



# Installation and Troubleshooting Guide



NOTE: This installation is to be completed by an Authorized Dealer or Professional Service Technicia. **Do not return to the Dealer or Distributor where the part was purchased. Contact CDI Electronics Directly for Return Materiel Authorization.**

## CDI P/N's: 193-4093 Voltage Regulator

This unit replaces P/N's: 18-5828, 439561, 584093, 585219 and 878768.

### WARNINGS:

**This product is designed for installation by a professional marine technician. CDI cannot be held liable for injury or damage resulting from improper installation, abuse, neglect or misuse of this product.**

**DO NOT USE A MAINTAINENCE FREE, AGM OR DRY CELL BATTERY WITH THIS TYPE REGULATOR/RECTIFIER AS THIS TYPE BATTERY MAY DAMAGE THE REGULATOR/RECTIFIER AND VOID THE WARRANTY!!!**

**NEVER DISCONNECT THE BATTERY WHILE THE ENGINE IS RUNNING AS THIS MAY BURN OUT THE REGULATOR/RECTIFIER. *If the boat is equipped with a battery switch, make sure that it is a make before break type.***

1. Disconnect the negative battery cable and all wires from the regulator.
2. Remove the old rectifier/regulator and thoroughly clean all ground connections and regulator mounting area.
3. Scrape the area around two of the mounting bolt holes so clean metal is showing to ensure the rectifier/regulator case is grounded.
4. If two of the mounting bolts do not have stainless steel star washers, install them on the bolts used in the mounting holes with bare metal showing.
5. Install the new regulator using the new gasket.
6. Connect the new rectifier/regulator to the stator (ignore any stripes on the stator as the new rectifier/regulator does not require the Yellow wires to be connected to a particular stator wire).
7. Reconnect the negative battery cable.

### TESTING REGULATOR/RECTIFIERS ON THE ENGINE

Recommended tools:

CDI multimeter (or equal) with DVA adapter (CDI 511-9773)      Piercing probes (CDI 511-9770)  
Ammeter Adapter (CDI 511-9772)      Battery Load bank

1. Check the voltage on the Purple wire while the engine is running, you should see the same voltage as the battery.
2. With all wires connected and the engine running at approximately 1500 RPM, check the DVA voltage from each Yellow wire to engine ground. The two readings should be within 2 volts of each other (i.e. if one is reading 20 volts, the other should read between 18 and 22 volts). If the readings are not equal, go to step 5. If they are equal, go to step 4.
3. Check the DVA voltage from the Yellow wires to the Red wire going to the solenoid. The two readings must be within 2 volts of each other. If the readings are unequal, go to step 4. If they are equal on this step and step 2, the rectifier (or rectifier/regulator) and battery charging portion of the stator are OK.
4. If the readings are unequal, mark across the connection between the stator and rectifier on the low side. Turn the engine off and swap the stator leads. Crank the engine up and retest. The component that has the marked wire with the low reading is bad.
5. At 800-1000 RPM, check output on the Grey wire, reading should be at least 8 volts with a DVA meter. A low reading usually indicates a bad regulator/rectifier or Tachometer if the system is charging the battery.
6. Try another Tachometer connected at the engine. If the test Tachometer works at the engine, connect it at the dash. If it works at both locations, replace the Tachometer in the dash. If the test Tachometer does not work at the engine, replace the regulator/rectifier.

### CHECKING MAXIMUM OUTPUT TO THE BATTERY

1. Install an ammeter capable of reading the maximum output in line on the Red wire connected to the starter solenoid.
2. Connect a load bank to the battery.
3. In the water or on a Dynamometer, start the engine and bring the RPM up to approximately 3500.
4. Turn on the load bank switches to increase the battery load to match the rated output of the stator (35 amps).
5. Check the ammeter.
6. If the amperage is low,
  - A) Check the Purple wire for voltage while the engine is running. You should see the same voltage as the battery.
  - B) Connect a jumper wire from the Positive battery cable to the Purple wire and recheck the ammeter. If the amperage is now correct, there is a problem in the harness or keyswitch.
7. If the amperage is correct, but the battery voltage remains low, replace the battery.

#### Bench test

- A) Diode plate check:** Test the forward diodes between the two Yellow wires and the Red wire just like you would on a regular rectifier. You should get a reading one way but not the other. Check the resistance from each of the Yellow wires to case ground, you should have a high reading, typically in the M range. The Red wire should not read to ground or show a very high reading, 25M ohms or more.
- B) Tachometer Circuit:** Check the ohms resistance between the Grey wire and engine ground. You should read approximately 10K (10,000) ohms. Grey to Red, and Grey to the Yellow wires should be a high reading, usually in the M range.