Contents

Recommended Marine Shop Electrical Test Equipment and Tools

The following is a listing of tools available from CDI Electronics and recommended for testing late model engines:

Part Number	Description	Remarks/Use
511-9764	Neon Spark Tester	Sealed single cylinder has removable ground clamp can be used for running tests
511-9766	Sealed Spark Gap Tester	Allows for testing up to 8 cylinder for cranking tests. Sealed design reduces the chance of engine fire.
511-9770	Piercing Probes	Allows access to wires for testing without removing the connection. Tiny hole usually reseals itself.
511-9773 .	DVA (Peak Voltage)Adapter	Unit automatically compensates for polarity. Can be used with most quality Multimeters
511-9775	Load Resistor	Used to load the output of ignition modules when testing ignition coils.
518-33A	CDI 33 Meter Includes 511-9773 DVA Adapter	Meter has voltage, amperage, diode check and ohms DVA Adapter allows meter to read peak voltage
518-80TK	Fluke Temperature Adapter	Works with most digital Multimeters capable of reading millivolts.
520-ST80	DC Inductive Timing Light	DC Powered timing light with a very bright strobe light.
551-33GF	Gearcase Filler w/Check Valve	Universal design makes filling lower units easier. Check valve assembly helps prevent oil spills and makes filling easier.
551-34PV	Pressure/Vacuum Tester	Repairable metal combination unit does both vacuum and pressure testing.
551-5110	Flywheel Holder	Longer handle helps during use.
551-9765	Spark Plug Wire Puller	Grounded design reduces the chances of shocking.
553-2700	Amphenol Pin Tool Set	Set contains 1 each of 553-2697 (Insertion), 553-2698 (Pin Removal) and 553-2699 (Socket Removal)
553-9702	Sensor Gap Gauge Tool	Used to set the timer-base air gap on 1973-1978 OMC 3 and 4 cylinder engines with screw terminal power packs.
554-9706	Amp Pin Removal Tool	Used to remove the connector pins in the ignition system on Chrysler/Force engines using the Prestolite type ignitions. Also used on the Mercury TPI sensor connectors.
911-9783	Bullet Connector Kit	Contains 10 pieces each of the male, female and sleeves.
912-9708	Marine Terminal Kit	Contains 100+ pieces of hard to find terminals and heat shrink.
991-9705	Dielectric Grease	Use to keep water and corrosion out of connectors.
511-6996	Remote Starter For OMC	Used to replace the boat-side harness for engine testing, Fits most OMC engines 1969 to 2000.
511-7900	Remote Starter for Mercury	Used to replace the boat-side harness for engine testing, Fits most Mercury engines 1979 to 2000.
519-LB85	Load Bank	Used to load the battery when testing the battery charging output.

Optional Equipment

511-4017	OMC Optical Sensor Tester	Unique handheld tester that will efficiently test the optical ignition sensor.
511-0401	CDI 2 Cylinder Ignition Tester	New hand-held ignition tester generates high-voltage stator and low voltage trigger signals to test a variety of 2 cylinder ignition systems. Engine specific adapters are required. Includes 511-0402, 511-0403 and 511-0404 adapters.
520-ST84	Ferret Ultra Bright Timing Light	Ultra bright timing light is visible in bright sunlight. Also has a built-in tachometer for 2 and 4 stroke engines. This feature is a valuable diagnostic tool when troubleshooting ignition system problems.

Tricks to Testing with Minimal Test Equipment

All Engines

Please keep detailed records when you repair an engine. If an engine comes in with one cylinder not firing, mark which one on the work order/history.

Intermittent Firing: This problem can be very hard to isolate. A good inductive tachometer can be used to compare the RPM on all cylinders up through WOT (wide-open throttle). A significant difference in the RPM readings can help pinpoint a problem quickly.

Visually Check the Stator, Trigger, Rectifier/Regulator and Flywheel: Cracks, burned areas and bubbles in or on the components indicate a problem. If the battery charge windings on the stator are dark brown, black or burned on most or all of the posts, the rectifier/regulator is likely shorted as well. Any sign of rubbing on the outside of the stator indicates a problem in the upper or lower main bearings. A cracked trigger or outer charging magnets can cause many problems ranging from misfiring to no fire at all. Loose flywheel magnets can be dangerous, check the tightness of the bonding adhesive.

Rectifier/Regulators can cause problems ranging from a high-speed miss to a total shutdown. An easy check is to disconnect the stator leads to the rectifier (Make sure to insulate them) and retest. If the problem is gone – replace the rectifier/regulator.

Johnson/Evinrude

Open Timer Bases: When all cylinders fire with the spark plugs out, but will not with them installed, try re-gapping the sensors using P/N: 553-9702 Gap Gauge. (See the section on OMC ADI Ignitions page 22-24).

Engines with S.L.O.W. Features: If the customer is complaining that the engine won't rev up and shakes real bad, the S.L.O.W. function could be activating. If the engine is NOT overheating, a temperature sensor or VRO sensor failing early can cause this problem. Disconnect the TAN wires *at the power pack* and retest. If the engine performs normally, reconnect the tan wires one at a time until the problem recurs, then replace the last sensor you connected. Make sure that all of the TAN wires are located as far as possible from the spark plug wires. Also check the blocking diode in the engine harness.

Mercury 6 Cylinder Engines with ADI Ignitions

If more than one cylinder is not firing: Replace BOTH switch boxes unless you can pin the problem down to the trigger. Replacing just one switch box can result in damage to the engine if the remaining switch box on the engine has a problem in the bias circuit.

Always check the bias circuit: Disconnect the White/Black jumper between the switch boxes and check the resistance from the White/Black terminal on each switch box to engine ground. You should read 12-15,000 ohms on stock switch boxes, and 9,000-9,800 ohms on racing switch boxes. MAKE SURE THE READING IS THE SAME ON BOTH SWITCH BOXES! Any problem with the bias circuit and BOTH switch boxes must be replaced as a set.

No Fire on 1, 3, 5 or 2, 4, 6: Swap the stator leads from one switch box to the other. If the problem moves, replace the stator. If the problem remains on the same cylinders, replace the switch box. If the stator is replaced and the problem is still present, try another flywheel.

No Fire on One Cylinder: This can be caused by a defective blocking diode in the other switch box. Disconnect the White/Black jumper between the switch boxes and retest. If all cylinders are now firing, replace the switch box that was originally firing all three cylinders. To verify this condition, swap the trigger leads on the switch box that was originally firing all three cylinders. If the misfire moves to another cylinder, the switch box is bad.

Voltage Drop Measurement

Start by using a good digital auto-ranging voltmeter capable of reading 1/10th of a volt. The use of an auto-ranging meter will allow for more accurate testing without damaging the meter due to an incorrect range setting.

Remove the spark plug wires form the spark plugs and connect them to a spark gap tester and remove the emergency stop clip as well. This prevents the engine from starting and also reduces the chance of getting shocked by the ignition system.

The use of an ohmmeter to test a conductor or switch contact for their condition is not the best tool to use. In most cases, it is preferable to use a volt drop test to make sure the conductor, as well as the connection, is in good condition.

Before testing, remove and clean all battery cables and connection points.

Testing the Positive Battery Cable to the Engine

1. Select the DC Volts position on the meter.
2. Connect the Red (Positive) lead on the meter to the positive battery *POST*.
3. Connect the Black (Negative) lead on the meter to the starter solenoid terminal where the positive battery cable is connected.
4. Using a remote start switch, activate the starter solenoid to spin the engine and observe the reading on the meter. A reading above 0.6V indicates a bad cable or bad connection.
   (a) If the meter reads above 0.6V, move the Black lead on the meter to the positive battery cable terminal on the starter solenoid and retest. If the reading drops to below 0.6V, the cable connection is bad.
   (b) If the meter still reads above 0.6V, move the Black lead on the meter to the positive battery cable terminal on the battery and retest. If the reading drops to below 0.6V, the cable is bad or undersized.

Service Note: A bad power connection to the ignition or battery charging system can be found by connecting the Black lead on the meter to the power connection of the ignition system or charging system; then working your way back to the battery positive post. At no time should you see a reading above 1V.

Testing the Negative Battery Cable to the Engine

1. Select the DC Volts position on the meter.
2. Connect the Black (Negative) lead on the meter to the negative battery *POST*.
3. Connect the Red (Positive) lead on the meter to the engine block where the negative battery cable is connected.
4. Using a remote start switch, activate the starter solenoid to spin the engine and observe the reading on the meter. A reading above 0.6V is an indicator of a bad cable or bad connection.
   (a) If the meter reads above 0.6V, move the Red lead on the meter to the negative battery cable terminal on the engine block and retest. If the reading drops to below 0.6V, the cable connection is bad.
   (b) If the meter still reads above 0.6V, move the Red lead on the meter to the negative battery cable terminal on the battery and retest. If the reading drops to below 0.6V, the cable is bad or undersized.

A bad ground connection to the ignition and battery charging system can be found by connecting the Red lead on the meter to the ground connection of the ignition or battery charging system; then working your way back to the battery negative post. At no time should you see a reading above 1V.

Johnson/Evinrude Model to Year Identification for 1980 and newer Engines

"INTRODUCES"

I	N	T	R	O	D	U	C	E	S
1	2	3	4	5	6	7	8	9	0

Example: J150TTLCE would be a 1989 150 HP Johnson and aE175STEU would be a 1997 175 HP Evinruide.

Engine Wiring Cross Reference Chart for Most Outboards

Circuit	Mercury PRE- 1978	Mercury 1978 & UP	OMC	Yamaha	Force PRE- 1994	Force 1994 & UP	Suzuki
Power	Red	Red	Red	Red	Red	Red/Purple	White
Ign Switch	White	Purple	Purple	Yellow	Blue	Red/Blue	Gray
Eng Gnd	Black	Black	Black	Black	Black	Black	Black
Kill Circuit	Orange Salmon White	Blk/Yellow	Blk/Yellow	White	White	Blk/Yellow	Green Red Blue
Eng Start	Yellow	Yellow/Red	Yellow/Red	Brown	Yellow	Yellow/Red	Brown Yellow/Red
Tach	Brown	Gray	Gray	Green	Purple	Gray	Yellow
Battery Charge	Yellow/Red	Yellow Yellow/Blk	Yellow Yellow/Gry	Green	Yellow	Yellow Yellow/Blk	Yellow/Red
Stator CDI Power	Red White Blue(a)	Blue Blue/White Red Red/White Green/Wht Wht/Green	Brown Brown/Yel Brown/Blk Brown/Wht	Blue Brown Red Blk/Red	Blue Yellow Brown/Blue Brown/Yel	Blue Blue/White Red Red/White Green/Wht Wht/Green	Green Black/Red
Choke	Gray Blue	Yellow/Blk	Purple/Wht	Blue	Green	Yellow/Blk	Orange
Overheat Eng Temp	Tan	Tan	Tan (b) White/Blk(c)	Pink	Orange	Tan	Green/Yel

(a) Ignition Driver systems only, all others were battery driven systems.
(b) The stripe color on the Tan wire indicates the temperature at which the sensor trips.
(c) The White/Black wire is the cold engine temp indicator and shorts to Gnd at approx 105 deg F.

Blk = Black Wht = White Gry = Gray
Yel = Yellow Blk = Black

ABYC Recommended Boat Wiring Color Codes		
Color	**Function**	**Comments**
Yellow/Red Stripe (YR)	Engine Start Circuit	
Brown/Yellow Stripe (BY)	Bilge Blower	Alternate color is Yellow (Y)
Yellow Stripe (Y)	Bilge Blower	If used for DC negative, blower MUST be Brown/Yellow Stripe.
Dark Gray (Gy)	Navigation Lights	Fuse or Switch to lights
Dark Gray (Gy)	Tachometer	
Brown (Br)	Generator/Alternator	Charge Indicator Lights, Fuse or switch to pumps.
Orange (O)	Accessory Power	Ammeter to alternator output and accessory fuse or switches. Distribution Panel accessory switch.
Purple (Pu)	Ignition Instrument power	Ignition switch to coil and electrical instruments , Distribution Panel to electric instruments.
Dark Blue	Cabin and instrument lights	Fuse or switch to lights.
Light Blue (Lt Bl)	Oil Pressure	Oil sender to gauge.
Tan	Water Pressure	Temperature sender to gauge.
Pink (Pk)	Fuel Gauge	Fuel sender to gauge.
Green/White Stripe	Tilt/Trim down or in	Tilt and Trim circuits
Blue/White Stripe	Tilt/Trim up or out	Tilt and Trim circuits

Chrysler Troubleshooting

Points Type Ignitions with Amplifiers (Power packs)

(Preamps are electronic replacements for points)

A large proportion of the problems with the battery CD units are caused by low battery voltage or bad ground connections. Low voltage symptoms are weak fire or erratic firing of cylinders. Maintenance free batteries are NOT recommended for this application.
WARNING!! Battery reversal will cause severe damage to the CD module and rectifier.

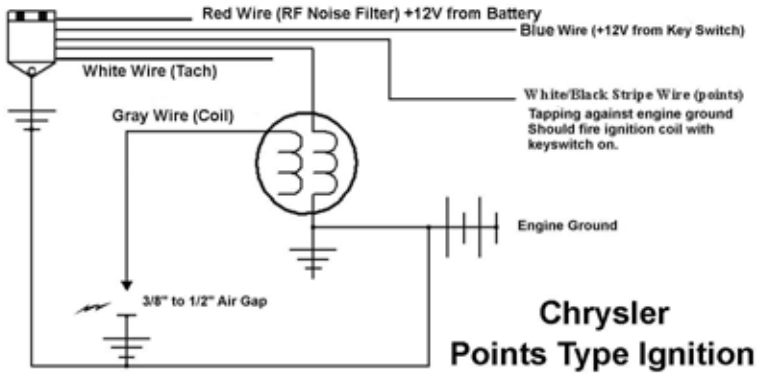
NOTE: The Chrysler CD modules are similar to the OMC CD modules with the exception of wire colors. The chart below will assist you as a general guideline for the Chrysler units:

Red	+12V from battery (RF Noise Filter)
Blue	+12V from the Key Switch
Gray	+ Terminal of ignition coil
White	OEM Tachometer signal
White/Black Stripe	Points or Preamp Module
Black	Engine ground

No Fire at All:

1. Clean all battery connections and engine grounds.
2. Make sure the CD module is grounded. Units using rubber shock mounts require a ground wire fastened from the pack to the engine block.
3. Connect a spark gap tester to the high tension lead coming from the ignition coil and set it to approximately ½". If it fires when you crank the engine over, there is a problem in the distributor cap, rotor button or spark plug wires.

Wiring Connection for Testing CD Module



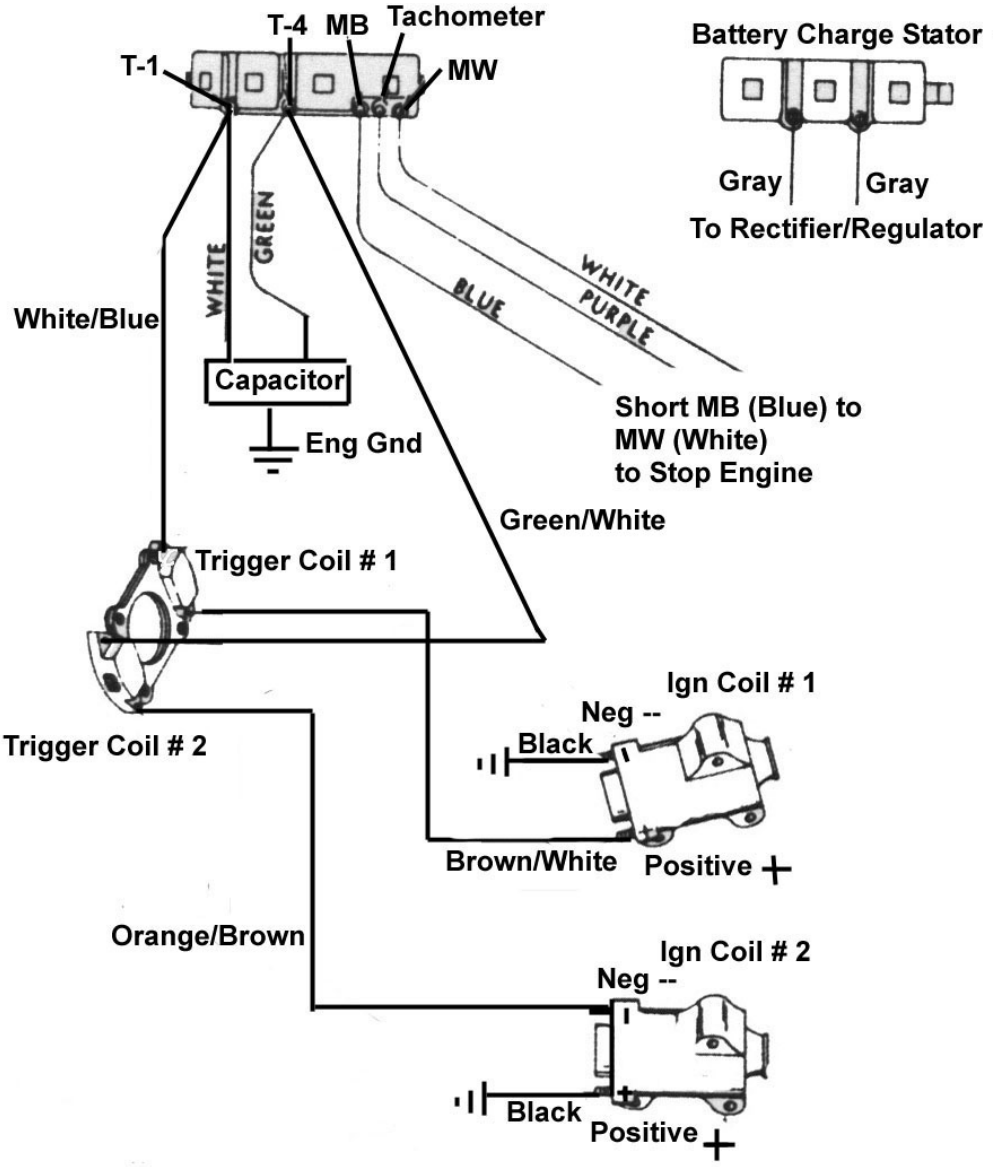
NOTE: Preamps are an electronic version of points and the ignition module will test the same for both.

4. Check voltage present on the blue wire at cranking. It MUST be at least 9½ volts. If not, the problem is likely in the harness, key switch, starter or battery.
5. Connect a DC voltmeter to the white/black wire (while it is connected to the distributor) and rotate the engine. There should be some fluctuation in the meter reading. If the reading is high, and fails to move up and down, there is definitely a problem inside the distributor. If the reading is low, disconnect the white/black wire from the distributor and with the key switch turned on, strike the white/black wire against engine ground. The unit should fire each time. If it does, then the CD module is usually good and the points (or Preamp) require checking. If the CD module fails to fire with this test, then the CD module is usually bad.
6. Check DVA voltage on the gray wire going to the coil, it should be approximately 200 volts at cranking. If the voltage is correct, replace the coil with another coil and retest or use a load resister if another coil is not available. A coil that is shorted internally will give a low reading. In this case replace the coil and retry.

After repairing the engine, check the battery voltage at approximately 3500 RPM, The MAXIMUM allowable voltage reading is 16 volts and the minimum is 12V. Running below 12V or over 16 volts will damage the ignition. Check for loose connections or a bad battery.

Magnapower II Systems

1. Disconnect the white and blue kill wires from the CD Module and retest. If the engine starts and runs, the key-switch or kill circuit is bad.
2. Connect a DC voltmeter from the kill wires to engine ground and turn the ignition switch on and off several times. At no time should you see battery voltage on the kill circuit.
3. Connect a spark gap tester to all cylinders and test with the spark plugs in and out. If the coils will not fire with the spark plugs in, check compression with the spark plugs removed from all cylinders. A blown head gasket on these engines can prevent the coils from firing with the spark plugs installed. This is caused by a hard to explain problem with the triggering circuit.
4. Crank the engine with the starter and then stop. Check the DVA voltage on terminals T1 and T4. You should read between 170 and 270 volts Positive on terminal T1 and between 170, and 270 volts Negative on terminal T4. (Remember that some DVA adapters are not polarized and will read the same regardless of the polarity). If there is a low reading on one of the terminals, disconnect the white/blue and green/white trigger wires, then retest. If the readings are now correct, one of the trigger modules is bad. A continued low reading may be caused by a bad capacitor. To test, use a couple of jumper wires and swap the green and white capacitor wires going to terminals T1 and T4. If the low reading remains on the same terminal, the CD is bad. If it moves when you move the capacitor wires, the capacitor is shorted.
5. Check to see if the ignition coils are wired correctly. The #1 coil on a two cylinder engine and the #1 & 2 cylinder on a four cylinder engine are wired as NEGATIVE GROUND. The #2 coil on a two cylinder engine and the #3 & 4 cylinder on a four cylinder engine are wired as POSITIVE GROUND.



Chrysler Troubleshooting

Capacitive Discharge Module with Alternator
(ADI – Alternator Driven Ignition)

General Troubleshooting

1. Disconnect the kill wires from the CD and connect a DC voltmeter between the kill wires and engine ground. Turn the ignition switch on and off several times. If, at any time, you see voltage appearing on the meter, there is a problem in the harness or ignition switch. At NO TIME SHOULD YOU SEE BATTERY VOLTAGE ON A KILL CIRCUIT.
2. Check the flywheel for a broken or loose magnet.
3. Check for broken wires and terminals, especially inside the plastic plug-in connectors. We recommend that you remove the pins from the connectors using the CDI **511-9706** pin removal tool and visually inspect them.
4. Visually inspect the stator for burned or discolored areas. If found, replace the stator. If the areas are on the battery charge windings, it indicates a possible problem with the rectifier.

IF NO FIRE ON ANY CYLINDER:

1. Disconnect all kill wires AT THE PACK.
2. Check for broken or bare wires on the unit, stator and trigger.
3. Using the CDI meter with the 511-9773 peak reading adapter, or CD-77 and 511-9770 piercing probes, measure DVA voltage of the stator between the output wire sets. With everything connected, reading's should be approximately 180 volts or more. Resistance readings between the stator wire sets range from 680 – 800 ohms (factory) and 400 – 500 (CDI/RAPAIR).
4. Disconnect the rectifier. If the engine fires, replace the rectifier.

NO FIRE OR INTERMITTENT ON ONE CYLINDER:

1. Check the stator resistance, you should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow (Note – On some two cylinder engines, the stator has two blue wires and no yellow wire. The stator will read from blue to blue). All stator wires should read open to engine ground.
2. Check the trigger resistance, trigger wire sets read approximately 50 ohms between the wire sets (DVA-5V or more), and open to engine ground.
3. If readings are good, disconnect kill wire from one pack. If the dead cylinder starts firing, the problem is likely the blocking diode in the opposite pack.

NO FIRE ON TWO CYLINDERS:

If two cylinders from the same CD unit will not fire, the problem is usually in the stator. Test per above.

ENGINE WILL NOT KILL:

Check kill circuit in the pack by using a jumper wire connected to the kill wire coming out of the pack and shorting it to ground. If this kills the pack, the kill circuit in the harness or on the boat is bad, possibly the ignition switch.

COILS ONLY FIRE WITH THE SPARK PLUGS OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the CDI meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine fires, replace the rectifier.

Two Cylinder Engines with Combination CD Module with Built-in Ignition Coils

NO FIRE OR INTERMITTENT ON ONE CYLINDER:

1. Check the stator resistance, you should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow (Note – On some two cylinder engines, the stator has two blue wires and no yellow wire. The stator will read from blue to blue). All stator wires should read open to engine ground.
2. Check the trigger resistance, trigger wire sets read approximately 50 ohms between the wire sets (DVA-5V or more), and open to engine ground.
3. If readings are good, disconnect kill wire from one pack. If the dead cylinder starts firing, the problem is likely the blocking diode in the opposite pack.

ENGINE WILL NOT SHUT OFF:

Check kill circuit in the pack by using a jumper wire connected to the kill wire coming out of the pack and shorting it to ground. If this kills the pack, the kill circuit in the harness or on the boat is bad, the ignition switch could also be bad.

