on the front of the SBI may cause damage to the unit and/or equipment connected to it. Connecting to the control terminals will void the warranty of the unit.



SPECIFICATIONS

System Voltage	12V Nominal
Turn ON Voltage	11.0V
Turn OFF Voltage	10.5V
Turn ON Delay	10 sec
Turn OFF Delay	2 sec
Max. Cont. Current	100 Amps
Max. Inrush Current	400 Amps
Standby Current	< 5mA
Operating Current	<0.1A
Dimensions	75 x 70 x 80mm
Weight	200g
Warranty	2 years
Standards	CE, C-Tick, AS/NZS CISPR11:2004
Main Stud Torque	5-6.2 Nm

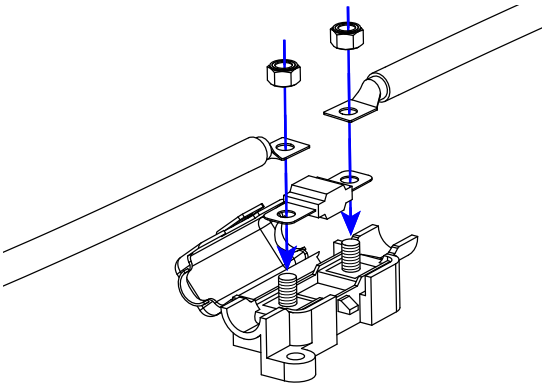
THE SBI12-LLD

The SBI12-LLD is a microprocessor controlled Load Disconnect Isolator. The SBI12-LLD is designed specifically for use in LiFePO4 battery applications as a system to protect the lithium battery from being excessively discharged by auxiliary loads, enabling the auxiliary battery to remain above the level at which internal protection circuitry would activate. Falling below this threshold would prevent many chargers from recharging the battery.

Put simply, once the auxiliary battery has been overly discharged, the Load Disconnect Isolator will turn off any connected loads. Similarly, if the battery climbs back above a suitable level, the Load Disconnect Isolator will restore power to the connected loads.

RECOMMENDED FUSES & CABLING

Suitably sized Wire and fuses for the connected loads should be used. REDARC recommend using MIDI fuses along with a quality fuse holder to match. The diagram below shows the construction of a MIDI fuse installation (cables not included).



REDARC offer MIDI fuse kits containing the required fuses, fuse holders, crimps and nuts:

- 40A Fuse Kit (FK40)
- 60A Fuse Kit (FK60)
- 100A Fuse Kit (FK100)

INSTALLATION INSTRUCTIONS

1. Mount the SBI12-LLD securely in a convenient location near the auxiliary battery bank. Do not mount in direct engine heat.
2. Install in the order described below:
   - Make sure the auxiliary battery negative is properly grounded to the vehicle chassis.
   - Ground Connection. Connect the SBI12-LLD ground terminal to chassis ground. Remove any paint to ensure a good ground connection. Note: A good ground will ensure correct switching voltage.
   - Select correct Circuit Breaker/Fuse sizes and install at battery end of the positive cable
   - LED Connections (optional). Connect a wire from the Blue wire of the SBI12-LLD to the positive end of an indicator LED (15mA limited current draw) or LED/resistor combination.
   - Override Feature (optional). Connect a wire from the Blue wire of the SBI12-LLD to one terminal of a momentary push button switch. Connect the other terminal of the momentary push button switch to the auxiliary battery supply. To manually operate the Load Disconnect Isolator (force the loads to stay connected below the cutoff voltage), hold the momentary push button and the Isolator will manually operate until the switch is released. Care should be taken not to excessively discharge the Auxiliary battery.
   - Checking the Operation: The SBI12-LLD should now be operational. Once the auxiliary battery voltage rises to the 'ON' voltage the SBI12-LLD will activate, you will hear the solenoid click and see the LED illuminate. Discharge the auxiliary battery. The SBI12-LLD will disconnect load from the auxiliary battery once the voltage on the auxiliary battery drops to the 'OFF' Voltage; The solenoid will make an audible click and the LED will go out. Note:

