



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: 113-6292K 1

This unit replaces the following P/N's: 586015, 586098, and 586292.

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.

This unit requires the Factory Recommended Champion QL78YC (0.30 Gap) Spark Plugs and the Gray or Blue spark plug wires.

DO NOT OPERATE ENGINE WITH PLASTIC ENCODER COVER OFF OF THE ENGINE.

How to test the Engine Stop Circuit (Kill) for DC Voltage:

1. DC voltage present on the kill circuit of the Power Pack due to a faulty key switch, boat harness, or engine harness will severely damage the Power Pack's internal kill circuit. Connect a Digital Multi Meter to the Ignition Stop wire AT THE POWER PACK while disconnected from the Power Pack in reference to a known good engine ground. Turn the Ignition switch on and off several times. If, at any time, you see over 2 VDC on the kill wire, there is a problem with one or both harnesses and/or the Ignition switch. The Ignition Stop wire should not be connected back to the new Power Pack at any point until the problem is corrected **OR DAMAGE TO THE POWER PACK WILL OCCUR!**

INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the Optical Sensor cover, the Power Pack cover, and Voltage Regulator cover (between the Optical Sensor cover and the Power Pack).
3. Disconnect the Stator wire connector from the Power Pack.
4. Disconnect the harness wire connector from the Power Pack.
5. Disconnect the Optical sensor wire connector from the Optical sensor.
6. Carefully remove the sensor support return spring between the flywheel cover and the Optical sensor support assembly and set aside.
7. Remove the bolt securing the Encoder wheel and CAREFULLY remove the Encoder wheel, making sure not to crack or damage it in anyway. Pay special attention to the timing pointer. Carefully move the timer pointer away from the Encoder wheel enough to pull the Encoder wheel up and off without loosening the timer pointer. If the timer pointer is loosened, it will have to be recalibrated by calibrating cylinder #1 with a dial indicator to TDC. If the Encoder wheel is damaged it will need to be replaced.
8. Remove the five Pozidriv screws holding the Optical sensor support retainers down that secure the Optical sensor support assembly in place.
9. Remove the Optical sensor assembly from the flywheel cover.
10. Remove the two Pozidriv screws the secure the Optical sensor to the Optical sensor support assembly.
11. Install the new Optical sensor in the Optical sensor support assembly with the infrared LEDs facing up towards the Encoder wheel. Secure with the two Pozidriv screws by tightening to 15-20 in. lbs.
12. Apply a light coat of marine grade grease to the sliding surfaces of the Optical sensor support. Position the Optical sensor support in the flywheel cover. Position the two Optical sensor support retainers and tighten the five Pozidriv screws. Check to see that the Optical sensor support arm rotates freely.
13. Attach the Optical sensor support return spring to the Optical sensor support assembly and to its post on the flywheel cover.
14. Reinstall the Encoder wheel by carefully moving the timing pointer out of the way just enough to slide the Encoder wheel on to the crankshaft. The Encoder wheel is slotted for a keyway and will only go on one way.
15. Install the Encoder wheel retaining bolt to the crankshaft using a thread locking compound and tighten to 120-140 in. lbs.
16. Disconnect the spark plug wires from the spark plugs.
17. Unbolt and remove the Ignition coils and old Power Pack. Look for burned areas between the coil mounting holes on the stainless RF shield. If a discoloration is found, replace that particular Ignition coil.
18. Disconnect the Orange Primary wires of the old Power Pack from the Ignition coils.
19. Make sure the RF noise shield is between the Ignition coils and the Power Pack.
20. Install the Ignition coils and connect the Orange Primary wires of the new Power Pack to the Ignition coils. The Orange/Blue Primary wires are for cylinders 1 and 2, and the Orange/Green Primary wires are for cylinders 3 and 4.
21. Install the new spark plug wires to the Ignition coils.
22. Install the Ignition coils and Power Pack to the engine. Take care not to over-torque the mounting bolts, OEM specification calls for 50-95 in lbs. of torque.
23. Connect the Stator and harness connectors to the Power Pack. Use a small amount of dielectric silicone grease on the connector seal but do not put any inside the sockets.
24. Connect the Optical sensor connector to the Optical Sensor.
25. Replace the Encoder wheel cover, Power Pack cover, and Voltage Regulator cover using the Pozidriv screws you removed earlier.

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Web Support: www.cdielelectronics.com • Tech Support: 1-866-423-4832 • Order Parts: 1-800-467-3371

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26. Connect the spark plug wires to the spark plugs.
27. Reconnect the negative battery cable.
28. Set the engine timing according to the OEM service manual for your engine.