Chrysler/Force Troubleshooting

Prestolite Capacitive Discharge Module with Alternator
(ADI – Alternator Driven Ignition)

Two Cylinder Engines Using a Separate Switch Box and Ignition Coils

1. Disconnect the stop wires from the CD and connect a DC voltmeter between the stop wires and engine ground, turn the ignition switch on and off several times. If, at any time, you see voltage appearing on the meter, there is a problem in the harness or ignition switch. At NO TIME SHOULD YOU SEE BATTERY VOLTAGE ON A STOP CIRCUIT.
2. Check the flywheel for a broken or loose magnet.
3. Check for broken wires and terminals, especially inside the plastic plug-in connectors. We recommend that you remove the pins from the connectors using the CDI **511-9706** pin removal tool and visually inspect them.
4. Visually inspect stator for burned or discolored areas. If found, replace the stator. If the areas are on the battery charge windings, it indicates a possible problem with the rectifier.

IF NO FIRE ON EITHER CYLINDER:

1. Disconnect all stop wires AT THE PACK.
2. Check for broken or bare wires on the ignition module, stator and trigger.
3. Using the CDI meter with the 511-9773 peak reading adapter, or CD-77 and 511-9770 piercing probes, measure DVA voltage of the stator between the output wire sets. With everything connected, reading's should be approximately 180 volts or more. Resistance readings between the stator wire sets ranges from 680 – 800 ohms (factory) and 250-350 ohms (CDI/RAPAIR).
4. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. Check the stator resistance, you should read 680-800 ohms (factory) and 400 – 500 (CDI/RAPAIR) DVA 180V or more from blue to yellow (Note – On some two cylinder engines, the stator has two blue wires and no yellow wire. The stator will read from blue to blue). All stator wires should read open to engine ground.
2. Check the trigger resistance, trigger wire sets read approximately 50 ohms between the wire sets (DVA-5V or more), and open to engine ground.
3. If readings are good, disconnect stop wire from one pack. If the dead cylinder starts sparking, the problem is likely the blocking diode in the opposite pack.

ENGINE WILL NOT STOP:

Check the stop circuit in the pack by using a jumper wire connected to the white stop wire coming out of the pack and shorting it to the white stop wire coming out of the other pack. If this stops all spark from the pack, the stop circuit in the engine harness or on the boat is bad, the ignition switch could also be bad.

COILS ONLY HAS SPARK WITH THE SPARK PLUGS OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the CDI meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

Three and Four Cylinder Engines Using Separate Switch Boxes and Ignition Coils

1. Check for broken wires and terminals, especially inside the plastic plug-in connectors. We recommend that you remove the pins from the connectors using the CDI **511-9706** pin removal tool and visually inspect them.
2. Check the flywheel for a broken or loose magnet.
3. Disconnect the stop wires from the CD and connect a DC voltmeter between the stop wires and engine ground, turn the ignition switch on and off several times. If, at any time, you see voltage appearing on the meter, there is a problem in the harness or ignition switch. At NO TIME SHOULD YOU SEE BATTERY VOLTAGE ON A STOP CIRCUIT.
4. Visually inspect stator for burned or discolored areas. If found, replace the stator. If the areas are on the battery charge windings, it indicates a possible problem with the rectifier.

IF NO SPARK ON ANY CYLINDER:

1. Disconnect stop wire AT THE PACK.
2. Check for broken or bare wires on the unit, stator and trigger.
3. Using the CDI meter with the 511-9773 peak reading adapter, or CD-77 and 511-9770 piercing probes, measure DVA voltage of the stator between the output wire sets. With everything connected, reading s should be approximately 180 volts or more. Resistance readings between the stator wire sets range from 680 – 800 ohms (factory) and 250-350 ohms (CDI/RAPAIR).
4. Disconnect the rectifier. If the engine has spark, replace the rectifier.

Chrysler/Force Troubleshooting

Capacitive Discharge Module with Alternator
(ADI – Alternator Driven Ignition)

Three and Four Cylinder Engines Using Separate Switch Boxes and Ignition Coils (Continued)

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. Check the stator and trigger resistance; the trigger wire sets should read approximately 50 ohms between the wire sets (DVA-5V or more), the stator should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow.
2. If readings are good, disconnect the stop wire from one pack. If the dead cylinder starts sparking, the problem is likely the blocking diode in the opposite pack.

NO SPARK ON TWO CYLINDERS:

If two cylinders from the same CD unit will not spark, the problem is usually in the stator. Test per above.

ENGINE WILL NOT SHUT OFF:

Check the stop circuit in the pack by using a jumper wire connected to the stop wire coming out of the pack and shorting it to ground. If this stops the pack from sparking, the stop circuit in the harness or on the boat is bad, the ignition switch could also be bad.

COILS ONLY HAS SPARK WITH THE SPARK PLUGS OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the Fluke meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

Pack #1 (Firing #1 and #2 Cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		White/Red (a)
	White/Green Stripe		White/Green Stripe
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue Stripe		Brown/Blue Stripe
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		White

Pack #3 (Firing #4 and #5 Cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		White/Red (a)
	White/Green Stripe		White/Green Stripe
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue Stripe		Brown/Blue Stripe
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		White

P Pack #2 (Firing #3 Cylinder)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		No Connection
	White/Green Stripe		No Connection
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue		No Connection (must be connected to the blue terminal on pack 1)
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		No Connection

(a) CDI replacement triggers do not have a connection for this wire from the power pack as the new trigger uses a common ground wire. This allows the wires going to the power pack from the trigger to be larger and more durable. The power pack uses that color as a ground wire for the trigger.

Color Code Cross Reference

FUNCTION	OLD	NEW
Trigger	Orange	White/Orange Stripe
Trigger	Green	White/Yellow Stripe
Trigger	Red	White/Red Stripe White/Green Stripe
Trigger	White/Green Stripe	White/Green Stripe
Stator	Blue	Brown/Blue Stripe
Stator	Yellow	Brown/Yellow Stripe
Pack Output to Coil	Orange	Orange/Blue
Pack Output to Coil	Red	Blue/Red
Ignition Coil	White	Orange/Blue
Stop Circuit	White	Black/Yellow

Force Troubleshooting

Prestolite ADI Ignitions 1984-1992

General

1. Check for broken wires and terminals, especially inside the plastic plug-in connectors. We recommend that you remove the pins from the connectors using the CDI **511-9706** pin removal tool and visually inspect them.
2. Check the flywheel for a broken or loose magnet.
3. Disconnect the stop wires from the CD and connect a DC voltmeter between the stop wires and engine ground, turn the ignition switch on and off several times. If, at any time, you see voltage appearing on the meter, there is a problem in the harness or ignition switch. At NO TIME SHOULD YOU SEE BATTERY VOLTAGE ON A STOP CIRCUIT.
4. Visually inspect stator for burned or discolored areas. If found, replace the stator. If the areas are on the battery charge windings, it indicates a possible problem with the rectifier.

IF THERE IS NO SPARK ON ANY CYLINDER:

1. Disconnect the stop wire AT THE PACK.
2. Check for broken or bare wires on the CD Module, stator and trigger.
3. Check the stator resistance and output using the CDI meter with the 511-9773 peak reading adapter and 511-9770 piercing probes, as follows:

Read Form	Read To	Resistance (OEM)	Resistance (CDI)	DVA (connected)	DVA (disconnected)
Yellow	Blue	680-850	250-350	180V or more	200 V or more
Yellow	Engine Gnd	Open	Open	180 V or more (a)	2 V or less (b)
Blue	Engine Gnd	Open	Open	180 V or more (a)	2 V or less (b)

NOTE: Remember that the stator may use Brown/Yellow or Brown/Black/Yellow for Yellow and Brown/Blue or Brown/Black/Blue for Blue.

(a) The DVA reading to engine ground is checking a circuit inside the power pack. If the readings are not fairly equal, swap the stator wires going to the power pack and recheck. If the low reading stays on the same wire from the stator, replace the stator. Otherwise, replace the power pack.

(b) Most meters will pick up a small amount of voltage due to inductive pick-up. As long as the voltage is very low, it will not indicate a problem.

4. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Check the stator and trigger resistance; the trigger wire sets should read approximately 50 ohms between the wire sets (DVA-.5V or more), the stator should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow.
2. If readings are good, disconnect stop wire from one pack. If the dead cylinder starts sparking, the problem is likely the blocking diode in the opposite pack.

NO SPARK ON TWO CYLINDERS:

If two cylinders from the same CD unit have no spark, the problem is usually in the stator. Test per above.

ENGINE WILL NOT SHUT OFF:

Check the stop circuit in the pack by using a jumper wire connected to the stop wire coming out of the pack and shorting it to ground. If this stops the pack from sparking, the stop circuit in the harness or on the boat is bad, the ignition switch could also be bad.

COILS ONLY HAVE SPARK WITH THE SPARK PLUGS OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the CDI meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

Two Cylinder Engines using Combination CD Module with Built-in Ignition Coils (1984-88)

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Check the stator resistance; you should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow (Note – On some two cylinder engines, the stator has two blue wires and no yellow wire. The stator will read from blue to blue). All stator wires should read open to engine ground.
2. Disconnect and check the trigger resistance; trigger wire sets read approximately 50 ohms between the wire sets (DVA-0.5V or more), and open to engine ground.
3. If readings are good, disconnect stop wire from one pack. If the dead cylinder starts sparking, the problem is likely the blocking diode in the opposite pack.

ENGINE WILL NOT SHUT OFF:

Check the stop circuit in the pack by using a jumper wire connected to the stop wire coming out of the pack and shorting it to ground. If this stops the pack from firing, the stop circuit in the harness or on the boat is bad. The ignition switch could also be bad.

Force Troubleshooting

Prestolite ADI Ignitions 1984-1992

Two Cylinder Engines Using Separate Switch Boxes and Ignition Coils

GENERAL:

1. Disconnect the stop wires from the CD and connect a DC voltmeter between the stop wires and engine ground, turn the ignition switch on and off several times. If, at any time, you see voltage appearing on the meter, there is a problem in the harness or ignition switch. At NO TIME SHOULD YOU SEE BATTERY VOLTAGE ON A STOP CIRCUIT.
2. Check the flywheel for a broken or loose magnet.
3. Check for broken wires and terminals, especially inside the plastic plug-in connectors. We recommend that you remove the pins from the connectors using the CDI **511-9706** pin removal tool and visually inspect them.
4. Visually inspect the stator for burned or discolored areas. If found, replace the stator. If the areas are on the battery charge windings, it indicates a possible problem with the rectifier.

IF THERE IS NO SPARK ON EITHER CYLINDER:

1. Disconnect all stop wires AT THE PACK.
2. Check for broken or bare wires on the switch box, stator and trigger.
3. Using the CDI meter with the 511-9773 peak reading adapter, or CD-77 and 511-9770 piercing probes, measure DVA voltage of the stator between the output wire sets. With everything connected, reading s should be approximately 180 volts or more. Resistance readings between the stator wire sets range from 680 – 800 ohms (factory) and 250-350 ohms (CDI/RAPAIR).
4. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

IF THERE IS NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Check the stator resistance; you should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow (Note – On some two cylinder engines, the stator has two blue wires and no yellow wire. The stator will read from blue to blue). All stator wires should read open to engine ground.
2. Check the trigger resistance, trigger wire sets read approximately 50 ohms between the wire sets (DVA-0.5V or more), and open to engine ground.
3. If readings are good, swap the power pack output from the ignition coil that works to the one that does not. If the coil that had spark stops sparking, replace the power pack.

ENGINE WILL NOT SHUT OFF:

Check the stop circuit in the pack by using a jumper wire connected to the white stop wire coming out of the pack and shorting it to ground. If this stops all spark from the pack, the stop circuit in the harness or on the boat is bad. The ignition switch could also be bad.

NO SPARK UNLESS THE SPARK PLUGS ARE OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the CDI meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine now has spark, replace the rectifier.
3. Check for broken wires and terminals, especially inside the plastic plug-in connectors. We recommend that you remove the pins from the connectors using the CDI **511-9706** pin removal tool and visually inspect them.
4. Check the flywheel for a broken or loose magnet.
5. Disconnect the stop wires from the CD and connect a DC voltmeter between the stop wires and engine ground, turn the ignition switch on and off several times. If, at any time, you see voltage appearing on the meter, there is a problem in the harness or ignition switch. At NO TIME SHOULD YOU SEE BATTERY VOLTAGE ON A STOP CIRCUIT.
6. Visually inspect the stator for burned or discolored areas. If found, replace the stator. If the areas are on the battery charge windings, it indicates a possible problem with the rectifier.

Three and Four Cylinder Engines Using Separate Switch Boxes and Ignition Coils

NO SPARK ON ANY CYLINDER:

1. Disconnect the stop wire AT THE PACK.
2. Check for broken or bare wires on the unit, stator and trigger.
3. Using the CDI meter with the 511-9773 peak reading adapter, or CD-77 and 511-9770 piercing probes, measure DVA voltage of the stator between the output wire sets. With everything connected, reading s should be approximately 180 volts or more. Resistance readings between the stator wire sets range from 680 – 800 ohms (factory) and 250-350 ohms (CDI/RAPAIR).
4. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Check the stator and trigger resistance; trigger wire sets should read approximately 50 ohms between the wire sets (DVA-0.5V or more), the stator should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow.
2. If readings are good, disconnect stop wire from one pack. If the dead cylinder starts sparking, the problem is likely the blocking diode in the opposite pack.

Force Troubleshooting

Prestolite ADI Ignitions 1984-1992

Three and Four Cylinder Engines Using Separate Switch Boxes and Ignition Coils (Continued)

NO SPARK ON TWO CYLINDERS:

If two cylinders from the same CD unit do not spark, the problem is usually in the stator. Test per above.

ENGINE WILL NOT SHUT OFF:

Check the stop circuit in the pack by using a jumper wire connected to the stop wire coming out of the pack and shorting it to ground. If this stops the pack from firing, the stop circuit in the harness or on the boat is bad. The ignition switch could also be bad.

COILS ONLY SPARK WITH THE SPARK PLUGS OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the CDI meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

Pack #1 (Firing #1 and #2 Cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		White/Red (a)
	White/Green Stripe		White/Green Stripe
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue Stripe		Brown/Blue Stripe
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		White

Pack #2 (Firing #3 and #4 Cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		White/Red (a)
	White/Green Stripe		White/Green Stripe
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue Stripe		Brown/Blue Stripe
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		White

Pack #2 (Firing #3 Cylinder)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		No Connection
	White/Green Stripe		No Connection
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue		No Connection (must be connected to the blue terminal on pack 1)
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		No Connection

(a) CDI replacement triggers do not have a connection for this wire from the power pack as the new trigger uses a common ground wire. This allows the wires going to the power pack from the trigger to be larger and more durable. The power pack uses that color as a ground wire for the trigger.

Color Code Cross Reference

FUNCTION	OLD	NEW
Trigger	Orange	White/Orange Stripe
Trigger	Green	White/Yellow Stripe
Trigger	Red	White/Red Stripe White/Green Stripe
Trigger	White/Green Stripe	White/Green Stripe
Stator	Blue	Brown/Blue Stripe
Stator	Yellow	Brown/Yellow Stripe
Pack Output to Coil	Orange	Orange/Blue
Pack Output to Coil	Red	Blue/Red
Ignition Coil	White	Orange/Blue
Stop Circuit	White	Black/Yellow

Sample Connection for a 4 Cylinder Using New Design CDI Trigger

Pack #1 (Firing #1 and #2 cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		No Connection
	White/Red		No Connection
	White/Green Stripe		White/Green Stripe
Pack:	Yellow	**Stator:**	Yellow
	Blue		Blue
Pack:	Orange/Blue	**Coil #1:**	White
Pack:	Blue/Red	**Coil #2:**	White

Pack #2 (Firing #3 and #4 cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow Stripe		No Connection
	White/Red		No Connection
	White/Green Stripe		White/Green Stripe
Pack:	Yellow	**Stator:**	Yellow
	Blue		Blue
Pack:	Orange/Blue	**Coil #3:**	White
Pack:	Blue/Red	**Coil #4:**	White

Force Troubleshooting

Prestolite ADI Ignitions 1984-1992

5 Cylinder Engines Using Separate Switch Boxes and Ignition Coils

IF THERE IS NO SPARK ON ANY CYLINDER:

1. Disconnect the stop wire AT THE PACK.
2. Check for broken or bare wires on the CD Modules, stator and trigger.
3. Check the stator resistance and output using the CDI meter with the 511-9773 peak reading adapter and 511-9770 piercing probes, as follows:

Read Form	Read To	Resistance (OEM)	Resistance (CDI)	DVA (connected)	DVA (disconnected)
Yellow	Blue	680-850	250-350	180V or more	200 V or more
Yellow	Engine Gnd	Open	Open	180 V or more (a)	2 V or less (b)
Blue	Engine Gnd	Open	Open	180 V or more (a)	2 V or less (b)

NOTE: Remember that the stator may use Brown/Yellow or Brown/Black/Yellow for Yellow and Brown/Blue or Brown/Black/Blue for Blue.

(a) The DVA reading to engine ground is checking a circuit inside the power pack. If the readings are not fairly equal, swap the stator wires going to the power pack and recheck. If the low reading stays on the same wire from the stator, replace the stator. Otherwise, replace the power pack.

(b) Most meters will pick up a small amount of voltage due to inductive pick-up. As long as the voltage is very low, it will not indicate a problem.

4. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Check the stator and trigger resistance; the trigger wire sets should read approximately 50 ohms between the wire sets (DVA-.5V or more), the stator should read 680-800 ohms (factory) and 250-350 ohms (CDI/RAPAIR) DVA 180V or more from blue to yellow.
2. If readings are good, disconnect stop wire from one pack. If the dead cylinder starts sparking, the problem is likely the blocking diode in the pack you disconnected.

NO SPARK ON TWO CYLINDERS:

If two cylinders from the same CD unit have no spark, the problem is usually in the stator. Test per above.

ENGINE WILL NOT SHUT OFF:

Check the stop circuit in the pack by using a jumper wire connected to the stop wire coming out of the pack and shorting it to ground. If this stops the pack from sparking, the stop circuit in the harness or on the boat is bad, the ignition switch could also be bad.

COILS ONLY HAVE SPARK WITH THE SPARK PLUGS OUT:

Check for dragging starter or low battery causing slow cranking speed. DVA test stator and trigger.

HIGH SPEED MISS:

1. Using the CDI meter with the 511-9773 peak reading adapter, (or CD-77) and 511-9770 piercing probes, DVA check stator voltage to each pack at high speed. If it exceeds 400 volts, replace the pack.
2. Disconnect the rectifier. If the engine now has spark, replace the rectifier.

Connections: 5 Cylinder

Pack #1 (Firing #1 and #2 Cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		White/Red (a)
	White/Green Stripe		White/Green Stripe
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue Stripe		Brown/Blue Stripe
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		White

Pack #3 (Firing #4 and #5 Cylinders)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		White/Red (a)
	White/Green Stripe		White/Green Stripe
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	Brown/Blue Stripe		Brown/Blue Stripe
Pack:	Orange/Blue	**Coil:**	White
	Blue/Red		White

Pack #2 (Firing #3 Cylinder)

Pack:	White/Orange Stripe	**Trigger:**	White/Orange Stripe
	White/Yellow		White/Yellow (a)
	White/Red		No Connection
	White/Green Stripe		No Connection
Pack:	Brown/Yellow Stripe	**Stator:**	Brown/Yellow Stripe
	No Connection		Blue (must be connected to the blue terminal on pack 1)
Pack:	Orange/Blue	**Coil: #3**	White
	Blue /Red		No Connection

(a) CDI replacement triggers do not have a connection for this wire from the power pack as the new trigger uses a common ground wire. This allows the wires going to the power pack from the trigger to be larger and more durable. The power pack uses that color as a ground wire for the trigger.

Color Code Cross Reference

FUNCTION	OLD	NEW
Trigger	Orange	White/Orange Stripe
Trigger	Green	White/Yellow Stripe
Trigger	Red	White/Red Stripe White/Green Stripe
Trigger	White/Green Stripe	White/Green Stripe
Stator	Blue	Brown/Blue Stripe
Stator	Yellow	Brown/Yellow Stripe
Pack Output to Coil	Orange	Orange/Blue
Pack Output to Coil	Red	Blue/Red
Ignition Coil	White	Orange/Blue
Stop Circuit	White	Black/Yellow

Force Troubleshooting
Mercury Designed Ignitions
(1991-1996)

Two Cylinder Engines Using a Separate Switch Box and Ignition Coils

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire AT THE PACK and retest. If the engine's ignition fires, the stop 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 now has spark, replace the rectifier.
3. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
4. Check the stator resistance and DVA output as follows:

Black Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Blue/White	3250-3650	500-600	180V or more
Red	Red/White	75-90	28-32	25V or more

Red Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

Red Stator Adapter

WIRE	Read To	OEM RESISTANCE	DVA
Blue	Engine GND	OPEN	180V or more

NO SPARK OR INTERMITTANT SPARK ON ONE CYLINDER:

1. If the cylinders are only misfiring above an idle, connect an inductive Tachometer to each cylinder in turn and try to isolate the problem cylinder.
2. Check the trigger resistance and DVA output as shown below:

Wire Color	Check To (Wire Color)	Resistance	DVA Reading
Brown wire	White wire	800-1400	4V or more Connected
Brown wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)

(*) 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 DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both places. If the reading is low on one cylinder, disconnect the green 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.

ENGINE WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to each cylinder in turn and try to isolate the problem. A single cylinder dropping spark will likely be a bad switch box or ignition coil. All cylinders not sparking properly usually indicates a bad stator.
2. Connect a DVA meter between the stator's Blue wire and Blue/White wires. Perform a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs usually indicates a bad stator. (Read from Blue to Engine GND if the engine has a Red stator kit installed).
3. Connect a DVA meter between the stator's Red wire and Red/White wires. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than on the Blue wire reading indicates a bad stator.

High Speed Miss:

1. 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 switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under "*No spark or Intermittent spark on One Cylinder*".
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

Force Troubleshooting
Mercury Designed Ignitions
Three Cylinder Engines 1991-1996

Three Cylinder Engines Using a Single Switch Box and Three Ignition Coils

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire AT THE PACK and retest. If the engine's ignition now has spark, the stop 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 has spark, replace the rectifier.
3. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to spark properly.
4. Check the stator resistance and DVA output as outlined below:

Black Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Engine GND	3250-3650	500-600	180V or more
Red	Engine GND	75-90	28-32	25V or more

Red Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

Red Stator Adapter (Not Available from CDI)

WIRE	Read To	OEM RESISTANCE	DVA
Blue	Engine GND	OPEN	180V or more

NO SPARK ON ONE OR MORE CYLINDERS:

1. If the cylinders are only misfiring above an idle, connect an inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Check the trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	White/Black	800-1400	4V or more Connected
White wire	White/Black	800-1400	4V or more Connected
Purple wire	White/Black	800-1400	4V or more Connected
Brown wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)
Purple wire	Engine GND	Open	1V or more (*)

(*) 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 DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

4. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both places. If the reading is low on one cylinder, disconnect the green 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.

ENGINE WILL NOT ACCELERATE BEYOND 3000-400 RPM:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A single cylinder dropping spark will likely be the switch box or ignition coil. All cylinders acting up usually indicate a bad stator.
2. Connect a DVA meter from the stator's blue wire to engine ground and do a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. (Check from the adapter's blue to engine ground if the engine has a red stator kit installed).
3. Connect a DVA meter to the Red wire. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the blue wire reading indicates a bad stator.

