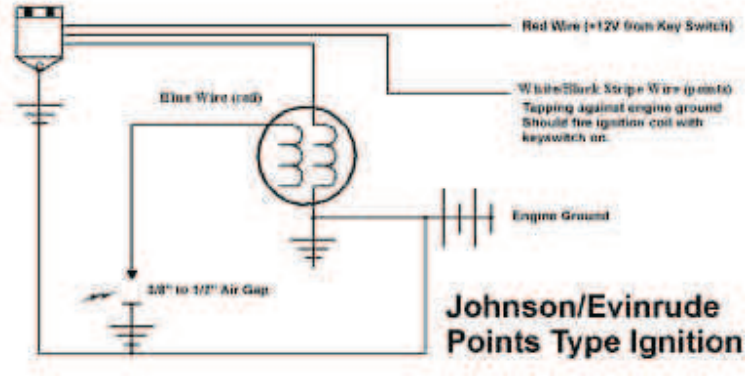
Johnson/Evinrude Troubleshooting
Battery CD Ignitions with Points

1. Clean all battery connections and engine grounds.
2. Check wiring as follows:

Pack Wire Color	Function
Red or Purple	12V from keyswitch
Blue	Positive to ignition coil
Black/White	To points
Black	Engine Ground

Engine Wiring Connections for Testing Ignition Module



3. Connect a spark gap tester to the high tension lead coming from the ignition coil and set it to approximately ½". When you crank the engine over, if it fires while the spark gap tester is connected to the coil and does not fire through the spark plug wires – there is a problem in the distributor cap, rotor button or spark plug wires.
4. Check voltage present on the purple wire at cranking. It MUST be at least 9½ volts. If not, there is a problem in the harness, key switch, starter or battery.
5. Check DVA voltage on the blue wire going to the coil, it should be approximately 200 volts at cranking.
6. Disconnect the white/black points wire. Turn the ignition switch on and strike the white/black points wire against engine ground. The unit should fire each time. If it does, this usually means the CD module is good. Check the points, points plate and grounding wire for the points.
7. Connect a spark gap tester to the high-tension leads coming from the distributor cap and set the gap to approximately 7/16". Align the rotor with #1 spark plug wire. Turn the ignition switch on and strike the white/black points wire against engine ground. Only the #1 spark plug wire should fire. If another spark plug wire has fire, there is a problem in the distributor cap. Repeat the test for the other cylinders.
8. Check the battery voltage at approximately 3500-RPM, MAXIMUM reading allowable is 16 volts. Over 16 volts will damage the ignition. Check for loose connections or a bad battery. Maintenance free batteries are **NOT** recommended for this application.

Johnson/Evinrude
Prestolite Battery Ignitions with Pickup Sensors

1. Clean all battery connections and engine grounds.
2. Check wiring as follows:

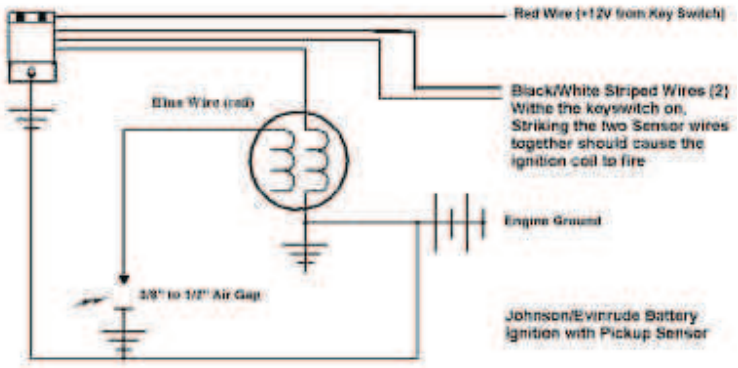
Except 1967

Pack Wire Color	Function
Red or Purple	12V from keyswitch
Blue	Positive to ignition coil
Black/White (2)	To trigger sensor
Black	Engine Ground
Green/Black*	Anti-reverse Spring

1967

Pack Wire Color	Function
Red or Purple	12V from keyswitch
Green	Positive to ignition coil
Blue (2)	To trigger sensor
Black	Engine Ground
Green/Black*	Anti-reverse Spring

* Some engines had this wire on the sensor plate.



