



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: 173-1225

This unit replaces P/N's: 581046, 581225, and 763772.

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.

INSTALLATION

1. Disconnect the Negative battery cable.
2. Remove the flywheel according to the service manual for your engine.
3. Disconnect the original Stator wires.
4. Remove the original Stator and save the original bolts.
5. Install the new Stator using the original bolts with a good thread-locker applied to the bolts and tightened to the factory torque specifications.
6. Connect the new Stator to the Power Pack.
7. Connect the new Stator to the Rectifier. Ignore any stripes on the Rectifier as the new Stator does not require the Yellow wires to be connected to a particular Rectifier wire.
8. Replace the flywheel according to the service manual for your engine.
9. Clean all battery cable connections both on the battery and the engine.
10. Reconnect the Negative battery cable.

TROUBLESHOOTING

NO SPARK ON ANY CYLINDER:

1. Check the cranking RPM. A cranking speed of less than 250 RPM may not allow the system to spark properly. This can be caused by a weak battery, dragging starter, bad battery cables, or a mechanical problem inside the engine.
2. Perform a visual inspection of all ground wire connections to make sure that they are clean and tight.
3. Disconnect the Black/Yellow stop wire from the Power Pack and retest. If the engine's ignition now has spark, the stop circuit has a fault. Check the key switch, harness, and shift switch (if present).
4. Disconnect the Yellow wires from the Rectifier and retest. If the engine now sparks, replace the Rectifier.
5. Check the Stator and Timer Base resistance and DVA as given below:

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Stator)	Brown/Yellow (Stator)	835-985 Ω (1973)	640-785 Ω	150-400 V	150-400 V
Brown (Stator)	Brown/Yellow (Stator)	555-705 Ω (1974-77)	640-785 Ω	150-400 V	150-400 V
White/Black (#1 Sensor)	Black/White (#3 sensor)	10-20 Ω	35-55 Ω	0.6 V minimum	0.6 V minimum
Black/White (#2 Sensor)	White/Black (#4 Sensor)	10-20 Ω	35-55 Ω	0.6 V minimum	0.6 V minimum
Brown (Stator)	Engine Gnd	Open	Open	150-400 V	-
Brown/Yellow (Stator)	Engine Gnd	Open	Open	150-400 V	-
Black/White (all)	Engine Gnd	Open	Open	0.6 V minimum	-
White/Black (all)	Engine Gnd	Open	Open	0.6 V minimum	-

6. Check the DVA on the Black/Yellow kill wire on the screw terminal of the Power Pack. You should have a reading of at least 150 DVA or more. The Stator and Timer Base should be connected to the Power Pack for this test. If you do not, check the DVA on the Stator and Timer Base. If the DVA on the Stator and Timer Base is good but the DVA on the Black/Yellow Kill wire on the screw terminal of the Power Pack is low, the Power Pack is likely faulty.
7. If equipped with an OEM Timer Base and the Timer Base DVA is low, you may try to reset the air gap between the Timer Base sensor and the Timer Base magnet using a Sensor Gap Gauge or use the following procedure:
 - a) Loosen the two mounting screws and the nuts on the Timer Base Sensor located in the epoxy on the outside of the heat shield of the Timer Base.
 - b) Slide the Timer Base sensor in toward the crankshaft until the sensor touches the stop boss located at the base of the sensor mounting area. Tighten the mounting screws.
 - c) Coat the face of the sensors with machinists bluing or equivalent.
 - d) Install the flywheel without the woodruff key and rotate the flywheel at least one full turn.
 - e) Remove the flywheel and check to see if the Timer Base magnet struck the face of the sensors. If it did, back the sensor out approximately 0.005" and repeat steps c, d, and e.
 - f) If the ignition now has spark, finger tight the nuts on the outside of the heat shield and coat them with RTV.
 - g) If still no spark, replace the Timer Base.

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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8. Check the DVA on each Black/White wire to engine ground. You should have a reading of at least 150 V minimum (while connected to the Power Pack). If the reading is low, disconnect the Timer Base wires from the Power Pack and recheck the Black/White terminals **ON THE POWER PACK**. If the voltage jumps up to an acceptable reading, the Timer Base may have a problem in the internal wiring
9. Check the Timer Base and Stator coil flywheel magnets for cracked, broken, or loose magnets.

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. Disconnect the Yellow wires from the Rectifier and retest. If the engine now has good spark, replace the Rectifier.
2. Check the Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
3. Swap the Timer Base wire sets (swap the #1 & #3 pair with the #2 & #4 pair) and see if the no spark problem follows a Timer Base wire.
4. Check the DVA on the Orange Primary wires from the Power Pack while connected to the Ignition coils. You should have a reading of at least 150 V minimum. If the reading is low on one cylinder, disconnect the Orange Primary wire from the ignition coil for that cylinder and reconnect it to a Pack Load resistor. Retest. If the reading is good, the Ignition coil is likely bad. A continued low reading indicates a bad Power Pack.
5. Visually inspect the Ignition coils for burned or discolored areas or cracks in the casing (indicating arcing inside the coil).
6. Swap the Ignition coil with one that has good spark.
7. Rare causes include a weak Timer Base magnet. If possible, try another flywheel.

POWER PACK OR TIMER BASE REPEATEDLY BLOWS ON SAME CYLINDER:

1. Check the Timer Base wires for shorts to engine ground as a shorted Timer Base wire can destroy a SCR inside the Power Pack.
2. In contrast, a shorted SCR inside the Power Pack can destroy a Timer Base coil. Check the Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
3. Replace the Ignition coil on the cylinder dropping spark.

ENGINE WILL NOT STOP (KILL):

1. Disconnect the Black/Yellow wire at the Power Pack. Connect a jumper wire to the Black/Yellow stop wire from the Power Pack and short it to engine ground. If this stops the Power Pack from sparking, the stop circuit has a fault. Check the key switch, harness, and shift switch (if present). If this does not stop the Power Pack from sparking, replace the Power Pack.

MISS AT ANY RPM:

1. Disconnect the Yellow wires from the Stator to the Rectifier and retest. If the miss clears, replace the Rectifier.
2. Connect an inductive tachometer to each cylinder in turn and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the Power Pack or Ignition coil. Occasionally a Timer Base will cause this same problem. Check the Timer Base DVA (see **NO SPARK ON ANY CYLINDER**).
3. Perform a high speed shutdown and read the spark plugs. Check for water. A crack in the block can cause a miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem.
4. Check the Timer Base and Stator coil flywheel magnets for cracked, broken, or loose magnets.
5. Disconnect the Rectifier and retest. If the system now has spark, replace the Rectifier.

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 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).

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6. If there is no change, try a single (**NOT** more than one) known good fully charged battery that is 850+ CCA 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. Check the voltage on the Red wire while the engine is running, you should see the same voltage as the battery.
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 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. Install an ammeter capable of reading at least 10 Amps between the Red wire 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 10 Amps.
5. Check the ammeter.
6. If the amperage is low,
 - a) Check the Red 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 Red wire and recheck the ammeter. If the amperage is now correct, there is a problem in the harness or key switch.
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 Rectifier with the voltage at the battery. If the voltage is ok at the Rectifier 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.