



# Installation and Troubleshooting Guide



This installation is to be completed by an Authorized Dealer or Professional Service Technician. For questions regarding installation or warranty, call CDI Tech Support at 866-423-4832. Do not return to the Dealer or Distributor where the part was purchased. Contact CDI Electronics Directly for Return Material Authorization.

## CDI P/N: 154-6770 Rectifier

This unit replaces P/N: 18-5707, 332-2910, 62351, 78614, and 816770.

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

**DO NOT USE A MAINTENANCE FREE, AGM, OR DRY CELL BATTERIES AS THE USE OF THESE TYPE BATTERIES WILL VOID THE WARRANTY AND DAMAGE THE RECTIFIER AND/OR THE STATOR!**

**NEVER DISCONNECT THE BATTERY WHILE THE ENGINE IS RUNNING AS THIS MAY DAMAGE THE RECTIFIER.**

**If the boat is equipped with a battery switch, make sure that it is a make before break type.**

## INSTALLATION

1. Disconnect the Negative battery cable.
2. Disconnect and remove the old Rectifier.
3. Visually check the Stator for burned battery charge windings. Dark Brown or Black charge windings indicate the Stator has been overheated and needs replacement.
4. Install the replacement Rectifier using the original bolts.
5. Connect the Gray tachometer wire to either one of the Yellow Stator wires.
6. Reconnect the Negative battery cable.

## TROUBLESHOOTING

### BATTERY CHARGING ISSUES:

1. Regardless if the charging issue is overcharging or not charging at all, the #1 cause of all charging issues is the battery often due to improper style and/or charging neglect. #2 is the battery's connections. #3 is the Rectifier. #4 is the Stator.
2. The recommended type of battery for outboards is a single (NOT more than one) 850+ CCA dual purpose or cranking/starting **non-maintenance-free battery**.
3. Non-maintenance-free batteries (lead-acid flooded cell; has vent caps on its top) have heavy, thick plates. They're ideal for outboards, where batteries are commonly drained by accessories while fishing, etc. when there is no charge applied to a battery while the battery is in use. Its heavy plates can withstand constant discharging and charging. These batteries have much more reserve time and are much more suited for this behavior.

**NOTE: Some Maintenance free batteries will have vented caps on top. When in doubt, change the battery to a non-maintenance free type.**

4. Maintenance-free batteries should **NEVER** be used in an Outboard application. A new, fully charged maintenance-free battery may work fine at first but their life span is dramatically shortened due to the constant charging and discharging. This activity will cause the cells to become weak, and/or the cells will become dead. When this happens, the battery is unable to accept a full charge, thus putting the Rectifier at extreme risk of failure. Therefore, maintenance-free style batteries commonly cause charging issues shortly after installation.
5. Check all battery connections, particularly at engine ground. Make sure that all connections are tight and free of corrosion. Do **NOT** use wing nuts as they tend to loosen over a period of time from vibration. A loose connection **WILL** cause a premature battery and/or Rectifier failure(s).
6. If there is no change, try a single (**NOT** more than one) known good fully charged battery that is 850+ CAA Dual Purpose, or a cranking/starting battery that is non-maintenance free. Make sure the battery is a lead acid flooded cell battery (has vent caps on its top).
7. Measure the DVA across the Stator's Yellow battery charge wires, while connected to the Rectifier. At idle the DVA will normally be between 8-25 DVA. If not, disconnect the Yellow wires from the Rectifier and retest. DVA will normally be 17-50 DVA at idle. If the voltage is low, the Stator is possibly faulty. Perform a visual of the Stator for browning and varnish dripping. These are signs that the Stator has overheated. If the visual inspection shows any of these signs, replace the Stator.

### BATTERY NOT CHARGING:

1. Clean and service the battery cable connections (both on the engine and on the battery). Stainless hex nuts and lock washers are recommended to connect the cables to the battery.
2. Charge and load test the battery.
3. Remove the flywheel and inspect the heavy battery charge windings for discoloration. If the windings are a dark color, replace the Stator. Typical resistance readings of the Stator's battery charging circuit should measure less than 2  $\Omega$ .

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## TACHOMETER TEST

1. Measure the DVA across the Stator's Yellow battery charge wires, while connected to the Rectifier. At idle the DVA will normally be between 8-25 DVA. If not, disconnect the Yellow wires from the Rectifier and retest. DVA will normally be 17-50 DVA at idle. If the voltage is low, the Stator is possibly faulty.
2. At 800-1000 RPM, check the DVA on the Yellow wire where the Gray wire is attached in reference to ground, reading at least 8 DVA minimum. If you get a low reading, move the Gray wire to the other Yellow wire. If the tachometer now reads, the Stator or Rectifier is potentially shorted to ground on the first Yellow wire (or stud post on the Rectifier) that you checked. Check continuity on the Stator's Yellow wires in reference to engine ground with the Yellow wires disconnected from the Rectifier. If there is continuity, replace the Stator. If no continuity, replace the Rectifier.
3. If still no tachometer signal, check to ensure continuity of the Gray wire in the boat side harness to the tachometer.
4. If still no tachometer signal, try a known good tachometer.

## MAXIMUM OUTPUT TEST

1. Install an ammeter capable of reading at least 15 amperes 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.
4. Turn on the load bank switches to increase the battery load to equal 20 Amps and bring the RPM up to approximately 4500 in gear.
5. Check the ammeter. You should show approximately the rated amperage of the Stator.
6. If the amperage is low, check the load bank connections and meter for battery draw. If the output is still low, check and clean all connections between the battery and the Rectifier.
7. If the amperage is correct, but the battery voltage remains low, replace the battery.

## OVERCHARGING BATTERY:

1. Using a multi-meter, check the voltage on the battery and compare it to the voltage on the Red wire connected to the starter solenoid to engine ground.
2. If the voltage is high on the engine compared to the voltage on the battery, do a voltage drop test and try to isolate the area where the problem is.
3. If the voltage is the same on the battery and the engine, but is over 15.5 VDC at 4500 RPM, replace the battery with a known good flooded wet lead acid marine cranking battery.

## BENCH TEST:

1. Disconnect all wires from the Rectifier. Using an multi meter, check the resistance of the forward diodes between the two Yellow wire stud posts and the positive stud post on the Rectifier. You should get a low reading in one direction and a high reading on the other. Check the resistance from each of the Yellow wire stud posts to case ground of the Rectifier. You should get a low reading in one direction and a high reading on the other.

<u>Black Lead</u>	<u>Red Lead</u>	<u>Reading</u>
Positive stud post	Yellow stud post	High
Yellow stud post	Positive stud post	Low
Yellow stud post	Case Ground	High
Case ground	Yellow stud post	Low