



# INSTRUCTION MANUAL FOR TORNATECH MODEL BCE BATTERY CHARGERS



## INTRODUCTION

Controller model GPD is supplied with two battery chargers.

Each battery charger is connected to each diesel engine battery.

Each battery charger is equipped with its own individual transformer and circuit breaker.

The battery chargers have RS485 communication ports to communicate with the main mother board.

Battery charger #1 is powered by transformer XTR1 and protected by circuit breaker CB1.

Battery charger #2 is powered by transformer XTR2 and protected by circuit breaker CB2.

The controller has a visual and audible indication for failure of any battery charger.

The fire pump controller is equipped with an audio and visual alarm in case either of the battery chargers fails.

A battery charger failure alarm can be initiated by either the battery charger itself or by the main mother board.

The model BCE battery charger is designed to annunciate a charger failure if any of the following conditions occur:

1. Under amperage
2. Low voltage during bulk charge mode
3. De-synchronization of the AC voltage

The fire pump controller will initiate a battery charger failure if the RS485 communication is lost between either of the chargers and the main mother board for more than 1 minute.

This alarm will be visually indicated on the controllers main display screen.



If the « Charger Communication Loss » alarm is visually indicated, this means that the either of the battery chargers have lost communication with the main mother board. This may have been caused by a bad connection, broken connection or a defective electronic component.

A « Charger Communication Loss » alarm means that the battery charger is not 100% effective. For example the voltage and amperage readings might not be precise. However, the fire pump controller itself is fully 100% functional.

Important Note: To silence to audible alarm the HAND-OFF-AUTOMATIC selector switch must be placed to the OFF position. Placing it to OFF inhibit automatic operation of the controller so user must place controller back to AUTO.

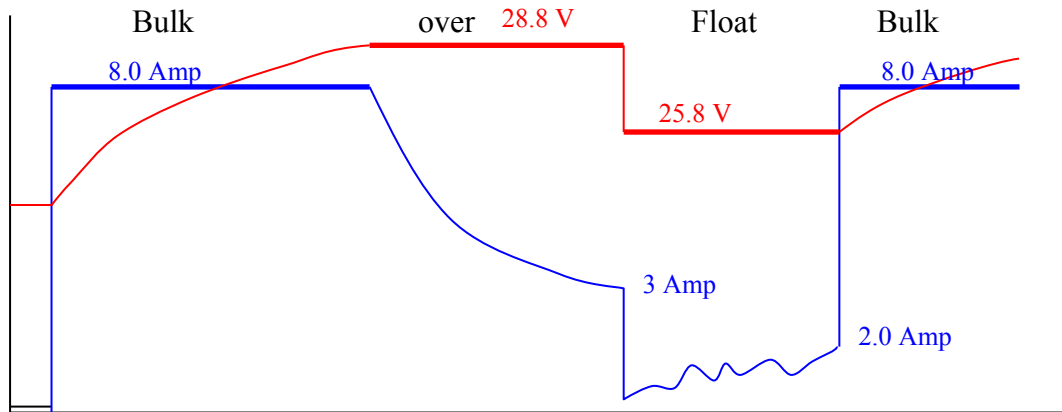
## **BASIC SEQUENCE OF OPERATION**

The battery charger requires several seconds after energization (Initialization Mode) before it starts outputting amperage.

Once the initialization mode is over, the battery chargers enter into BULK mode which will deliver 8.0A (factory regulated not field adjustable). During BULK mode, the battery voltage slowly and gradually increases. Once the batteries reach 28.8V, the battery chargers enter OVERCHARGE mode.

In OVERCHARGE mode, the battery voltage is regulated at 28.8V and amperage decreases slowly while still charging the batteries. When the amperage reaches 3.0A, the chargers enter into FLOAT mode

In FLOAT mode the voltage is regulated at 25.8V and the amperage will vary in reference to the quality and stability of the batteries themselves and the consumption of the fire pump controller. The amperage can vary between 0 and 2.0A (max.). If the charging amps surpass 2.0A, the battery charger with enter BULK charge mode and the sequence re-starts.



In the above graphic, the blue curve represents the amperage delivered to the battery in function of time. The red curve represents the voltage of the battery over time

Note: If the consumption of the battery is above 2.0A (loss of excessive charge), the charger will switch from OVERCHARGE mode to BULK mode which will/can cause the battery to boil.