⚠ CAUTION

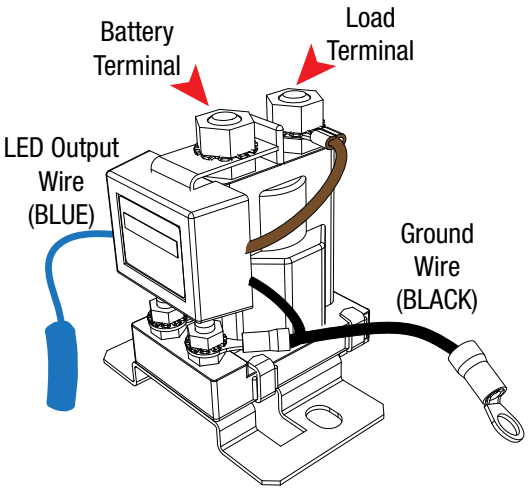
OVER DISCHARGE RISK. ENSURE THAT THE TURN OFF VOLTAGE IS SUITABLE FOR THE SPECIFICATIONS PROVIDED BY THE BATTERY MANUFACTURER.

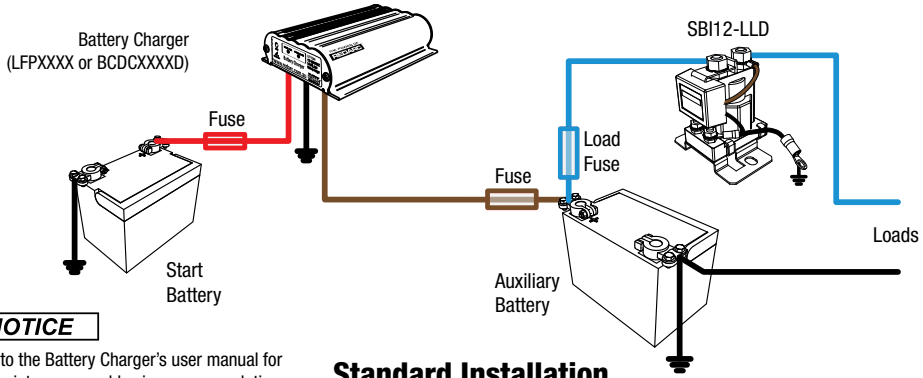
NOTICE

- As per above, it is normal for the LED to stay ON whenever the auxiliary battery is in a condition suitable for running loads.
- The amount of time it takes for the battery voltage to drop low enough for the solenoid to turn off will vary due to battery condition, age and state of charge. Refer to the table on page 2 for specific voltage thresholds.

STANDARD WIRING DIAGRAMS

- Ensure adequately sized cable is used.
- Ensure the auxiliary battery and loads are properly grounded to a common chassis earth point.
- Ensure the SBI12-LLD ground wire is making good contact with the chassis ground point.
- When using fuses make sure that the fuse makes a good low resistance connection.
- Fuse/Circuit Breaker ratings are dependent on the type of installation and the size of the loads.



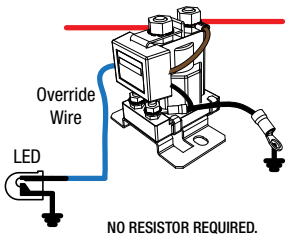


NOTICE

Refer to the Battery Charger's user manual for appropriate power cable size reccomendations

Standard Installation

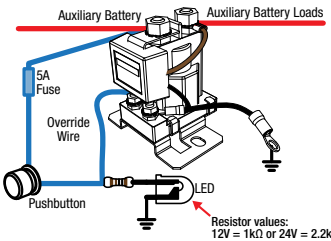
SBI with External LED



NO RESISTOR REQUIRED.

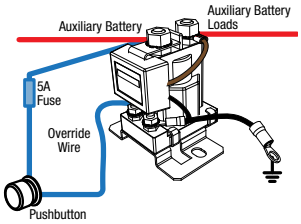
OPTION 1

SBI with Push Button for Override and LED



OPTION 2

SBI with Push Button for Override



OPTION 3

FAULT INDICATION

NOTE: The LED will be on when the SBI12-LLD is active (on).