3. Connect a spark gap tester to the high tension lead coming from the ignition coil and set it to approximately ½". When you crank the engine over, if it fires while the spark gap tester is connected to the coil and does not fire through the spark plug wires – there is a problem in the distributor cap, rotor button or spark plug wires.
4. Check voltage present on the Purple (or Red) wire at cranking. It MUST be at least 9½ volts. If not, there is a problem in the harness, key switch, starter or battery.
5. Check DVA voltage on the Blue (or Green) wire going to the coil, it should be approximately 200 volts at cranking.
6. Disconnect the sensor wires. Turn the ignition switch on and strike the sensor wires together. The unit should fire each time. If it does, this usually means the CD module is good. Check the sensor and sensor air gap.
7. Make sure the triggering ring is the correct one for the type ignition being used. Phase II ignitions require the sensor with wide gaps between the lobes.

8. Reset the sensor air gap to 0.020 in. If this allows the pack to fire, leave the gap at that setting.
9. Connect a spark gap tester to the high-tension leads coming from the distributor cap and set the gap to approximately 7/16". Align the rotor with #1 spark plug wire. Turn the ignition switch on and strike the sensor's wires together. Only the #1 spark plug wire should fire. If any of the other spark plug wires have fire, there is a problem in the distributor cap. Repeat the test for the other cylinders.
10. Check the battery voltage at approximately 3500-RPM, MAXIMUM reading allowable is 16 volts. Over 16 volts will damage the ignition. Check for loose connections or a bad battery. Maintenance free batteries are **NOT** recommended for this application.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions

1972-1978 Engines

(With screw terminal type power packs)

Two Cylinder Engines

No Fire at All:

1. Disconnect the black yellow kill wire and retest. If the engine's ignition has fire, the kill circuit has a fault-check the key switch, harness and shift switch.
2. Check the stator resistance. You should read approximately 500 ohms from the brown wire to engine ground.
3. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to engine ground (while connected to the pack).
4. Check the timer base's resistance from the black/white wire to the white/black wire. Reading should be 10-20 ohms. Note: The original factory specifications was 8-14 ohms, this was changed around the mid to late 1970's.
5. Check the DVA output from the timer base. A reading of at least 0.5V or more from the black/white wire to the white/black (while connected to the pack) is needed to fire the pack. If the output is low, you may try to reset the air gap between the timer base sensor and the triggering magnet.
    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 trigging magnet struck the sensor face.
    f) If the ignition fired, finger tight the nut on the outside of the heat shield and coat it with RTV.
    g) If still no fire, slide the sensor in another 0.005" and repeat steps c through f.
6. Check the DVA voltage on each trigger 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 trigger 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 it's internal wiring (A thin spot in the insulation on one wire).
7. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

No fire on One Cylinder:

Either a faulty power pack or ignition coil normally causes this. Extremely rare causes include a weak trigger magnet in the flywheel or a timer base.

Three Cylinder Engines

No Fire at All:

Note: If the ignition only fires with the spark plugs out, the timer base is likely weak or the engine is not spinning fast enough. See # 6 and #8.

1. Disconnect the black yellow kill wire and retest. If the engine's ignition has fire, the kill circuit has a fault-check the key switch, harness and 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 resistance. You should read approximately 500 ohms from the brown wire to the brown/yellow wire.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack).
5. Check the timer base's resistance from the black/white wire to the white/black wires. Reading should be 10-20 ohms.
6. Check the DVA output from the timer base. A reading of at least 0.5V or more is needed from the black/white wire to the white/black wires (while connected to the pack) to fire the pack. If the output is low, you may try to reset the air gap between the timer base sensor and the triggering magnet using a Sensor Gap Gauge (553-9702) or use the following procedure outlined below.
    a) Loosen the two mounting screws on the sensors and the nuts located in the epoxy on the outside of the heat shield of the timer base.
    b) Slide the sensors in toward the crankshaft until the sensor touches the stop boss located at the base of the sensor mounting area. Tighten the mounting screws.
    c) Coat the face of the sensor with machinists bluing or equivalent.
    d) Install the flywheel without the key and rotate the flywheel at least one full turn.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions

1972-1978 Engines

(Three Cylinder Engines with screw terminal type power packs, continued..)

e) Remove the flywheel and check to see if the trigging magnet struck the sensor face. If it did, back the sensor out approximately 0.005" and repeat steps C, D and E.
f) If the ignition fired, finger tight the nut on the outside of the heat shield and coat it with RTV.
g) If still no fire, replace the sensor.

