



# 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: 173-4560

This unit replaces P/N's: 584560 and 763763.

**Warning! This product is designed for installation by a professional marine mechanic. CDI cannot be held liable for injury or damage resulting from improper installation, abuse, neglect, or misuse of this product.**

**Please use the Factory recommended sparkplug (currently Champion QL78YC) gapped at 0.030".**

## 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. Using the appropriate pin tool (order P/N: **553-2700** for a pin tool set), remove the Black/Yellow Kill wire from the 5 pin connector (in the center position) on the old Stator.
5. Remove the original Stator, saving the original bolts.
6. Install the new Stator using the original bolts with a good thread-locker applied to the bolts and tighten to the factory torque specifications.
7. Insert the Black/Yellow Kill wire into the 5 pin connector (in the center position) on the new Stator.
8. Connect the new Stator to the Power Pack and to the Regulator/Rectifier (ignore any stripes on the Regulator/Rectifier's Yellow wires).
9. Replace the Flywheel according to the service manual.
10. Connect the negative battery cable.

## TROUBLESHOOTING

### NO SPARK ON ANY CYLINDER:

1. Disconnect the Black/Yellow Kill wire AT THE POWER PACK and retest. If the engine's ignition now has spark, the Kill/Stop circuit has a fault. Check the key switch, engine harness and boat harness.
2. Check the cranking RPM. A cranking speed of less than 250 RPM may not allow the system to fire properly. This can be caused by a weak battery, dragging starter, bad battery cables, or a mechanical problem inside the engine.
3. 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 the Timer Base resistance and DVA as given below:

### 35-50 HP 2 Cylinder

| Read from             | Read to                   | OEM Ohms         | CDI Ohms         | DVA (Connected) | DVA (Disconnected) |
|-----------------------|---------------------------|------------------|------------------|-----------------|--------------------|
| Brown (Stator)        | Brown/Yellow (Stator)     | 750-950 $\Omega$ | 650-850 $\Omega$ | 150-400 V       | 150-400 V          |
| Orange (Power Coil)   | Orange/Black (Power Coil) | 360-440 $\Omega$ | 45-55 $\Omega$   | 11-22 V         | 45-120 V           |
| White (Common)        | Blue (#1 Timer Base)      | 22-32 $\Omega$   | 25-30 $\Omega$   | 100-400 V       | 0.6 V Minimum      |
| White (Common)        | Green (#2 Timer Base)     | 22-32 $\Omega$   | 25-30 $\Omega$   | 100-400 V       | 0.6 V Minimum      |
| White (Common)        | Engine Gnd                | Open             | Open             | -               | -                  |
| Blue (#1 Timer Base)  | Engine Gnd                | Open             | Open             | 100-400 V       | -                  |
| Green (#2 Timer Base) | Engine Gnd                | Open             | Open             | 100-400 V       | -                  |

### 25-70 HP 3 Cylinder

| Read from             | Read to                              | OEM Ohms         | CDI Ohms         | DVA (Connected) | DVA (Disconnected) |
|-----------------------|--------------------------------------|------------------|------------------|-----------------|--------------------|
| Brown (Stator)        | Brown/Yellow (Stator)                | 750-950 $\Omega$ | 650-850 $\Omega$ | 150-400 V       | 150-400 V          |
| Orange (Power Coil)   | Orange/Black (Power Coil)            | 360-440 $\Omega$ | 45-55 $\Omega$   | 11-22 V         | 45-120 V           |
| White (Common)        | Blue (#1 Timer Base)                 | 1-5M $\Omega$    | 1-5M $\Omega$    | 100-400 V       | 0.6 V Minimum      |
| White (Common)        | Purple (#2 Timer Base)               | 1-5M $\Omega$    | 1-5M $\Omega$    | 100-400 V       | 0.6 V Minimum      |
| White (Common)        | Green (#3 Timer Base)                | 1-5M $\Omega$    | 1-5M $\Omega$    | 100-400 V       | 0.6 V Minimum      |
| White (Common)        | Black/White (Quick Start Timer Base) | 400-500 $\Omega$ | 400-500 $\Omega$ | 6-10 V (a)      | 6-12 V             |
| White (Common)        | Engine Gnd                           | Open             | Open             | -               | -                  |
| Blue (#1 Timer Base)  | Engine Gnd                           | Open             | Open             | 100-400 V       | -                  |
| Green (#2 Timer Base) | Engine Gnd                           | Open             | Open             | 100-400 V       | -                  |

**a) Voltage will drop below 1 DVA when engine drops out of QuickStart (engine is over 104° F or 1200 RPM).**

5. Check the Timer Base and Charge Coil flywheel magnets for cracked, broken, or loose magnets.

CDI Electronics • 353 James Record Road SW • Huntsville, AL 35824 USA

Web Support: [www.cdielelectronics.com](http://www.cdielelectronics.com) • Tech Support: 1-866-423-4832 • Order Parts: 1-800-467-3371

