Installation and Troubleshooting Guide

CDI P/N: 113-4808

This unit replaces the following P/N's: 18-5774, 18-5780, 584808, 585145, 585189, 5004532 and 5004533.

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. Disconnect the negative battery cable.
2. Remove power pack mounting bolts and disconnect all of the wires going to the old power pack.
3. Clean ALL engine grounds, especially where the power pack is grounded.
4. Check for DC voltage on the kill (stop) wire (usually Black/Yellow) with the key-switch in the on and off position. At no time should you see over 2 volts DC on this wire as severe damage to the power pack can occur.
5. Connect the wires to the new power pack. Some engines do not need the pigtail three wire adapter, if so, simply remove the pigtail.
6. Use a small amount of dielectric silicone grease in the bullet connectors (if used).
7. Position the stator wire connector in the slot provided in the bracket.
8. Position the Timer Base wire connector in the slot provided in the bracket.
9. Mount the new power pack using the original bolts.
10. Connect the orange wires to the ignition coils as follows:

Wire	Cylinder	Wire	Cylinder	Wire	Cylinder
Orange/Blue	#1 Cylinder (Top)	Orange/Violet	#2 Cylinder (Middle)	Orange/Green	#3 Cylinder (Bottom)

SERVICE NOTE: Use a small amount of dielectric grease in the boots and use a twisting motion to install the terminals on the coils. The dielectric grease will seal out moisture and make the terminals easier to install.

11. Reconnect the battery cables.

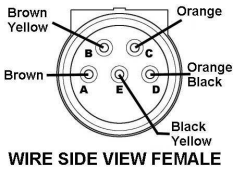
TROUBLESHOOTING

Service Note: Please use the Factory recommended spark plug (currently Champion QL77JC4) gapped at 0.030".

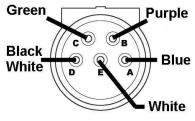
Note: These engines usually have a 10 Amp battery charging capacity. Due to the size and weight of the flywheel magnets, it is highly recommended that you check to make sure both the triggering and charge magnets are still secure in the flywheel before you service the engine. A loose or broken magnet can be deadly to you or your pocketbook. It is a recommended you index the flywheel and check the timing on all cylinders when servicing these engines. Also check for static firing and intermittent spark.

ENGINE WILL NOT START OR MISFIRES:

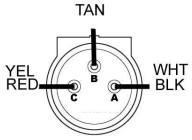
1. Verify the wiring in the connectors as follows:



WIRE SIDE VIEW FEMALE



WIRE SIDE MALE



WIRE SIDE VIEW MALE

2. Check the flywheel center hub magnet to verify the triggering magnet has not come loose.
3. Index the flywheel and check the ignition timing on all cylinders. The timing should be close to the same offset as #1 cylinder.

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow kill wires AT THE PACK and retest. If the engine's ignition now has fire, the kill circuit has a fault-possibly the key switch, harness or shift switch.
2. Disconnect the yellow wires from the stator to the rectifier and retest. If the engine fires, replace the rectifier.
3. Check the stator and timer base resistance and DVA output as given below:

WIRE	READ TO	OEM Ohms	CDI Ohms	DVA (Connected)	DVA (Disconnected)
Brown	Brown/Yellow	360-440 (9 amp)	650-850	150-400 V (*)	150-400 V (*)
Brown	Brown/Yellow	750-950 (12 amp)	650-850	150-400 V (*)	150-400 V (*)
Orange	Orange/Black	360-440	45-55	11-22 V	45-120 V (*)
White	Purple	(^)		100 V + (a)	0.6 V + (#)
White	Blue	(^)		100 V + (a)	0.6 V + (#)
White	Green	(^)		100 V + (a)	0.6 V + (#)
White	Black/White	400-500	400-500	6 to 12 V(b)	6 to 12 V (from pack)

(*) This reading can be used to determine if a stator or pack has a problem. For instance, if you have no spark on any cylinder and the stator's DVA reading is out of spec – disconnect the stator wires and recheck the DVA output. If the reading is still out of spec – the stator is bad. If the reading is now within spec – the pack is bad.

(#) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no spark on one cylinder and the timer base's DVA reading for that cylinder is low – disconnect the timer base wires and recheck the DVA output. If the reading stays low – the timer base is bad. If the reading is now within spec – the pack is likely bad.

(^) This reading will vary according to the meter used. Do a comparison reading and if there is a difference of over 10%, replace the timer base. Typically, use the Red meter lead to the White wire and the Black meter lead to the other wires. The Fluke series meters will typically read 1 MΩ to 2.4 MΩ while the CDI 511-60 meter will read about 5 MΩ.

(a) This reading will be only approximately 0.6-1.5 volts if the SCR inside the pack is not firing. You will read 100 to 200 volts depending upon your meter and the voltage generated by the stator if the SCR in the pack is firing out to the ignition coil (due to the bypass filter cap inside the pack).

(b) Voltage will drop below 1 volt when engine drops out of QuickStart (engine is over 104 Deg or 1200 RPM).

4. Check the center hub triggering magnet in the flywheel. A loose magnet can cause this problem.
5. Check the triggering and charge coil flywheel magnets for cracked, broken and loose magnets.
6. Check the cranking RPM. A cranking speed of less than 250-RPM will 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.

