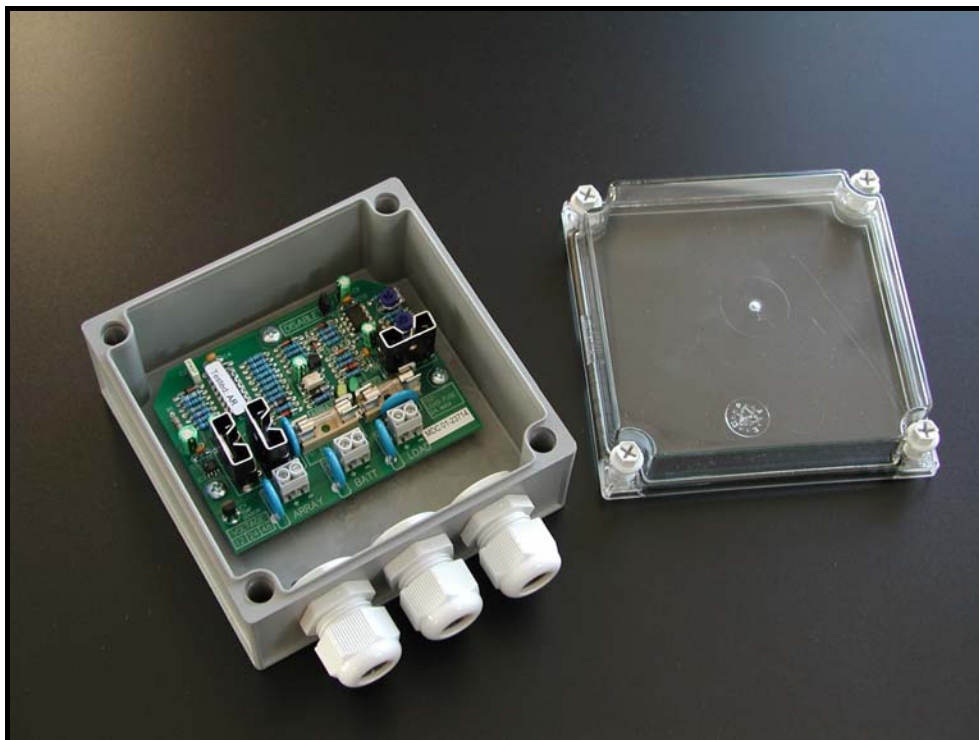


MCC-51 Charge Controller

Product Manual



1. Introduction

The MCC-51 range of solar system charge controllers have been designed for industrial applications where a low cost, robust and solid-state switching solution is required. The controller prevents damage to the battery due to excessive charge or discharge and also provides a convenient place to interconnect the solar array, battery bank and load equipment.

The MCC-51 Charge Controller has connections for one solar array, one battery and one load. The basic function of the regulator is to control the transfer of energy from the array to the battery and load. The state of charge of the battery is sensed by monitoring the battery voltage.

1.1. Standard Features of the MCC-51 Charge Controller

- 1.1.1. System Voltages: 12V, 24V, 48V (Factory set).
- 1.1.2. System Polarity: Positive or Negative Earth (PE or NE) (Factory set).
- 1.1.3. System Regulation: Single stage series regulation (i.e. connects the array to the battery for charging).
- 1.1.4. Single Array Input with a maximum 5A charging current (solid-state switching).
- 1.1.5. Single Load Output with a maximum 1A load current (solid-state switching).
- 1.1.6. Load Disconnect by solid-state switch.
- 1.1.7. Temperature compensation by a sensor mounted on the controller PCB.
- 1.1.8. Charging LED – yellow LED illuminates to indicate charging.
- 1.1.9. Load Connected LED – green LED illuminates to indicate the load is connected.
- 1.1.10. Disable link allows the user to disconnect the Load and the Array (insert link to disable).
- 1.1.11. 10A Battery and 2A Load fuses for over current protection.
- 1.1.12. Metal oxide varistors to give induced lightning protection.
- 1.1.13. IP65 Polycarbonate enclosure 125mm high x 125mm wide x 75mm deep with grey lid.
- 1.1.14. Optional transparent enclosure lid.
- 1.1.15. Three glands provided for Battery, Array and Load cables.
- 1.1.16. Battery, Array and Load connections by PCB terminals suitable for 2.5mm² wire.