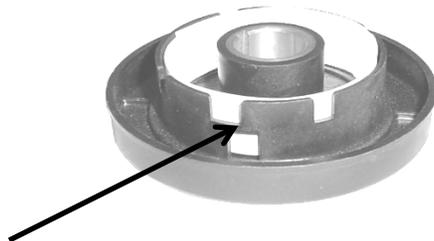
TROUBLESHOOTING

NO SPARK ON ANY CYLINDER:

1. Disconnect the port 4 pin connector on the Power Pack that holds the Black/Yellow stop wire 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. Disconnect the Yellow wires from the Stator to the Voltage Regulator and retest. If the engine sparks, replace the Voltage Regulator.
3. Check the cranking RPM. A cranking speed of less than 250 RPM will 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.
4. Check the Stator resistance and DVA as given below:

Read from	Read to	Ohms	DVA (Connected)	DVA (Disconnected)
Brown (Stator)	Brown/Yellow (or Brown/White) (Stator)	900-1200 Ω	150-400 V	150-400 V (*)
Orange (Power coil)	Orange/Black (Power coil)	50-60 Ω	11-22 V	45-120 V (*)

5. Check the DVA on the Black/Yellow kill wire by back probing the connector of the Power Pack. You should have a reading of at least 150 DVA or more. The Stator and Optical Sensor plugs should be connected to the Power Pack for this test. If you do not, check the DVA on the Stator and the DC voltage on the Optical Sensor. If the DVA on the Stator and the DC voltage is good on the Optical Sensor but the DVA on the Black/Yellow Kill wire coming out of the Power Pack is low, the Power Pack is likely faulty.
6. Verify the engine is turning in a clockwise direction (see **ENGINE TRIES TO RUN BACKWARDS**).
7. Check the Power Pack and Ignition coil ground wires for corrosion and tightness.
8. If the engine loses spark after the key switch is disengaged, check the DVA on the Stator's Power Coil. If the DVA is low, the Stator is likely defective.
9. Check the battery voltage on the Yellow/Red wire while cranking the engine. If below 11 VDC, charge the battery and check all battery cables. A continued low battery reading could be caused by a dragging starter, a faulty starter solenoid, or a faulty key switch.
10. Remove the Optical sensor wheel and check for damage, especially where the top slots are located. Sometimes the wheels will break out where the windows overlap.



The thin area between the crank position and the cylinder position is the most common breakout location.

11. Check the Optical sensor eyes for dirt, grease, etc. If you have to clean it, use denatured alcohol and a Q-tip. Do not use any other cleaning agent because damage to the Optical lens will occur.
12. Check the Power Pack DVA to the Orange Primary coil wires as follows:

Read from	Read to	DVA (Connected)
Orange/Blue	Engine Gnd	150 V Minimum
Orange/Green	Engine Gnd	150 V Minimum

NOTE: If the Orange Primary DVA reading is low on one cylinder, disconnect the wire from the Ignition coil for that cylinder and reconnect it to a Pack Load resistor (CDI P/N 511-9775). Retest. If the reading is now within specification, the Ignition coil is likely defective. If it still measures low, this indicates a defective Power Pack If the Optical sensor tests within specification.



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13. Check the Optical sensor DC voltage as follows:

Read from	Read to	OEM DC (Connected)	CDI DC (Connected)
Orange/Red (Input from Power Pack)	Engine Gnd	11 V Minimum	9.5 V Minimum
Black/Orange (Return from Optical sensor)	Engine Gnd	9 V Minimum	7.5 V Minimum

WARNING! The Black/Orange wire should NEVER be shorted to engine ground as this will damage the sensor.

NOTE: When checking the Optical sensor, there can be only a maximum voltage difference of 2 V DC between the input voltage and the return voltage. If the voltage difference is more than 2 V, or if the input voltage and the return voltage are equal (given that the input voltage is at an acceptable reading), replace the Optical sensor.

14. Check the Charge coil flywheel magnets for cracked, broken, or loose magnets.

ONLY HAS SPARK AS LONG AS THE KEY SWITCH IS ENGAGED OR WILL NOT REV ABOVE IDLE SPEED:

1. Check the DVA on the Stator's Power coil.
2. As the engine RPM increases, the DVA should rapidly increase and stabilize up to 22 DVA (voltage exceeding 22 DVA indicates a bad Power Pack). A sharp drop in voltage right before the miss becomes apparent usually indicates a bad Stator Charge coil winding. A sharp drop in voltage when you disengage the key switch indicates a bad Power coil on the Stator.

ENGINE TRIES TO RUN BACKWARDS:

1. Check the Encoder wheel. It must have 5 notches.
2. Check the ignition timing. Before Quick Start, it should be set to 4° BTDC. After Quick Start, it should be set to 6° ATDC.
3. If possible, try another Optical sensor.
4. If still no change, replace the Power Pack.

NO SPARK OR INTERMITTENT SPARK ON ONE BANK:

1. Check the Stator resistance and DVA (see **NO FIRE ON ANY CYLINDER**).
2. Disconnect the 4-pin connector on the port side of the Power Pack and see if the fire returns. If it does, check resistance to see if the Black/Yellow wire is shorted to engine ground or is intermittently shorting to ground.

NO SPARK ON ONE CYLINDER:

1. Check the DVA on the Orange primary wire going to the Ignition coil not firing. You should have a reading of 150 DVA or more.
2. Check the resistance of the Ignition coil secondary circuit in reference to engine ground. A difference of over 25 Ω indicates a defective Ignition coil.
3. Check the resistance of the spark plug wire. Normally, you will read approximately 100 Ω between the connectors on either end.