HIGH SPEED MISS:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under "*No fire or Intermittent on One or More Cylinders*".
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

Four Cylinder Engines
(1991-1996)
Four Cylinder Engines Using a Single Switch Box and Four Ignition Coils

No Fire At All:

1. Disconnect the black/yellow stop wires AT THE PACK and retest. If the engine's ignition now has spark, the stop 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 has spark, replace the rectifier.
3. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to spark properly.
4. Check the stator resistance and DVA output as given below:

Flywheel with Bolted in Magnets

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Blue/White	5000-7000	2200-2400	180V or more
Red	Red/White	125-155	45-55	25V or more

Flywheel with Glued-in Magnets

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Blue/White	3250-3650	500-600	180V or more
Red	Red/White	75-90	28-32	25V or more

Red Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

Red Stator Adapter

WIRE	Read To	OEM RESISTANCE	DVA
Blue	Blue	OPEN	180V or more
Blue (Each)	Ground	OPEN	180V or more

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. If the cylinders are only acting up above an idle, connect an inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Check the trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Purple wire	White wire	800-1400	4V or more Connected
Brown wire	White/Black wire	800-1400	4V or more Connected
Purple wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)
Brown wire	Engine GND	Open	1V or more (*)
White/Black wire	Engine GND	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

Note: If #1 and #2, or #3 and #4 are misfiring, check the trigger as described above. The trigger uses two coils to spark four cylinders. #1 & 2 share one trigger coil and #3 & 4 share the other trigger coil. Also, the switch box is divided into two parts. The #1 and #2 cylinders spark on one half, and #3 and #4 spark on the other half of the switch box. If the trigger tests fine by the chart above, but you have two cylinders not sparking (either #1 and #2 or #3 and #4), the switch box or stator is bad.

3. If you have two cylinders not sparking (either #1 and #2 or #3 and #4), swap the stator leads end to end on the switch box (Red with red/white and blue with blue/white). If the problem moved to the other cylinders, the stator is bad. It the problem stayed on the same cylinders, the switch box is likely bad if the trigger tests within specifications.
4. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both terminals. If the reading is low on one cylinder, disconnect the green 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.

Four Cylinder Engines
(1991-1996)
Four Cylinder Engines Using a Single Switch Box and Four Ignition Coils (continued)

ENGINE WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. If two cylinders on the same end of the switch box are dropping out, the problem is likely going to be either the switch box or trigger. A single cylinder dropping spark will likely be the trigger, switch box or ignition coil. All cylinders misfiring usually indicate a bad stator.
2. Connect a DVA meter to the stator's blue wire and blue/white wires and do a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. (Note: Check between the adapter's blue wires if the engine has a red stator kit installed).
3. Connect a DVA meter between the Red wire and Red/White wire and do a running test. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the reading on the blue wires indicates a bad stator.

HIGH SPEED MISS:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under "*No fire or Intermittent on One or More Cylinders*".
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

5 Cylinder with Single Switch Box
(1991-1992)

NOTE: This engine uses a battery powered inverter box to provide 250V power to the switch box. The inverter is in a 332-4797 CD module case. This unit is easily identified as the inverter has four terminals instead of the seven used on the 332-4797 CD module. The original stator's only function is to charge the battery. CDI Electronics offers a replacement for the inverter, which combines the functions of the inverter box with the stator. The stator has a high voltage output in addition to the battery charging output, allowing the inverter box to be removed.

NO SPARK ON ANY CYLINDER:

1. Check the red wire on the converter box from the battery at cranking; Minimum voltage is 9.5V.
2. Check the DVA voltage on the purple/white terminal on the converter box at cranking. A minimum of 0.3V is needed to trigger the inverter box. If the voltage is low, check the DVA voltage from the white/black trigger to the yellow, black, brown, white and purple trigger wires. If you read 4V or more, the inverter box is likely bad.
3. Check the DVA voltage on the blue terminal on the converter box at cranking, reading should be approximately 250V.
4. *CDI Electronics replacement stator only*: Check the DVA output and resistance from the blue wire to engine ground. You should read a minimum of 160V DVA and 80 ohms resistance.

NO SPARK ON ONE CYLINDER:

1. Check the DVA voltage from the white/black trigger to the yellow, black, brown, white and purple trigger wires. If you read 4V or more, the trigger is likely good.
2. Check the DVA voltage from the switch box. You should have the same reading on all of the Green Striped output wires to the ignition coils. If one cylinder reads low, swap the locations of the Green Striped wire not firing with one that has spark. If the problem moves, replace the power pack. If the no spark condition remains on the same cylinder, replace the ignition coil.

ALL CYLINDERS HAVE SPARK, BUT ENGINE WILL NOT RUN:

Disconnect the white/black wire from the switch box and check the resistance from the switch box's white/black wire to engine ground. The reading should be approximately 8400 ohms. A low reading indicates a bad bias circuit and the switch box needs to be replaced.

Johnson/Evinrude Troubleshooting

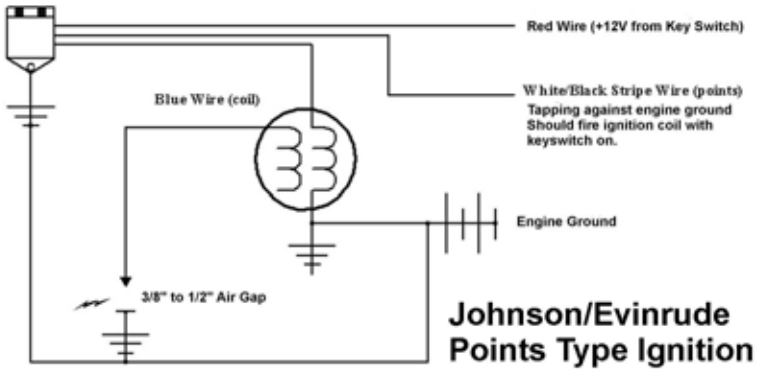
Battery CD Ignitions with Points

DUE TO THE CONSTRUCTION OF THE BATTERIES, NEITHER MAINTAINENCE FREE NOR LOW MAINTAINENCE BATTERIES ARE NOT RECOMMENDED FOR THIS APPLICATION!

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

Pack Wire Color	Function
Red or Purple	12V from key-switch
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 sparks while the spark gap tester is connected to the coil and does not spark 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 spark 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 spark. If another spark plug wire has spark, 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.

Johnson/Evinrude

Prestolite Battery Ignitions with Pickup Sensors

DUE TO THE CONSTRUCTION OF THE BATTERIES, NEITHER MAINTAINENCE FREE NOR LOW MAINTAINENCE BATTERIES ARE NOT RECOMMENDED FOR THIS APPLICATION!

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

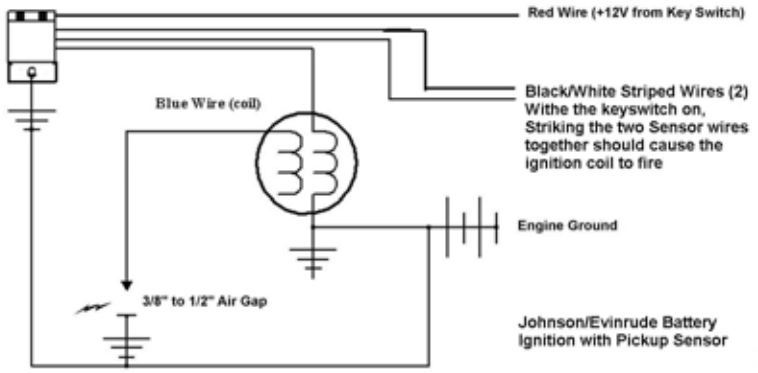
Except 1967

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 sparks while the spark gap tester is connected to the coil and does not spark 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.

Phase One Rotor

Phase Two Rotor

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.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions 1972-1978

(With screw terminal type power packs)

Two Cylinder Engines

NO SPARK ON EITHER CYLINDER:

1. Disconnect the black yellow stop wire and retest. If the engine's ignition has spark, the stop 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 (or 30-40 ohms for CDI Electronics 133-0875K1). Note: The original factory specifications was 8-14 ohms, this was changed around the mid 1970's in response to the change in SCR's triggering requirements.
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.

1. 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.
2. Slide the sensor in toward the crankshaft approximately 0.005" at a time.
3. Coat the face of the sensor with machinists bluing or equivalent.
4. Install the flywheel according to the service manual and crank the engine over.
5. Remove the flywheel and check to see if the trigging magnet struck the sensor face.
6. If the ignition fired, finger tight the nut on the outside of the heat shield and coat it with RTV.
7. 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 spark properly.

NO SPARK 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 SPARK ON ANY CYLINDER:

Note: If the ignition only sparks 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 stop wire 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 stator resistance. Reading should be about 500 ohms from the brown wire to 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 (or 30-40 ohms for CDI Electronics Blue Timer Bases).
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 and 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.
   b) Coat the face of the sensor with machinists bluing or equivalent and install the flywheel without the key and rotate the flywheel at least one full turn. 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.
   c) If the ignition has spark, finger tight the nut on the outside of the heat shield and coat it with RTV.
   d) If still no spark, replace the sensor.

Johnson/Evinrude Troubleshooting

Alternator Driven CD Ignitions 1972-1978

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

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 SPARK OR INTERMITTENT ON ONE OR MORE CYLINDERS:

1. Check the timer base resistance from the black/white wire to the white/black wires. Reading should be 10-20 ohms (or 30-40 ohms for CDI Electronics Blue Timer Bases) .
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 SPARK ON ANY CYLINDER:

(Note: If the engine has spark 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 stop wire and retest. If the engines' ignition now has spark, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Disconnect the yellow wires from the rectifier and retest. If the engine has spark, replace the rectifier.
3. Check the stator resistance. You should read about 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 resistance from the #1 to the #3 sensor wire, and from the #2 to the #4 sensor wire. Reading should be 10-20 ohms on each set (or 30-40 ohms for CDI Electronics Blue Timer Bases).
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

Four Cylinder Engines with screw terminal type power packs (Continued)

NO SPARK OR INTERMITTENT ON ONE OR MORE CYLINDERS:

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 SPARK OR INTERMITTENT ON ONE BANK:

1. Check the timer base's resistance from the #1 to the #3 sensor wire, and from the #2 to the #4 sensor wire. Reading should be 10-20 ohms on each set (or 30-40 ohms for CDI Electronics Blue Timer Bases).
2. Check the DVA output from the timer base. A reading of at least 0.5V or more from the #1 to the #3 sensor wire, and from the #2 to the #4 sensor wire (while connected to the pack) is needed to have spark. 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 the previous page.
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 connect a load resistor to that terminal. 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 has spark 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.

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire 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 stator resistance. You should read about 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 (or 30-40 ohms for CDI Electronics Blue Timer Bases).
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 SPARK OR INTERMITTENT ON ONE OR MORE CYLINDERS:

1. Check the timer bases resistance from the white wire to the blue, green and purple wires. Reading should be 10-20 ohms (or 30-40 ohms for CDI Electronics Blue Timer Bases).
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 1978-2006

Two Stroke/Except Direct Injected Engines

Two Cylinder Engines

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire and retest. If the engine's ignition has spark, the stop circuit has a fault-check the key switch, harness and shift switch.
2. Check the stator and trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550	150V or more Connected
Black/White wire	White/Black wire	15-42	0.6V or more Connected
Some engines use the following wiring on the trigger:			
White wire	Blue wire	15-42	0.6V or more Connected
White wire	Green wire	15-42	0.6V or more Connected

3. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to spark properly.
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 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.

NO SPARK 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.

WILL NOT ACCELERATE BEYOND 3000 RPM:

1. 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.
2. Check the stator resistance. If it reads approximately 900 ohms, replace it with the 500 ohm design.

Engines 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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.
4. Check the stator resistance. If it reads approximately 900 ohms, replace it with the 500 ohm design.

Three Cylinder Engines

(Except Quick Start Models)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire 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 ignition now has spark, replace the rectifier.
3. Check the stator and trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550	150V or more Connected
White wire	Purple	38-42	0.6V or more Connected
White wire	Blue wire	38-42	0.6V or more Connected
White wire	Green wire	38-42	0.6V or more Connected

4. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to spark properly.

NO SPARK OR INTERMITTENT ON ONE OR MORE CYLINDERS:

1. Check the trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
White wire	Purple	38-42	0.6V or more Connected
White wire	Blue wire	38-42	0.6V or more Connected
White wire	Green wire	38-42	0.6V or more Connected

2. 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 1978-2006
(Three Cylinder Engines Continued…)

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, 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)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire and retest. If the engine's ignition has spark, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Disconnect the yellow wires from the rectifier and retest. If the ignition now has spark, replace the rectifier.
3. Check the stator and trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550	150V or more Connected
Orange wire	Orange/Black wire	450-550**	150V or more Connected
White wire	Purple	1.1M-2.4M ^^	0.6V or more Connected
White wire	Blue wire	1.1M-2.4M ^^	0.6V or more Connected
White wire	Green wire	1.1M-2.4M ^^	0.6V or more Connected

** NOTE: Some engines use a 50 or a 100 ohms power coil.

^^ 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 wire to the other wires.

4. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to spark properly.

NO SPARK ON ONE OR MORE CYLINDERS:

1. Check the stator and trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550	150V or more Connected
Orange wire	Orange/Black wire	450-550**	150V or more Connected
White wire	Purple	1.1M-2.4M ^^	0.6V or more Connected
White wire	Blue wire	1.1M-2.4M ^^	0.6V or more Connected
White wire	Green wire	1.1M-2.4M ^^	0.6V or more Connected

** NOTE: Some engines use a 50 or a 100 ohms power coil.

^^ 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 wire to the other wires.

2. 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.

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, 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 1978-2006

Four Cylinder Engines (Except Quick Start Models)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire and retest. If the engine's ignition has spark, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Disconnect the yellow wires from the rectifier and retest. If the engine has spark, replace the rectifier.
3. Check the stator and trigger resistance and DVA output as given below for both banks:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550	150V or more Connected
White wire	Blue wire	38-42	0.6V or more Connected
White wire	Green wire	38-42	0.6V or more Connected

4. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.
5. Check the center hub triggering magnet in the flywheel for damage and tight fit.

NO SPARK OR INTERMITTENT ON ONE CYLINDER OR ONE BANK:

1. Check the stator and trigger resistance and DVA output as given below for both banks:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550	150V or more Connected
White wire	Blue wire	38-42	0.6V or more Connected
White wire	Green wire	38-42	0.6V or more Connected

NOTE: Also check the DVA readings 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.

2. 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 1978-2006

Four Cylinder Engines (Quick Start Models)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire and retest. If the engine's ignition has spark, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Disconnect the yellow wires from the rectifier and retest. If the engine has spark, replace the rectifier.
3. Check the stator and trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	950-1100	150V or more Connected
Orange wire	Orange/Black wire	93-100**	150V or more Connected
White wire	Purple	35-55	0.6V or more Connected
White wire	Blue wire	35-55	0.6V or more Connected
White wire	Green wire	35-55	0.6V or more Connected
White wire	Pink	35-55	0.6V or more Connected
White wire	Purple/White	115-125	1.6V or more Connected
White wire	Blue/White	115-125	1.6V or more Connected
White wire	Green/White	115-125	1.6V or more Connected
White wire	Pink/White	115-125	1.6V or more Connected

** NOTE: Some engines use a 50 ohm power coil.

4. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

NO SPARK OR INTERMITTENT ON ONE OR MORE CYLINDERS:

1. Check the trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
White wire	Purple	35-55	0.6V or more Connected
White wire	Blue wire	35-55	0.6V or more Connected
White wire	Green wire	35-55	0.6V or more Connected
White wire	Pink	35-55	0.6V or more Connected

2. Disconnect the white/black temperature wire and retest. If all cylinders now fire, replace the timer base.
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.

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

Six Cylinder Engines
Without Quick Start

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wires and retest. If the engine's ignition has spark, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to spark properly.
3. Disconnect the yellow wires from the rectifier and retest. If the engine now has spark, replace the rectifier.
4. Check the center hub triggering magnet in the flywheel for damage and tight fit.

NO SPARK ON ONE BANK:

1. Check the stator and trigger resistance and DVA output as given below for each bank:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	450-550 (9 amp)	150V or more Connected
Brown wire	Brown/Yellow wire	900-1100 (35 amp)	150V or more Connected
White wire	Purple	15-42(a)	0.6V or more Connected
White wire	Blue wire	15-42(a)	0.6V or more Connected
White wire	Green wire	15-42(a)	0.6V or more Connected

(a) Use a comparison reading as the values for different years used different coils in the Timer-Base. As long as you have approximately the same ohm reading on all three tests and the correct output with the DVA meter, the Timer-Base should be good. The exception would be if the insulation is breaking down while the engine is running.

2. Check the DVA voltage to engine ground on the White Timer-Base wire while it is connected to the pack. You should see approximately the same reading as you do between the Brown & Brown/Yellow wires for that bank. A low reading usually indicates a bad Timer-Base.
3. Disconnect the Black/Yellow stop wire from one of the packs and retest. If the bank that had no fire now has spark, the pack that was appearing to fire correctly is faulty.

NO SPARK ON ONE CYLINDER:

1. 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 or Timer-Base.
2. Check the Timer Base resistance and DVA output as given below for each cylinder:

Wire Color	Check to Wire Color	Resistance	DVA Reading
White wire	Purple wire	15-42(a)	0.6V or more Connected
White wire	Blue wire	15-42(a)	0.6V or more Connected
White wire	Green wire	15-42(a)	0.6V or more Connected

(a) Use a comparison reading as the values for different years used different coils in the Timer-Base. As long as you have approximately the same ohm reading on all three tests and the correct output with the DVA meter, the Timer-Base should be good.

3. Inspect the ignition coil for burned or discolored areas indicating arcing.
4. Swap the ignition coil with one that is sparking correctly.
5. Banks with the power packs and see if the problem moves. If fit does, replace the power pack. If not, replace the Timer-Base.

Six 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 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.

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 trigger resistance and DVA output as given below for each bank:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	900-1100 (35 amp)	150V or more Connected
Orange	Orange/Black	93-103 OEM	12-24V Connected
Orange	Orange/Black	45-55 CDI	12-24V Connected
White wire	Purple wire	(a)	0.6V or more Connected
White wire	Blue wire	(a)	0.6V or more Connected
White wire	Green wire	(a)	0.6V or more Connected
White wire	Purple wire 2nd connector	(a)	0.6V or more Connected
White wire	Blue wire 2nd connector	(a)	0.6V or more Connected
White wire	Green wire 2nd connector	(a)	0.6V or more Connected
White wire	Black/White wire 2nd connector	215-225	Not Applicable

(a) Use a comparison reading as different brands of meters will give different readings. The typical range is 1M to 5M ohms. As long as you have approximately the same ohm reading on all six tests and the correct output with the DVA meter, the Timer-Base should be good. The exception would be if one of the scr's inside the Timer-Base is breaking down while the engine is running. This can be found indexing the flywheel and checking the timing on all cylinders. If the readings are off, reverse the meter leads and retest to see if the readings are corrected.

4. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.

NO SPARK ON ONE CYLINDER:

1. Check the timer base's resistance and output (see NO SPARK ON ANY CYLINDER above).
2. 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 130V 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 or Timer-Base.

NO SPARK ON ONE BANK:

1. Check the stator resistance and output (see NO SPARK ON ANY CYLINDER above).
2. 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 all of the ignition coils are likely bad. A continued low reading indicates a bad power pack.

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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.
4. Disconnect the VRO sensor from the engine harness and retest. If the engine performs correctly, replace the VRO or sensor.

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 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.

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 trigger resistance and DVA output as given below for each bank:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	Brown/Yellow wire	900-1100 (35 amp)	150V or more Connected
Orange	Orange/Black	93-103 OEM	12-24V Connected
Orange	Orange/Black	40-55 CDI	12-24V Connected
White wire	Purple wire	(a)	0.6V or more Connected
White wire	Blue wire	(a)	0.6V or more Connected
White wire	Green wire	(a)	0.6V or more Connected
White wire	Pink wire	(a)	0.6V or more Connected
White wire	Purple wire 2nd connector	(a)	0.6V or more Connected
White wire	Blue wire 2nd connector	(a)	0.6V or more Connected
White wire	Green wire 2nd connector	(a)	0.6V or more Connected
White wire	Pink wire 2nd connector	(a)	0.6V or more Connected
White wire	Black/White wire 2nd connector	215-225	Not Applicable

(a) Use a comparison reading as different brands of meters will give different readings. The typical range is 1M to 5M ohms. As long as you have approximately the same ohm reading on all six tests and the correct output with the DVA meter, the Timer-Base should be good. The exception would be if one of the scr's inside the Timer-Base is breaking down while the engine is running. This can be found indexing the flywheel and checking the timing on all cylinders. If the readings are off, reverse the meter leads and retest to see if the readings are corrected.

4. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.

NO SPARK ON ONE CYLINDER:

1. Check the timer base's resistance and output (see NO SPARK ON ANY CYLINDER above).
2. 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 130V 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 or Timer-Base.

NO SPARK ON ONE BANK:

1. Check the stator resistance and output (see NO SPARK ON ANY CYLINDER above).
2. 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 all of the ignition coils are likely bad. A continued low reading indicates a bad power pack.

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, replace the temperature switch.
3. Make sure the tan temperature switch wire is not located next to a spark plug wire.
4. Disconnect the VRO sensor from the engine harness and retest. If the engine performs correctly, replace the VRO or sensor.

Troubleshooting the Johnson/Evinrude 60° 6 Cylinder Ignition (OIS 2000) Carbureted 1991-2006 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 exit QuickStart after 5 minutes of running time regardless of the condition of the cold sensor. The CDI power pack also will not fire if the wrong encoder wheel (4 cylinder) is installed by mistake. At cranking speed the voltage from the stator may not be enough to operate the circuits inside the power pack. Therefore, battery voltage supplied via the yellow/red striped start 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 will need the 511-4017 Timing Tool or the OEM version to set the timing for idle and WOT. 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:

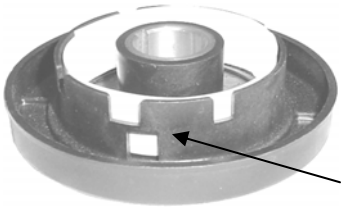
1. Early 150 and 175 HP engines did not have the tension washer on top of the sensor encoder wheel. This washer is required to keep the encoder locked in place. If it is missing, be sure to install the correct washer.
2. 1991 and 1992 engines did not have a shift interrupter switch. This resulted in 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.

Troubleshooting the Johnson/Evinrude 60° 6 Cylinder Ignition (OIS 2000)
1991-2006 Model Years (Continued)

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 CDI 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

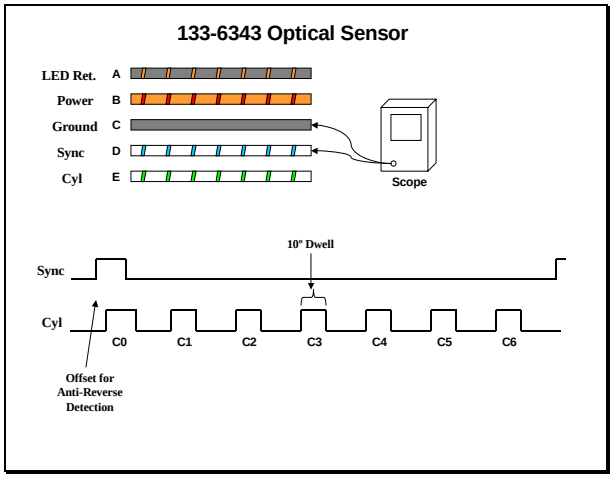
Note: If the DVA values are below these specifications, the power pack or sensor is likely bad.

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

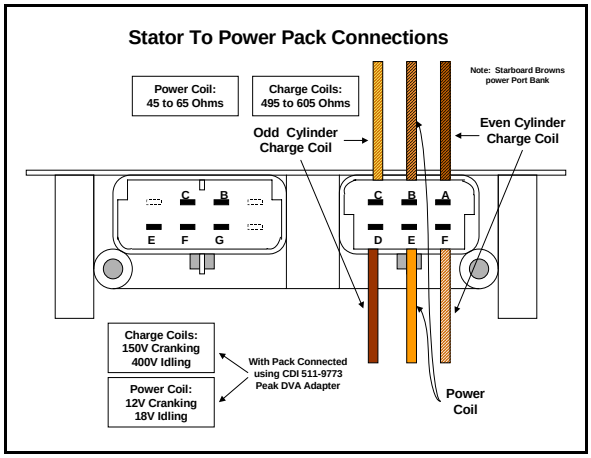
No Spark on One Bank of Cylinders:

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 CDI 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)
1991-2006 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 usually 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:

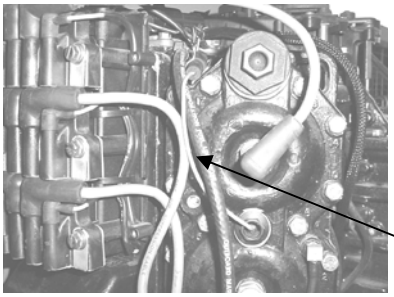
Using the Piercing Probes and DVA adapter, check the DVA voltage while connected as follows:

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.

