

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: 173-3536

This unit replaces P/N's: 583340, 583536, and 763767

**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. Remove 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, saving 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.
9. Clean all battery cable connections, both on the battery and the engine.
10. Replace the Negative battery cable.

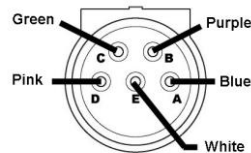
### TROUBLESHOOTING

#### NO SPARK ON ANY CYLINDER:

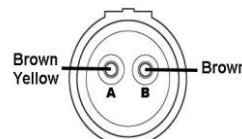
1. Check the cranking RPM. A cranking speed of less than 250 RPM may not allow the system to spark properly. This can be caused by a weak battery, dragging starter, bad battery cables, or a mechanical problem inside the engine.
2. Perform a visual inspection of all ground wire connections to make sure that they are clean and tight.
3. Disconnect the Black/Yellow stop wire from the Power Pack and retest. If the engine's ignition 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 shown below:

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Stator)	Brown/Yellow (Stator)	510-620 $\Omega$	500-620 $\Omega$	150-400 V	150-400 V
White (Common)	Blue (#1 Timer Base)	30-50 $\Omega$	38-48 $\Omega$	0.6 V Minimum	0.6 V Minimum
White (Common)	Purple (#2 Timer Base)	30-50 $\Omega$	38-48 $\Omega$	0.6 V Minimum	0.6 V Minimum
White (Common)	Green (#3 Timer Base)	30-50 $\Omega$	38-48 $\Omega$	0.6 V Minimum	0.6 V Minimum
White (Common)	Pink (#4 Timer Base)	30-50 $\Omega$	38-48 $\Omega$	0.6 V Minimum	0.6 V Minimum

6. Check wire pin-out as follows:



WIRE SIDE MALE



FEMALE BACK SIDE VIEW



# Installation and Troubleshooting Guide



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7. Check the Stator input diodes connected inside the Power Pack using a meter set to diode scale. If the readings show a short or open, replace the Power Pack.

Red meter lead	Black meter lead	Reading
Orange/Blue (#1 Primary)	Blue (#1 Timer Base Input)	110 Ω (a)
Orange/Purple (#2 Primary)	Purple (#2 Timer Base Input)	110 Ω (a)
Orange/Green (#3 Primary)	Green (#3 Timer Base Input)	110 Ω (a)
Orange (#4 Primary)	Pink (#4 Timer Base Input)	110 Ω (a)
White (Common)	Black (Ground)	Shorted
Brown (Stator)	Black (Ground)	Reading*
Brown/Yellow (Stator)	Black (Ground)	Reading*
Black (Ground)	Brown (Stator)	Open*
Black (Ground)	Brown/Yellow (Stator)	Open*

(a) Use a comparison reading as different brands of meters will give different readings. The typical range is 90-150 Ω for the Orange Primary wires. You should have approximately the same ohm reading on all four tests with the Orange wires. If one of the SCR's inside the Power Pack is shorted or open, the readings will be quite a bit different.

\* This measurement is with the meter set to the Diode scale. Where you see the term "Reading" represents a reading on the meter. Actual meter readings will vary depending on the type of meter.

8. Check the DVA on the Black/Yellow kill wire coming out 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 coming out of the Power Pack is low, the Power Pack is likely faulty.

## NO SPARK OR INTERMITTENT ON ONE OR MORE CYLINDERS:

1. Check the Resistance and DVA of the Stator and Timer Base:

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Stator)	Brown/Yellow (Stator)	510-620 Ω	500-620 Ω	150-400 V	150-400 V
White (Common)	Blue (#1 Timer Base)	30-50 Ω	35-52 Ω	0.6 V Minimum	0.6 V Minimum
White (Common)	Purple (#2 Timer Base)	30-50 Ω	35-52 Ω	0.6 V Minimum	0.6 V Minimum
White (Common)	Green (#3 Timer Base)	30-50 Ω	35-52 Ω	0.6 V Minimum	0.6 V Minimum
White (Common)	Pink (#4 Timer Base)	30-50 Ω	35-52 Ω	0.6 V Minimum	0.6 V Minimum

2. 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 or more. If the reading is low on one cylinder, disconnect the Orange Primary wire from the Ignition coil for that cylinder and connect it to a Pack Load resistor. Retest. If the reading is now good, the Ignition coil is likely faulty. A continued low reading usually indicates a bad Power Pack.
3. Swap the Ignition coil with one that is sparking correctly.
4. Rare causes include a weak Timer Base magnet. If possible, try another flywheel.
5. Check the Power Pack resistance (see **NO SPARK ON ANY CYLINDER**).

## ENGINE WILL NOT STOP (KILL):

1. Disconnect the Black/Yellow wire at the Power Pack. Connect a jumper wire to the 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. In the water or on a Dynamometer, check the DVA on the Orange wires from the Power Pack while connected to the Ignition coils. You should have a reading of at least 150 DVA or more, increasing with engine RPM until it reaches 300-400 DVA maximum. A sharp drop in DVA right before the miss becomes apparent on all cylinders will normally be caused by a bad Stator. A sharp drop in DVA on less than all cylinders will normally be the Power Pack or Timer Base.
3. 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**).
4. 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.
5. Check the Timer Base and Charge coil flywheel magnets for cracked, broken, or loose magnets.



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## 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. Check the Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
3. Replace the Ignition coil on the cylinder dropping spark.

## 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 Regulator/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 Regulator/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 Regulator failure(s).
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 Regulator/Rectifier. At idle the DVA will normally be between 8-25 DVA. If not, disconnect the Yellow wires from the Regulator/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 Purple 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  $\Omega$ .

## TACHOMETER TESTS

1. Measure the DVA across the Stator's Yellow battery charge wires, while connected to the Regulator/Rectifier. At idle the DVA will normally be between 8-25 DVA. If not, disconnect the Yellow wires from the Regulator/Rectifier and retest. DVA will normally be 17-50 DVA at idle. If the voltage is now within specification, the Regulator/Rectifier is likely defective.
2. Check the resistance between the Gray wire from the Regulator/Rectifier and engine ground. You should read about 10K  $\Omega$ . Gray to Red, and Gray to the Yellow wires should be a high reading, usually in the M  $\Omega$  range.
3. Disconnect the Regulator/Rectifier's Gray wire. At 800-1,000 RPM, check the DVA on the Gray wire FROM THE REGULATOR/RECTIFIER measured to engine ground. The reading should be 8 DVA or more. If not, replace the Regulator/Rectifier.
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.

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## 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 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 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 multi-meter and compare it to the dash meter.
3. Compare the voltage at the Regulator/Rectifier with the voltage at the battery. If the voltage is ok at the Regulator/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.