2. Health & Safety

2.1. General

Read this manual thoroughly BEFORE undertaking any work.

Potentially lethal voltages can be present at the terminals within the Unit. Extreme care MUST be taken when performing any of the actions described in this manual. Remove all metallic personal adornments from the hands, wrists and neck before commencing work on a live unit. Ensure all tools are insulated.

2.2. Earthing

The MCC-51 Charge Controller can be used with either a Positive Earth or Negative Earth solar system.

3. Controller Operation

3.1. General

The Charge Controller uses analogue electronic circuit technology to achieve the necessary functions of a solar system charge controller.

3.2. Battery Connection

The battery connection is used to power the controller and to measure the battery voltage to sense the state of charge of the battery. A precision voltage reference is used to provide the necessary set-points used within the controller.

3.3. Temperature

The temperature is detected by a temperature sensor mounted on the controller PCB assembly and this is used to temperature compensate the battery voltage measurement.

3.4. Regulation

The compensated battery measurement is compared to a reference voltage to provide single point regulation. When the controller is charging the battery, the charging is interrupted briefly every 5-10 seconds to ensure there is sufficient voltage on the array to charge the battery. If there is sufficient voltage on the array and the battery voltage is below the regulation set-point, then the Charging LED will be illuminated and the Array will be connected to the Battery.

3.5. Load Disconnect

The controller will protect the battery by disconnecting the load when the battery voltage falls below the Load Disconnect set-point. When the load is connected, the Load Connected LED will be illuminated. The battery will be reconnected to the load when the battery voltage is above the Load Reconnect set-point.

3.6. Disable Link

The user can Disable the controller by inserting a link onto LK1. This will force the array and load switching devices to disconnect the array and the load from the battery.

3.7. Protection

The controller provides over current protection by means of fuses for the battery (10A fuse) and the load (2A fuse). Metal oxide varistors are provided to give protection against voltage surges induced by lightning. The controller is protected against reverse connection of the Battery, Array and Load.

4. Controller Set-points

The Charge Controller can be factory set for Fulmen, Vented or VRLA battery cells. The set-points for each battery type are shown in the tables below:

Fulmen Settings	Per cell	12V	24V	48V
Regulation Voltage	2.35 V	14.10 V	28.20 V	56.40 V
Load Disconnect	1.90 V	11.40 V	22.80 V	45.60 V
Load Reconnect	2.15 V	12.90 V	25.80 V	51.60 V
Temperature Compensation Null Temp	20°C	20°C	20°C	20°C
Temperature Compensation Rate (per cell)	-5.0mV/°C	-30mV/°C	-60mV/°C	-120mV/°C

Vented Settings	Per cell	12V	24V	48V
Regulation Voltage	2.40 V	14.40 V	28.80 V	57.60 V
Load Disconnect	1.80 V	10.80 V	21.60 V	43.20 V
Load Reconnect	2.00 V	12.00 V	24.00 V	48.00 V
Temperature Compensation Null Temp	25°C	25°C	25°C	25°C
Temperature Compensation Rate (per cell)	-5.5mV/°C	-33mV/°C	-66mV/°C	-132mV/°C

VRLA Settings	Per cell	12V	24V	48V
Regulation Voltage	2.30 V	13.80 V	27.60 V	55.20 V
Load Disconnect	1.80 V	10.80 V	21.60 V	43.20 V
Load Reconnect	2.00 V	12.00 V	24.00 V	48.00 V
Temperature Compensation Null Temp	25°C	25°C	25°C	25°C
Temperature Compensation Rate (per cell)	-3.3mV/°C	-20mV/°C	-40mV/°C	-80mV/°C

5. Installation

5.1. Mounting and Position

The MCC-51 Charge Controller should be installed using either the two mounting feet supplied or using the four fixing points which are hidden by the cover fixing screws (see Figure 1). Ensure that the fixing method employed is sturdy enough to support the weight of the Unit. Position the unit so that it is shaded from direct sunlight, sheltered from extreme weather conditions and oriented so that the cable glands are pointing downwards.