Should a fault occur, the SBI12-LLD is set to notify the operator of the fault. The LED will flash repeatedly with the following sequences:

CODE 1	2 Flashes	Over-Voltage
CODE 2	3 Flashes	Voltage Drop or Excessive Current Draw Fault

FAULT CODE 1: 2 Flashes (Over-Voltage Detection)

If the battery connected to the SBI12-LLD should rise above 16.5 Volts the Smart Start® will:

- Disconnect, to prevent the source of over-voltage reaching the load
- Flash the LED 2 times for 20 seconds, then reassess the fault condition, continuing until the fault is cleared.

FAULT CODE 2: 3 Flashes (Voltage Drop / Excessive Current Draw)

If the SBI12-LLD detects a voltage drop across its contacts of greater than 1 Volt for more than ½ second then the unit will:

- Immediately protect itself and the load by disconnecting the load; and
- Flash the LED 3 times for 20 seconds, then reassess the presence of a fault, continuing until the fault is cleared.

FREQUENTLY ASKED QUESTIONS

Q Is the unit protected against voltage spikes?

A Yes, the SBI12-LLD incorporates a number of spike protection components specifically designed to reduce the risk of damaging the unit. The SBI12-LLD is also designed to prevent any spikes generated by the solenoid coil from affecting any vehicle equipment.

Q What does the red LED indicate?

A The red LED indicates the solenoid is activated and therefor the battery is supplying power to the load. A flashing red LED during operation indicates a fault. See Fault Indication on page 6.

Q Can the voltage limits and time delay settings be changed?

A Yes! Both upper and lower voltage limits & on and off times can be changed. However, this needs to be done at the time of manufacture and will incur a cost.

Q We are experiencing repetitive switching of our SBI12-LLD. What could be causing this?

A This can occur for one of two reasons. Firstly, switching an excessively large load which would drop the battery to below its lower voltage limit and causing the SBI12-LLD to turn off. After turning off the load, the battery would recover in voltage; If the battery voltage climbs higher than the turn on threshold, the SBI12-LLD would turn the loads back on.

A Secondly, voltage drop due to cable length (ie the SBI12-LLD being mounted too far from Auxiliary battery) can cause the voltage at the battery terminal on the SBI12-LLD to be lower than at the auxiliary battery, which can also cause the unit to switch off. Voltage seen by the SBI12-LLD will now rise again until the SBI12-LLD switches back on. This switching will continue until the cause of voltage drop is removed. On and Off Time delays are built into the product to avoid the solenoid contacts chattering in this scenario.

Q Does the internal LED illuminate when I use the external override switch?

A Yes.

Q Can I use the SBI12-LLD on a positive chassis vehicle?

A Yes. Please contact REDARC for further information.

WARRANTY

LIMITED WARRANTY

For full warranty terms and conditions, visit the Warranty page of the REDARC website.
Refer to the web address and contact details applicable to your region.

AUSTRALIA, NEW ZEALAND & EUROPE

www.redarc.com.au/**warranty**

REDARC Electronics Pty Ltd

23 Brodie Road (North),

Lonsdale SA 5160

Australia

NORTH AMERICA

www.redarcelectronics.com/**warranty**

REDARC Corporation

c/o Shallco, Inc.

308 Component Dr.

Smithfield, NC 27577

USA

Australia	+61 8 8322 4848	**USA**	+1 (704) 247-5150
New Zealand	+64-9-222-1024	**Canada**	+1 (604) 260-5512
UK & Europe	+44 (0)20 3930 8109	**Mexico**	+52 (558) 526-2898

IMPORTER CONTACT INFORMATION

UK
Ozparts UK Ltd
1 Prospect Place
Pride Park
DE24 8HG, Derby
UK

Europe
Ozparts Pl sp. z o. o.
ul. Slowackiego 32/5
87–100 Torun
Poland

Tech Support
1300 REDARC (1300-733-272)

Australia
+61 8 8322 4848

New Zealand
+64 9 222 1024

UK & Europe
+44 (0)20 3930 8109

USA
+1 (704) 247-5150

Canada
+1 (604) 260-5512

Mexico
+52 (558) 526-2898

redarcelectronics.com

THE POWER OF REDARC®

WARSBI12-LLD-4 EN