



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: 194-9502

This unit will replace the following P/N's: 86255A 3, 77305A 2, 86255A2, 99502A 7, 99502A 8, 99502A 9, 99502A12, and 99502A12.

Warning! This product is designed to be installed 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 CAUSE DAMAGE TO THE VOLTAGE REGULATOR, ENGINE, 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.

INSTALLATION

There are several variations of wiring for these engines. If you are unsure of the wiring for your engine, please refer to the OEM service manual for your engine application.

1. Disconnect the Negative battery cable.
2. Disconnect all of the wires from the Voltage Regulator.
3. Remove the old Voltage Regulator.
4. Thoroughly clean all ground connections and Voltage Regulator mounting area.
5. Install the new Voltage Regulator.
6. Connect all of the wiring (except the Negative battery cable) as follows:

Regulator	Harness
Yellow (Stator)	Yellow (Stator)
Yellow (Stator)	Yellow/Gray (Stator)
Red (12 V constant Positive)	Battery terminal of starter solenoid
Purple (12 V key on Positive)	Connect to key on 12 V (Usually located at the choke solenoid)
Black wire (Voltage Regulator Gnd)	Engine Gnd
No Connection	Red, Red/White, and Orange (Tape off or remove)

7. Reconnect the Negative battery cable.

TROUBLESHOOTING

BATTERY CHARGING ISSUES:

1. Regardless of whether 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 this type of application, 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 this type of 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).

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7. Measure the DVA across the Stator's Yellow battery charge wires, while connected to the Voltage Regulator. At idle the DVA will normally 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 the Red wire is connected to 12 VDC from the battery.
5. Remove the flywheel and inspect the heavy battery charge windings of the Stator 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.

MAXIMUM OUTPUT TEST:

1. Check the Purple wire for voltage while the engine is running. You should see the same voltage as the battery.
2. Install an ammeter capable of reading at least 40 Amps between the Red wire and the starter solenoid battery post.
3. Connect a load bank to the battery.
4. In the water or on a Dynamometer, start the engine and bring the RPM up to approximately 4500 RPM in gear.
5. Turn on the load bank switches to increase the battery load to equal 30 Amps.
6. Check the ammeter.
7. If the amperage is low,
 - a) Check the load bank for battery amperage draw.
 - b) Reconnect the ammeter between the Red wire connected to the starter solenoid. Retest. You should show about 30-40 Amps from the Voltage Regulator.
 - c) If the output is still low, check and clean all connections between the battery and the Voltage Regulator.
8. 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 Maintenance type flooded wet lead acid marine battery. If the battery voltage remains ok, install a new Maintenance type flooded wet lead acid battery.

BENCH TEST

1. Test the Voltage Regulator as follows:

Red Meter Lead	Black Meter Lead	Ohms
Yellow Stator Leads (each)	Red	Reading*
Red	Yellow Stator Leads (each)	Open*
Yellow Stator Leads (each)	Case	M Ω
Red	Case	Open, M Ω, or OL(Out of Limit)
Purple	Case	Open, M Ω, or OL(Out of Limit)

*** This Measurement is with the meter set to the diode scale. Where you see the term "Reading" represents a reading on the meter. Where you see the term "Open" represents no value showing on the meter.**