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: 173-4643

This Stator replaces P/N: 584643, 763779, and 18-5877.

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.

Any sign of leakage out of the Ignition charge 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 Voltage Regulator be closely checked. To replace Stators with ring terminals, please use the bullet to ring adapters enclosed with this Stator.

Please use the Factory recommended spark plug (Champion QL77JC4 or QL78YC) gapped at 0.030".

These engines use a gear Reduction starter which results in a lower cranking RPM than usual. If you have one or more cylinders intermittently sparking at cranking speed, start the engine and checking to see if ALL of the cylinders now fire correctly. If so, the engine's ignition system is working properly. Make sure the battery is sized correctly as the cranking capacity can affect the cranking speed. These engines should have a minimum 850 CCA flooded wet non-maintenance free marine cranking battery.

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 from the Power Pack and the Voltage Regulator.
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 listed in the service manual for your engine.
6. Connect the new Stator to the Power Pack.
7. Connect the new Stator to the Voltage Regulator.
8. Replace the flywheel according to the service manual for your engine.
9. Replace the negative battery cable.

TROUBLESHOOTING

NO SPARK ON ANY CYLINDER:

1. 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).
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. Disconnect the Yellow wires from the Stator to the Voltage Regulator and retest. If the engine sparks, replace the Voltage Regulator.
5. 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.
6. Check the Stator and Timer Base resistance and DVA as given below for each bank:

Read from	Read to	Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Stator)	Brown/Yellow (Stator)	900-1100 Ω	150-400 V	150-400 V
Brown (Stator)	Brown/Yellow (Stator)	900-1100 Ω	150-400 V	150-400 V
Orange (Power Coil)	Orange/Black (Power Coil)	93-103 Ω	11-22 V	45-120 V
White (Common)	Blue wire (#1 Timer Base) (a)	1-5 MΩ	100-400 V	0.6 V Minimum
White (Common)	Blue wire (#2 Timer Base) (b)	1-5 MΩ	100-400 V	0.6 V Minimum
White (Common)	Purple wire (#3 Timer Base) (a)	1-5 MΩ	100-400 V	0.6 V Minimum
White (Common)	Purple wire (#4 Timer Base) (b)	1-5 MΩ	100-400 V	0.6 V Minimum
White (Common)	Green wire (#5 Timer Base) (a)	1-5 MΩ	100-400 V	0.6 V Minimum
White (Common)	Green wire (#6 Timer Base) (b)	1-5 MΩ	100-400 V	0.6 V Minimum
White (Common)	Black/White wire (Quick Start Timer Base)	215-230 Ω	6-10 V (c)	6-10 V (from Power Pack)

(a) 4 pin connector with Black/White wire
(b) 4 pin connector with Solid White wire
(c) DVA will drop below 1 V when the engine drops out of Quick Start (engine is over 104° F or 1200 RPM)

NO SPARK ON ONE CYLINDER:

1. Check the Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
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 indicates a potentially defective Power Pack or Timer Base.
3. Check the spark plug wires for breaks and abrasions.
4. Check the Power Pack resistance given below:

Read from		Read to		Ohms
Orange/Blue	(#1 Primary)	Blue	(#1 Timer Base Input) (a)	110 Ω (c)
Orange	(#3 Primary)	Purple	(#3 Timer Base Input) (a)	110 Ω (c)
Orange/Green	(#5 Primary)	Green	(#5 Timer Base Input) (a)	110 Ω (c)
Orange/Blue	(#2 Primary)	Blue	(#2 Timer Base Input) (b)	110 Ω (c)
Orange	(#4 Primary)	Purple	(#4 Timer Base Input) (b)	110 Ω (c)
Orange/Green	(#6 Primary)	Green	(#6 Timer Base Input) (b)	110 Ω (c)
White	(Timer Base Common)	Black	(Engine Gnd)	Shorted (while connected)
Brown	(Stator)	Black	(Engine Gnd)	Open or M range
Brown/Yellow	(Stator)	Black	(Engine Gnd)	Open or M range
Brown/White	(Stator)	Black	(Engine Gnd)	Open or M range
Brown/Black	(Stator)	Black	(Engine Gnd)	Open or M range

(a) 4 pin connector with Black/White wire
(b) 4 pin connector with Solid White wire
(c) 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 six 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.

NO SPARK ON ONE BANK:

1. Disconnect the Black/Yellow (or the Black/Orange) 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).
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 seat securely in the connectors and that the pins themselves are clean and free of corrosion.
4. Swap the Stator Amphenol connectors from one side to the other (do not remove the wires from the connectors). If the problem moves, replace the Stator because one of the Stator's Charge coils is defective .
5. Check the Stator and Timer Base resistance and DVA (see **NO SPARK ON ANY CYLINDER**).
6. 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 coils for that bank and connect them to a Pack Load resistor. Retest. If the reading is now good, one or all of the Ignition coils for that bank of cylinders are likely bad. A continued low reading indicates a bad Power Pack.

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.

MISS AT ANY RPM:

1. Disconnect the Yellow wires from the Stator to the Voltage Regulator and retest. If the miss clears, replace the Voltage Regulator.
2. 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.
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 Trigger and Charge coil flywheel magnets for cracked, broken, or loose magnets.

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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 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.

ENGINE STAYS IN QUICK START:

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. Disconnect the Black/White wire going to the Timer Base from the Power Pack. If the Quick Start feature is now not working, replace the Power Pack.
4. If the Quick Start feature is still active, replace the Timer Base.

ENGINE DROPS OUT AND BACK IN QUICK START 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 ENGAGE QUICK START:

1. Disconnect the White/Black wire from the temperature sensor.
2. With the engine idling, check the Black/White Timer Base wire for DC voltage. There should be 6-10 VDC on this wire while the engine is running for the Quick Start to engage.
3. Short the White/Black Temperature Switch wire FROM the Power Pack to engine ground. If the voltage on the Black/White wire drops out after approximately 5 seconds but the engine timing does not change, replace the Timer Base. If the voltage remains present, disconnect the Yellow/Red wire to the Power Pack and repeat the test. If the voltage still remains, replace the Power Pack. If the voltage goes away, check for voltage on the Yellow/Red. If there is any voltage on the Yellow/Red, there is a potentially a fault with the key switch or the starter solenoid.

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 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.

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. Disconnect the Voltage Regulator's Gray wire. At 800-1,000 RPM, check the DVA on the Grey wire FROM THE VOLTAGE REGULATOR measured to engine ground. The reading should be 8 DVA or more. If not, replace the Voltage Regulator.
3. If at least 8 DVA, run a jumper wire from the Grey 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.