Troubleshooting the Johnson/Evinrude 60° 4 Cylinder Ignition (OIS 2000) Carbureted 1995-2006 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 coil 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. The CDI power pack will not fire if the wrong encoder wheel (6 cylinder) is installed by mistake.

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 have to 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.

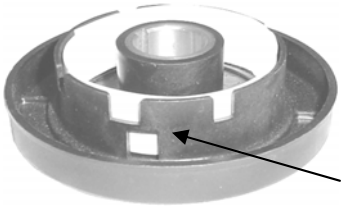
A breakthrough at CDI Electronics has allowed the use of microprocessor digital control circuits to handle the timing, QuickStart, S.L.O.W., rev limiter and data logging inside the power pack. This allows the timing to be set using a timing light, remote starter, spark gap tester, piston stop tool and 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° - 21° 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. Some engines do not have the RFI/MFI noise shield between the ignition coils and the power pack. If it is missing, replace it.
2. 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 4-pin connector on the port side of the power pack and see if the spark returns. If it does, use the CDI 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

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/Green	Engine Ground	130 V or more

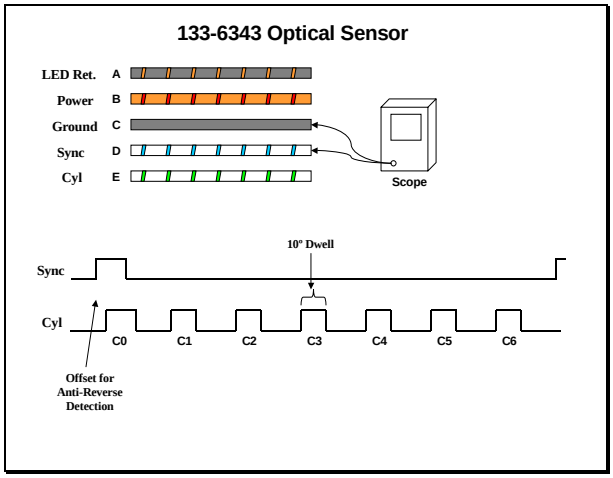
Note: If the DVA values are below these specifications, the power pack or sensor is likely bad.

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.

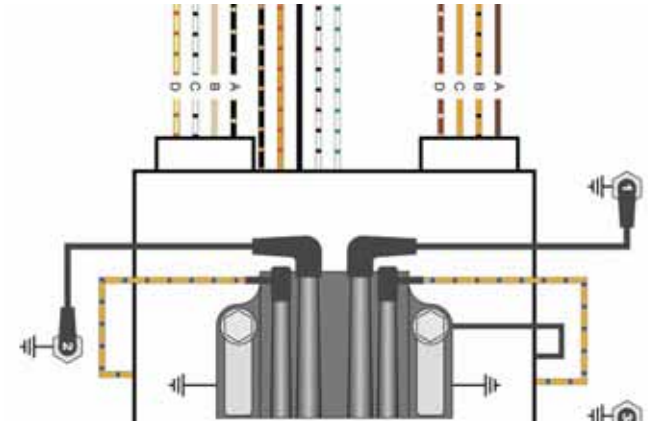
14. If an oscilloscope is available, check the white/blue (crank position signal) and white/green (cylinder position signal) sensor wires while connected to the sensor. With the engine cranking over, you should see a square toothed pattern on both wires. The white/blue wire should show 1 pulse per revolution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



f. Led Power – Black/Orange
g. Power – Orange Red
h. Ground – Black
i. Sync – White/Blue Stripe
j. Cyl – White/Green

No Spark on One Bank of Cylinders:

1. If the power pack has no spark on one bank and the readings are good, replace the power pack.
2. Disconnect the 4-pin connector on the port side of the power pack and see if the spark returns. If it does, use the CDI meter set to Ohms and see if the Black/Yellow wire is shorted to engine ground.
3. Check to see if the Shift Interrupter switch is shorted.



Port 4 Pin Connector	**Starboard 4 Pin Connector**
a) Black/Yellow	a) Brown
b) Tan	b) Orange/Black
c) White/Black	c) Orange
d) Yellow/Red	d) Brown/Yellow

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
Brown	Brown/Yellow	150V +

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 usually indicate a bad coil or 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:

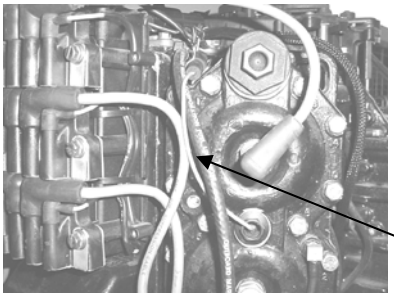
Using the Piercing Probes and DVA adapter, check the DVA voltage while connected as follows:

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):

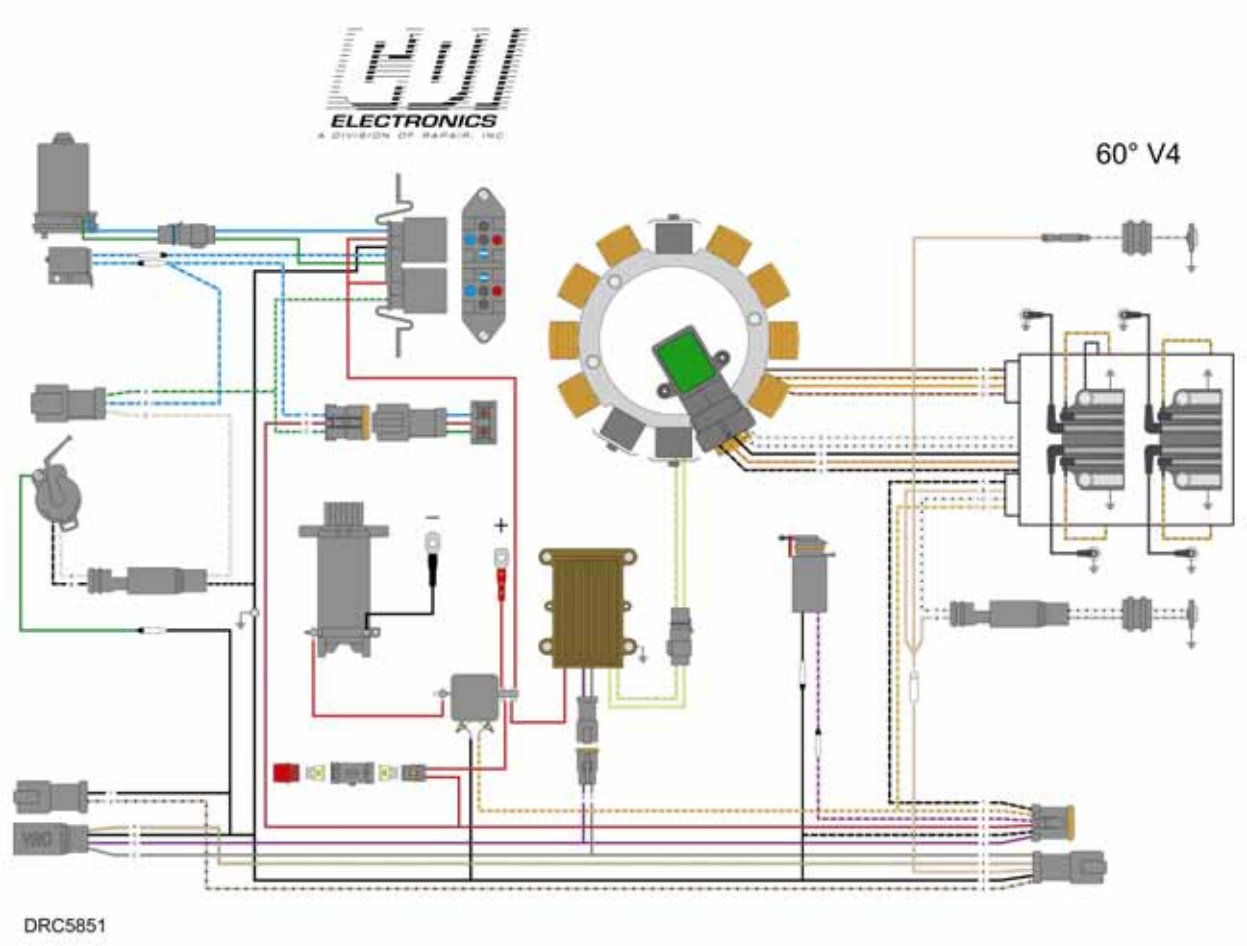
1. Verify the engine is not actually over-heating by using a digital pyrometer.
2. Check the routing of the tan temperature wires, an example of a bad location is shown below. The tan wires have to be located as far away as possible from the spark plug wires.



(Unacceptable routing for the temp wire.)

3. Verify the engine is not overheating and disconnect the Tan temperature sensor wire. If the engine performs normally, 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.

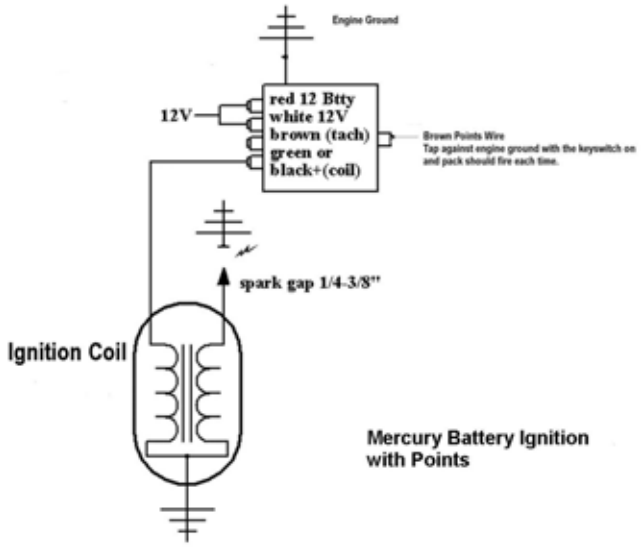
Engine stays in QuickStart All of the Time:
Check the Yellow/Red wire for 12 volts while the engine is running. You should only see voltage on this wire while the starter solenoid is engaged.



Mercury
Battery CD Ignitions with Points

1. SERVICE NOTE: 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.*** A CD Tester (CDI Electronics P/N: 511-9701) can be used to test the CD module, distributor cap, rotor button and spark plug wires on the engine.

Engine Wiring Connection for Testing Ignition Module



2. Clean all battery connections and engine grounds.
3. Disconnect the mercury tilt switch and retest. If the ignition works properly, replace the mercury switch.
4. Connect a spark gap tester to the spark plug wires and check for fire on *all cylinders*. If some cylinders fire and not others, the problem is likely in the distributor cap, rotor button or spark plug wires.
5. Connect a spark gap tester to the high-tension lead coming from the ignition coil and set it to approximately 7/16". 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.
6. Check voltage present on the white and red terminals while at cranking. It MUST be at least 9½ volts. If not, there is a problem in the harness, key switch, starter battery cables or battery.
7. Check DVA voltage on the green wire going to the coil, it should be over 100 volts at cranking.
8. Disconnect the brown points wires. Turn the ignition switch on and strike one of the brown points wire against engine ground. The unit should fire each time. If the coil does fire, this means the CD module is usually good and the points, points plate and grounding wire for the points plate should be checked.
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 brown points wire against engine ground (Or use a CD Tester). Only the #1 spark plug wire should fire. If any other spark plug wire now has fire, there is a problem in the distributor cap. Repeat the test for the other cylinders.
10. Perform a voltage drop test after the engine is repaired to see if there is a problem with the voltage going to the CD module. At cranking and while the engine is running, use a DC voltmeter and put the black meter lead on the battery POS (+) *post* and the red meter lead on the positive battery cable at the starter solenoid. Keep the black lead on the battery post and shift the red meter lead to the positive post of the rectifier, then to the red and white terminals on the switch box. If you find a reading above 0.6V, there is a problem at the point where the voltage jumped up. For example, if the meter reads 0.4V until you get to the white terminal and then jumps to 2.3V on the white terminal –this indicates a problem in the key switch, or harness. Repeat the test for the negative battery post by putting the black meter lead on the battery NEG (-) *post* and the red meter lead on the negative battery cable terminal, then shifting to the engine block, rectifier base and case ground of the CD module.

Mercury

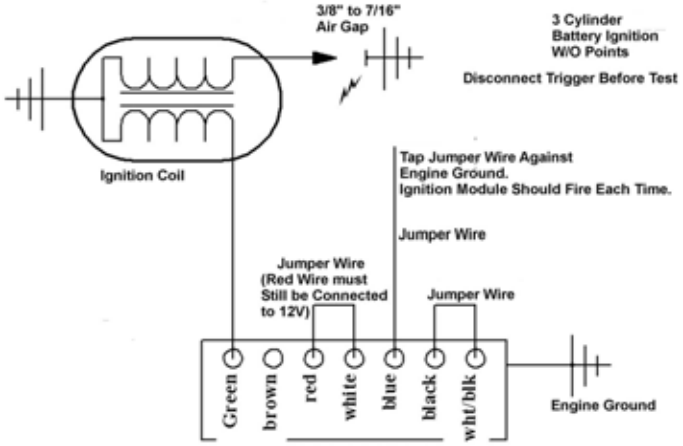
Battery CD Ignitions without Points

Three Cylinder Engines with 332-4796/393-4797 Battery Type Ignitions

Note: A CD Tester by CDI Electronics (511-9701) or Merc-o-Tronics can be used to test the CD module, distributor cap, rotor button and spark plug wires on the engine while the Trigger Tester by CDI can be used to test the distributor trigger.

SERVICE NOTE: Check the battery voltage at approximately 3500 RPM, MAXIMUM reading allowable is 16 volts and minimum is 12V. Running below 12V or over 16 volts will damage the ignition. Check for loose connections or a bad battery. ***Maintenance free batteries are NOT recommended for this application.***

Engine Wiring Connection for Testing Ignition Module



General:

1. Clean all battery connections and engine grounds.
2. Disconnect the mercury tilt switch and retest. If the ignition works properly, replace the mercury switch.
3. Connect a spark gap tester to the spark plug wires and check for fire on *all cylinders*. If some cylinders fire and not others, the problem is likely in the distributor cap, rotor button or spark plug wires.
4. Perform a voltage drop test after the engine is repaired to see if there is a problem with the voltage going to the CD module. At cranking and while the engine is running, use a DC voltmeter and put the black meter lead on the battery POS (+) *post* and the red meter lead on the positive battery cable at the starter solenoid. Keep the black lead on the battery post and shift the red meter lead to the positive post of the rectifier, then to the red and white terminals on the switch box. If you find a reading above 0.6V, there is a problem at the point where the voltage jumped up. For example, if the meter reads 0.4V until you get to the white terminal and then jumps to 2.3V on the white terminal –this indicates a problem in the key switch, or harness. Repeat the test for the negative battery post by putting the black meter lead on the battery NEG (-) *post* and the red meter lead on the negative battery cable terminal, then shifting to the engine block, rectifier base and case ground of the CD module.

NO SPARK ON ANY CYLINDER:

1. Connect a spark gap tester to the high-tension lead coming from the ignition coil and set it to approximately 7/16". 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.
2. Check the DC voltage present on the white and red terminals while at cranking. It MUST be at least 9½ volts. If not, there is a problem in the harness, key switch, starter battery cables or battery.
3. Check the DC voltage on the white/black trigger terminal while cranking, there must be at least 9V available with the trigger wire connected.
4. Check DVA voltage between the blue and black trigger wires (they must be connected to the switch box). You should read at least 3V. A low reading indicates a bad trigger.
5. Check DVA voltage on the green wire going to the coil, it should be over 100 volts at cranking.

ONLY HAS SPARK AS LONG AS THE STARTER IS ENGAGED:

This symptom usually indicates a bad trigger or low voltage.

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. Connect a spark gap tester to the high-tension leads coming from the distributor cap and set the gap to approximately 7/16". Use of a CD Tester is highly recommended.
2. Align the rotor with #1 spark plug wire. Disconnect the trigger wires and connect a jumper wire from the white/black trigger terminal to the black trigger terminal on the switch box.
3. Connect another jumper wire to the blue trigger terminal turn the ignition switch on. Strike the jumper wire from the blue terminal against engine ground – (DO NOT HOLD THE JUMPER AGAINST ENGINE GROUND). Only the #1 spark plug wire should fire. If any other spark plug wire now has fire, there is a problem in the distributor cap.
4. Repeat the test for the other cylinders.

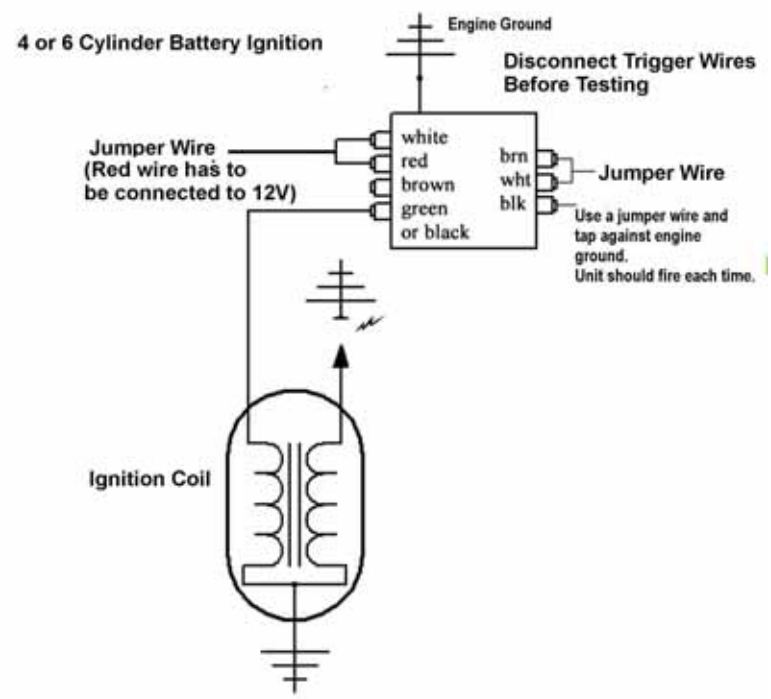
HIGH SPEED MISS:
Check the battery voltage on the red and white terminals of the switch box at high speed, the voltage should be between 12.5V and 16V DC. A reading outside this range will damage the CD module. If the readings are abnormal, perform the voltage drop test described above.

Four and Six Cylinder Engines with 332-2986/393-3736 Battery Type Ignitions

Note: A CD Tester like the one by CDI Electronics or Merc-o-Tronics can be used to test the CD module, distributor cap, rotor button and spark plug wires on the engine while the Trigger Tester by CDI can be used to test the distributor trigger.

SERVICE NOTE: Check the battery voltage at approximately 3500 RPM, MAXIMUM reading allowable is 16 volts and minimum is 12V. Running below 12V or over 16 volts will damage the ignition. Check for loose connections or a bad battery. ***Maintenance free batteries are NOT recommended for this application.***

Engine Wiring Connection for Testing Ignition Module



General:
1. Clean all battery connections and engine grounds.
2. Disconnect the mercury tilt switch and retest. If the ignition works properly, replace the mercury switch.
3. Connect a spark gap tester to the spark plug wires and check for fire on *all cylinders*. If some cylinders fire and not others, the problem is likely in the distributor cap, rotor button or spark plug wires.
4. Perform a voltage drop test after the engine is repaired to see if there is a problem with the voltage going to the CD module. At cranking and while the engine is running, use a DC voltmeter and put the black meter lead on the battery POS (+) *post* and the red meter lead on the positive battery cable at the starter solenoid. Keep the black lead on the battery post and shift the red meter lead to the positive post of the rectifier, then to the red and white terminals on the switch box. If you find a reading above 0.6V, there is a problem at the point where the voltage jumped up. For example, if the meter reads 0.4V until you get to the white terminal and then jumps to 2.3V on the white terminal –this indicates a problem in the key switch, or harness. Repeat the test for the negative battery post by putting the black meter lead on the battery NEG (-) *post* and the red meter lead on the negative battery cable terminal, then shifting to the engine block, rectifier base and case ground of the CD module.

NO SPARK ON ANY CYLINDER:
1. Connect a spark gap tester to the high-tension lead coming from the ignition coil and set it to approximately 7/16". 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.
2. Check the DC voltage present on the white and red terminals while at cranking. It MUST be at least 9½ volts. If not, there is a problem in the harness, key switch, starter battery cables or battery.
3. Check the DC voltage on the brown trigger terminal while cranking, there must be at least 9V available with the trigger wire connected.
4. Check DVA voltage between the white and black trigger wires (they must be connected to the switch box). You should read at least 3V. A low reading indicates a bad trigger.
5. Check DVA voltage on the green wire going to the coil, it should be over 100 volts at cranking.

ONLY HAS SPARK AS LONG AS THE STARTER IS ENGAGED:
This symptom usually indicates a bad trigger or low voltage.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:
1. Connect a spark gap tester to the high-tension leads coming from the distributor cap and set the gap to approximately 7/16". (Use of a CD Tester is recommended).
2. Align the rotor with #1 spark plug wire. Disconnect the trigger wires and connect a jumper wire from the brown trigger terminal to the white trigger terminal.
3. Connect another jumper wire to the black trigger terminal turn the ignition switch on. Strike the jumper wire from the black terminal against engine ground – (DO NO HOLD THE JUMPER AGAINST ENGINE GROUND). Only the #1 spark plug wire should fire. If any other spark plug wire has fire, there is a problem in the distributor cap.
4. Repeat the test for the other cylinders.

HIGH SPEED MISS:
1. Check the battery voltage on the red and white terminals of the switch box at high speed, the voltage should be between 12.5V and 16V DC. A reading outside this range will damage the CD module. If the readings are abnormal, perform the voltage drop test described above.
2. Perform a high-speed shutdown and read the spark plugs. Check for water. A crack in the block can cause a high miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem.

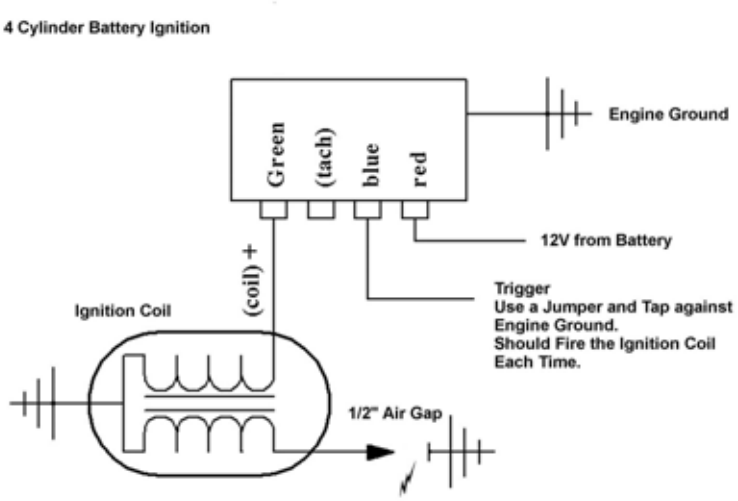
Four Cylinder Engines

1970-1971 Engines with 337-4406/337-4411 Ignitions

WARNING: Check the battery voltage at approximately 3500 RPM, MAXIMUM allowable reading is 16 volts and minimum is 12V. Running below 12V or over 16 volts will damage the ignition. Check for loose connections or a bad battery. Maintenance free batteries are NOT recommended for this application.