## PARAMETERS

Parameter configuration is done at the factory as follows;

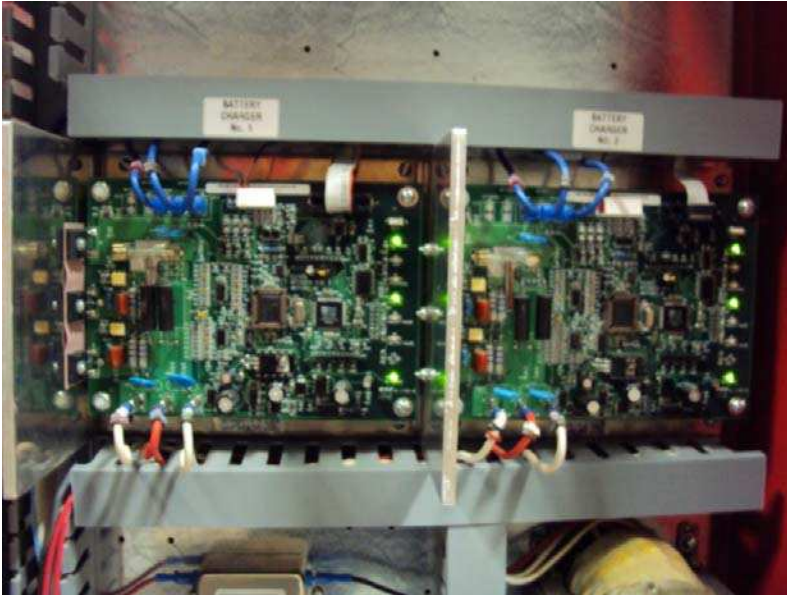
Configuration	
Default Configuration	24 V
Normal Battery Voltage	24.00 V
Dead Cell Threshold	12.00 V
Defective Cell Charging Time	24.00 H
Battery Overvoltage	32.00 V
Bulk Charge Current	8.00 A
Bulk Charge Stop Threshold	28.80 V
Over Charge Voltage	28.80 V
Over Charge Stop Current	3.00 A
Floating Voltage	25.80 V
Floating Maximum Current	2.00 A
Calibration Current Offset	
Calibration Current Slope	
Calibration Volt Ratio	
<input type="button" value="Get"/> <input type="button" value="Set"/>	