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## NO SPARK ON ONE OR MORE CYLINDERS:

1. Check the Timer Base's 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 coil. You should have a reading of at least 150 V or more.
3. Visually inspect the Ignition coils for burned or discolored areas or cracks in the casing indicating arcing inside the Ignition coil.
4. Swap the Ignition coil with one that is sparking correctly.
5. Rare causes include a weak trigger magnet. If possible, try another flywheel.
6. Check the Power Pack resistance as given below:

| Read from                  | Read to                | Ohms             |
|----------------------------|------------------------|------------------|
| Orange/Blue (#1 Primary)   | Blue (#1 Timer Base)   | 110 $\Omega$ (a) |
| Orange/Purple (#2 Primary) | Purple (#2 Timer Base) | 110 $\Omega$ (a) |
| Orange/Green (#3 Primary)  | Green (#3 Timer Base)  | 110 $\Omega$ (a) |
| White (Common)             | Black (Engine Gnd)     | Shorted          |
| Brown (Stator)             | Black (Engine Gnd)     | Open or M range  |
| Brown/Yellow (Stator)      | Black (Engine Gnd)     | Open or M range  |

(a) Use a comparison reading as different brands of meters will give different readings. The typical range is 90-150  $\Omega$  for the Orange 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.

7. Check the DVA to the Ignition coils from the Power Pack while connected in reference to engine ground. You should have a reading of 150 DVA minimum. If the reading is low on one cylinder, disconnect the Orange wire from the Ignition Coil for that cylinder and reconnect it to a Pack Load Resistor. Retest. If the reading is over 150 DVA, the Ignition Coil is likely bad. A continued low reading indicates a defective Power Pack. You can also swap the Orange Primary wire with the low DVA with another cylinder that is sparking correctly. If the low DVA follows the Orange Primary wire, replace the Power Pack if all other readings are within specification.

## 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, 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.

## 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).

## ENGINE DIES WHEN QUICKSTART DROPS OUT (3 Cyl 50-70 HP):

1. Check Ignition timing at idle with the White/Black temperature wire disconnected. Remember to allow for the 12-15 ° drop in ignition timing when Quick Start disengages. Verify Ignition timing after the engine has warmed up.

## ENGINE WILL NOT STAY IN QUICKSTART OVER 10 SECONDS (3 Cyl 50-70 HP):

1. Verify the engine temperature is below the trip point (89° F on some engines and 104° F 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 (White/Black stripe wire) is likely defective.

## ENGINE STAYS IN QUICKSTART ON ALL CYLINDERS (3 Cyl 50-70 HP):

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 may not disengage. A voltage of over 2-7 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 from the Power Pack. If the Quick Start feature is not now working, replace the Power Pack.

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## ENGINE WILL NOT ENGAGE QUICKSTART (3 Cyl 50-70 HP):

1. Disconnect the White/Black wire from the temperature sensor.
2. With the engine idling, check the Black/White wire to the Timer Base wire for DVA. There should be 6-10 DVA on this wire to activate Quick Start.
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 DVA is still present, replace the Power Pack.

## ENGINE DROPS OUT AND BACK INTO QUICKSTART AT IDLE (3 Cyl 50-70 HP):

1. Verify the spark plugs are the Recommended Champion QL77JC4 or QL78YC.
2. Check the engine RPM, if the engine is idling too close to the trip point, it could be going into Quick Start and dropping back out due the RPM threshold.
3. With the engine idling, check the Yellow/Red wire for DC voltage. A voltage of 2-7 VDC will not engage the starter solenoid yet will engage Quick Start. With the engine idling, disconnect and short the Black/White 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 ENGAGES S.L.O.W. (Limits at 2500 PM) WHEN THE NO OIL, LOW OIL OR OVERHEAT ALARM SOUNDS:

1. Disconnect the Boat Side harness and the Tan wire from the temperature sensor in the cylinder head.
2. Using an Digital Multi Meter, check the diode in the engine harness as shown below. If open or shorted, replace it.

| Red Meter Lead                      | Black Meter Lead                    | Reading                   |
|-------------------------------------|-------------------------------------|---------------------------|
| Tan pin in Engine Harness Connector | Tan Lead to the Cyl Head Temp       | 0.500 on Diode scale      |
| Tan Lead from the Cyl Head          | Tan pin in Engine Harness Connector | OL or over 1.0 M $\Omega$ |



## 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 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 Rectifier/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/Rectifier 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 Regulator/Rectifier. At idle the DVA will normally 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.



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## 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's Gray wire. At 800-1,000 RPM, check the DVA on the Grey 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.