

Technical Note**TrueCharge**

512-0014-01-01 Rev 1

TrueCharge Frequently Asked Questions**FAQ****1. Q: Why does the TRUECHARGE (TC) charger stop every 15 minutes?**

A: This behavior is normal. The TC will stop charging to check the battery voltage and to check for new or disconnected batteries. The TC stops for approximately 15 seconds and then resumes charging where it left off.

2. Q: How accurate are the specified absorption/float voltages from unit to unit?

A: Manufacturing tolerance allows +/- 0.15 V at no load. Expect up to 0.5 V at full output current.

3. Q: Is it possible to use two TCs (12 V) connected in series to charge two - 12 V batteries in a series (24 V system)?

A: Yes, two units having isolated outputs can operate in series to charge a 24 V system made up of two 12 V batteries.

4. Q: What is the maximum length I can extend the TC remote panel wire?

A: Using regular telephone cord wiring you may extend it up to 100 ft provided that the environment is not electrically noisy (EMI). A heavier gauge shielded 4 conductor phone style cable would improve the remote panel operation in noisy and/or long distance applications.

5. Q: How vulnerable is the TC software/microcomputer to environmental factors such as internal/external noise?

A: So far only a rare nearby lightning strike has been known to damage a TC. Occasional glitches from power sources should merely reset the TC automatically.

6. Q: Can you adjust the maximum output current, or various voltage settings?

A: The set points and maximums are predetermined, selectable only by changing the battery type/temp switch positions. All settings are stored in the microcomputer, which is not accessible to the end user.

7. Q: What happens during extreme temperature operation?

A: At high ambient temperatures (above 86F/ 30C) the TC scales back the output current. The TC de-rates to half of its maximum output current at 122F/50C. At low temperatures the TC will not begin charging until above -5F/-20C, although the warranted minimum operating temperature is 32F/0C. This is NOT true of all TCs. The TC10 clip lead and the TciCE97 models do NOT have temperature-scaled current limits. The TC10hw/tb and the TC20+/40+ do. For the models without temperature-scaled current limits, the unit will run at full output regardless of the ambient temperature, up to a temperature at which they shut down. It will restart once it cools off sufficiently.

8. Q: When the charger stops charging in the periodic (15-minute) test mode does the orange charging light stay on, or do all lights go off for the no-charge time?

A: The lights blink a pattern with two current lights on for one second, and then two current lights on for one more second. The Charging LED then re-lights and charging resumes as before.

9. Q: Will a TC20 remote panel work with a TC40, is the label the only difference?

A: The label current indicators markings are the only difference.

10. Q: What do the TC10hw LED's indicate?

A: Bulk mode light on indicates 8–10 A charge current. Absorption mode light on indicates 1–8 A charge current. Float/Ready mode light on indicates 0–1 A charge current.

11. Q: Can a battery charger be powered from an inverter so the system can generate 115 VAC, and charge the battery at the same time without shore or generator power being connected?

A: No, the inverter, wiring, and charger all waste power as the current is moved around the system loop resulting in quickly discharged batteries. Batteries must be charged from an external source of energy such as an engine alternator, shore-powered battery charger, fuel or wind powered generator operating a battery charger, or solar panels.

12. Q: How can I charge a third battery bank with my two-bank Truecharge?

A: Although you cannot run the charger output through a “battery isolator diode” as it will interfere with the charger’s sensing of the battery charge condition, you could use a “battery combiner” available at WestMarine. A battery combiner is a charge voltage controlled relay that connects two battery banks together when the applied voltage is higher than 13.1 V, i.e. when a charger is connected.

13. Q: Why should I mount my TC20 vertically versus horizontally?

A: The TC20 has no fan for cooling, but it does have ventilation holes. If mounted vertically, cool air will enter the bottom vents, be heated by the charger’s internal components, and naturally rise up to exit the top vents, thereby creating a natural air convection that actually improves airflow/cooling. This natural “hot air rising” convection will not occur to the same level if the TC is mounted horizontally as the air will not pass through the length of the unit. The improvement would, however, only be noticeable when operating the TC at higher currents and at elevated ambient temperatures—greater than 90F/30C, for example. In addition, BOTH the TC20+ and 40+ models are CSA Certified ONLY under the condition that they are mounted vertically.

14. Q: Equalization is only up to 5 hours according to the manual. Why did my battery take longer?

A: When you press the equalization button the TC first goes back into a standard charge cycle to ensure that you obtain a normally fully charged battery. Then it switches into the actual equalization charge raising the battery voltage to approximately 15.3 V with a 5 or 10 A limited charge current. The top-up normal charge can take a few hours depending on the battery condition/charge status. Also, note that equalizing batteries require user vigilance. The user should periodically (every hour or two) check the battery specific gravity, according to the battery manufacturer’s instructions, and terminate the equalization by pushing the button again.