7. Check the DVA voltage on the black/white wire to engine ground. You should have a reading of at least 150V or more (while connected to the pack). If the reading is low, disconnect the trigger wires from the pack and recheck the black/white terminal on the pack. If the voltage jumps up to an acceptable reading, the timer base may have a problem in the internal wiring (A thin spot in the insulation on one wire).
8. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

No fire or Intermittent on One Cylinder:

1. Check the timer base resistance from the black/white wire to the white/black wires. Reading should be 10-20 ohms.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more is needed from the black/white wire to the white/black wires (while connected to the pack) to fire the pack.
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. 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.

Four Cylinder Engines

No Fire at All:

(Note: If the engine fires with the spark plugs out but not with them installed, the timer base is either weak or the engine is not spinning fast enough. See # 6 and #8.)

1. Disconnect the black yellow kill wire and retest. If the engines' 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 resistance. You should read approximately 500 ohms from the brown wire to the brown/yellow wire.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack).
5. Check the timer bases resistance from the #1 sensor wire to the #3 sensor wire, and from the #2 sensor wire to the #4 sensor wire. Reading should be 10-20 ohms on each set.
6. Check the DVA output from the timer base. A reading of at least 0.5V or more from the #1 sensor wire to the #3 sensor wire, and from the #2 sensor wire to the #4 sensor wire (while connected to the pack) is needed to fire the pack. If the output is low, you may try to reset the air gap between the timer base sensor and the triggering magnet using a Sensor Gap Gauge (553-9702) or use the following procedure:
    a) Loosen the two mounting screws on the sensors and the nuts located in the epoxy on the outside of the heat shield of the timer base.
    b) Slide the sensors in toward the crankshaft until the sensor touches the stop boss located at the base of the sensor mounting area. Tighten the mounting screws.
    c) Coat the face of the sensors with machinists bluing or equivalent.
    d) Install the flywheel without the key and rotate the flywheel at least one full turn.
    e) Remove the flywheel and check to see if the trigging magnet struck the face of the sensors. If it did, back the sensor out approximately 0.005" and repeat steps c, d and e.
    f) If the ignition fired, finger tight the nuts on the outside of the heat shield and coat them with RTV.
    g) If still no fire, replace the sensor.

7. Check the DVA voltage on each black/white wire to engine ground. You should have a reading of at least 150V or more (while connected to the pack). If the reading is low, disconnect the trigger wires from the pack and recheck the black/white terminals on the pack. If the voltage jumps up to an acceptable reading, the timer base may have a problem in the internal wiring (possibly a thin spot in the insulation on one wire).
8. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions

1972-1978 Engines

(With screw terminal type power packs)

Four Cylinder Engines (Continued)

No fire or Intermittent on One Cylinder:

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 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.

No fire or Intermittent on One Bank:

1. Check the timer base's resistance from the #1 sensor wire to the #3 sensor wire, and from the #2 sensor wire to the #4 sensor wire. Reading should be 10-20 ohms on each set.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the #1 sensor wire to the #3 sensor wire, and from the #2 sensor wire to the #4 sensor wire (while connected to the pack) is needed to fire the pack. If the output is low, you may try to reset the air gap between the timer base sensor and the triggering magnet using a sensor gap gauge or use the procedure outlined in #6 above.
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. 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

Six Cylinder Engines

Note: If the engine fires with the spark plugs out but not with them installed, the timer base is likely weak or the engine is not spinning fast enough. See # 6 and #8.

1. Disconnect the black/yellow kill wire and retest. If the engine's ignition has fire, the kill circuit has a fault, check the key switch, harness and 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 resistance. You should read approximately 500 ohms from the brown wire to the brown/yellow wire.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack) on each bank.
5. Check the timer base's resistance from the white wire to the blue, green and purple wires. Reading should be 10-20 ohms.
6. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green and purple wires (while connected to the pack) is needed to fire the pack.
7. Check the DVA voltage on the white wire to engine ground. You should have a reading of at least 150V or more (while connected to the pack). If the reading is low, disconnect the trigger wires from the pack and recheck the white terminal on the pack. If the voltage jumps up to an acceptable reading, the timer base may have a problem in the internal wiring (possibly a thin spot in the insulation on one wire).
8. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.

