

CHARGER RUNS TOO LONG OR DOES NOT TURN OFF

In a fully charged battery, both the positive and negative plates have no remaining depleted material that will convert to active material; all the acid is in the electrolyte and the specific gravity is at maximum. As the battery discharges, acid is drawn from the electrolyte, reacting with battery plates as they become depleted, releasing water into the electrolyte. As this process continues, the battery voltage decreases, the electrolyte specific gravity decreases, and the battery plates become depleted.

When a battery is placed on charge, the reverse action takes place. As charging progresses, the on-charge voltage increases, the battery plates react, removing water from the electrolyte while releasing acid into the electrolyte as the plates return toward their active state. After all the acid is returned to the electrolyte, continued charging will not activate any additional battery plate material, increase the on-charge voltage or increase the specific gravity. Briefly, on discharge, the battery voltage decreases as the plates absorb acid and on charge, the battery voltage increases as the plates return the acid back to the electrolyte.

The charger is designed to cease charging when essentially no further electrochemical reactions are occurring inside the battery. The electronic timer senses the progress of the reactions and, when these charging reactions virtually cease, the electronic timer kit turns the charger off.

There are only two ways to test if the electrochemical charging reaction has actually ceased. These tests must be performed only while the charger is operating.

- (1) You can use an accurate hydrometer to determine cessation of the electrochemical charging reaction. If the measured specific gravity of several cells does not increase in three (3) consecutive readings taken one hour apart while the charger continues to charge, the charger is operating too long.
- (2) An accurate 5½digit, digital voltmeter can be used to determine cessation of the electrochemical charging reaction. Connect the leads at the battery posts of the battery being charged. Monitor and record the on-charge voltage at 30-minute intervals. If the on-charge battery voltage either begins to decrease between 30-minute intervals or increases by less than 0.012 DC volts in two consecutive 30-minute intervals, then the charger is operating too long.

If the test results indicate the charger to be operating past the cessation of the electrochemical charging reaction, use only the following procedure when personally turning the charger off. The procedure is required to safely turn the charger off and provides the only reliable method to test for the failure of the electronic timer's control relay to open.

⚠DANGER: DO NOT UNPLUG THE DC CHARGING CONNECTOR WHILE THE CHARGER IS OPERATING. Turn the charger off by first disconnecting the AC plug from its outlet. With the AC plug disconnected, then disconnect the DC charging plug from the DC charging receptacle. As an additional test, with the DC charging plug still disconnected, connect the AC power supply cord to the outlet and listen for the sound of the transformer hum. If the transformer is heard to hum, the electronic timer kit control relay has failed to open and must be replaced.