LFEV-ESCM Final Report and Maintenance Manual

Latest Revision: 18 March 2013

Abstract

LFEV-ESCM Final Report and Maintenance Manual
Contents

MAINTENANCE MANUAL .................................................................................................................................................. 2
BATTERY PACK ........................................................................................................................................................... 2
PART NAMES: ................................................................................................................................................................ 2
ASSEMBLY ..................................................................................................................................................................... 5
Maintenance Manual

Battery Pack

Part Names:

Pack Walls:

**Charging End Cap:** This is the end cap of the pack that interfaces what is contained within the pack to the outside world. In order to differentiate this end cap from the non-discharging end cap, this cap contains the charging connector. The charging end cap contains mounting holes for a discharging connector, a safety loop connector, an I2C connector, and two charging fuses.

**Non-Charging End Cap:** This is the end cap of the pack that interfaces what is contained within the pack to the outside world. In order to differentiate this end cap from the charging end cap, this cap does not contain the charging connector. The non-charging end cap contains mounting holes for a discharging connector, a safety loop connector, an I2C connector, and a ground fault cable connection hole.

**Discharging Fuse Inside Wall:** This is a plate of aluminum that will mount to the bottom of the pack and to the sides of the pack. Its purpose is to hold the cells in place and to provide a surface to mount the discharging fuse to.
**Charging Inside Wall:** This is a plate of aluminum that will mount to the bottom of the pack and to the sides of the pack. Its purpose is used to hold the cells in place and to provide a surface to mount the isolation relay to.

**Pack Floor:** This is the plate of aluminum that will provide mounting holes for the isolation relay and for the Charging Inside Wall and the Discharging Fuse Inside Wall.

**Connectors:**

**Standard Bar:** This bar is used to connect two cells together. It has a length of 3.1 inches, a width of .87 inches and a thickness of .5 inches. It contains four holes on each end for interfacing to the cell terminals. It also has two holes for banana jacks to connect to the BMS.

**Necked Bar:** This bar is exactly the same as the standard bar except that it has a region between the two banana jacks which defines it as distinct from the standard bar. This region is only .08 inches thick and is .75 inches wide. This bar is used for current sensing.
End Connectors:

**Terminal to Discharging Fuse:** This fuse connects on the end of that pack that has the discharging fuse holder. This connector has four holes that allow it to be connected to the terminal. On either side of these four holes there is a threaded hole. One of these threaded holes is for a ring terminal to connect to an analog voltmeter and the other is for a ring terminal to connect to the charging path. The semi-cylindrical part of this connector is used to connect into the discharging fuse holder.

**Terminal to Isolation Relay:** This connector is exactly the same as the Terminal to Discharging Fuse connector except that instead of having the semi-cylindrical part that connects to the discharging fuse it has a rectangular region with a hole that connects to the Isolation Relay.

Other Connectors:

**Isolation Relay to Male PowerLock:** This connector is used to connect the isolation relay on the side of the charging fuses to the male powerlock discharging connector. This part has two holes for the studs in the relay and in the powerlock connector.

**Discharging Fuse to Isolation Relay:** This part is used to connect to the part below, the Isolation Relay to Discharging Fuse connector. It has a semi-cylindrical part that connects into the discharging fuse holder and a rectangular part that has a hole at the end to connect to the Isolation Relay to Discharging Fuse connector via a screw.
**Isolation Relay to Discharging Fuse:** This part is used to connect to the part above, the Discharging Fuse to Isolation Relay. It has a large hole to connect to the isolation relay and a smaller hole at the end to connect to the part above via a screw.

**Isolation Relay to Female Powerlock:** This connector is used to connect the isolation relay on the side opposite the charging fuses to the female powerlock discharging connector. This part has two holes for the studs in the relay and in the powerlock connector.

**Assembly**

Please note that all of the above parts are required to build a complete pack as designed. Please follow the steps below for proper assembly. Order is of the utmost importance.

1. Attach the Terminal to Isolation Relay and Isolation Relay to Male PowerLock connectors to the an isolation relay. A nut is required on each end for a secure connection
2. Screw the isolation relay to the charging inside wall.
3. Screw the Terminal to Isolation Relay connector to one terminal of one of the cells.
4. Connect the other terminal of that cell to the terminal of another cell via the necked bar.
5. The second cell should be connected to the third cell by screwing in a standard bar between the two terminals.
6. Screw the discharging fuse block to the Discharging Fuse Inside Wall.
7. The last cell should be connected to the discharging fuse block by screwing the Terminal to Discharging Fuse connector through the four holes to the cell terminal and by screwing in the semi-cylindrical end to the fuse block.
8. Screw in the Discharging Fuse to Isolation Relay into the discharging fuse block.
9. Use a nut to connect the Isolation Relay to Discharging Fuse to the isolation relay that will be put on the discharging fuse end.
10. Slide the relay towards the discharging fuse holder until the two connectors meet. When they do, use a screw to hold the connection in place.
11. Screw the relay to the pack floor.
12. Screw the pack floor to both Charging Inside Wall and to the Discharging Fuse Inside Wall.
13. Screw the female discharging powerlock connector to the Non-Charging End cap, and screw the male discharging powerlock connector to the Charging End cap. Make sure that the bolts of the connectors are on the inside of the pack.
14. Snap the safety loop connectors in to the holes that match the size of the safety loop connectors. These connectors should be oriented lengthwise.
15. Snap the I2C connector into the end caps.
16. Snap the Anderson connector in the hole on the Charging End cap.
17. Snap the two charging fuses in the holes on the top of the Charging End cap.
18. Screw the Charging End cap to the Pack floor on the end without the discharging fuse. This will send the back end of the male powerlock connector in through the hole in the Isolation Relay to Male PowerLock. Use a nut to secure this connection.
19. On the discharging fuse block side, use a nut to secure the Isolation Relay to Female Powerlock to the relay. Please note that this connector should extend upward towards the BMS.
20. Screw the Non-Charging End cap in to the pack floor. In doing this the female discharging power lock connector will fit into the Isolation Relay to Female Powerlock connector. Use a nut to secure the connection.