No fire or Intermittent on One Cylinder:

1. Check the timer bases resistance from the white wire to the blue, green and purple wires. Reading should be 10-20 ohms.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green and purple wires (while connected to the pack) is needed to fire the pack.
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. 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions

1978-2002

Two Stroke/Except Ficht

Two Cylinder Engines

No Fire at All:

1. Disconnect the black/yellow kill wire and retest. If the engine's ignition has fire, the kill circuit has a fault-check the key switch, harness and shift switch.
2. Check the stator resistance. You should read approximately 500 ohms from the brown wire to engine ground. (See DVA Charts).
3. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to brown/yellow (while connected to the pack).
4. Check the timer base's resistance from the black/white wire to the white/black wire. Reading should be 10-20 ohms or 38-42 ohms.
5. Check the DVA output from the timer base. A reading of at least 0.5V or more from the black/white wire to the white/black (while connected to the pack) is needed to fire the pack.
6. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.
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 load resistors. Retest. If the reading is now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

No fire on One Cylinder:

Either a faulty power pack or ignition coil normally causes this problem. Rare cases include a weak trigger magnet in the flywheel or a timer base.

Engines with S.L.O.W.

Engine will not rev 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.

Three Cylinder Engines

(Except Quick Start Models)

No Fire at All:

1. Disconnect the black/yellow kill wire and retest. If the engine's ignition has fire, the kill circuit has a fault-check the key switch, harness and shift switch.
2. Disconnect the yellow wires from the stator to the rectifier and retest. If the ignition now fires, replace the rectifier.
3. Check the stator resistance. You should read approximately 500 ohms from the brown wire to the brown/yellow wire. (See DVA Charts).
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack).
5. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.
6. Check the timer base's resistance from the white wire to the blue, green and purple wires. Reading should be 38-42 ohms.
7. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green and purple wires (while connected to the pack) is needed to fire the pack.
8. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

Johnson/Evinrude Troubleshooting
Alternator Driven CD Ignitions 1978-2002
(Three Cylinder Engines Continued…)

No fire or Intermittent on One Cylinder:
1. Check the timer bases resistance from the white wire to the blue, green and purple wires. Reading should be 38-42 ohms.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green and purple wires (while connected to the pack) is needed to fire the pack.
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. 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

Models with S.L.O.W.

Engine will not rev 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.

Three Cylinder Engines
(Quick Start Models)

1. Disconnect the black/yellow kill wire and retest. If the engine's ignition 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 ignition now fires, replace the rectifier.
3. Check the stator resistance. You should read approximately 550 ohms from the brown wire to the brown/yellow wire and 100 ohms or 500 ohms from the orange to orange/black.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire and at least 12V or more from the orange to orange/black (while connected to the pack).
5. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.
6. Check the timer base's resistance from the White wire to the Blue, Green and Purple wires. Reading should be 1.4 to 2.2 M ohms when read using the Fluke meter's Red lead to the White wire.
7. Check the DVA output from the timer base. A reading of at least 0.5V or more from the White wire to the Blue, Green and Purple wires (while connected to the pack) is needed to fire the pack.
8. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

No fire or intermittent on One Cylinder:
1. Check the timer bases resistance from the white wire to the blue, green and purple wires. Reading should be 1.4 to 2.2 M ohms.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the White wire to the Blue, Green and Purple wires (while connected to the pack) is needed to fire the pack.
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. 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

Models with S.L.O.W.

Engine will not rev 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions 1978-2002

Four Cylinder Engines (Except Quick Start Models)

No Fire at All:

1. Disconnect the black/yellow kill wire and retest. If the engine's ignition 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 resistance. You should read approximately 500 ohms from the brown wire to the brown/yellow wire.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack).
5. Check the timer base's resistance from the white wire to the blue, green, pink and purple wires. Reading should be 38-42 ohms.
6. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green, pink and purple wires (while connected to the pack) is needed to fire the pack.
7. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

No fire or Intermittent on One Cylinder:

1. Check the timer base's resistance from the white wire to the blue, green, pink and purple wires. Reading should be 38-42 ohms.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green, pink and purple wires (while connected to the pack) is needed to fire the pack.
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. 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

No fire or Intermittent on One Bank:

1. Check the stator resistance. You should read approximately 500 ohms from the brown wire to the brown/yellow wire.
2. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack). Also check DVA to engine ground from each brown wire and compare the readings. If one wire reads low while connected to the pack, swap the connections and see if the low reading stays on the same stator wire. If it does, the stator is bad.
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. If the reading is low on one bank, disconnect the orange wires from the ignition coil for that bank and reconnect them to a load resistor. Retest. If the reading is now good, one or both of the ignition coils are likely bad. A continued low reading indicates a bad power pack.

