

CDI Electronics®

Johnson/Evinrude Two Cylinder Engines 1977-2006 4-60 HP Models

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

NO SPARK ON ANY CYLINDER:

1. Disconnect the Black/Yellow stop wire AT THE POWER PACK and retest. If the engine's ignition has spark, the stop circuit has a fault. Check the key switch, harness and shift switch.
2. Disconnect the Yellow wires from the rectifier and retest. If the engine has spark, replace the rectifier.
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. Inspect and clean all engine and ignition ground connections.
5. Check the stator and timer base resistance and DVA output as given below:

WIRE	READ TO	RESISTANCE	DVA (Connected)	DVA (Disconnected)
Brown	Brown/Yellow	450-550	150-400 V	150-400 V (*)
Brown	Engine GND	Open	150-400 V	< 2 V (c)
Brown/Yellow	Engine GND	Open	150-400 V	< 2 V (c)
Orange	Orange/Black	450-550 (CDI 45-55)	11-22 V	45-120 V (*)
Black/White	White/Black	15-50	0.6 V +	0.6 V + (#)
Black/White	Engine GND	Open	150-400 V (b)	< 2 V (c)
White/Black	Engine GND	Open	150-400 V (b)	< 2 V (c)
Some engines use the following wiring on the timer base:				
White	Blue	15-50	100-400 V (a)	0.6 V + (#)
White	Green	15-50	100-400 V (a)	0.6 V + (#)
White	Engine GND	Shorted	N/A	N/A
Blue	Engine GND	25-30	100-400 V (a)	N/A
Green	Engine GND	25-30	100-400 V (a)	N/A

(*) 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 bad.

(a) Check stator DVA first. Then if timer base DVA is 0.6 - 2.5 V, the pack is faulty. If below 0.6 V or 2.6 - 99 V, the timer base is faulty.

(b) The trigger signal rides on top of the high voltage on these timer bases. Check stator DVA first. Then if timer base DVA is 0.6 - 2.5 V, the pack is faulty.

(c) Some meters will pickup static/stray electricity up to 2 volts.

6. **1988 and newer models:** Check the power pack resistance given below:

WIRE	(CYL)	READ TO	RESISTANCE
Orange/Blue	(#1)	Blue	110 (a)
Orange/Green	(#2)	Green	110 (a)
White		Black (Engine Ground)	Shorted
Brown & 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.

7. Check the DVA output on the Orange wires from the power pack while connected to the ignition coils. You should have a reading of at least 150V or more. If the readings are low, disconnect the Orange wires from the ignition coils and reconnect them to a load resistor. Retest. If the reading is now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.
8. Check the center hub triggering magnet in the flywheel. A loose magnet can cause this problem.
9. Check the triggering and charge coil flywheel magnets for cracked, broken and loose magnets.

NO SPARK ON ONE CYLINDER:

1. Check the timer base resistance and DVA output (see NO SPARK ON ANY CYLINDER above).
2. Swap the timer base wires and see if the problem follows a timer base wire.
3. Check the DVA output on the Orange wires from the power pack while connected to the ignition coils. You should have a reading of at least 150V or more while connected. 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 good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.
4. Visually inspect the ignition coils for burned or discolored areas and cracks in the casing (indicating arcing inside the coil).
5. Swap the ignition coil with one that is sparking correctly.
6. Rare causes include a weak trigger magnet. If possible, try another flywheel.

CDI Electronics®

POWER PACK OR TIMER BASE REPEATEDLY BLOWS ON SAME CYLINDER:

1. Check the timer base wires for shorts to engine ground as a shorted timer base wire can destroy a SCR inside the power pack.
2. In contrast, a shorted SCR inside the power pack can destroy a timer base coil. Check the timer base resistance and DVA output (see NO SPARK ON ANY CYLINDER above).
3. Replace the ignition coil on the cylinder dropping spark.

ENGINE WILL NOT SHUT OFF:

Disconnect the stop wire at the power pack. Connect a jumper wire to the stop wire from the pack and short it to engine ground. If this stops the pack from sparking, the stop circuit has a fault. Check the key switch, harness and shift switch. If this does not stop the pack from sparking, replace the power pack. Repeat test as necessary for additional packs.

WILL NOT ACCELERATE BEYOND 3000 RPM (Runs smooth below that RPM):

1. Disconnect the Yellow wires from the rectifier and retest. If the engine has good spark, replace the rectifier.
2. In the water or on a Dynameters, check the DVA output on the Orange wires from the power pack while connected to the ignition coils. You should have a reading of at least 150V or more, increasing with engine RPM until it reaches 300-400 volts. A sharp drop in voltage right before the miss becomes apparent will normally be caused by a bad stator. A drop on only one Orange wire will normally be the power pack.
3. Check the stator resistance. If it reads approximately 900 ohms, replace it with the 500 ohm design.

MISS AT ANY RPM:

1. Disconnect the Yellow wires from the stator to the rectifier and retest. If the miss clears, replace the rectifier.
2. In the water or on a Dynameters, check the DVA output on the Orange wires from the power pack while connected to the ignition coils. You should have a reading of at least 150V DVA or more, increasing with engine RPM until it reaches 300-400V 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 voltage (see NO SPARK ON ANY CYLINDER above).
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 triggering and charge coil flywheel magnets for cracked, broken and loose magnets.
6. Rotate the stator one bolt hole in either direction and retest.

Models with S.L.O.W.

ENGINE WILL NOT ACCELERATE BEYOND 2500 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, check the temperature switch, harness and vacuum sensor.
3. Make sure the Tan temperature switch wire is not located next to a spark plug wire (RF interference can activate the SLOW function).
4. Check the stator resistance. If it reads approximately 900 ohms, replace it with the 500 ohm design.