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: 173-3410

This unit replaces P/N's: 583410 and 763769.

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.

It is recommended that dielectric grease be used in the bullet nose connectors to help prevent corrosion.

Any sign of leakage out of the high voltage coils or bubbling around the battery charge windings indicate a bad Stator. Check for burned marks on each pole. If a problem is found on the battery windings, we recommend the Regulator/Rectifier be closely checked.

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 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 Regulator/Rectifier. Ignore any stripes on the Regulator/Rectifier as the new Stator does not require the Yellow wires to be connected to a particular Regulator/Rectifier wire.
8. Replace the flywheel according to the service manual.
9. 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. Disconnect the Black/Yellow stop wire plug 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).
3. Perform a visual inspection of all ground wire connections to make sure that they are clean and tight.
4. Check all of the Amphenol connectors of each component to assure that all of the pins are seated securely in the connectors and that the pins themselves are clean and free of corrosion.
5. Disconnect the Yellow wires from the Stator to the Regulator/Rectifier and retest. If the engine now has spark, replace the Regulator/Rectifier.
6. Check the Stator and Timer Base resistance and DVA as given below for each bank:

Read from	Read to	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Stator)	Brown/Yellow (Stator) (9 Amp)	455-505 Ω	500-620 Ω	150 V Minimum	150 V Minimum
Brown (Stator)	Brown/Yellow (Stator) (35 Amp)	850-1100 Ω	860-1100 Ω	150 V Minimum	150 V Minimum
Orange (Power coil)	Orange/Black (Power coil)	90-110 Ω	90-110 Ω	12-24 V	45-120 V
White (Common)	Blue (#1 Timer Base 5 pin)	35-55 Ω	35-55 Ω	0.5 V Minimum	0.5 V Minimum
White (Common)	Purple (#2 Timer Base 5 pin)	35-55 Ω	35-55 Ω	0.5 V Minimum	0.5 V Minimum
White (Common)	Green (#3 Timer Base 5 pin)	35-55 Ω	35-55 Ω	0.5 V Minimum	0.5 V Minimum
White (Common)	Pink (#4 Timer Base 5 pin)	35-55 Ω	35-55 Ω	0.5 V Minimum	0.5 V Minimum
White (Common)	Blue/White (#1 Quick Start 4 pin)	100-160 Ω	100-160 Ω	1.2 V Minimum	1.2 V Minimum
White (Common)	Purple/White (#2 Quick Start 4 pin)	100-160 Ω	100-160 Ω	1.2 V Minimum	1.2 V Minimum
White (Common)	Green/White (#3 Quick Start 4 pin)	100-160 Ω	100-160 Ω	1.2 V Minimum	1.2 V Minimum
White (Common)	Pink/White (#4 Quick Start 4 pin)	100-160 Ω	100-160 Ω	1.2 V Minimum	1.2 V Minimum

Note: The CDI Timer Base for this application uses solid Blue, Purple, Green, and Pink wires in place of the Blue/White, Purple/White, Green/White, and Pink/White wires that the original OEM Timer Base used in the 4 pin plug for Quick Start.

7. 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.
8. Check the Trigger and Charge coil magnets in the flywheel. A loose or broken magnet can cause this problem.

NO SPARK ON ONE 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. Check all of the Amphenol connectors of each component to assure that all of the pins are seated securely in the connectors and that the pins themselves are clean and free of corrosion.
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 or more. 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 now good, the Ignition coil is likely bad.
5. Check the Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
6. Check the spark plug wires for breaks and abrasions.

NO SPARK ON ONE BANK:

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. Disconnect the Yellow wires from the Stator to the Regulator/Rectifier and retest. If the engine now has spark, replace the Regulator/Rectifier.
4. Check Stator DVA and Resistance (see **NO SPARK ON ANY CYLINDER**).
5. Check the Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
5. 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 bank, disconnect the Orange Primary wires from the Ignition coil for that bank and reconnect them to a Pack Load resistor. Retest. If the reading is now good, one or all of the Ignition coils are likely bad. A continued low reading indicates a bad Power Pack.
6. Check the spark plug wires for breaks and abrasions.

MISS AT ANY RPM:

1. Disconnect the Yellow wires from the Stator to the Regulator/Rectifier and retest. If the miss clears, replace the Regulator/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. In the water or on a Dynamometer, 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 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.
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 Trigger and Charge coil flywheel magnets for cracked, broken, or loose magnets.

ENGINE WILL NOT STOP (KILL):

1. Disconnect the Black/Yellow wires at the Power Pack. Connect a jumper wire to the stop wires 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.

ENGINE DIES WHEN QUICKSTART DROPS OUT:

1. Check base ignition timing at idle with the White/Black temperature from the temperature sensor to the Power Pack disconnected. Remember to allow for the drop in ignition timing when Quick Start disengages. The timing will be about 10-15° BTDC while in Quick Start. Verify ignition timing after engine has warmed up, according to the service manual.