Models with S.L.O.W.

Engine will not rev 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.

Johnson/Evinrude Troubleshooting
Alternator Driven CD Ignitions 1978-2002
Four Cylinder Engines (Quick Start Models)

No Fire at All:

1. Disconnect the black/yellow kill wire and retest. If the engine's ignition 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 resistance. You should read approximately 1000 ohms from the brown wire to the brown/yellow wire and 100 ohms from the orange to orange/black.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack).
5. Check the timer base's resistance from the white wire to the blue, green, pink and purple wires. Reading should be 1.4 to 2.2 M ohms. Resistance from the white wire to the wires in the other connector should be approximately 120 ohms on each.
6. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green, pink and purple wires (while connected to the pack) is needed to fire the pack.
7. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

No fire or Intermittent on One Cylinder:

1. Check the timer base's resistance from the white wire to the blue, green, pink and purple wires. Reading should be 38-42 ohms.
2. Disconnect the white/black temperature wire and retest. If all cylinders now fire, replace the timer base.
3. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green, pink and purple wires (while connected to the pack) is needed to fire the pack.
4. 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 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

Models with S.L.O.W.

Engine will not rev 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.

Six and Eight Cylinder Engines
Quick Start Models

Note: These engines usually have a 35 Amp battery charging capacity. Due to the size and weight of the flywheel magnets, it is highly recommended that you check to make sure the magnets are still tight in the flywheel before you service the engine. A loose or broken magnet can be deadly to you or your pocketbook.

No Fire at All:

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 resistance. You should read approximately 1000 ohms from the brown wire to the brown/yellow wires and 100 ohms from the orange to orange/black.
4. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack) on each bank and at least 12V or more from the orange to orange/black.
5. Check the timer base's resistance from the white wire to the blue, green and purple wires. Reading should be approximately the same on all (typically 1 to 2 M ohms). If the readings are off, reverse the meter leads and retest to see if the readings are corrected.
6. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green and purple wires (while connected to the pack) is needed to fire the pack.
7. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions 1978-2002

Six and Eight Cylinder Engines (Continued)

No fire or Intermittent on One Cylinder:

1. Check the timer base's resistance from the white wire to the blue, green and purple wires. Reading should be approximately the same on all (typically 1 to 2 M ohms). If the readings are off, reverse the meter leads and retest to see if the readings are corrected.
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the white wire to the blue, green and purple wires (while connected to the pack) is needed to fire the pack.
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. 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 now good, the ignition coil is likely bad. A continued low reading indicates a bad power pack.

No fire or Intermittent on One Bank:

1. Check the stator resistance. You should read approximately 1000 ohms from the brown wire to the brown/yellow wires and 100 ohms from the orange to orange/black.
2. Check the DVA output from the stator. You should have a reading of at least 150V or more from the brown wire to the brown/yellow wire (while connected to the pack) on each bank.
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. If the reading is low on one bank, disconnect the orange wires from the ignition coil for that bank and reconnect them to a load resistor. Retest. If the reading is now good, one or both of the ignition coils are likely bad. A continued low reading indicates a bad power pack.

Models with S.L.O.W.

Engine will not rev 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.

Troubleshooting the Johnson/Evinrude 60° 6 Cylinder Ignition (OIS 2000)
1991-2003 Model Years

