

# CDI Electronics®

## Johnson/Evinrude

### Two Cylinder Engines

#### 1971-1977 50-55 HP Models (With Screw Terminal Power Packs)

##### 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 now sparks, 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	OEM RESISTANCE	CDI RESISTANCE	DVA (Connected)	DVA (Disconnected)
Brown	Engine GND	400-600	400-600	150-400 V	150-400 V (*)
Black/White	White/Black	10-20	30-40	0.6 V +	0.6 V + (#)
Black/White	Engine GND	Open	Open	150-400 V (a)	N/A
White/Black	Engine GND	Open	Open	150-400 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 low – disconnect the stator wires and recheck the DVA output. If the reading stays low – 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) 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.

6. If the timer base output is low, you may try to reset the air gap between the timer base sensor and the triggering magnet. See below for resetting the air gap:
  - a) Loosen the two mounting screws on the sensor and the nut located in the epoxy on the outside of the heat shield of the timer base.
  - b) Slide the sensor in toward the crankshaft approximately 0.005" at a time.
  - c) Coat the face of the sensor with machinists bluing or equivalent.
  - d) Install the flywheel according to the service manual and crank the engine over.
  - e) Remove the flywheel and check to see if the triggering magnet struck the sensor face.
  - f) If the ignition sparked, finger tight the nut on the outside of the heat shield and coat it with RTV.
  - g) If still no spark, slide the sensor in another 0.005" and repeat steps c through f until the sensor strikes the triggering magnet. Then back the sensor off 0.005". A continued problem can indicate a bad sensor.
7. With another person's help, verify the triggering circuit inside the power pack as follows: Disconnect the timer base wires and using a good 1-1/2 volt battery (AA or larger), connect a jumper wire to each timer base terminal. Hold one jumper wire to the negative side of the battery. Have the other person crank the engine over and tap the remaining jumper wire to the positive side of the battery. (**Be careful not to touch the engine or stand in water as the triggering circuit is 'riding high' on the high voltage inside the power pack**). You should get a spark from the ignition coil with each tap. Reverse the connections to the battery and test again. If you get sparks from both tests, the power pack should be OK.
8. Check the DVA voltage on each timer base wire to engine ground. You should have a reading of at least 150V or more from the Black/White wire and the White/Black wire to engine ground (while connected to the pack). If the reading is low, disconnect the timer base wires from the pack and recheck the terminals ON THE PACK. If the voltage jumps up to an acceptable reading, the timer base may have a problem in its internal wiring (a thin spot in the insulation on one wire).
9. Check the center hub triggering magnet in the flywheel. A loose magnet can cause this problem.
10. Check the triggering and charge coil flywheel magnets for cracked, broken and loose magnets.

##### NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Check the timer base resistance and DVA output (see NO SPARK ON ANY CYLINDER above).
2. Check the timer base per steps #7 & #8 above.
3. Check the DVA output from the power pack. You should read at least 150V DVA while connected.
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.

##### 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.

# **CDI Electronics®**

## **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.

## **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.