The above is for information only. The user cannot and must not make any changes

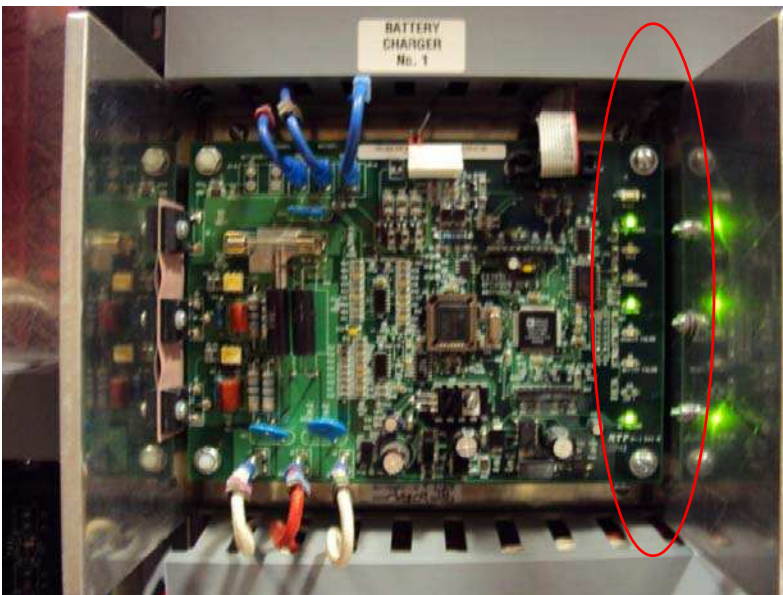


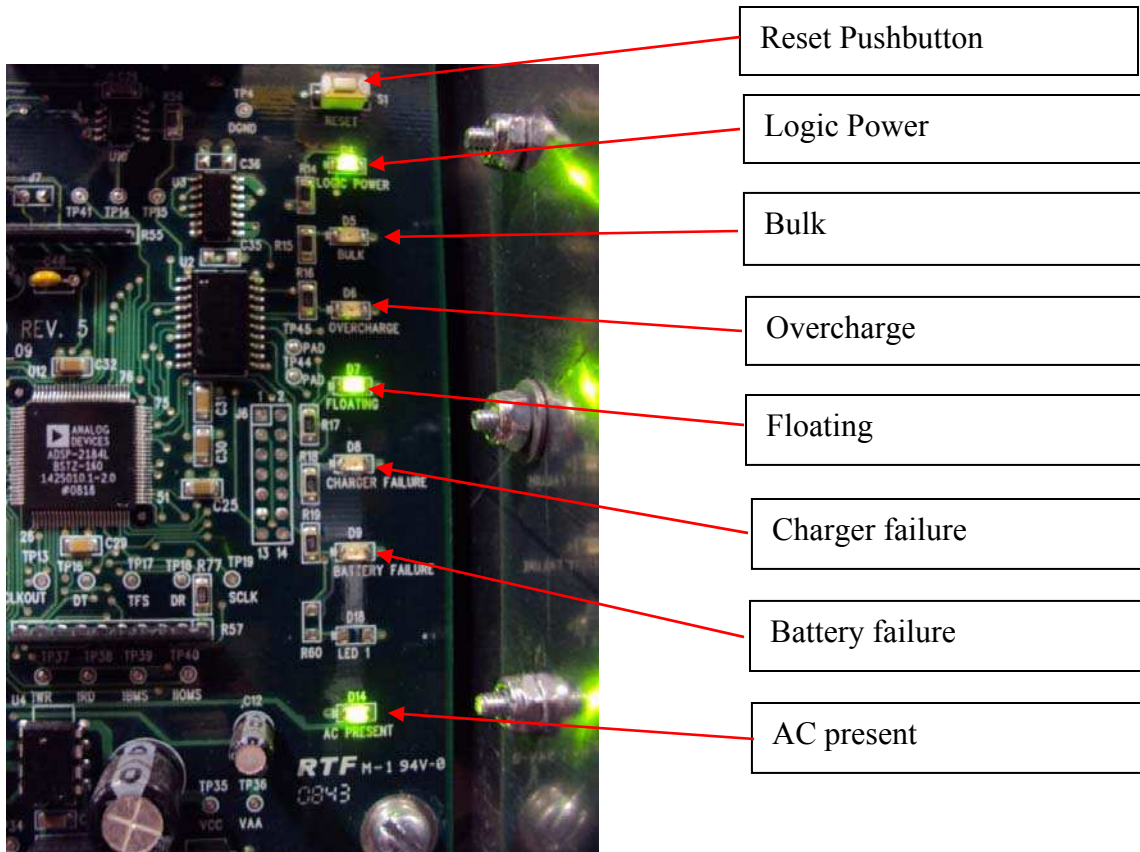
## VISUAL INDICATIONS (LED'S) ON THE BATTERY CHARGERS

Battery chargers installed in controller.



Visual indications (LED's) are arranged vertically along the right side of the charger.





Visual indicators (LED's) description :

- 'Logic Power' indicates that the battery charger circuit board is energized. This LED must be either solid or flashing.
- 'Bulk' indicates that the battery charger is in BULK mode. In this mode, the battery charger delivers the maximum amperage that it is capable of to the battery
  - Note: While the charger is in BULK mode, the temperature of the transformer is high. This is a normal occurrence.
- 'Overcharge' indicates that the battery charger is delivering a constant voltage and is regulating the amperage in order to increase the electrolyte gravity.
- 'Floating' indicates that the battery is charged and that the charger is delivering the minimum amperage to maintain the battery charged.



- « Charger Failure » indicates a failure of the battery charger. This failure is due to the failure of an internal component, if the charging amperage surpasses 15A, if the battery charger is de-synchronized with the AC power for more than 1 minute or if the charging amperage is less than 0.5A in BULK or OVERCHARGE mode (burnt fuse). It will be necessary to RESET the battery charger by using the RESET pushbutton
- « Battery Failure » indicates a battery failure. This alarm will appear if the voltage of the battery drops below 50% of its nominal voltage, if the battery has not reached the acceptable voltage limit within 24 hours of BULK charge or if the battery is disconnected or connected backwards. Replacement of the battery is probably necessary.
- « AC present » indicates that the battery charger is connected to the AC source (solid). If the AC source is lost, the LED will flash (not solid) and the back light of the main display screen will go dim.

**IMPORTANT: The fuse situated on the battery charger circuit board is of type SLO-BLO 3AG-32VDC-20A. It is imperative that this type/model fused is used for the proper and safe functioning of the battery charger.**