Due to the differences in this ignition system, troubleshooting can be somewhat difficult if you are not familiar with the design. The other Johnson/Evinrude QuickStart ignitions use stator charge coils and a power coil to provide high voltage and power for the QuickStart and rev limiter circuits. They require a timer base for triggering and use separate magnets for the high voltage and triggering the timer base. The OIS 2000 Optical system uses the stator charge coils to provide high voltage for the firing of the ignition coils *and* a *power coil to provide power for the electronics, both inside the power pack and inside the sensor.* The other QuickStart models will run the engine without the power coil being connected (of course this will burn out the control circuits inside the power pack). The OIS 2000 ignition has to have the power coil supplying power in order to operate the QuickStart, S.L.O.W., rev limiter, and fire the coils beyond cranking speed. The optical sensor located on the top is fed power from the power pack and sends crankshaft position, cylinder location and direction of rotation back to the power pack. The pack is smart enough to know not to fire if the engine is not turning in the right direction. S.L.O.W. functions reduce the engine RPM to approximately 2500 when the engine over-heats or the no oil warning is activated. QuickStart (a 10° timing advance) activates as long as the engine RPM is below 1100, the engine temperature is below 105° F and the Yellow/Red wire from the starter solenoid is not feeding 12V DC to the power pack all of the time. QuickStart will also activate for 5-10 seconds each time the engine is started regardless of engine temperature. CDI Electronics (blue case with red sleeve) power packs have a built-in feature to compensate for a shorted cold sensor, allowing the engine to come out of QuickStart after 5 minutes of running time regardless of the condition of the cold sensor. At cranking speed the voltage from the stator may not be enough to operate the circuits inside the power pack, therefore there is battery voltage supplied from the starter solenoid via the yellow/red striped wire. The extra voltage is needed in order for the optical sensor to operate correctly as low voltage from the battery and/or stator can cause intermittent or no fire at all. There are a couple of critical items you should be aware of on these engines. First, the spark plug wires have to be the Gray *inductive* resistor wires – these are NOT automotive wires. Secondly, the spark plugs should be the factory recommended QL78YC. Use of other spark plugs or wires can cause problems inside the power pack from RFI and MFI noise. CDI Electronics has the spark plug wires available as a set, P/N: 931-4921.

A breakthrough at CDI Electronics has allowed the use of microprocessor digital control circuits to handle the timing, QuickStart, S.L.O.W., rev limiter and data logging inside the power pack. This allows the timing to be set using a timing light, remote starter, spark gap tester, piston stop tool and a jumper wire. With these new digital power packs, you disconnect the port temperature switch/sensor leads and use a jumper wire to short the tan temperature sensor wire to engine ground. Once you have verified the timing pointer using a piston stop tool (Or a dial indicator), connect all spark plug wires to a spark gap tester, connect a remote starter to the engine and a timing light to # 1 spark plug wire. When you crank the engine over with the remote starter and check the timing, you should see the timing is set to approximately 4°-6° ATDC (After Top Dead Center). By advancing the throttle all the way and rechecking the timing for WOT (Wide Open Throttle), you should see approximately 19° - 20° BTDC (Before Top Dead Center) Without this timing feature built into the power pack, you would not be able to easily set the timing for idle or WOT without a optical diagnostic tool. Additional advantages offered by the digital circuitry include the ability to compensate for a bad temperature switch, a smoother rev limit, customized rev limiters and special timing curves.

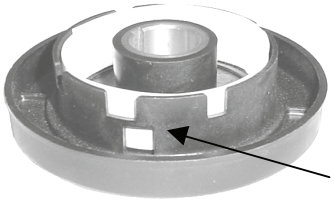
Additional items to be aware of:

1. Early 150 and 175 HP engines did not have the tension washer on top of the sensor encoder wheel. This washer is necessary to keep the encoder locked in place. If it is not on the engine, you may experience erratic firing of the cylinders or no fire at all. If it is missing, be sure to install the correct washer.
2. 1991 and 1992 engines did not have a shift interrupter switch. This resulted in hard shifting and required a conversion to resolve this problem.
3. The shift interrupter switch killed the fire on the starboard bank of cylinders from 1993 thru mid 1990's. By 1998, a change was made for the shift interrupter switch to kill the fire on the Port bank.
4. 1991 through late 1990's engines occasionally developed a crack in the water jacket allowing water into the intake at high speed. This typically resulted in # 1 cylinder ingesting water. You can usually see signs of this because the head looks like it has been steam cleaned inside the combustion chamber.
5. 1991 and 1992 engines came out with a Black sleeved power pack (P/N 584122) and stator (P/N 584109) and used a P/N 584265 sensor. In 1993 the power packs were changed to a Gray sleeve (Production) power pack (P/N 584910). The stator was changed to a Gray sleeve (P/N 584981) and the sensor was changed to P/N 584914. Engines with ignition problems had a service replacement power pack with a blue sleeve and a replacement sensor installed as a set. The Blue sleeved power pack was only available as a service replacement. The Gray sleeved stator could be used with all of the power packs, but the Black sleeved stator was to be used only with a Black sleeved power pack. The sensor P/N changed to 586343 in the late 1990's.