ENGINE WILL NOT STAY IN QUICK START OVER 10 SECONDS:

1. Verify the engine temperature is below the trip point (89° on some engines and 104° on others) of the temperature switch.
2. Disconnect the White/Black temperature switch wire from the Port temperature switch. If the engine now stays in Quick Start, the temperature switch is likely defective.

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ENGINE STAYS IN QUICKSTART ON ALL CYLINDERS:

1. With the engine idling, check the Yellow/Red wire for DC voltage. If there is DC voltage on this wire while the engine is running, the Quick Start will not disengage. A voltage of less than 7 V will not engage the starter solenoid yet will engage Quick Start.
2. Short the White/Black Temperature Switch wire FROM the Power Pack to engine ground. Start the engine, if the Quick Start drops out after approximately 5 seconds, replace the White/Black Temperature Switch.
3. If the only way to disable Quick Start is to disconnect the 4 pin connector with the Blue/White, Purple/White, Green/White, and Pink/White wires (The CDI Timer Base for this application uses solid Blue, Purple, Green, and Pink wires) between the Power Pack and the Timer Base, replace the Power Pack.

ENGINE DROPS OUT AND BACK IN QUICKSTART AT IDLE:

1. Check the engine RPM. If the engine is at idle but is idling marginally too high and the White/Black Temperature wire is not connected, the engine will activate the Quick Start feature as normal. The engine timing will go up and the engine RPM will also go up, possibly going above the upper trip point for Quick Start causing Quick Start to turn off. As the RPM drops back down, it may return back into Quick Start. Retard the ignition timing slightly to lower idle RPM and see if the engine idle RPM stabilizes.
2. With the engine idling, check the Yellow/Red wire for DC voltage. Intermittent DC voltage on this wire while the engine is running will re-engage Quick Start. A voltage of less than 7 V will not engage the starter solenoid but will engage Quick Start.
3. With the engine idling, disconnect the Black/White wire from the Power Pack and short the White/Black Temperature Switch wire FROM the Power Pack to engine ground. If the Quick Start drops out and stays out after approximately 5 seconds, replace the White/Black Temperature Switch. If the problem is still present, replace the Power Pack.

ENGINE WILL NOT ACCELERATE BEYOND 2500 RPM (Runs smooth below that RPM):

1. Use a temperature probe and verify that the engine is not overheating.
2. Disconnect the Tan temperature wire from the Power Pack and retest. Make sure to cut the key switch off killing the engine, and then crank the engine back again. This resets the circuit board inside the Power Pack. If the engine now performs properly, check the temperature switch, the VRO Pump, remote oil tank, blocking diode built into the engine harness, and System Check Gauge.
3. Make sure the Tan temperature switch wire is not located next to a spark plug wire (RF interference can activate the S.L.O.W function without sounding the warning horn).
4. If the engine will not rev above 2500 RPM and the Tan wire is disconnected from the Power Pack (and not near a spark plug wire), the Power Pack is likely defective. Make sure to cut the key switch off killing the engine, and then crank the engine back again. This resets the circuit board inside the Power Pack. Retest. If no change, the Power Pack is likely defective.

ENGINE ENGAGES S.L.O.W. WHEN THE NO OIL, LOW OIL, OR FUEL VACUUM ALARM SOUNDS:

1. Disconnect engine harness.
2. Disconnect the Tan wires from the temperature sensors in both cylinder heads.
3. Using a multi meter set on Diode scale, check the diode in the engine harness as follows:

Red Meter Lead	Black Meter Lead	Reading
Tan pin in Engine Harness Connector	Tan Lead from Port Cyl Head	Reading*
Tan pin in Engine Harness Connector	Tan Lead from Starboard Cyl Head	Reading*
Tan Lead from Starboard Cyl Head	Tan pin in Engine Harness Connector	Open*
Tan Lead from Port Cyl Head	Tan pin in Engine Harness Connector	Open*

**** 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.***

NOTE: You can replace the diode in the harness with a 1N4007 diode available at most electronics stores.

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 Rectifier failure.
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 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 Ω.

MAXIMUM OUTPUT TEST:

1. Install an ammeter capable of reading at least 12 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 12 Amps.
5. Check the ammeter.
6. If the amperage is low,
   A) Check the load bank connections and meter for battery draw.
   B) If the output is still low, check and clean all connections between the battery and the Regulator/Rectifier. Inspect the Stator windings for burned or discolored windings.
7. If the amperage is correct, but the battery voltage remains low, replace the battery.

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. 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.
3. 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.
4. If still no tachometer signal, try a known good tachometer.
5. If still no tachometer signal, replace the Stator.

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.