SERVICE NOTE: Due to problems associated with this system, it is recommended that the system be converted over to a 332-2986/393-3736 type system. (CDI Electronics offers a conversion kit, P/N – 114-2986K1)

Engine Wiring Connection for Testing Ignition 337-4411 Module



General:
1. Clean all battery connections and engine grounds.
2. Disconnect the mercury tilt switch and retest. If the ignition works properly, replace the mercury switch.
3. Connect a spark gap tester to the spark plug wires and check for fire on *all cylinders*. If some cylinders fire and not others, the problem is likely in the distributor cap, rotor button or spark plug wires.
4. Perform a voltage drop test after the engine is repaired to see if there is a problem with the voltage going to the CD module. At cranking and while the engine is running, use a DC voltmeter and put the black meter lead on the battery POS (+) *post* and the red meter lead on the positive battery cable at the starter solenoid. Keep the black lead on the battery post and shift the red meter lead to the positive post of the rectifier, then to the red and white terminals on the switch box. If you find a reading above 0.6V, there is a problem at the point where the voltage jumped up. For instance, if the meter reads 0.4V until you get to the white terminal and then jumps to 2.3V on the white terminal –this indicates a problem in the key switch, or harness. Repeat the test for the negative battery post by putting the black meter lead on the battery NEG (-) *post* and the red meter lead on the negative battery cable terminal, then shifting to the engine block, rectifier base and case ground of the CD module.

NO SPARK ON ANY CYLINDER:

1. If a mercury switch is connected to the switch box, disconnect it and retest. If you now have spark, replace the mercury switch.
2. Connect a spark gap tester to the high-tension lead coming from the ignition coil and set it to approximately 7/16". 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.
3. Check the DC voltage present on the white trigger wire and the red terminal of the switch box while cranking. It MUST be at least 9½ volts. If not, there is a problem in the harness, key switch, starter, battery cables or battery.
4. Check DVA voltage between the blue terminal and engine ground while cranking (The trigger wire must be connected to the switch box). You should read at least 9V.
5. Disconnect the wire from the blue terminal of the switch box and connect a jumper wire to the terminal. Strike the other end of the jumper wire against engine ground. The CD module should fire each time. Failure to fire usually indicates a bad CD module.
6. Check DVA voltage on the green wire going to the coil, it should be over 100 volts at cranking.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. Connect a spark gap tester to the spark plug wires coming from the distributor cap and set the air gap to approximately 7/16".
2. Align the rotor with #1 spark plug wire. Disconnect the wire from the blue terminal of the switch box and connect a jumper wire to the terminal. Strike the other end of the jumper wire against engine ground. Only the #1 spark plug wire should fire. If any other spark plug wire has fire, there is a problem in the distributor cap.
3. Repeat the test for the other cylinders.

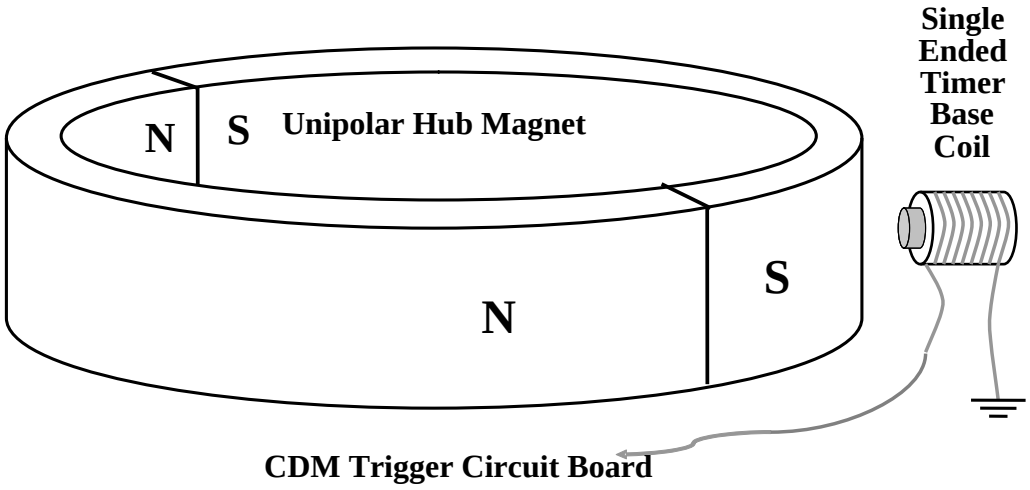
NOTICE: The 4 cylinder engines using the 332-3213 ignition module and belt driven ignition driver DO NOT USE BATTERY VOLTAGE. Connecting 12V to the Red terminal will destroy the module.

Mercury Trigger Magnets

THE FLYWHEELS WITH THESE MAGNET DESIGNS CANNOT BE INTERCHANGED!!!!

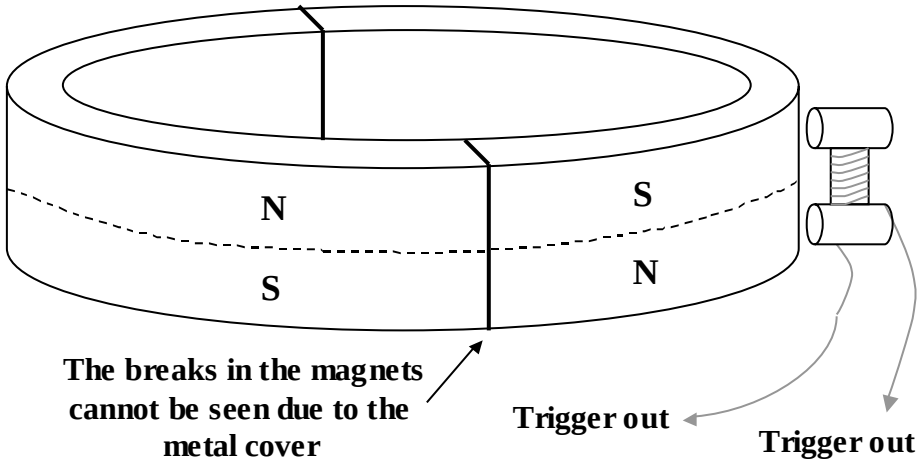
Mercury CDM Hub Magnet Design

1996 to 2006 2, 3 and 4 cylinder engines with CDM Modules



Mercury Hub Magnet Design

Push-Pull Trigger Coil Design (1978-1996 on 2, 3 and 4 Cyl engines All 1978-2005 L6, 2.0L, 2.4L and 2.5L engines)



Note that the design of the magnet for the push-pull is the same for the 3, 4 and 6 cylinder engines using standard ADI ignitions. The trigger magnet for the CDM modules is completely different.

Mercury

Alternator Driven Ignitions

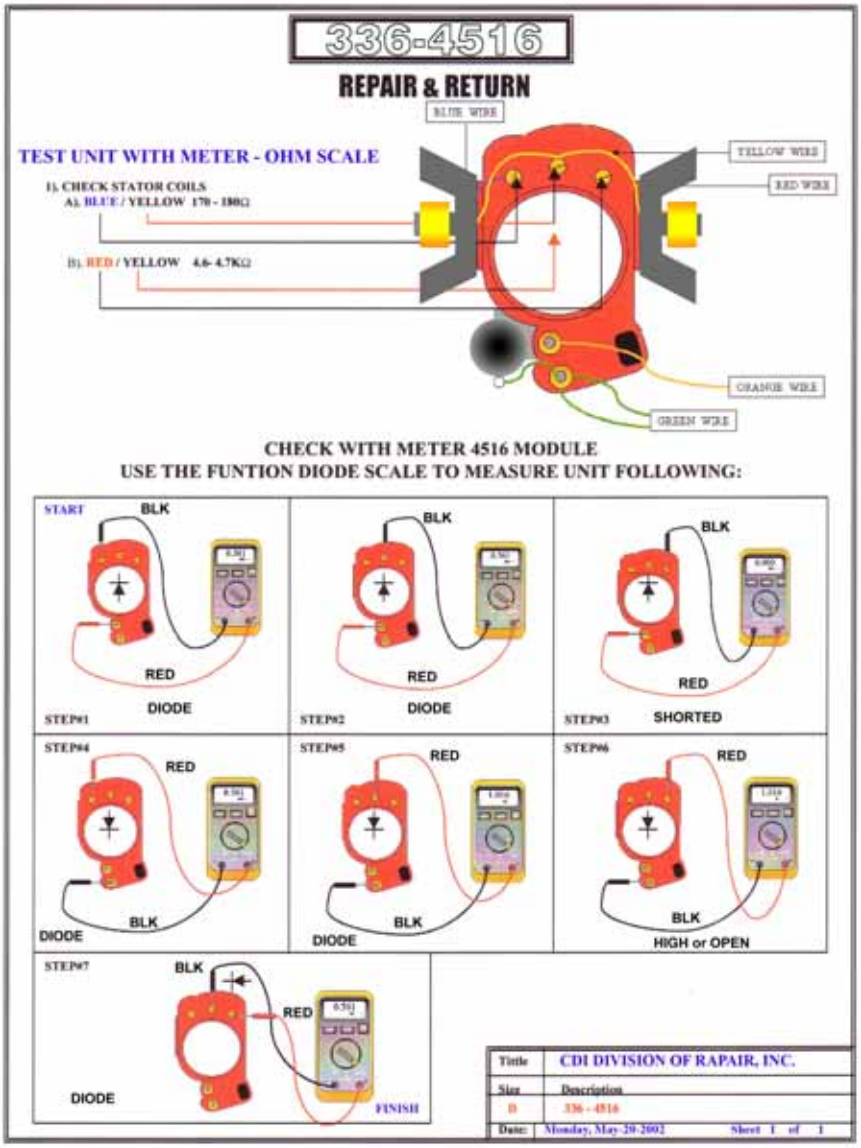
Two Cylinder Engines 1971-1975 (With Phase-Maker Ignition)

NO SPARK ON ONE OR BOTH CYLINDERS:

1. Disconnect the orange stop and retest. If the engine now has spark, the stop circuit has a fault.
2. Check the Stator resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Red wire	Yellow wire	320-550	Not Available
Blue wire	Yellow wire	3600-5500	Not Available
Green wire	Engine Ground	--	180V or more Connected

2. Disconnect the points wires (Brown and White) one at a time and retest. If the spark comes back on the one still connected when you disconnect one of them, the points or points wire is defective for the disconnected cylinder.
3. Disconnect the Green wires one at a time and retest If the spark comes back on one cylinder, the ignition coil not connected is defective. Remember that the coils must not be the Black or Blue coils (these coils are not isolated ground).
4. Test the 336-4516 module as follows:



Mercury

Two Cylinder Engines 1974-1985 (With the 336-3962 or 336-3996 Stator/Switch Box)

WARNING!! DO NOT START AND RUN THIS ENGINE ON A FLUSHING ATTACHMENT OR EAR MUFFS AND ACTIVATE THE STOP CIRCUIT. This system operates with the orange stop wire normally shorted to ground. When you activate the stop circuit, you open the orange's connection to ground. The resulting backlash into the stator may damage the electronics. You must use the choke to stop the engine. In the water, the back pressure from the exhaust will slow the engine quickly enough to prevent damage to the stator.

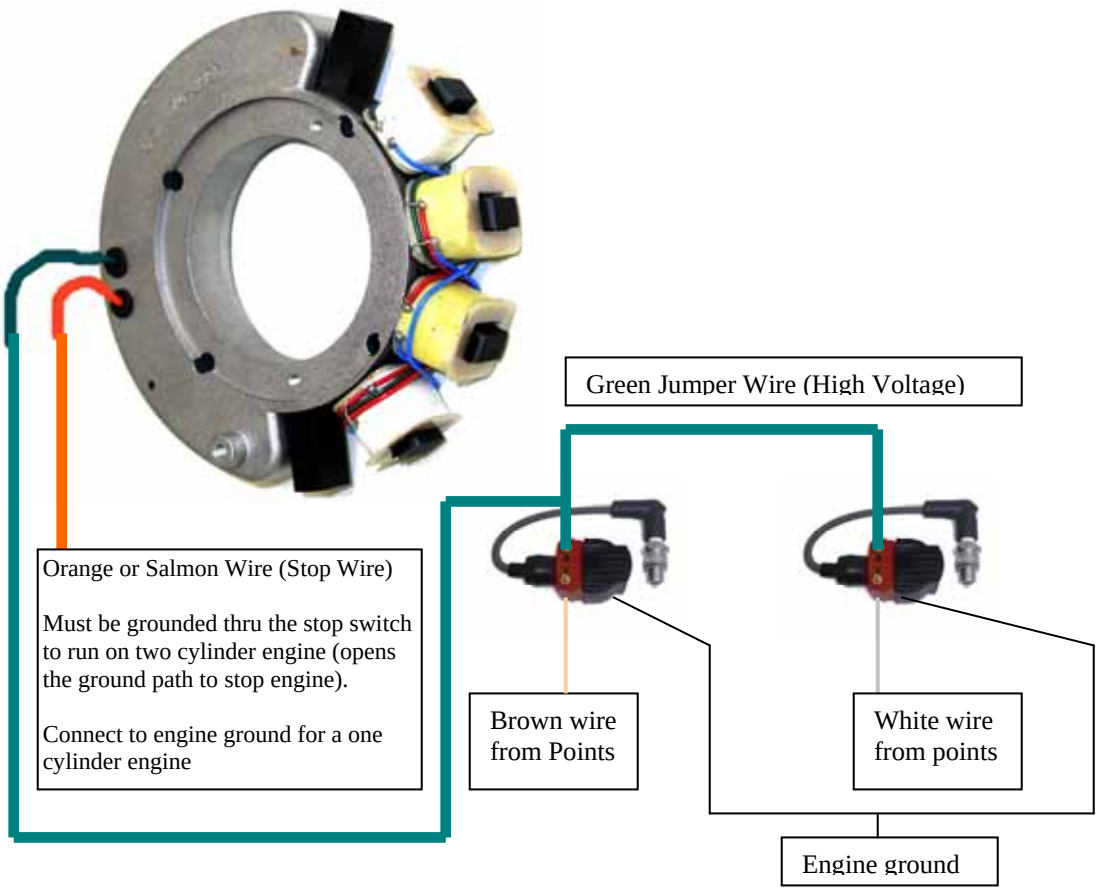
Note: The insulator blocks used with this stator are very important. You are strongly advised to closely inspect the points wires and insulator blocks for cracking or arcing. This system operates at a much higher voltage than the normal systems and what would be acceptable on other systems will cause arcing problems.

NO SPARK ON ANY CYLINDER:

1. Disconnect the Orange stop wire and retest. If the ignition system now has spark, the stop circuit has a problem.
2. Use a jumper wire and short the orange (Salmon) wire to ground. If the engine now has spark, replace the stop switch.
3. Disconnect the points wires from the ignition coils and connect a jumper wire to the negative side of the coils. Crank the engine and carefully tap the jumper to engine ground, if the coil sparks – check the points and points wires. If it fails to spark, inspect the ignition coil. You should have either a red, orange or green coil with a bare braided ground wire coming out of the backside of the coil. This bare braided ground wire MUST be connected to a clean engine ground. You cannot use a black or blue ignition coil.

NO SPARK ON ONE CYLINDER:

1. Disconnect the points wires from the ignition coils and swap them for a cranking test. Crank the engine over and see if the spark moves to a different coil. If it does, you have a problem in the points, points wire or insulator block for the cylinder not sparking.
2. If the spark remains on the same coil when you swap the points wires and it is the coil where the green wire is coming from the stator, remove the green jumper wire. Swap the green wire coming from the stator from one coil to the other coil. If the spark moves to the other coil, replace the green jumper wire connecting the two coils.
3. Check the ignition coil. You should have approximately 1,000 (1 K ohm) of resistance from the spark plug wire to engine ground.
4. Inspect the ignition coils. You should have either a red, orange or green coil with a bare braided ground wire coming out of the backside of the coil. This bare braided ground wire MUST be connected to a clean engine ground. You cannot use a black or blue ignition coil.



Mercury

Two Cylinder Engines 1974-1985 (With the 339-5287 or 339-6222 Switch Box)

NO SPARK ON ANY CYLINDER:

1. Disconnect the Orange stop wire and retest. If the ignition system now has spark, the stop circuit has a problem.
2. Check the stator and trigger resistance and DVA output:

WIRE	Read To	RESISTANCE	DVA
Orange	Engine GND	1600-1800 (800-900 per coil)	180V or more
Brown	White*	140-160	0.5V or more

Note: Some units had used a trigger that has 2 Brown wires instead of a Brown and White.

3. Inspect the ignition coils. You should have either a red, orange or green coil with a bare braided ground wire coming out of the backside of the coil. This bare braided ground wire MUST be connected to a clean engine ground. You cannot use a black or blue ignition coil.
4. Check the ignition coils as follows: Check resistance from + to – terminal reading should be 0.2-1.0 ohms and 800-1100 ohms from the high tension lead to engine ground. There should be no connection from the – terminal to engine ground.
5. Check the flywheel for broken magnets.

ENGINE HAS SPARK BUT WILL NOT RUN:

1. Index the flywheel and check the timing. If it is out by 180 degrees, swap the trigger wires to the switch box.
2. If the timing is off by any other degree, check the flywheel key.

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. Check the DVA output between the Green wire and Green/Whites from the switch box, also between the Blue and Blue/White wires while they are 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 wires from the ignition coil for that cylinder 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 switch box.
2. Connect an inductive tachometer to each cylinder and compare the RPM readings at the RPM where the problem is occurring. If only one cylinder is dropping out, swap the ignition coil locations and retest. If the problem follows a coil, replace the coil. If it stays on the same spark plug, replace the switch box.
3. Check the flywheel magnets to see if one has come loose and moved.

Mercury

Two Cylinder Engines 1974-1985 (With the 332-4911 or 332-4733 Switch Box)

NO SPARK ON ANY CYLINDER:

1. Disconnect the Orange (or Black/Yellow) stop wire and retest. If the ignition system now has spark, the stop circuit has a problem.
2. Check the stator and trigger resistance and DVA output:

WIRE	Read To	RESISTANCE	CDI RESISTANCE	DVA
Blue	Engine GND	3500-5500		180V or more
Red	Engine GND	450-550		20V or more
Brown	White*	140-160		0.5V or more

3. Check the flywheel for broken magnets.

ENGINE HAS SPARK BUT WILL NOT RUN:

1. Index the flywheel and check the timing. If it is out by 180 degrees, swap the trigger wires to the switch box.
2. If the timing is off by any other degree, check the flywheel key.

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. Check the DVA output from the switch box on the Green wires while they are 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 wires from the ignition coil for that cylinder 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 switch box.
2. Connect an inductive tachometer to each cylinder and compare the RPM readings at the RPM where the problem is occurring. If only one cylinder is dropping out, swap the ignition coil locations and retest. If the problem follows a coil, replace the coil. If it stays on the same spark plug, replace the switch box.
3. Check the flywheel magnets to see if one has come loose and moved.

Mercury

Two Cylinder Engines 1979-1996 (With the 332-7452 Switch Box)

NO SPARK ON ANY CYLINDER:

1. Disconnect the Black/Yellow stop wire and retest. If the ignition system now has spark, the stop circuit has a problem.
2. Check the stator and trigger resistance and DVA output:

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Black/Yellow	Engine GND	3250-3650	2200-2400	180V or more
Black/White	Engine GND	150-250	200-250	25V or more
Brown/Yellow	Brown/White	750-1400	925-1050	4V or more
Brown/Yellow	Engine GND	Open	Open	1V or more
Brown/White	Engine GND	Open	Open	1V or more

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both places. If the reading is low on one cylinder, disconnect the green 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 switch box.
2. Check the trigger resistance and DVA output as shown below:

Wire Color	Check To (Wire Color)	Resistance	DVA Reading
Brown wire	White wire	800-1400	4V or more Connected
Brown wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Connect a inductive tach to each cylinder and compare the RPM readings at the RPM where the problem is occurring. If only one cylinder is dropping out, swap the ignition coil locations and retest. If the problem follows a coil, replace the coil. If it stays on the same spark plug, replace the switch box.
4. Check the flywheel magnets to see if one has come loose and moved.

WILL NOT ACCELERATE BEYOUND 3000-4000 RPM:

1. Check the stator resistance and DVA output:

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Black/Yellow	Engine GND	3250-3650	2200-2400	180V or more
Black/White	Engine GND	150-250	200-250	25V or more

2. Connect a DVA meter to the Black/White wire/terminal and while under load, run the engine up to the RPM where the problem is occurring. The stator high speed voltage should increase with RPM. If the stator voltage falls off or if it does not increase with RPM, replace the stator.
3. Connect an inductive tach to each cylinder and compare the RPM readings at the RPM where the problem is occurring. If only one cylinder is dropping out, swap the ignition coil locations and retest. If the problem follows a coil, replace the coil. If it stays on the same spark plug, replace the switch box. If both cylinders become intermittent, replace the switch box.

Two Cylinder Engines 1994-1996 (With the 18495A4, A5, A6, A8, A11 or A13 Switch Box)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire AT THE PACK and retest. If the engine's ignition now has spark now, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
3. Check the stator resistance and DVA output as given below:

Black Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Blue/White	3250-3650	500-600	180V or more
Red	Red/White	75-90	28-32	25V or more

Red Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

Red Stator Adapter (Not Available from CDI)

WIRE	Read To	OEM RESISTANCE	DVA
Blue	Engine GND	OPEN	180V or more

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. If the cylinders are only misfiring above an idle, connect an inductive an Tachometer to each cylinder in turn and try to isolate the problem cylinder.
2. Check the trigger resistance and DVA output as shown below:

Wire Color	Check To (Wire Color)	Resistance	DVA Reading
Brown wire	White wire	800-1400	4V or more Connected
Brown wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both places. If the reading is low on one cylinder, disconnect the green 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.

WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to each cylinder in turn and try to isolate the problem. A single cylinder dropping fire will likely be the switch box or ignition coil. All cylinders misfiring usually indicate a bad stator.
2. Connect a DVA meter between the stator's blue wire and blue/white wires. Perform a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. (read the blue wire to engine ground if the engine has a red stator kit installed).
3. Connect a DVA meter between the stator's red wire and red/white wires. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the reading on the blue wire indicates a bad stator.
4. If both cylinders become intermittent, replace the switch box.
5. 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.
6. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

Two Cylinder Engines 1994-1996 (With the 18495A9, A14, A16, A20, A21 or A30 Switch Box)

NOTE: This engine has a locked trigger arm. Therefore, the timing is controlled by the switch box and is adjusted according to the engine RPM. RPM limiting is done by retarding the timing at high RPM's. Where possible, it is recommended that the ignition system be changed over to either the newer type ignition or the older type of ignition.

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire AT THE PACK and retest. If the engine's ignition now has spark now, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
3. Check the stator resistance and DVA output as given below:

Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Black	2900-3500	2200-2600	180V or more connected
Red	Black	100-180	200-250	25V or more connected
Black	Eng Gnd	Open	Open	2V or more connected

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. If the cylinders are only misfiring above an idle, connect an inductive an Tachometer to each cylinder in turn and try to isolate the problem cylinder.
2. Check the trigger resistance and DVA output as shown below:

Wire Color	Check To (Wire Color)	Resistance	DVA Reading
Brown wire	White wire	800-1400	4V or more Connected
Brown wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both places. If the reading is low on one cylinder, disconnect the green 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.

Two Cylinder Engines 1994-1996 (With the 18495A9, A14, A16, A20, A21 or A30 Switch Box)

(Continued)

WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to each cylinder in turn and try to isolate the problem. A single cylinder dropping fire will likely be the switch box or ignition coil. All cylinders misfiring usually indicate a bad stator.
2. Connect a timing light to #1 cylinder and verify that the timing is advancing. Also check to make sure the timing is not retarding too early.
3. Connect a DVA meter between the stator's blue wire and black wires. Perform a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. (read the blue wire to engine ground if the engine has a red stator kit installed).
4. Connect a DVA meter between the stator's red wire and black wires. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the reading on the blue wire indicates a bad stator.
5. If both cylinders become intermittent, replace the switch box.
6. 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.
7. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

Two Cylinder Engines 1994-2006 (With the 855721A3 & A4 Switch Box)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire AT THE PACK and retest. If the engine's ignition now has spark now, the stop circuit has a fault-possibly the key switch, harness or shift switch.
2. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
3. Check the stator and trigger resistance and DVA output as given below:

WIRE	Read To	OEM Ohms	CDI Ohms	DVA
Green/White	White/Green	660-710	350-450	180V minimum connected
Green/White	Eng Gnd	Open	Open	None disconnected
White/Green	Eng Gnd	Open	Open	None disconnected
Brown/White	Brown/Yellow	850-1100	850-1100	4V minimum connected
Brown/White	Eng Gnd	Open	Open	None disconnected
Brown/Yellow	Eng Gnd	Open	Open	None disconnected

NO SPARK OR INTERMITTENT ON ONE CYLINDER:

1. If the cylinders are only misfiring above an idle, connect an inductive an Tachometer to each cylinder in turn and try to isolate the problem cylinder.
2. Check the trigger resistance and DVA output as shown below:

Wire Color	Check To (Wire Color)	Resistance	DVA Reading
Brown/White	Brown/Yellow	850-1100	4V minimum connected
Brown/White	Eng Gnd	Open	1V or more (*)
Brown/Yellow	Eng Gnd	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both places. If the reading is low on one cylinder, disconnect the green 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.

WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to each cylinder in turn and try to isolate the problem. A single cylinder dropping fire will likely be the switch box or ignition coil.
2. Connect a DVA meter between the stator's Green/White wire and White/Green wires. Perform a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs usually indicates a bad stator.
3. If both cylinders become intermittent, replace the switch box if the stator tests good.
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. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

Three Cylinder Engines

1976-1996

Three Cylinder Engines Using a Single Switch Box and Three Ignition Coils

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wire AT THE PACK and retest. If the engine's ignition now has spark, the stop 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 has spark, replace the rectifier.
3. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
4. Check the stator resistance and DVA output as given below:

Flywheel with Bolted-in Magnets

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Engine GND	5800-7000	2200-2400	180V or more
Red	Engine GND	135-165	45-55	25V or more

Flywheel with Glued-in Magnets

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Engine GND	3250-3650	500-600	180V or more
Red	Engine GND	75-90	28-32	25V or more

Red Stator Kit

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more
Blue	Engine GND	OPEN		180V or more

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. If the cylinders are only misfiring above an idle, connect a inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Check the trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Brown wire	White/Black	800-1400	4V or more Connected
White wire	White/Black	800-1400	4V or more Connected
Purple wire	White/Black	800-1400	4V or more Connected
Brown wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)
Purple wire	Engine GND	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both terminals. If the reading is low on one cylinder, disconnect the green 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 symptom indicates a bad power pack.

ENGINE WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A single cylinder dropping fire will likely be the switch box or ignition coil. All cylinders misfiring usually indicate a bad stator.
2. Connect a DVA meter to the stator's blue wire and engine ground and do a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. (blue to engine ground if the engine has a red stator kit installed).
3. Connect a DVA meter to the stator's red wire and engine ground and do a running test. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the reading on the blue wire indicates a bad stator.

HIGH SPEED MISS:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder indicates a problem usually in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under "*No spark or Intermittent on One or More Cylinders*".
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.
4. Rotate the stator 1 bolt hole in either direction and retest.

WILL NOT IDLE BELOW 1500 RPM:

1. Check the Bias resistance from the Black/White terminal to engine ground. Reading should be 14-15,000 ohms.
2. Check for air leaks.

Four Cylinder Engines
(With Ignition Driver Distributors)

WARNING!! DO NOT CONNECT 12VDC TO THE IGNITION MODULE AS DC VOLTAGE WILL BURN OUT THE SWITCH BOX AND IGNITION DRIVER.

NO SPARK ON ANY CYLINDER:

1. Disconnect the orange stop wire AT THE PACK and retest. If the engine's ignition now has spark, the stop circuit has a fault-check the key switch, harness and mercury tilt switch.
2. Check the Ignition Driver resistance and DVA output:

Wire Color	Read to	Function	Resistance	DVA Reading
Red	White wire	Cranking Winding	400 ohms	180V+
Blue	White wire	High Speed Winding	10 Ohms	20V+
Green	Engine Gnd	Pack output	N/A	150V+
White	Common for Ignition Driver (DOES NOT CONNECT TO ENGINE GND)			

3. Check the cranking RPM. A cranking speed of less than 250-RPM will not allow the system to fire properly.

NO SPARK ON ONE OR MORE CYLINDERS:

If only one or two cylinders are not firing on this system, the problem is going to be either in the distributor cap or spark plug wires.

Four Cylinder Engines
1978-1996
Four Cylinder Engines Using a Single Switch Box and Four Ignition Coils

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wires AT THE PACK and retest. If the engine's ignition now has spark, the stop circuit has a fault-check the key switch, harness and mercury tilt switch.
2. Disconnect the yellow wires from the stator to the rectifier and retest. If the engine now has spark, replace the rectifier.
3. Verify the correct flywheel is installed.
4. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
5. Check the stator resistance and DVA output as shown below:

Flywheel with Bolted-in Magnets

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Blue/White	5000-7000	2200-2400	180V or more
Red	Red/White	125-155	45-55	25V or more

Flywheel with Glued-in Magnets

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	Blue/White	3250-3650	500-600	180V or more
Red	Red/White	75-90	28-32	25V or more

Red Stator

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more
Blue	Blue	OPEN		180V or more
Blue (Each)	Ground	OPEN		180V or more

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. If the cylinders are only misfiring above an idle, connect an inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Check the trigger resistance and DVA output as given below:

Wire Color	Check to Wire Color	Resistance	DVA Reading
Purple wire	White wire	800-1400	4V or more Connected
Brown wire	White/Black wire	800-1400	4V or more Connected
Purple wire	Engine GND	Open	1V or more (*)
White wire	Engine GND	Open	1V or more (*)
Brown wire	Engine GND	Open	1V or more (*)
White/Black wire	Engine GND	Open	1V or more (*)

(*) This reading can be used to determine if a pack has a problem in the triggering circuit. For instance, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

Note: If #1 and #2, or #3 and #4 are misfiring, check the trigger as described above. The trigger has two coils firing four cylinders. #1 & 2 share a trigger coil and #3 & 4 share a trigger coil. Also, the switch box is divided into two parts. The #1 and #2 cylinders are fired on one side and #3 and #4 are fired from the other side of the switch box. If the trigger tests are okay according to the chart above, but you have two cylinders not firing (either #1 and #2, or #3 and #4), the switch box or stator is bad.

3. If you have two cylinders not firing (either #1 and #2, or #3 and #4), switch the stator leads end to end on the switch box (red with red/white and blue with blue/white). If the problem moves to the other cylinders, the stator is bad. It the problem stayed on the same cylinders, the switch box is likely bad.
4. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both terminals. If the reading is low on one cylinder, disconnect the green 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 symptom indicates a bad power pack.

ENGINE WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. If two cylinders on the same end of the switch box are dropping out, the problem is likely going to be either the switch box or trigger. A single cylinder dropping fire will likely be the switch box or ignition coil. All cylinders misfiring usually indicate a bad stator.
2. Connect a DVA meter to the stator's blue wire and blue/white wires and do a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. (Check from blue to blue if the engine has a red stator kit installed).
3. Connect a DVA meter to the red wire and red/white wires and do a running test. The DVA voltage should show a smooth climb in voltage and remain high through the RPM range. A reading lower than the reading on the blue wires indicates a bad stator.

HIGH SPEED MISS:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder indicates a problem usually in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under "*No fire or Intermittent on One or More Cylinders*".
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

WILL NOT IDLE BELOW 1500 RPM:

1. Index the flywheel and check the timing on all cylinders. If the timing cannot be adjusted correctly or if the timing is off on one cylinder, replace the trigger.
2. Check for air leaks.
3. Check synchronization of the carburetors.

Inline 6 and V6 Carbureted Engines Using Dual Switch Boxes and Six Ignition Coils

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wires AT THE 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 less than 250-RPM will not allow the system to fire properly.

NO SPARK ON ONE BANK (3 OF 6 ON THE INLINE L-6):

1. Check the stator resistance and DVA output as shown below:

9 to 16 Amp Battery Charging Capacity

WIRE (Read to Engine ground)	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	5000-7000	2200-2400	180V or more
Blue/White	5000-7000	2200-2400	180V or more
Red	90-200	30-90	25V or more
Red/White	90-200	30-90	25V or more

40 Amp Battery Charging Capacity

WIRE (Read to Engine ground)	OEM RESISTANCE	CDI RESISTANCE	DVA
Blue	3200-4200	2200-2400	150V or more
Blue/White	3200-4200	2200-2400	150V or more
Red	90-140	90-110	20V or more
Red/White	90-140	90-110	20V or more

2. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both terminals on all cylinders. If the reading is low on one bank and the stator voltage is good, the switch box is usually bad. (Note: A final test to verify which component is bad is to swap the stator leads from one switch box to the other. If the problem moves, the stator is bad. If the same bank still does not fire, the switch box is usually bad.)
3. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. Connect a spark gap tester and verify which cylinders are misfiring. If the cylinders are only misfiring above an idle, connect an inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Check the trigger resistance and DVA output as shown below:

BLACK SLEEVE TO	YELLOW SLEEVE	Resistance	DVA Reading
Brown wire	White wire	800-1400	4V or more Connected
White wire	Purple wire	800-1400	4V or more Connected
Purple wire	Brown wire	800-1400	4V or more Connected

Service Note: You should get a high or open resistance reading to engine ground from each wire, but you will get a DVA reading of approximately 1-2 Volts. This reading can be used to determine if a pack has a problem in the triggering circuit. For example, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

3. Check the DVA output on the green wires from the switch box while connected to the ignition coils. Check the reading on the switch box terminal AND on the ignition coil terminal. You should have a reading of at least 150V or more at both terminals. If the reading is low on one cylinder, disconnect the green 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 symptom indicates a bad power pack.

ENGINE WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Connect an inductive RPM meter to all cylinders and try to isolate the problem. If two or more cylinders on the same bank are dropping out, the problem is likely going to be either the stator or the switch box. A single cylinder dropping fire will likely mean the switch box or ignition coil is defective.
2. Check the stator resistance:

9 to 16 Amp Battery Charging Capacity

WIRE (Read to Engine ground)	OEM RESISTANCE	CDI RESISTANCE
Blue	5000-7000	2200-2400
Blue/White	5000-7000	2200-2400
Red	90-200	30-90
Red/White	90-200	30-90

40 Amp Battery Charging Capacity

WIRE (Read to Engine ground)	OEM RESISTANCE	CDI RESISTANCE
Blue	3400-4200	2200-2400
Blue/White	3400-4200	2200-2400
Red	90-140	90-110
Red/White	90-140	90-110

3. Connect a DVA meter to the Blue wire and do a running test. The DVA voltage should jump up to well over 200V and stabilize. A drop in voltage right before the problem occurs indicates a bad stator. Repeat for the blue/white wire and compare the readings.

WIRE (Read to Engine ground)	CRANKING	1000 RPM	3000 RPM
Blue	100-265	195-265	255-345
Blue/White	100-265	195-265	255-345
Red	25-50	120-160	230-320
Red/White	25-50	120-160	230-320
White/Black*	1-6	3-15	10-30

- This voltage is read with an analog DC volt meter – Not a DVA meter.

4. Check the trigger as follows:

WIRE	Read to	OEM RESISTANCE	CDI RESISTANCE	DVA @ CRANKING
Brown (Black Sleeve)	White (Yellow Sleeve)	1100-1400	800-1000	4V or more
White (Black Sleeve)	Purple (Yellow Sleeve)	1100-1400	800-1000	4V or more
Purple (Black Sleeve)	Brown (Yellow Sleeve)	1100-1400	800-1000	4V or more

Service Note: You should get a high or open resistance reading to engine ground from each wire, but you will get a DVA reading of approximately 1-2 Volts. This reading can be used to determine if a pack has a problem in the triggering circuit. For example, if you have no fire on one cylinder and the DVA trigger reading for that cylinder is low – disconnect the trigger wire and recheck the DVA output to ground from the trigger wire. If the reading stays low – the trigger is bad.

High Speed Miss:

1. Connect an inductive RPM meter to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under 'No fire or Intermittent on One or More Cylinders'.
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.

Two Cylinder Engines 1996-2006

Engines Using a Combination Switch Box and Ignition Coil (CDM Modules)

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wires from the harness and retest. If the engine's ignition sparks, the stop circuit has a fault- check the key switch, harness and shift switch.
2. Swap the White/Green and Green White stator wire and retest. If the problem moves to the other cylinder, the stator is likely bad.
3. Disconnect one CDM module at a time and using a set of piercing probes and jumper wires- short the stator and trigger wire in the CDM connector to engine ground. Retest. If the other module starts sparking, the CDM you unplugged is bad.
4. Disconnect the yellow wires from the stator to the rectifier and retest. If the engine now has spark, replace the rectifier.
5. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to spark properly.
6. Check the stator resistance and DVA output as follows:

WIRE	Read to	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

7. Check the resistance of the CDM as follows:

	Red Meter Lead	Black Meter Lead	Reading
CDM Pin #	A	C	700-1300 Ohms
CDM Pin #	D	A	DIODE*
CDM Pin #	A	D	DIODE*
CDM Pin #	D	B	DIODE*
CDM Pin #	B	D	DIODE*
CDM Pin #	A	B	DIODE*
CDM Pin #	B	A	DIODE*
	High Tension Lead	A	700-1300 Ohms

* Diode readings are to be read one way, then reverse the leads and read again. You should get a low reading in one direction and a higher reading in the other.

NO SPARK OR INTERMITTENT SPARK ON ONE CYLINDER:

1. If the cylinders are only misfiring up above an idle, connect an inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Using a set of piercing probes, check the trigger DVA output as shown below:

Wire Color	Check To (Wire Color)	Resistance	DVA Reading
White wire	Engine GND	Open	1V or more
Brown wire	Engine GND	Open	1V or more

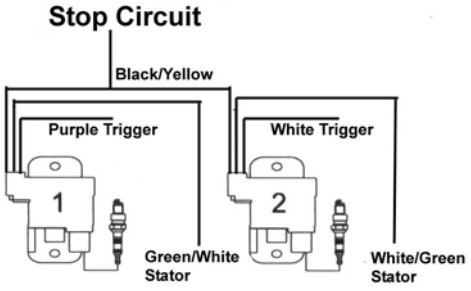
3. If # 1 is not sparking, swap the White/Green and Green White stator wire and retest. If the problem moves to the #2 cylinder, the stator is likely bad. If no change, swap locations with #2 and see if the problem moves. If it does, the module is bad. A continued no spark condition on the same cylinder indicates a bad trigger.
4. Check the resistance of the CDM as follows:

	Red Meter Lead	Black Meter Lead	Reading
CDM Pin #	A	C	700-1300 Ohms
CDM Pin #	D	A	DIODE*
CDM Pin #	D	B	DIODE*
CDM Pin #	A	B	DIODE*
	High Tension Lead	A	700-1300 Ohms

* Diode readings are to be read one way, then reverse the leads and read again. You should get a low reading in one direction and a higher reading in the other.

High Speed Miss:

1. 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 trigger or CDM module.
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracked or broken magnets.



Three Cylinder Engines
1996-2006 Engines Using CDM Modules

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wires from the harness and retest. If the engine's ignition now sparks, the stop circuit has a fault- check the key switch, harness and shift switch.
2. Disconnect one CDM module at a time and see if the other modules start sparking. If they do, the module you just unplugged is bad.
3. If the bottom two CDM modules are not sparking, swap the connection between the top and middle cylinder. If the middle cylinder starts sparking, replace the top CDM.
4. Disconnect the yellow wires from the stator to the rectifier and retest. If the engine now has spark, replace the rectifier.
5. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to spark properly.
6. Check the stator resistance and DVA output as given below:

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

7. Check the resistance of the CDM as follows:

	Red Meter Lead	Black Meter Lead	Reading
CDM Pin #	A	C	700-1300 Ohms
CDM Pin #	D	A	DIODE*
CDM Pin #	A	D	DIODE*
CDM Pin #	D	B	DIODE*
CDM Pin #	B	D	DIODE*
CDM Pin #	A	B	DIODE*
CDM Pin #	B	A	DIODE*
	High Tension Lead	A	700-1300 Ohms

* Diode readings are to be read one way, then reverse the leads and read again. You should get a low reading in one direction and a higher reading in the other.

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. If the cylinders are only misfiring above an idle, connect an inductive Tachometer to all cylinders and try to isolate the problem cylinders.
2. Using a set of piercing probes, check the trigger DVA output as shown below:

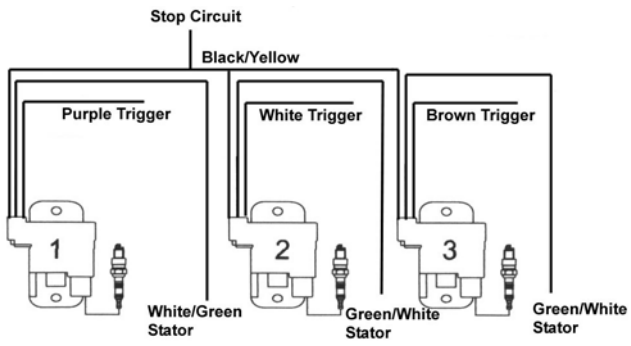
Wire Color	Check to Wire Color	Resistance	DVA Reading
Purple wire	Engine GND	Open	1V or more
White wire	Engine GND	Open	1V or more
Brown wire	Engine GND	Open	1V or more

NOTE: These triggers have the bias circuitry internally built-in, therefore you cannot measure the resistance like you can measure on the older engines.

3. If # 1 CDM module is not sparking, disconnect the #2 CDM module and see if the #1 CDM module starts sparking. If it does, the module you just unplugged is bad. If it does not, reconnect #2, then disconnect the #3 CDM module and see if the #1 module starts sparking. If it does, the module you just unplugged is bad.
4. If there is no spark ire on either # 2 or #3, swap locations with #1 and see if the problem moves. If it does, the module is bad. A continued no spark on the same cylinder indicates a bad trigger.

HIGH SPEED MISS:

1. Connect an inductive Tachometer to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder indicates a problem usually in the trigger or CDM module.
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.
4. Use the diagram below to help in locating the area where the problem may be. Remember a short in #1 can cause either #2 and #3 not to have spark. By the same reason, a problem in either #2 or #3 can cause #1 not to have spark.



Four Cylinder Engines
1996-2006 Engines Using CDM Modules

NO SPARK ON ANY CYLINDER:

1. Disconnect the black/yellow stop wires from the harness and RPM Limiter. 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 less than 250-RPM will not allow the system to fire properly.
4. Check the stator resistance and DVA output as given below:

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

5. Check the resistance of the CDM as follows:

	Red Meter Lead	Black Meter Lead	Reading
CDM Pin #	A	C	700-1300 Ohms
CDM Pin #	D	A	DIODE*
CDM Pin #	A	D	DIODE*
CDM Pin #	D	B	DIODE*
CDM Pin #	B	D	DIODE*
CDM Pin #	A	B	DIODE*
CDM Pin #	B	A	DIODE*
	High Tension Lead	A	700-1300 Ohms

Note: Diode readings are to be read one way, then reverse the leads and read again. You should get a low reading in one direction and a higher reading in the other.

NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

1. If the cylinders are only misfiring above an idle, connect an inductive RPM meter to all cylinders and try to isolate the problem cylinders.
2. Disconnect the CDM's one at a time and see if you get spark back on the problem cylinders.
3. Using a set of piercing probes, check the trigger DVA output as given below:

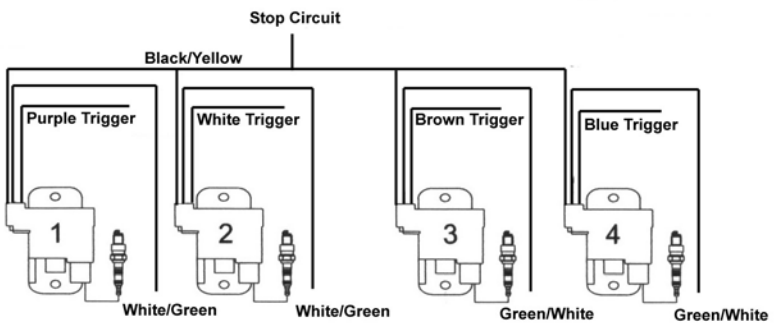
Wire Color	Check to Wire Color	Resistance	DVA Reading
Purple wire	Engine GND	Open	3V or more
White wire	Engine GND	Open	3V or more
Brown wire	Engine GND	Open	3V or more
White/Black wire	Engine GND	Open	3V or more

NOTE: These triggers have the bias circuitry internally built-in, therefore you cannot measure the resistance like you can measure on the older engines. In addition, these engines use four triggering coils versus the two triggering coils used on the older engines.

4. Disconnect one of the CDM modules that are firing one at a time and see if the dead CDM starts firing. If it does, the CDM you just unplugged is bad.

High Speed Miss:

1. Connect an inductive RPM meter to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger as described above under "*No spark or intermittent spark on any cylinder*".
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.
4. Use the wiring diagram below as an aid in locating areas where problems may occur. Remember a short in either #1 or #2 can cause either # 3 and #4 not to have spark.



Six Cylinder Engines

1996-2005 2.0L and 2.5 L Engines Using CDM Modules

NO SPARK ON ANY CYLINDER:

1. Inspect the spark plug wires, boots and spark plugs. Check for chafing on the wiring and harnesses.
2. Clean and inspect CDM ground wire connection to engine ground
3. Disconnect the Black/Yellow stop wires from the harness and RPM Limiter. Retest. If the engine's ignition now has spark, the stop circuit has a fault-check the key switch, harness and shift switch. If there is still no spark, disconnect the CDM's one at a time and see if you get spark back on the other cylinders. A shorted stop circuit in one CDM will prevent ALL cylinders from sparking.
4. Disconnect the yellow wires from the rectifier and retest. If the engine has spark, replace the rectifier.
5. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
6. Check the stator resistance and DVA output as given below:

WIRE	Read To	OEM RESISTANCE	CDI RESISTANCE	DVA
White/Green	Green/White	500-700	500-600	180V or more

7. Check the resistance of each of the CDM's as follows:

	Red Meter Lead	Black Meter Lead	Reading
CDM Pin #	A	C	700-1300 Ohms
CDM Pin #	D	A	DIODE*
CDM Pin #	A	D	DIODE*
CDM Pin #	D	B	DIODE*
CDM Pin #	B	D	DIODE*
CDM Pin #	A	B	DIODE*
CDM Pin #	B	A	DIODE*
	High Tension Lead	A	700-1300 Ohms

Note: Diode readings are to be read one way, then reverse the leads and read again. You should get a low reading in one direction and a higher reading in the other.

NO SPARK OR INTERMITTENT SPARK ON ONE OR TWO CYLINDERS:

1. Inspect the spark plug wires, boots and spark plugs. Check for chafing on the wiring and harnesses
2. Clean and inspect CDM ground wire connection to engine ground.
3. If the cylinders are only misfiring above an idle, connect an inductive RPM meter to all cylinders and try to isolate the problem cylinders.
4. Using a set of piercing probes, check the trigger Resistance and DVA output as given below:

Wire Color	Check to Wire Color	OEM Resistance	CDI Resistance	DVA Reading
Purple wire	Blue	1100-1400	850-1050	4V or more
White wire	Red	1100-1400	850-1050	4V or more
Brown wire	Yellow	1100-1400	850-1050	4V or more

High Speed Miss:

1. Connect an inductive RPM meter to all cylinders and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the CDM module.
2. 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.
3. Remove the flywheel and check the triggering and charge coil flywheel magnets for cracks or broken magnets.
4. Index the flywheel and check the timing on ALL cylinders. On carbureted models, the control module rev limi function starts to retard timing in sequence (2, 3, 4, 5, 6, 1) at 5800-6000 RPM. The control module will retard the timing each cylinder up to 30 degrees (starting with #2) and then stop firing that cylinder if the RPM is still above the limit. It will continue to retard, then shut down each cylinder until the engine drops below the limit.