NO SPARK ON ONE CYLINDER:

1. Check the timer base's resistance and output (see NO SPARK ON ANY CYLINDER above).
2. Check the power pack resistance as given below:

Wire Color	(CYL)	Check to Wire Color	Resistance
Orange/Blue	(#1)	Blue	110 (a)
Orange/ Violet	(#2)	Violet	110 (a)
Orange/Green	(#3)	Green	110 (a)
White		Black (Engine Ground)	Shorted
Brown		Black (Engine Ground)	Open or M range
Brown/Yellow		Black (Engine Ground)	Open or M range

(a) Use a comparison reading as different brands of meters will give different readings. The typical range is 90 to 150 ohms 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.

3. Check the spark plug wires for breaks and abrasions.
4. Check the DVA output to the coils from the power pack while connected to the ignition coils. You should have a reading of at least 150V or more. If the reading is low on one cylinder, disconnect the orange wire from the ignition coil for that cylinder and reconnect it to a load resistor. Retest. If the reading is over 150V, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

Check to Wire Color	Cylinder
Orange/Blue	#1
Orange/Violet	#2
Orange/Green	#3

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 pack and retest. If the engine now performs properly, test and replace the defective temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.
4. Connect the engine to a fuel tank containing a 50:1 fuel/oil mix and disconnect the VRO sensor from the engine harness. Re-test. If the engine performs correctly, replace the VRO or VRO sensor.

ENGINE DIES WHEN QUICKSTART DROPS OUT:

Check ignition timing at idle with the White/Black temperature wire disconnected. You should see the timing in the range of 4° BTDC to 10° BTDC. Remember to allow for the 12-15 degree drop in ignition timing when Quick Start disengages. Verify ignition timing after engine has warmed up, according to the service manual. Typical timing ranges are given below.

HORSEPOWER	IDLE TIMING COLD	IDLE TIMING WARM	WOT TIMING
50	5-8° BTDC	6-10° ATDC	14-17° BTDC
60, 65WM, 70	6-11° BTDC	2-6° ATDC	14-17° BTDC

ENGINE WILL NOT STAY IN QUICKSTART OVER 10 SECONDS:

1. Verify the engine temperature is below the trip point (89 degrees on some engines and 104 degrees 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 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 over 1.5 volts but less than 7 volts 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.

ENGINE WILL NOT ENGAGE QUICKSTART:

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 about 6 to 12 volts DC voltage 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 pack and repeat the test. If the voltage still remains, replace the pack.

ENGINE ENGAGES S.L.O.W. (Limits at 2500 PM) 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 an VOM Meter, 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 the Cyl Head	0.500 (approximately)
Tan Lead From the Cyl Head	Tan pin in Engine Harness Connector	OL or over 1.0

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

ENGINE DROPS OUT AND BACK IN QUICKSTART AT IDLE:

1. Verify the spark plugs are the Champion QL77JC4 or QL78YC. These plugs are *INDUCTIVE* – NOT Resistive RF suppression.
2. Check the engine RPM,
3. 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 volts will not engage the starter solenoid, yet will engage Quick-Start.
4. 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.

TECHNICAL SERVICE BULLETIN

Reference Information OMC Outboard Service Bulletin 2276 Rev 1 April 1994

No. 032510
Mar, 2003

Subject:	**Engine Over-Heating**			
Make:	**Johnson & Evinrude**			
Horsepower:	**50 HP**	**60 HP**	**65 HP**	**70 HP**
Years:	**1986-94**	**1986-94**	**1987-94**	**1989-94**

Problem: The engine and electrical system can become damaged due to over-heating when air is trapped in the upper half of the cooling system. Trapped air can cause the upper cylinder or regulator/rectifier to overheat, resulting in damage to the piston or the regulator/rectifier (possibly burning out and damaging the stator also).
Air can become trapped when:
1. The engine is idling with a blocked or restricted thermostat bypass hole.
2. The engine is operated in aerated water, such as a pontoon or deck boat wakes.

Solution: Relocate the water pump indicator outlet tee (for the pee tube) from the side of the engine block to the top of the engine block. This allows air to be vented from the top of the cooling system and helps ensure an adequate water level when idling.

If the engine does not have a threaded hole located in the top of the cylinder block, please follow the steps below:

1. Remove the indicator hose from the outlet tee and discard it.
2. Remove the outlet tee.
3. Install a 1/8th NPT Brass pipe plug into the hole where the tee was located (use Gelseal on the threads).
4. Measure 2 inches forward from the rear corner of the exhaust manifold cover(ref “A”) and 1-3/8 inches from the exhaust cover gasket (ref “B”. Mark the intersection with a center punch (see figure 2).
5. Mark an 11/32nd (Letter “R”) drill bit ½ inch from the tip (to prevent damage to the water jacket) as a depth gauge. Grease the tip of the drill bit and drill a hole through the casting. The grease will help prevent metal shavings from entering the cooling system.
6. Grease the tip of an 1/8 inch NPT tap and thread the hole. Be careful to not over tap the hole (over tapping may not allow the adapter from sealing off).
7. Apply Gel Seal to the threads of the original tee and install it into the hole you just tapped. Position the tee so the nipple is facing the rear of the engine.
8. Install a new piece of 3/16th rubber hose (19 inches long) from the tee to the indicator.