6. Some engines do not have the RFI/MFI noise shield between the ignition coils and the power pack. If it is missing, replace it.
7. The Gray inductive spark plug wires replaced the Black copper spark plug wires that were used on the early 1990's engines.
8. Originally the spark plugs were the QL82YC, but that recommendation was changed to the QL78YC for improved performance.

NO FIRE AT ALL:

1. Check the kill lanyard and key-switch position.
2. Verify the engine rotation (The engine needs to be turning in a clockwise direction).
3. Check the power pack and ignition coil ground wires for corrosion and tightness.
4. Connect a spark gap tester to all cylinders.
5. Disconnect the boat side harness and connect a remote starter unit. Check for spark. If the engine has spark, check the boat side harness's Black/Yellow wire for shorts to ground.
6. Disconnect the 5-pin connector on the port side of the power pack and see if the spark returns. If it does, use the Fluke meter set to Ohms and see if the Black/Yellow wires are shorted to engine ground.
7. Check the battery voltage on the Yellow/Red striped wire while cranking the engine. If below 11 volts, charge the battery or check all battery cables.
8. Remove the sensor wheel and check for damage, especially where the top slots are located. Sometimes the wheels will break out where the windows overlap.



(This area is the most common breakout location)

9. Check the 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.
10. Disconnect the voltage regulator/rectifier and retest. If the engine now has spark, replace the regulator/rectifier.
11. Using the Piercing Probes, check the resistance, then check the DVA voltage on the 6 pin stator connector while connected as follows:

Red Lead	Black Lead	Resistance	DVA Reading
Orange	Orange/Black	50-60 ohms	12 V or more
Brown	Brown/Yellow	450-600 ohms	150V or more
Brown/White	Brown/Black	450-600 ohms	150V or more

Note: Low readings on all checks indicate a possible problem with the flywheel magnets that require checking.

Service note: It is recommended that liquid neoprene be applied to the areas where the piercing probes were used.

12. If all the tests so far show good readings, check the DVA output from the power pack on the primary coil wires as follows:

Red Lead	Black Lead	DVA Reading
Orange/Blue	Engine Ground	130 V or more
Orange	Engine Ground	130 V or more
Orange/Green	Engine Ground	130 V or more

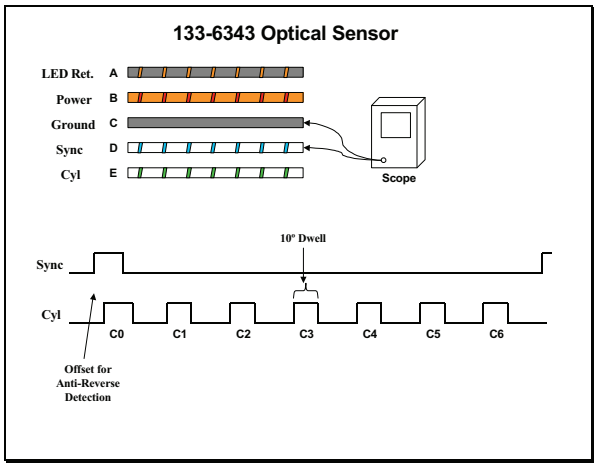
Note: If the DVA values are below these specifications, the power pack or sensor is likely bad.

13. Check the DVA voltage on the Black/Orange and Orange/Red sensors leads as follows:

Red Lead	Black Lead	DVA Reading
Orange/Red	Engine Ground	12 V or more
Black/Orange	Engine Ground	12 V or more

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

14. If an oscilloscope is available, check the white/blue (crank position signal) and white/green (cylinder position signal) sensor wires while connected to the sensor. With the engine cranking over, you should see a square toothed pattern on both wires. The white/blue wire should show 1 pulse per revolution and the white/green should show 7 pulses per revolution of the engine. See chart below.



a. Led Power – Black/Orange
b. Power – Orange Red
c. Ground – Black
d. Sync – White/Blue Stripe
e. Cyl – White/Green

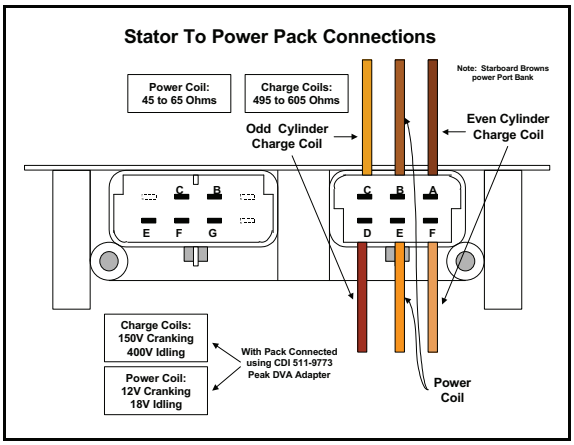
No Spark on One Bank of Cylinders:

1. Using the Piercing Probes and DVA adapter, check the resistance and DVA voltage for the bank without spark on the 6 pin stator connector while connected as follows:

Red Lead	Black Lead	Ohms Resistance	DVA	Bank/Cyl
Brown	Brown/Yellow	450-600 ohms	150V +	Stbd (1,3,5)
Brown/White	Brown/Black	450-600 ohms	150V +	Port (2,4,6)

NOTE: If the power pack has no spark on one bank and the readings are good, replace the power pack.

2. Disconnect the 5-pin connector on the port side of the power pack and see if the spark returns. If it does, use the Fluke meter set to Ohms and see if the Black/Yellow or Black/Orange wire is shorted to engine ground. Check to see if the Shift Interrupter switch is located in the circuit where there is no spark.



6 Pin Connector

a) Brown/Black
b) Orange/Black
c) Brown/Yellow
d) Brown
e) Orange
f) Brown/White

Troubleshooting the Johnson/Evinrude 60° 6 Cylinder Ignition (OIS 2000)
1991-2003 Model Years (Continued)

High Speed Miss:

1. If the engine runs fine until you get above 4900 RPM and then starts missing, check the Orange to Orange/Black power coil wires with an oscilloscope (If available) or replace the pack. A breakdown inside the pack could cause RFI noise to activate the rev limiter for no apparent reason.
2. Using the Piercing Probes and DVA adapter, check the DVA voltage at the RPM where the problem is occurring while connected as follows:

Red Lead	Black Lead	DVA	Bank/Cylinder
Brown	Brown/Yellow	150V +	Starboard (1,3,5)
Brown/White	Brown/Black	150V +	Port (2,4,6)

NOTE: The readings should rapidly increase as the engine RPM increases and stabilize below 400 volts (voltage exceeding 400 V DVA indicates a bad pack). A sharp drop in voltage right before the miss becomes apparent usually indicates a bad stator charge coil.

3. Connect an inductive tachometer to the spark plug wires one at a time and compare the readings. If most of the cylinders show the same reading and one or two show different readings, check the primary wires with the inductive pickup to see if the readings are the same coming out of the power pack. A difference in readings between the primary and secondary coil wires indicate bad ignition wires. No difference indicates a bad power pack.

Will Not Rev Above Idle Speed or Only Has Spark as Long as the Starter Solenoid is Activated:

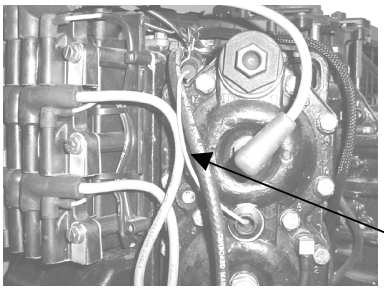
Using the Piercing Probes and DVA adapter, check the DVA voltage while connected as follows:

Red Lead	Black Lead	DVA
Orange	Orange/Black	11-24V

NOTE: The readings should rapidly increase as the engine RPM increases and stabilize below 24 volts (voltage exceeding 24 V DVA indicates a bad pack). A sharp drop in voltage right before the miss becomes apparent usually indicates a bad stator winding. A sharp drop in voltage when you let off of the starter solenoid indicates a bad power coil on the stator.

Engine Will Not Rev Above 2500 RPM *and Shakes Hard* (SLOW Activated):

1. Verify the engine is not actually over-heating by using a digital pyrometer.
2. Check the routing of the tan temperature wires, an example of a bad location is shown below. The tan wires have to be located as far away as possible from the spark plug wires.


(Unacceptable routing for the temp wire.)

3. Disconnect the temperature sensors and see if the engine performs normally. If it does, check both temperature sensors and replace the defective one.
4. If there is not any indication of a problem at this point, replace the power pack.

Engine stays in QuickStart All of the Time:

Check the Yellow/Red wire for 12 volts while the engine is running. You should only see voltage on this wire while the starter solenoid is engaged.