NO SPARK OR INTERMITTENT SPARK ON #1, #2 and #3 OR #4, #5 and #6 CYLINDERS:

1. Check the cranking RPM. A cranking speed less than 250-RPM will not allow the system to fire properly.
2. Disconnect the CDM's one at a time and see if you get spark back on the problem cylinders.
3. Check the stator resistance and DVA output as given below:

WIRE	Read To	OEM	CDI	DVA
White/Green	Green/White	500-700 ohms	500-600 ohms	180V or more connected
White/Green	Engine Gnd	Open	Open	180V or more connected
White/Green	Engine Gnd	Open	Open	Less than 2 V disconnected
Green/White	Engine Gnd	Open	Open	180V or more connected
Green/White	Engine Gnd	Open	Open	Less than 2 V disconnected

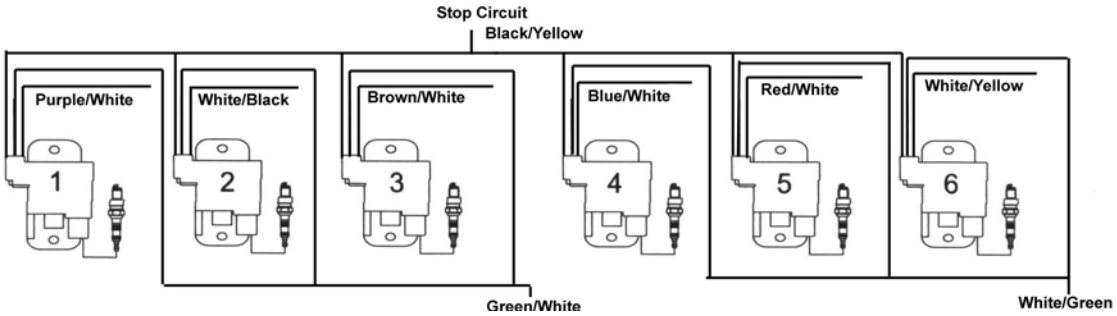
3. Using a set of piercing probes, check the trigger Resistance and DVA output as given below:

Wire Color	Check to Wire Color	OEM Resistance	CDI Resistance	DVA Reading
Purple wire	Blue	1100-1400	850-1050	4V or more
White wire	Red	1100-1400	850-1050	4V or more
Brown wire	Yellow	1100-1400	850-1050	4V or more

4. Using a set of piercing probes, check the trigger voltage going to the CDM's:

Wire Color	Check to Wire Color	OEM Resistance	CDI Resistance	DVA Reading
Purple wire	Engine GND	Open	Open	3V or more
White wire	Engine GND	Open	Open	3V or more
Brown wire	Engine GND	Open	Open	3V or more
Blue wire	Engine GND	Open	Open	3V or more
Red wire	Engine GND	Open	Open	3V or more
Yellow wire	Engine GND	Open	Open	3V or more

5. The connection guide below will assist you in locating areas where problems can occur. Remember a short in either #1, #2 or #3 can cause either # 4, #5 and #6 not to have spark.



CDI ELECTRONICS

(DVA) PEAK READING VOLTAGE AND RESISTANCE CHARTS

NOTICE: These charts were compiled using the CDI 511-9773 Peak Adapter with a shielded Digital Multimeter.

NOTE: The resistance readings are given for a room temperature of 68°F. Higher temperatures will cause a slightly higher resistance reading.
DVA readings should always be taken with everything hooked up with the exception of the kill circuit.

The CDI peak reading voltage adapter is specifically designed to work with shielded Digital Multimeters. This adapter will simplify the testing of electronic ignition systems, stators, sensors and charging systems. The DVA readings will be approximately the same as any other DVA meter and the specifications listed in the service manuals can be followed without problems (Hopefully a little easier to you).

The CDI piercing probe set (511-9770) and the pack load resister (511-9775) are highly recommended for use with this adapter.

INSTRUCTIONS

1. Plug the adapter into the shielded Digital Multimeter with the (+) rib side pin in the (V, Ohms) jack and the other pin in the (COM) jack.
2. Set the digital voltmeter to DC Volts (the purpose of the adapter is to convert and *store* the voltage so that it can be read by a meter).
3. Connect the probes to the component to be measured.

*NOTE: The adapter will **automatically compensate for polarity** and all readings will be peak voltage.*

See the following pages for readings of Chrysler, Force, Mercury, OMC (Johnson/Evinrude), OMC Sea Drive and Yamaha engines. Other ignitions can be tested using test results given by the manufacturer of the equipment or by comparing a known good system to a suspect one. Please forward any additional readings you would like to have included in future printings.

Chrysler

DVA (PEAK READING) and RESISTANCE CHARTS

		Model	Ignition	Stator	Stator	Stator	Trigger	Trigger	Trigger	Ignition Coil	
HP	**Year**	Type	**Part**		**DVA**	**Reading**		**DVA**	**Reading**	**Primary**	**Output**
			Number	**Ohms**	**Output**	**Colors**	**Ohms**	**Output**	**Colors**	**Ohms**	
7.5	1972	BOC/B1D /HOC/H1D	525475	680-850 300-400*	180V+	Blue - Blue	48-52	0.5V+	Orange to Grn Red to Wht/Grn	N/A	125-140
7.5	1977	BOC/B1C /HOC/H1C	525475	680-850 300-400*	180V+	Blue - Blue	48-52	0.5V+	Orange to Grn Red to Wht/Grn	N/A	125-140
7.5	1979- 1984	All Models	525475	680-850 300-400*	180V+	Blue - Blue	48-52	0.5V+	Orange to Grn Red to Wht/Grn	N/A	125-140
8	1982	82H8J -87H8A	525475	680-850 300-400*	180V+	Blue - Blue	48-52	0.5V+	Orange to Grn Red to Wht/Grn	N/A	125-140
9.9	1979- 1984	A, B	510301 116- 0301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
10	1976- 1978	W/CD & Alternator	510301 116- 0301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
12	1979	W/CD & Alternator	510301 116- 0301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
15	1976 - 1984	W/CD & Alternator	510301 116- 0301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
20	1979 - 1981	W/CD & Alternator	529301 116- 9301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
25	1983 - 1984	W/CD & Alternator	529301 116- 9301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
30	1979 - 1982	W/CD & Alternator	529301 116- 9301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
35	1978 - 1984	W/CD & Alternator	529301 116- 9301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
55	1977 - 1980	W/Magna-power II	474301- 1	Not Applicable	180V+	T1 & T4 to Eng Gnd	Open	0.5V+	Between Terminals	0.2-1.0	200- 2000
55	1981 - 1983	All Models	475301 116- 5301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
60	1984	All Models	475301 116- 5301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
65	1977 - 1978	W/Magna-power II	474301- 1	Not Applicable	180V+	T1 & T4 to Eng Gnd	Open	0.5V+	Between Terminals	0.2-1.0	200- 2000
80	1983 - 1984	W/CD & Alternator	475301 116- 5301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
90	1983 - 1984	W/CD & Alternator	475301 116- 5301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
105	1976	BD/BE/HA/HD/HE	474301- 1	Not Applicable	180V+	T1 & T4 to Eng Gnd	Open	0.5V+	Between Terminals	0.2-1.0	200- 2000
115	1983 - 1984	W/CD & Alternator	475301 116- 5301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
120	1976	BD/BE/HD/HE	474301- 1	Not Applicable	180V+	T1 & T4 to Eng Gnd	Open	0.5V+	Between Terminals	0.2-1.0	200- 2000
125	1981 - 1982	W/CD & Alternator	475301 116- 5301*	680-850 300-400*	180V+	Blue - Yellow	48-52	0.5V+	Orange to Grn Red to Wht/Grn	0.2-1.0	800- 1100
135	1976	BD/BE/ HD/HE	474301- 1	Not Applicable	180V+	T1 & T4 to Eng Gnd	Open	0.5V+	Between Terminals	0.2-1.0	200- 2000

Grn = Green

Wht/Grn = White/Green Stripe

* Indicates a part manufactured by CDI Electronics

FORCE

DVA (Peak Reading) Voltage and Resistance Chart

		Model	Ignition	Stator					Sensor			Ignition Coil	
HP	Year	Serial #	Part	Ohms		DVA		Reading		DVA	Reading	Input	Output
			Number	Low Spd	Hi Spd	Low Spd	Hi Spd	Colors(a)	Ohms	Output	Colors(b)	Ohms	
35	1987-1991	All Models	529301 116-9301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	N/A	125-140
50	1988	A, B, C	658475	680-850 300-400*		180V+		Blue - Blue	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	N/A	125-140
50	1988	D	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	N/A	125-140
50	1989-1992	All Models	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	N/A	125-140
50	1992-1995	OE009500-OE138599	18495 114-4953*	3250-3650 2200-2400*	75-90 28-32*	180V+	20V+	Blue and Red to Engine Gnd	800-1400	5V+	Wht/Blk to Brown, White and Purple	0.2-1.0	800-1100
50	1996-1997	OE138600-OE283999	827509 114-7509	500-700 400-600*		180V+		Green/White to White/Green	Open	1.5V+	Gnd to Wht/Blk at CDM	N/A	800-1100
60	1985	All Models	475301 116-5301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	800-1100
70	1991-1992	OE000001-OE009499	332-7778 114-7778*	3250-3650 2200-2400*	75-90 28-32*	180V+	20V+	Blue and Red to Engine Gnd	800-1400	5V+	Wht/Blk to Brown, White and Purple	0.2-1.0	800-1100
70	1993-1995	OE009500-OE138599	18495 114-4953*	3250-3650 2200-2400*	75-90 28-32*	180V+	20V+	Blue and Red to Engine Gnd	800-1400	5V+	Wht/Blk to Brown, White and Purple	0.2-1.0	800-1100
70	1996-1999	OE138600-OE369299	827509 114-7509	500-700 400-600*		180V+		Green/White to White/Green	Open	1.5V+	Gnd to Wht/Blk , Wht/Yel, Blue/Wht	N/A	900-1100 2100-2400*
75	1996-1999	OE138600-OE369299	827509 114-7509	500-700 400-600*		180V+		Green/White to White/Green	Open	1.5V+	Gnd to Wht/Blk , Wht/Yel, Blue/Wht	N/A	900-1100 2100-2400*
85	1983	856XL	475301 116-5301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	800-1100
85	1984-1989	All Models	475301 658301 116-5301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	200-2000
90	1990	All Models	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	800-1100
90	1991	B & D	332-7778 114-7778*	3250-3650 2200-2400*	75-90 28-32*	180V+	20V+	Blue and Red to Engine Gnd	800-1400	5V+	Wht/Blk to Brown, White and Purple	0.2-1.0	800-1100
90	1991	A, C & E	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	200-2000
90	1991-1995	OE000001-OE138599	332-7778 18495 114-7778 114-4953*	3250-3650 2200-2400*	75-90 28-32*	180V+	20V+	Blue and Red to Engine Gnd	800-1400	5V+	Wht/Blk to Brown, White and Purple	0.2-1.0	800-1100
90	1996-1999	OE138600-OE369299	827509 114-7509	500-700 400-600*		180V+		Green/White to White/Green	Open	1.5V+	Gnd to Wht/Blk , Wht/Yel, Blue/Wht	N/A	900-1100 2100-2400*
120	1990-1994	OE000001-OE0093669	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	200-2000
120	1996-1999	OE138600-OE369299	827509 114-7509	500-700 400-600*		180V+		Green/White to White/Green	Open	1.5V+	Gnd to Wht/Blk , Wht/Yel, Blue/Wht, Brn/Wht	N/A	900-1100 2100-2400*
120 L Drive	1990	A, B, C	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	200-2000
120 L Drive	1991-1992	B & D	332-5772 114-5772	3250-3650 2200-2400*	75-90 28-32*	180V+	20V+	Blue to Bl/Wht Red to Red/Wht	800-1400	5V+	Brown to Wht/Blk Purple to White	0.2-1.0	800-1100
125	1983-1989	All Models	475301 658301 116-5301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	800-1100
150	1989-1991	89A, 90C, 90D, 91A	658301 116-8301*	680-850 300-400*		180V+		Blue - Yellow (b)	48-52	0.5V+	Orange to Grn Red to Wht/Grn (a)	0.2-1.0	800-1100
150	1991-1992	OE000001-OE093699	332-817323 116-7323*	Not Applicable 12V Inverter		225-300V		Blue - Eng Gnd	800-1400	5V+	Wht/Blk to Brn, Blk, Wht, Pur & Yel	0.2-1.0	800-1100

* Indicates a part manufactured by CDI Electronics

(a) Some units use White/Orange stripe to White/Yellow and White/Red to White/Green. Also, some have additional black stripes

(b) Some units use Brown/Yellow stripe for Yellow and Brown/Blue for Blue. Also, some have additional black stripes

Johnson & Evinrude Outboard

DVA (Peak Voltage) and Resistance Chart

HP	Year	Ignition	Stator						Trigger		
		Part	Chg	Power	Chg	Power	Chg	Power		DVA	Reading
		Number	Ohms Reading		DVA Output		Read	Color	Ohm	Out	Colors
4-55	1971-1977	Power Pack 2	450-600	N/A	150V+	N/A	Brown to Engine Gnd	N/A	10-20	0.5V+	White/Black to Black/White
4-60	1978-1988	CD2	450-600	N/A	150V+	N/A	Brown to Brown/Yellow	N/A	35-55	0.5V+	White/Black to Black/White
4-55	1989-1993	CD2 - USL	450-950	N/A	150V+	N/A	Brown to Brown/Yellow	N/A	N/A	N/A	N/A
4-55	1989-1993	CDI Elect-USL Repl*	450-600	N/A	150V+	N/A	Brown to Brown/Yellow	N/A	35-55	0.5V+	White/Black to Black/White
5-60	1992-2000	CD2 W/SLOW	450-600	N/A	150V+	N/A	Brown to Brown/Yellow	N/A	35-55	0.5V+	White/Black to Black/White
5-60	1992-2005	CD2 SL	500-700	450-600	150V+	12-24V	Brown to Brown/Yellow	Org to Org/Blk	35-55	0.5V+	White/Black to Black/White
25-35 Elect Start	1995-1997	CD3 OPTICAL	720-880	52-62	150V+	12V+	Brown to Brown/Yellow	Org to Org/Blk	N/A	N/A	N/A
25-35 Man Start	1995-1997	CD3 OPTICAL	1010-1230	76-92	150V+	12V+	Brown to Brown/Yellow	Org to Org/Blk	N/A	N/A	N/A
60	1986-1989	CD3	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Blue/Pur/Grn
60	1989-1992	CD3 W/SLOW	450-600	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Blue/Pur/Grn
60	1993-2000	CD3 Looper	500-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
65 - 70	1972-1978	Power Pack 3	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	10-20	0.5V+	Black/White to White/Blacks
65	1989	CD3 W/SLOW	450-600	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Blue/Pur/Grn
65	1992-1995	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
65 COMM	1984-1988	CD3	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
65 COM Elect Start	1989-1992	CD3	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
65 COM Man Start	1989-1992	CD3 W/SLOW	500-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn
65 COM	1992-1995	CD3 W/SLOW	500-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn
70	1979-1988	CD3	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
70	1989-1997	CD3 W/SLOW	450-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn
80	1992-1996	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
85 - 140	1973-1977	Power Pack 4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	10 - 20	0.5V+	#1 to #3 and #2 to #4
85	1979-1983	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
85	1991-1995	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
88	1987-1996	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
90	1984-1997	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
90 - 115 OPTICAL	1995-2006	CD4AL	450-600	50-60	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	N/A	N/A	N/A
100	1990-1994	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk

N/A = Not Applicable
Sec = Secondary
Org/Blk = Orange/Black Stripe
Pk = Pink

*Part Manufactured by CDI Electronics
Pri = Primary
Blk = Black
Pur = Purple

COMM = Commercial
Gnd = Ground
Bl = Blue

NOTE: Ignition Coils will read 0.2 to 1.0 ohms on the Primary and 200-400 ohms on the secondary windings

NOTICE: ALL DVA READINGS ARE TO BE TAKEN WITH ALL WIRING CONNECTED EXCEPT THE STOP CIRCUIT.

Johnson & Evinrude Outboard

DVA (Peak Voltage) and Resistance Chart

HP	Year	Ignition	Stator						Trigger		
		Part	Chg	Power	Chg	Power	Chg	Power		DVA	Reading
		Number	Ohms Reading		Min DVA Output		Read	Color	Ohm	Out	Colors
100 COMM	1984-1997	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
105 JET OPTICAL	1994-2000	CD6AL	450-600	50-60	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	N/A	N/A	N/A
110	1986-1989	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
112	1994-1996	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
115	1978-1997	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
120-140 10 AMP	1985-1999	CD4	450-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
120-140 35 AMP	1985-1994	CD4	735-935	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
125	1991-1994	CD4	450-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
125 COMM	1989-1994	CD4	450-700	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
130	1994-2000	CD4AL	450-700	450-600 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
140	1978-1984	CD4	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn/Pk
150 - 235	1977-1978	Power Pack 3/6	450-600	N/A	150V+	N/A	Brown to Engine Gnd	N/A	10-20	0.5V+	Black/White to White/Blacks
150 - 185 10 AMP	1979-1988	CD3/6	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
150 - 185 35 AMP	1984-1988	CD3/6	735-935	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
150 - 175 10 AMP	1989-1991	CD3/6	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
150 - 175 35 AMP	1989-1991	CD3/6	735-935	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
150 - 175 OPTICAL	1992-2005	CD6AL	735-935	50-60	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	N/A	N/A	N/A
155 10 AMP	1984-1992	CD6	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
155 35 AMP	1984-1992	CD6	735-935	90-110	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
155 Turbojet	1995	CD6	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
185	1990-1994	CD6	735-935	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
200 - 235	1979-1983	CD3/6	450-600	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
200 - 225	1986-1987	CD3/6	735-935	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
200 - 225	1988-2000	CD6	735-935	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
235	1984-1985	CD3/6	735-935	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
250	1991-2000	CD6	735-935	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
275	1985-1987	CD4/8	735-935	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
275	1988-1989	CD8	735-935	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn
300	1985-1987	CD4/8	735-935	N/A	150V+	N/A	Brown to Brown/yellow	N/A	35-45	0.5V+	Wht to Bl/Pur/Grn
300	1988-1995	CD8	735-935	90-100 40-50*	150V+	12V+	Brown to Brown/yellow	Org to Org/Blk	Open	0.5V+	Wht to Bl/Pur/Grn

N/A = Not Applicable
Sec = Secondary
Org/Blk = Orange/Black Stripe
Pk = Pink

*Part Manufactured by CDI Electronics
Pri = Primary
Blk = Black
Pur = Purple

COMM = Commercial
Gnd = Ground
Bl = Blue

NOTE: Ignition Coils will read 0.2 to 1.0 ohms on the Primary and 200-400 ohms on the secondary windings

NOTICE: ALL DVA READINGS ARE TO BE TAKEN WITH ALL WIRING CONNECTED EXCEPT THE STOP CIRCUIT.

OMC Sea Drive

DVA (Peak Reading) Voltage and Resistance Chart

Engine	Year	Ignition	Stator						Trigger			Ignition Coil	
		Part	Charge Coil			Power Coil			Reading			Pri	Sec
		Number	Color	Ohms	DVA	Color	Ohms	DVA	Colors	Ohm	DVA	Ohm Reading	
2.5/2.6L 'S'	1982	582138 113-2138*	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
1.6L 'S'	1983	582125 113-2125	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Grn	35-45	0.5V+	0.2-1.0	200-400
2.6L 10AMP 1AA/2BA/2B B	1983	582556 113-2556	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
2.5L 35AMP 1AA/2BA/2B B	1983	582138 113-2138	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1984	582125 113-2125	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Grn	35-45	0.5V+	0.2-1.0	200-400
2.5/2.6L V6	1984	582556 113-2556	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1985	582811 113-2811	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Grn	35-45	0.5V+	0.2-1.0	200-400
2.5/2.6L V6	1985	582651 113-2651	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1986	583110 113-3110	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Grn	35-45	0.5V+	0.2-1.0	200-400
2.6L V6	1986	583114 113-3114	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1987	583110 113-3110	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Grn	35-45	0.5V+	0.2-1.0	200-400
1.8L V4 'S'	1987	583101 113-3101	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
2.7L V6	1987	583605 113-3605	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn	35-45	0.5V+	0.2-1.0	200-400
3.6L V8	1987	583101 113-3101	Brown to Brown/yellow	735-935	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1988	583101 113-3101	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
2.0L V4 'S'	1988	584041 113-4041	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
3.0L V6 'S'	1988	584037 113-4037	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn	Open	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1989	583030 113-3030	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
2.0L V4 'S'	1989	584041 113-4041	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
3.0L V6 'S'	1989	584037 113-4037	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn	Open	0.5V+	0.2-1.0	200-400
4.0L V8 'S'	1989	584035	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn/PK	Open	0.5V+	0.2-1.0	200-400
1.6L V4 'S'	1990	584028 113-4028	Brown to Brown/yellow	450-600	150V+	N/A	N/A	N/A	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
2.0L V4 'S'	1990	584041 113-4041	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn/PK	35-45	0.5V+	0.2-1.0	200-400
3.0L V6 'S'	1990	584037 113-4037	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn	Open	0.5V+	0.2-1.0	200-400
4.0L V8 'S'	1990	584035	Brown to Brown/yellow	735-935	150V+	Org to Org/Blk	90-110 40-55*	12V+	Wht to Bl/Pur/Grn/PK	Open	0.5V+	0.2-1.0	200-400

N/A = Not Applicable

*Part Manufactured by CDI Electronics

COMM = Commerical

Pri = Primary

Sec = Secondary

Gnd = Ground

Bl = Blue

Blk = Black

Grn = Green

Org = Orange

Org/Blk = Orange/Black Stripe

Pk = Pink

Pur = Purple

Wht = White

Mercury

DVA (Peak Reading) Voltage and Resistance Chart

Please note that all DVA readings are minimum voltages measured at cranking speed, not while the engine is running.

		Model	Ignition	Stator					Trigger			Ignition Coil	
HP	Year	Serial #	Part	Ohms		DVA		Reading		DVA	Reading	Primary	Output
			Number	Low Spd	Hi Sp	Low	Hi	Colors	Ohms	Out	Colors	Ohms	
4	1972-1975	3296137 - 4107219	336-4516	3600-5500	450-550	180V+		Green to Eng Gnd	N/A	N/A	Points Brn & Wht	0.2-1.0	800-1100
4	1976-1980	9075839 - 5595531	339-6222 114-6222	1600-1800 (800-900 per coil)		180V+		Orange to Eng Gnd	140-160	0.5V+	Brn to Brn or Brn to Wht	0.2-1.0	800-1100
4/4.5	1980-1989	5595532 - A855096	336-4516	3600-5500	450-550	180V+		Green to Engine Gnd	N/A	N/A	Points Brown & White	0.2-1.0	800-1100
6/8/9.9/10	1986-1996	A197112 - OG289100	332-7452 114-7452K1	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
6/8/10/15/20/25	1995-2006	OG760299 -1B000001	855713 114-5713	370-445		180V+		Green/White to White/Green	650-850	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
9.8/20	1972-1973	3226958-37956658	336-4516	3600-5500	450-550	180V+		Green to Engine Gnd	N/A	N/A	Points Brown & White	0.2-1.0	800-1100
9.8	1974-1985	3795659-5206549	339-6222 114-6222	1600-1800 (800-900 per coil)		180V+		Orange to Eng Gnd	750-1400	0.5V+	Brn to Brn or Brn to Wht	0.2-1.0	800-1100
15 20 25	1988-1993	OB238464-OG044365	332-7452 114-7452K1	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
15 20 25	1994-1996	OG044027 - OG437999	18495A30 114-4952K1	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blue to Black Red to Black	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
15/20	1996-1997	OG438000 - OG760299	332-7452 114-7452K1	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
18/20 25 XD	1979-1987	5837437-OB114230	332-7452A3 114-7452A3	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
20	1973-1977	3537531-4709592	332-4911 114-4911	3500-5500	450-550	180 V+	20V+	Blue and Red to Engine Gnd	N/A	N/A	Brn to Wht	0.2-1.0	800-1100
20/25	1980-1993	5705532-OG044026	332-7452 114-7452K1	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
35	1984-1989	6445653-OB393190	332-7452 114-7452K1	3200-3800 2200-2600*	120-180 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
40	1970-1971	2874704-3336237	332-4172 332-4172	3200-3800 2200-2600*	45-55 45-55*	180 V+	20V+	Blue and White to Engine Gnd	750-1400	0.5V+	Brn to Wht	0.2-1.0	800-1100
40	1972-1981	3336258 - 5823917	338-4733 332-4911 338-4733 114-4911	5000-7000 2200-2500*	180-220 45-55*	180 V+	20V+	Blue to Eng Gnd Red to Eng Gnd	750-1400	0.5V+	Brn/Wht to Brn/Yellow	0.2-1.0	800-1100
40	1982-1984	5283918-6999999	332-7452 114-7452K1	3200-3800 2200-2600*	150-200 225-300*	180 V+	20V+	Blk/Yel (LS) Blk/Wht(HS) to Eng Gnd	750-1400	0.5V+	Brn/Yel to Brn/Wht	0.2-1.0	800-1100
40-45 4 CYL NOTE 2	1989-1996	C159200-OG291031	332-5772 114-5772	3250-3650 2200-2400*	75-90 28-32*	180 V+	20V+	Blue to Bl/Wht Red to Red/Wht	750-1400	4V+	Brn to Wht/Blk Purple to White	0.2-1.0	800-1100
45-80 3 CYL NOTE 3	1989-1996	C159200-OG291031	18495 114-4953	3250-3650 500-700*	75-90 28-32*	180 V+	20V+	Blue to Eng Gnd Red to Eng Gnd	750-1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2-1.0	800-1100
40-125	1997-2001	OG531301 - OG980599	827509 114-7509	660-710 450-600*		180V+		Green/White to White/Green	Open	0.5V+	Gnd to Wht/Blk, Wht/Yel, Blue/Wht	N/A	900-1100 2100-2400
50	1970-1975	2858814-4357639	333-3213	380-420	9-11	180 V+	20V+	Red to White Blue to White	Ignition Driver	N/A	Not Applicable	Does not apply	Does not apply
50	1976-1985	4357640-6586624	332-5772 114-5772	5800-7000 2200-2400*	135-165 30-90*	180 V+	20V+	Blue to Blue/Wht Red to Red/Wht	800-1400	4V+	Brn to Wht/Blk Purple to White	0.2-1.0	800-1100
50	1985-1990	6586625-OD000749	332-7778 114-7778	3250-3650 2200-2400*	75-90 28-32*	180 V+	20V+	Blue to Eng Gnd Red to Eng Gnd	800-1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2-1.0	800-1100
50-60	1991-1996	OD000750-OG589999	19052 114-9052	3250-3650 500-700*	75-90 28-32*	180 V+	20V+	Blue to Gnd Red to Gnd	800-1400	4V+	Wht/Blk to Brn, Wht, Pur	0.2-1.0	800-1100

Mercury

DVA (Peak Reading) Voltage and Resistance Chart

Please note that all DVA readings are minimum voltages measured at cranking speed, not while the engine is running.