15. Q: The “Charging Current” lights on the charger are dimly lit and seem to flicker. Is something wrong with my charger?

A: The charger is operating normally. The charger’s microcomputer sends a *narrow* pulsed signal to the display circuitry 15 times per second when the lights are in the “off” condition. Under low ambient light conditions (for example, in a darkened room down in your boat) the lights may appear dimly lit even though they are actually “OFF”. The charger’s microcomputer sends a *wide* pulsed signal to the display circuitry at 15 Hz when the lights are in the ON condition. These lights are brightly light and unmistakably “ON”. They

flicker when OFF is because the computer updates the light status 15 times per second and our human eyes need at least 30 Hz to appear as a “continuous” state.

16. Q: How do I start the equalization charge on my TC20/40?

A: The equalization button is a recessed button. Look for a small hole just below the charging light. Place a toothpick, hair pin, or plastic pointed pencil through the hole and gently press the button and hold down for five seconds until the “Ready” and “Charging” lights both light simultaneously. Equalization is a controlled overcharge. Check the battery manufacturer’s recommendations for how often you should equalize your battery. Push the same button to terminate the equalize cycle.

17. Q: How do I charge a battery that’s been sitting in the basement for a few months, when my TC10 won’t go out of bulk mode?

A: TC10 amp charger is recommended for batteries in the 25–200 Ah range. A relatively large battery (or bank), or one that is partially sulfated can exceed the 10 amp charger’s ability to bring the battery to full charge. The charger normally applies 10 amps in bulk mode until the battery’s terminal voltage approaches 14.4 V (until the “flooded” battery charges up). This point normally corresponds to an approximately 70–95% charged state depending on battery capacity and condition. Once 14.4 V is reached the charger goes into absorption in which the battery no longer requires the full 10 amps to maintain the 14.4 V. In other words, the charge current drops below 10 amps until it reaches only 1 amp or 6 hours elapse, then it goes into float mode.

If the battery bank is large (e.g. 200–800 Ah) it will usually reach full charge. However, it will take much longer (perhaps days in an extreme case) for the battery to reach a 90% charged state. At that point the charge current would drop below 10 amps and the charger would go into absorption phase to complete the charge to 100%.

If the battery is very large (e.g. over 800 Ah) the charger may never approach 14.2 V, nor drop below 10 amps, nor get the battery to the 90% state. This is because 10 amps is only enough to “float” the battery (rather than properly recharge it).

If the battery is partially sulfated (i.e., has been resting in a partially discharged state for more than a week) it may never approach 14.2 V, due to sulfation damage, in which case the battery may need to be replaced.

The drawbacks of too small a charger for a given battery are:

- The battery may not reach full charge

- It will take a very long time to reach full charge, and

- The battery is held at a higher voltage for longer than necessary, thus accelerating electrolyte loss.

Ensure that the battery capacity is within the design range of 25–200 Ah then leave the charger on for 24 hours while monitoring electrolyte and specific gravity levels. If the battery is recoverable the charger will eventually reach full charge and go into float mode.

18. Q: Does the TRUECHARGE drain the battery when there is no AC power available?

A: The TC20, 40 and TC10hw (two bank) use isolation diodes for the two banks, which results in drawing less than 1 micro amp drain from the battery. This is an insignificant drain on the battery—far less than the self-discharge rate of the battery.

The TC10 one-bank portable model (clip-lead) draws up to 12 milli amps when no AC is present. This is comparable to the self-discharge rate of the battery. If the charger/battery is disconnected from any other charge source or load, the charger will typically drain the battery by 2 Ah in one week. Therefore we recommend disconnecting the charger after a week if there is no AC power available for extended periods. Actually, given that it only has clips, we recommend disconnection as soon as the battery is charged. For permanent connection people should be using the TC10hw or TC10tb.

19. Q: Will the TRUECHARGE charge an “over-discharged” battery that has been discharged to less than 10 V?

A. The TC10/hw, TC10tb, TC20i, TC20+, TC40i, and TC40+ will all proceed into bulk mode and attempt to charge at their respective bulk rates (10, 20, 40 amps) regardless of the state of the battery.

The TC10 clip-lead, one bank, portable model will behave as above for battery voltages down to roughly 5 VDC. Below that, the charger will not go into bulk mode, but will instead continuously reset (the LEDs will cycle). This results in a small amount of pulsed current going into the battery. If left in this condition long enough, and if the battery accepts this pulsed charge to the point where the battery voltage rises above approximately 5 VDC, the charger will proceed into bulk mode at the full 10 ADC.

A battery with an extremely low voltage may be damaged, and may not accept the charge. In this case the charger will time-out of bulk charge after eight hours, and it is likely the battery will need replacement.

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