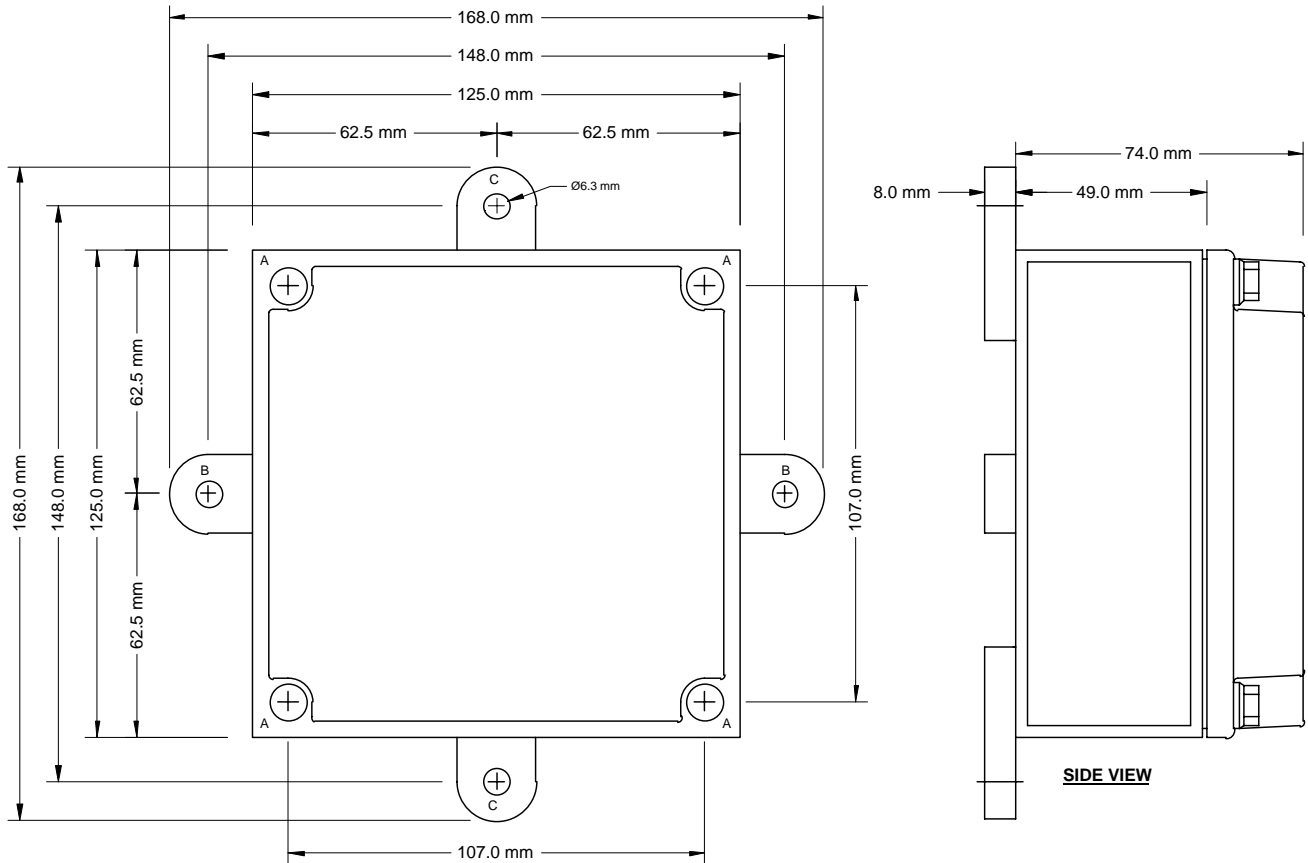


Figure 1

5.2. Electrical Connections

5.2.1. To disable the MCC-51 Charge Controller, ensure the Jumper Link is inserted on LK1(DISABLE) on the MCC-51 Control PCB Assembly.

5.2.2. Make the electrical connections in the following order:

Connect the PCB terminal BATT +VE to the Battery positive.

Connect the PCB terminal BATT -VE to the Battery negative.

Connect the PCB terminal ARRAY +VE to the Array 1 positive.

Connect the PCB terminal ARRAY -VE to the Array 1 negative.

Connect the PCB terminal LOAD +VE to the Load positive.

Connect the PCB terminal LOAD -VE to the Load negative.

5.2.3. To enable the MCC-51 Charge Controller, remove the Jumper Link from LK1 (DISABLE) on the MCC-51 Control PCB Assembly.