



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: 194-5279

This kit will replace all of the 815279, 817411, 830179, 854515, 856747, 856748, and 883072 series Regulator/Rectifiers, the 194-3072K1, 12082A1 Regulator, 62351A1 Rectifier, and 17602A1 tachometer terminal combination.

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 REGULATOR/RECTIFIER AND/OR THE STATOR!

NEVER DISCONNECT THE BATTERY WHILE THE ENGINE IS RUNNING AS THIS MAY DAMAGE THE VOLTAGE REGULATOR.

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

DO NOT REMOVE THE “Y” JUMPER FROM THE RED WIRES UNLESS THE OLD VOLTAGE REGULATOR HAS 2 RED WIRES CONNECTED TO IT AS BOTH RED WIRES MUST BE CONNECTED TO 12 VDC IN ORDER FOR THE VOLTAGE REGULATOR TO WORK.

INSTALLATION

1. Disconnect the battery negative post.
2. Disconnect and remove the old Voltage Regulator.
3. Visually check the Stator for burned battery charge windings. Dark brown or Black charge windings indicate the Stator has been over-heated and needs replacement.
4. If the unit being replaced has long Red and Yellow wires; Cut the wires off close to the **case of the old Voltage Regulator**, and crimp and solder the new terminals on to the wires. Use the wires on the new Voltage Regulator as a guide for terminal selection. Remember, Both Red wires must be connected to battery Positive 12 VDC for the Voltage Regulator to work.
5. Use a quality heat sink compound on the back of the Voltage Regulator when you install the new Voltage Regulator.
6. Use a good quality dielectric grease on the bullet connectors to seal out moisture.
7. Connect all wires to the new Voltage Regulator, matching wire colors. A Gray or Black stripe on the stator’s Yellow wires can be connected to either Yellow wire of the Voltage Regulator.

NOTE: Do not remove the jumper on the Red wires unless the old Voltage Regulator had Two Red wires connected to it as both Red wires on the new Voltage Regulator must be connected to 12 VDC for the new Voltage Regulator to work.

8. The normal wire connections are shown below:

9 AND 16 AMP STATOR WITH 2 YELLOW WIRES

<u>Voltage Regulator</u>	<u>Connect to</u>
Yellow (2)	Stator Yellow (Stripes on these wires can be ignored)
Gray	Tachometer
Red (With Y jumper installed)	Red wire from the harness to the Positive post of starter solenoid
Case	Connects through the mounting bolts to engine ground

40 AMP STATOR WITH 4 YELLOW WIRES

<u>Voltage Regulator #1</u>	<u>Connect to</u>
Yellow (2)	Stator Short Yellow wires (Stripes on these wires can be ignored)
Gray	Tachometer
Red (Small)	Red wire from the harness to the Positive post of starter solenoid
Red (Large)	Red wire from the harness to the Positive post of starter solenoid
Case	Connects through the mounting bolts to engine ground

<u>Voltage Regulator #2</u>	<u>Connect to</u>
Yellow (2)	Stator Long Yellow wires (Stripes on these wires can be ignored)
Gray	No Connection
Red (Small)	Red wire from the harness to the Positive post of starter solenoid
Red (Large)	Red wire from the harness to the Positive post of starter solenoid
Case	Connects through the mounting bolts to engine ground

NOTE: These Voltage Regulators may cause a small spark when you reconnect the battery and will draw a very small amount of current from the battery (Less than 0.001 amp).

CDI Electronics, LLC • 353 James Record Road SW • Huntsville, AL 35824 USA

Web Support: www.cdielelectronics.com • Tech Support: 1-866-423-4832 • Order Parts: 1-800-467-3371

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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 Voltage Regulator. #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 Voltage Regulator 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 Regulator 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 Voltage Regulator. At idle the DVA will normally be between 8-25 DVA. If not, disconnect the Yellow wires from the Voltage Regulator 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. Check the 25-30 Amp fuse between the Voltage Regulator and the battery (if present). Replace and retest if blown.
4. Verify that **Both** Red wires are connected to 12 VDC from the battery. Both wires must be connected to 12 VDC from the battery for the Voltage Regulator to work.
5. 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 Ω .

TACHOMETER TESTS

1. Measure the DVA across the Stator's Yellow battery charge wires, while connected to the Voltage Regulator. At idle the DVA will normally be between 8-25 DVA. If not, disconnect the Yellow wires from the Voltage Regulator and retest. DVA will normally be 17-50 DVA at idle. If the voltage is now within specification, the Voltage Regulator is likely defective.
2. Check the resistance between the Gray wire from the Voltage Regulator and engine ground. You should read about 10K Ω . Gray to Red, and Gray to the Yellow wires should be a high reading, usually in the M Ω range.
3. Disconnect the Voltage Regulator's Gray wire. At 800-1,000 RPM, check the DVA on the Gray wire FROM THE VOLTAGE REGULATOR measured to engine ground. The reading should be 8 DVA or more. If not, replace the Voltage Regulator.
4. If at least 8 DVA, run a jumper wire from the Gray wire out of the harness to one of the Stator's Yellow wires.
5. If still no tachometer signal, try a known good tachometer.
6. If still no tachometer signal, replace the Stator.



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MAXIMUM OUTPUT TEST:

1. Install an ammeter capable of reading at least 30 Amps between the Red wire (Y jumper) and the starter solenoid battery post.
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 4500 RPM in gear.
4. Turn on the load bank switches to increase the battery load to equal 30 Amps.
5. Check the ammeter.
6. If the amperage is low,
 - A) Check the load bank for battery amperage draw.
 - B) Reconnect the ammeter between the Red wire (Y jumper) going to the terminal strip. Retest. You should show about 15 - 20 Amps from the Voltage Regulator.
 - C) If the output is still low, check and clean all connections between the battery and the Voltage Regulator plate.
7. If the amperage is correct, but the battery voltage remains low, replace the battery.

OVERCHARGING:

1. Clean all battery terminals, cables, and mounting bosses.
2. Check the voltage on the battery with a digital voltmeter and compare it to the dash meter.
3. Compare the voltage at the Voltage Regulator with the voltage at the battery. If the voltage is ok at the Voltage Regulator and not good at the battery, you have a bad connection somewhere. Clean the battery posts and terminals.
4. Replace the battery with a known good marine battery and retest. If the battery voltage remains ok, install a new battery.

BENCH TEST:

1. Test the Voltage Regulator as follows:

Red Meter Lead	Black Meter Lead	Ohms
Yellow Stator Leads (each)	Red Regulator Y Jumper	30-50K Ω (a)
Yellow Stator Leads (each)	Case	Open, M Ω , or OL(Out of Limit)
Red Regulator (w/Barrel Terminal)	Red Regulator Y Jumper	Open, M Ω , or OL(Out of Limit)
Case	Yellow Stator Lead (each)	Open, M Ω , or OL(Out of Limit)
Case	Red Regulator Y Jumper	Open, M Ω , or OL(Out of Limit)
Case	Gray Terminal	10K Ω

(a) If one of the Yellow wires shows a low reading of about 10K Ω , leave the meter connected for a minute. It should change to the 30-50K Ω range.