Customer Service - Tech Notes

TechNote #400002

Sept. 29/97

TRUEcharge Charging Algorithm

The TRUEcharge charging algorithm has 4 modes:

1) **Bulk**

When the TRUEcharge first enters a charge cycle the "bulk" mode provides a constant current of 20A (ex. TRUEcharge 20) to bring the battery back up to 80% capacity in the shortest period of time. The TRUEcharge moves from Bulk to Absorption mode when the charger output/battery voltage reaches Absorption/gassing Voltage (typically 14.4V dependent on battery type switch setting, and temperature). The bulk charge current is reduced slowly as the battery voltage reaches about 97% of the Absorption voltage, therefore your instrument panels ammeter may read a slightly lower charge current before the battery voltage actually reaches the Absorption/gassing voltage. The TRUEcharge will stop charging for up to 20 seconds in 15 minute intervals to recalibrate and test the battery condition.

2) **Absorption**

Absorption mode holds the battery voltage constant (typically 14.4V +/- 0.1V) while allowing the battery to absorb the remaining 20% of it's capacity. During Absorption the battery actually determines the charge current, the charge current reduces as the battery continues to move closer to the fully charged state. When the current reduces to only 3A (TRUEcharge 20), the TRUEcharge continues to charge for 1 additional hour, then considers the battery fully charged and moves to the float mode. If your TRUEcharge is set to Gel the charger will go into float mode immediately.

If you happen to have a DC load turned on (ex. 5A DC cabin light, or fridge) the charger will attempt to provide the necessary current for the light as well. Therefore

the charger current may not drop to 3A. The TRUEcharge will automatically go into float mode after 6 hours to ensure the batteries are not held at the higher gassing voltage of 14.4.

3) **Float**

Float mode is a maintenance charge where the TRUEcharge has fully charged the battery and now holds the battery voltage at 13.5V (dependent on switch settings) to help ensure the battery does not self discharge. This constant voltage state also helps reduce the rate of sulfation. During float the typical charge current will be 1-3A and is dependent on the battery capacity, and condition. If additional DC loads (ex. 5A DC cabin light, or fridge) are turned on the TRUEcharge will provide up to 20A (TRUEcharge 20) of current to maintain the float voltage (13.5V). If the total draw is more than 20A, the charger output current will remain at its maximum and the battery system voltage will fall until the battery supplies the excess current. If the battery voltage drops to 12.5V for at least 15 minutes the charger will go into the regular charge cycle. The TRUEcharge will recharge the battery once the loads are turned off.

If the boat is docked without significant DC current use, the TRUEcharge will restart a regular charge cycle after 3 weeks (provided the TRUEcharge is connected to AC power).

If AC power to the charger is interrupted for up to 60 seconds only the charger will resume its charging mode. If AC power to the TRUEcharge is interrupted for more than 60 seconds the charger will reset and go into the regular charge cycle when reconnected to AC.

4) **Equalization**

Equalization is a controlled overcharge intended to dissolve any recently accumulated sulfation on the battery plates, regaining more of the batteries original capacity. When the small recessed button is pressed the TRUEcharge first completes a regular charge cycle to establish a charge state reference point. The TRUEcharge then charges at 5A (TRUEcharge 20) raising the battery voltage to maximum 15.5V. The operator is then to test the battery cells specific gravity every hour, and take the charger out of equalize mode when the cells are no longer equalizing. If the operator does not take the charger out of Equalize the

TRUEcharge will exit Equalize and go into float mode after 6 hours.

TRUEcharge Algorithm Suitability

If your TRUEcharge battery charger is operating normally, but the battery specific gravity does not reach 1.250 :

a) Delco brand batteries require Float and Absorption voltages approximately 1 V higher than normal lead acid flooded type batteries. The TRUEcharge presently is not designed to automatically charge these batteries to full capacity without performing a manual "equalize charge".

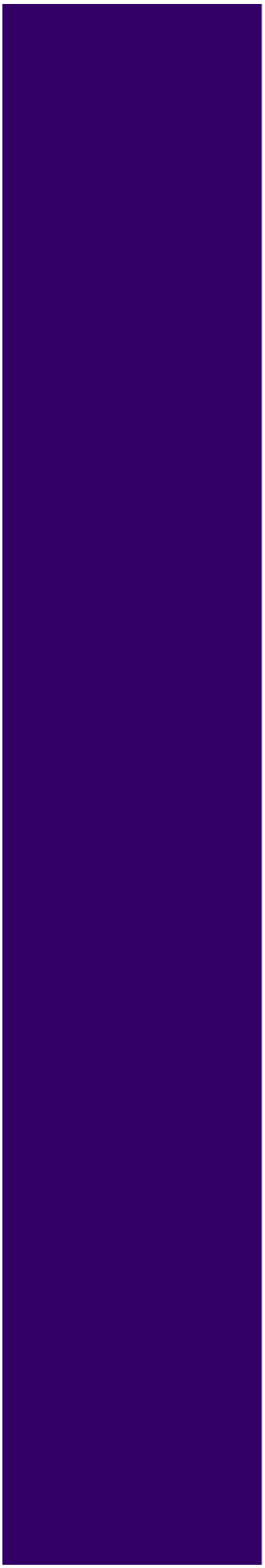
b) Trojan brand batteries will recharge to approximately 90 to 95% of full capacity. This results in approximately 5-10% reduction in battery capacity, but perhaps longer life. Battery "life expectancy" may be slightly compromised when every possible Ahr of a battery capacity is achieved through extensive charging.

c) Interstate batteries as with most others require an "initial" equalize charge (15.5V) at the time of sale to the end user, to recharge the battery after it has been sitting possibly discharged on the dealer's shelf at time of sale to customer. After proper initial charge, the TRUEcharge algorithm is ideal.

Over Discharged Batteries

The TRUEcharge 10/1 bank portable charger with it's anti-spark feature will not immediately begin a bulk charge if battery voltage is less than approximately 3V. Instead this TRUEcharge 10/1 bank model will pulse charge current into the battery until terminal voltage rises above this point. If the battery is recoverable it will begin normal charging within 8 hrs of being connected. If the battery does not begin charging within 8 hrs the battery is likely beyond recovery, and should be replaced.

The TRUEcharge 20/40 intended for permanent installation, will begin charging in bulk mode regardless of the battery terminal voltage.



If you have any questions please call Statpower Tech Support 9 am-5 pm PST (604) 420 1585, or fax in your questions (604) 420 1591.