50-60 65 Jet	1997- 2001	OG590000- OG980600	827509 114-7509	660-710 450-600*		180V+		Green/White to White/Green	Open	1.5V +	Gnd to Wht/Blk, Wht/Yel, Blue/Wht	N/A	900- 1100 2100- 2400
65	1968	2309311- 2452709	333-3213	380-420	9-11	180V+	20V +	Red to White Blue to White	Ignition Driver	N/A	Not Applicable	N/A	N/A
65	1976- 1979	4382057- 4571651	332-7778 114-7778	3250-3650 2200- 2400*	75-90 28-32*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Pur	0.2- 1.0	800- 1100
65	1994- 1996	OD283222- OG437999	18495 114-4953	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Pur	0.2- 1.0	800- 1100
65 Jet	1992- 1995	OE009500- OE138599	18495 114-4953	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Pur	0.2- 1.0	800- 1100
70	1977- 1993	4571652- OD283221	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2- 1.0	800- 1100
75	1984- 1988	643901- OB279480	332-5772 114-5772	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Bl/Wht Red to Red/Wht	800- 1400	4V+	Brn to Wht/Blk Purple to White	0.2- 1.0	800- 1100
80	1978- 1983	4831999- 6432900	332-5772 114-5772	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Bl/Wht Red to Red/Wht	800- 1400	4V+	Brn to Wht/Blk Purple to White	0.2- 1.0	800- 1100
80	1987- 1988	OA966142- OB209468	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2- 1.0	800- 1100
90 Inline 6	1979- 1986	5299506- OB110053	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd. Red to Gnd Red/Wht to Gnd	800- 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
90 3 CYL NOTE 2	1987- 1992	OA996142- OC221999	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2- 1.0	800- 1100
90 3 CYL NOTE 3	1989- 1996	OC222000- OG437999	18495 114-4953	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2- 1.0	800- 1100
90 Sport Jet	1995- 1997	OE141089- OE315900	18495 114-4953	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Eng Gnd Red to Eng Gnd	800- 1400	4V+	Wht/Blk to Brn, Wht and Purple	0.2- 1.0	800- 1100
100	1988- 1996	OB209468- OG437999	332-5772 114-5772	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Bl/Wht Red to Red/Wht	800- 1400	4V+	Brn to Wht/Blk Purple to White	0.2- 1.0	800- 1100
105 Jet	1992- 1996	OD082000- OG840500	332-7778 114-7778	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd Red to Gnd Red/Wht to Gnd	800- 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
115 6 Cyl	1979- 1989	5314656- OC09999	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd Red to Gnd Red/Wht to Gnd	800- 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
115/125 4 Cyl	1989- 1996	OC10000- OG437999	332-5772 114-5772	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Bl/Wht Red to Red/Wht	800- 1400	4V+	Brn to Wht/Blk Purple to White	0.2- 1.0	800- 1100
120 Sport Jet	1995	OE080400- OE141088	332- 826866 114-6866	3250-3650 500-700*	75-90 28-32*	180V+	20V +	Blue to Bl/Wht Red to Red/Wht	800- 1400	4V+	Brn to Wht/Blk Purple to White	0.2- 1.0	800- 1100
120 Sport Jet	1996- 2000	OE141089- OE384499	827509 114-7509	500-700 400-600*		180V+		Green/White to White/Green	Open	1.5V +	Gnd to Wht/Blk, Wht/Yel, Blue/Wht, Brn/Wht	N/A	900- 1100 2100- 2400
135-200 6 CYL 9-15 AMP	1978- 1985	4868998- OA904646	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd Red to Gnd Red/Wht to Gnd	800- 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
135-275 2.0L,2.4L 16 AMP	1985- 1988	OA904647- OC100860	332-7778 114-7778	5800-7000 2200- 2400*	135- 165 30-90*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd Red to Gnd Red/Wht to Gnd	800- 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
175/210 Sport Jet 16 AMP	1997- 2005	398-9873 174-9873-16	18495 114-4953	1000-1600 450-600*	75-90 28-32*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd Red to Gnd Red/Wht to Gnd	800- 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
135-275 2.0L, 2.4L 2.5L 40 AMP	1989- 2005	OC100861- OG840500	332-7778 114-7778	3200-4200 2100- 2400*	90-140 28-32*	180V+	20V +	Blue to Gnd Bl/Wht to Gnd Red to Gnd Red/Wht to Gnd	1100 - 1400	4V+	NOTE 1	0.2- 1.0	800- 1100
225 Carb 250 EFI 3.0L	1996- 2004	OD280813- OG840500	827509 114-7509	900-1100		180V+		Green/White to White/Green	Open	1.5V +	Gnd to Wht/Blk , Wht/Yel, Blue/Wht, Brn/Wht, Red/Wht, Pur/Wht	N/A	900- 1100 2100- 2400

Gnd = Engine ground
Bl/Wht = Blue/White

Blk = Black
Wht/Blk = White/Black

Blk/Wht = Black/White Stripe
Brn/Yel = Brown/Yellow Stripe

* Manufactured by CDI Electronics
Red/Wht = Red/White
Blk/Yel = Black/Yellow Stripe

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MDL	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					LS	HS	LS	HS	HS	LS	Ohms	DVA			Pri	Sec	
2	1984-2004	1	2		320-390				Brown to Gnd		N/A	N/A	N/A		0.21	3.2K	
2.5	2003-2004	1	4	F											.56-.84	11.6 K - 17.4 K	4-6 K
3	1984-2002	1	2		250-300		100		Brown to BLK		30-36 LS 280-340 HS		Red/White to BLK Green/Wht to BLK		0.1	2.6 K	
4	1984-1999	1	2		250-300		100		Brown to BLK		30-36 LS 280-340 HS		White/Red to BLK White/Grn to BLK		0.1	3.1 K	None
4	1999-2004	1	2				126		TCI to Gnd						.56-.84	11.6 K - 17.4 K	4.9-5.1 k
5	1984-2002	1	2		250-300		100		Brown to BLK		30-36 LS 280-340 HS		White/Red to BLK White/Grn to BLK		0.3	3.1 K	None
6	1984-2000	2	2		81-99		100		Brown to BLK		92-111		White/Red to Blk		0.1	3.5 K	None
6/8	2001-2004	2	4	F	81-99		100		Brown to BLK		92-111		White/Red to Blk		0.1	7.8 K	None
8	1986-2004	2	2		81-99		100		Brown to BLK		92-111		White/Red to Blk		0.3	3.5 K	None
9.9	1984-1992	2	2		81-99		100		Brown to BLK		92-111		White/Red to Blk		0.3	3.5 K	None
9.9	1993-1995	2	2		81-99		100		Brown to BLK		92-111		White/Red to Blk		0.3	5.4 K	None
9.9/15	1996-2004	2	2		280-340		105		Brown to BLK		396-484		White/Red to Blk		0.6	2.1 K	None
9.9	1984-1990	2	4	F/FT/T	300-400		90		Brown to Blue		280-340	2.5	White/Red to Blk		0.5	3.4 K	None
9.9	1991-2004	2	4	F/FT/T	300-400		90		Brown to Blue		280-340	2.5	White/Red to Blk		0.5	4.1K	None
15	1984-1995	2	2		81-99				Brown to BLK		92-111		White/Red to Blk		0.3	5.4 K	None
15	1998-2004	2	4	F	272-408		135		Brown to Blue		234-348	4	White/Red to Blk	115	0.5	4.91 K	None
20	1996-1997	2	2		340-420		125		Brown to Blue		310-390	5.5	White/Red to Blk White/Blk to Blk	105	0.5	3.2 K	None
25	1984-1987	2	2		120-150		190		Brown to Blue		12-16	5	White/Red to Blk White/Blk to Blk	210	0.5	3.5 K	None
25	1988-1993	2	2		200-275		190		Brown to BLK		90-120	5	White/Red to Blk White/Blk to Blk	210	0.5	3.5 K	None
25	1994-2004	2	2		340-420		125		Brown to Blue		310-390	5.5	White/Red to Blk White/Blk to Blk	105	0.5	3.2 K	None
25	1996-2002	3	2		340-420		175		Brown to Blue		310-390	4	White/Red to Blk White/Blk to Blk White/Grn to Blk	135	0.5	6.3 K	None
25	1990-1992	2	2	C	200-275		190		Brown to BLK		90-120	5	White/Red to Blk	210	0.5	3.5 K	None
25	1993-1995	2	2	C	200-275		190		Brown to BLK		90-120	5	White/Red to Blk	210	0.5	5.4 K	None
25	1996-1997	2	2	C	200-275		190		Brown to BLK		90-120	5	White/Red to Blk	210	0.5	8.5 K	None
25	1998-2004	2	4	F	660-710		190		Grn/Wht to Wht/Grn		300-350	6	Red to Wht	100	0.5	4.1 K	None
30	1984-1986	2	2		120-150		190		Brown to Blue		12-16	5	White/Red to Blk	210	0.5	3.5 K	None
30	1987-2002	3	2		280-330		175		Brown to Blue		310-390	4	White/Red to Blk White/Blk to Blk White/Grn to Blk	135	0.5	6.3K	None
30	1989-1992	2	2	C	120-150		190		Brown to Blk		12-16	5	White/Red to Blk	210	0.5	3.5 K	None
30	1993-1996	2	2	C	400-490		125		Brown to Blue		310-390	4	White/Red to Blk White/Blk to Blk	105	0.5	3.2 K	None
30	1997	2	2	C	340-420		125		Brown to Blue		310-390	4	White/Red to Blk White/Blk to Blk	105	0.5	3.2 K	None

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MD L	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					L S	HS	LS	HS	HS	LS	Ohms	DVA			Primary	Sec	
30	2001-2004	2	4	F	600-720		193		Grn/Wht to Wht/Grn		270-330	6	White/Red to Blk	151	0.5	4.1 K	None
40/50	1984-1988	3	2		180-250		175		Brown to Blue		310-390	4	White/Red, White/Blk, White/Grn to Blk	135	0.5	6.3K	
40/50	1989-1994	3	2		280-330		200		Brown to Blue		180-220	4	White/Red, White/Blk, White/Grn to Blk	175	0.5	3.2 K	None
40/50	1995-2004	3	2		400-510		145		Brown to Blue		180-240	3	White/Red, White/Blk, White/Grn to Blk	125	0.5	3.2 K	None
40	1989-1997	2	2	C	120-140		125		Brown to Blue		12-16	5.5	White/Red to Blk	115	0.5	3.5 K	None
40	1998-2002	3	2	C	400-510		145		Brown to Blue		180-220	4	White/Red, White/Blk, White/Grn to Blk	125	0.5	3.2 K	None
40	1999	4	4	F	300-380		140		Brown to Blue		375-475	7	Red//Wht to White/Blk	105	0.5	4.1 K	4-6 K
40	2000-2004	3	4	F	600-710		193		Grn/Wht to Wht/Grn		270-330	6	Red//Wht to Blk	151	0.5	2.7-3.7K	4-6 K
48	1995-2000	2	4	E	81-99				Brown to BLK		92-111		White/Red to Blk		0.3	5.4K	None
50	1999-2002	3	2	C	420-510		145		Brown to Blue		180-240	3	White/Red, White/Blk, White/Grn to Blk	125	0.5	3.2 K	None
50	1995-2000	4	4	F	300-380		137		Brown to Blue		375-475	3.5	Red//Wht to White/Blk	150	0.5	4.1 K	3.8-5.7 K
50	1996-2000	4	4	F	300-380		137		Brown to Blue		375-475	3.5	Red//Wht to White/Blk	150	0.5	4.1 K	3.8-5.7 K
50	2001-2004	4	4	F	272-408		144		Brown to Blue		396-594	6.3	Red//Wht to White/Blk	126	0.078-0.106	3.5-4.7 K	3.8-5.7 K
55	1989-1994	2	2	C	200-260		135		Brown to Blue		70-88 23-29	2	White/Red, White/Blk, Yel to Blk	150	0.5	3.1 K	None
55	1995	2	2	C	200-260		135		Brown to Blue		280-360	2	White/Red, White/Blk to Blk	150	0.5	3.1 K	None
60	1991-2000	3	2		145-190		140		Brown to Blue		110-150	2.5	White/Red, White/Blk, White/Grn to Blk	100	0.5	3.2 K	None
60	1992-1999	2	2	P	150-190		120		Brown to Blue		270-330	2.5	White/Red to White/Blk	105	0.5	4.1 K	None
60	1996-2002	2	2	C	150-190		120		Brown to Blue		270-330	2.5	White/Red to White/Blk	105	0.5	4.1 K	None
60	2001-2004	3	2		150-190		150		Brown to Blue		270-330	2.5	White/Red to White/Blk	105 on #1 & #3 at idle (0 on #2), 145 on all at 1500 RPM	0.5	4.1 K	None
60	2002-2004	4	4	F/T	272-408		144		Brown to Blue		396-594	6.3	Red//Wht to White/Blk	126	0.078-0.106	3.5-4.7 K	3.8-5.7 K
70	1984-1991	3	2		145-190		140		Brown to Blue		110-150	2.5	White/Red, White/Blk, White/Grn to Blk	100	0.5	3.2 K	
70	1992-2004	3	2		150-190		150		Brown to Blue		270-330	2.5	White/Red to White/Blk	105 on #1 & #3 at idle (0 on #2), 145 on all at 1500 RPM	0.5	4.1 K	None

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MDL	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					L Spd	HSpd	LS	HS	HS	LS	Ohms	DVA			Primary	Sec	
75	1994-1996	3	2	C	900-1100	105-140	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to Wht/Yel Wht/Grn to Wht/Blk	95	0.5	4.5K	
75	1998-1999	3	2	C	191-288	64-96	55	90	Brn to Red	Blue to Red	241-362	7	White/Red to White/Blk	105 on #1 & #3 at idle (0 on #2), 145 on all at 1500 RPM	0.5	4.0 K	None
75	1995-1996	3	2	E	900-1100	105-140	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Grn Wht/Blk to Wht/Grn	95	0.5	4.8K	None
75	1996-1999	3	2	P	900-1100	105-140	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	4.8 K	None
75	1997-2000	3	2	E	480-600	50-70	105	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Grn Wht/Blk to Wht/Grn	105	0.5	4.1K	None
75/90	2003-2004	4	4	F	?	?	?	?	?	?	396-594	2.7	White/Red to Blk White/Blk to Blk	107	0.5	4.1 K	#1 - 7.6K #2 - 5.6 K #3 - 6.3 K #4 - 7.2 K
80	1997	3	2	C	220-270	70-90	100	60	Brn to Red	Blue to Red	241-362	5	White/Red to Wht/Blk	130	0.5	4.1 K	None
80/100	1999-2002	4	4	F	?	?	?	?	?	?	396-594	2.7	White/Red to Blk White/Blk to Blk	107	0.5	4.1 K	#1 - 7.6K #2 - 5.6 K #3 - 6.3 K #4 - 7.2 K
85	1989-1996	4	2	C	900-1100	105-140	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	4.8 K	None
90	1984-1989	4	2		765-935	105-135	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	2.5 K	None
90	1990-1991	4	2		900-1100	105-140	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	4.8 K	None
90	1992-2004	3	2		220-270	70-90	100	60	Brn to Red	Blue to Red	241-362	5	White/Red to White/Blk	130	0.5	4.1 K	None
115	1984-1988	4	2	B/P/S	625-820	62-79	160	45	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	3.8 K	None
115	1994-2000	4	2	C	900-1100	105-140	85	45	Brn to Blue	Blue to Blk/Red	320-400	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	2.5 K	4-6 K
115	2000-2004	4	4	F	?	?	?	?	?	?	?	3	White/Red to Blk White/Blk to Blk	5			None

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MDL	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					L Spd	HSpd	LS	HS	HS	LS	Ohms	DVA			Primary	Sec	
130	1984-1989	4	2		900-1100	105-140	85	45	Brn to Blue	Red to Blue	290-370	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	95	0.5	4.8 K	None
130	1990-2003	4	2		625-820	62-79	160	45	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to White/Yel Wht/Grn to Wht/Blk	125	0.5	3.8 K	4-6 K
150/175	1984-1989	6	2		900-1100	21-27	75	14	Brn to Red	Blue to Blk/Red	280-460	1.6	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	105	0.5	2.5 K	4-6 K
150/175	1990-1995	6	2		660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	2	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	105	0.5	3.8 K	4-6 K
150	1996-2004	6	2	D/L/P/S	660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	3	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	130	0.5	4.1 K	5 K
150	1996-1999	6	2	C	460-620	70-90	90	30	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	65	0.5	4.1 K	None
150	1999-2003	6	2	DX/SX/VX	224-336		110		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red to Blk Wht/Grn to Blk Wht/Blk to Blk Wht/Blue to Blk Wht/Yel to Blk Wht/Brn to Blk	100	0.5	2.72 - 3.68 K	None
150	1999-2002	6	2	LX/PX	224-336		110		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red to Blk Wht/Grn to Blk Wht/Blk to Blk Wht/Blue to Blk Wht/Yel to Blk Wht/Brn to Blk	100	0.5	2.72 - 3.68 K	None
150	1994-1995	6	2	P	660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	65	0.5	3.8 K	None
150	2000-2004	6	2	Z/LZ/VZ	CDI OUTPUT		140		Blk/Org, Blk/Yel, Blk/Blue, Blk/Grn, Blk/Wht to Red/Yel		?	5	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	140			4-6 k
150	2004	6	4	F/LF	ECM OUTPUT		260		Blk/Org to Blk Blk/Wht to Blk		459-561	3.5	White/Red to Blk White/Blk to Blk	260	1.53-2.07	12.5 - 16.91 K	None

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MDL	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					L Spd	HSpd	LS	HS	HS	LS	Ohms	DVA			Primary	Sec	
175	1996-2000	6	2		660-820	62-79	140	40	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	130	0.5	4.1 K	5 K
175	2001-2004	6	2	Z/VZ	CDI OUTPUT		140		Blk/Org, Blk/Yel, Blk/Blue, Blk/Grn, Blk/Wht to Red/Yel		?	5	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	140			4-6 K
200	1984-1989	6	2		900-1100	21-27	75	14	Brn to Red	Blue to Blk/Red	280-460	1.6	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	105	0.5	2.5 K	
200	1990-1995	6	2		660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	105	0.5	3.8 K	None
200	1991-1995	6	2	P	660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	2	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	105	0.5	3.8 K	None
200	1996-1999	6	2	L/P/S	660-820	62-79	140	40	Brn to Red	Blue to Blk/Red	280-460	2.5	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	130	0.5	4.1 K	5 K
200	1998	6	2	V	224-336		115		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7 - 3.6 K	5 K
200	2002-2004	6	4	F	CDI OUTPUT		252		Blk/Org, Blk/Yel, Blk/Wht to Red/Yel		459-561	5.3	Wht/Red to Blk Wht/Grn to Blk Wht/Blk to Blk	252	1.5-1.9	19.6 - 35.4 K	None
200	1999-2002	6	2	LX	CDI OUTPUT		140		Blk/Org, Blk/Yel, Blk/Blue, Blk/Grn, Blk/Wht to Red/Yel		?	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	140			4-6 K
200	1999-2004	6	2	SX	CDI OUTPUT		100		Blk/Org, Blk/Yel, Blk/Blue, Blk/Grn, Blk/Wht to Red/Yel		?	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100			4-6 K
200	1999-2004	6	2	V/VX	224-336		115		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7-3.6 k	5 K

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MDL	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					L Spd	HSpd	LS	HS	HS	LS	Ohms	DVA			Primary	Sec	
200	2000-2004	6	2	LZ/Z HPDI	CDI OUTPUT		140		Blk/Org, Blk/Yel, Blk/Blue, Blk/Grn, Blk/Wht to Red/Yel		?	5	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	140	0.5		4-6 K
220	1984-1986	6	2		900-1100	21-27	75	14	Brn to Red	Blue to Blk/Red	280-460	1.6	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	58	0.5	2.5 K	5 K
225	1984-1989	6	2		900-1100	21-27	75	14	Brn to Red	Blue to Blk/Red	280-460	1.6	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	58	0.5	2.5 K	5 K
225	1990-1995	6	2	L/HP	660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	2	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	105	0.5	3.8 K	5 K
225	1996-1997	6	2	L/HP	660-820	62-79	145	40	Brn to Red	Blue to Blk/Red	280-460	2	Wht/Red to Wht/Grn Wht/Blk to Wht/Blue Wht/Yel to Wht/Brn	130	0.5	4.1 K	5 K
225	1994-1995	6	2	X/HP U/HP	224-336	224-336	90	90	Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7 K	5 K
225	2002-2004	6	4	F	CDI OUTPUT		252		Blk/Org to Red/Yel Blk/Yel to Red/Yel Blk/Wht to Red/Yel		459-561	5.3	Wht/Red to Blk Wht/Grn to Blk Wht/Blk to Blk	252	1.5-1.9	19.6-35.4 k	None
225	1996-2002	6	2	S/X/U L/LX/SX	224-336		115		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7 K	5 K
225	1998-2004	6	2	VX	224-336		115		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7 K	5 K
225	2003-2004	6	2	VZ HPDI	224-336		160		Red to Blk/Wht		294-398	3.5	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	160	1.87-2.53	8.93-12.08 K	None
250	1990-1996	6	2		224-336		90		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7 K	5 K
250	1997-2002	6	2		224-336		115		Brn to Red	Blue to Blk/Red	294-398	3	Wht/Red, Wht/Grn, Wht/Blk, Wht/Blue, Wht/Yel , Wht/Brn to Blk	100	0.5	2.7 K	5 K

YAMAHA DVA and RESISTANCE CHARTS

HP	YEAR	# Cyl	STK	MDL	STATOR						TRIGGER			CDI Out	IGNITION COIL		SPK PLG
					OHMS		DVA		CHECK POINTS		OHMS	DVA	CHECK POINTS		OHMS +/- 10%		CAP
					L Spd	HSpd	LS	HS	HS	LS	Ohms	DVA			Primary	Sec	
250	2003-2004	6	2	HPDI	CDI OUTPUT		160		Red to Blk/Wht		294-398	3.5	Wht/Red to Blk Wht/Grn to Blk Wht/Blk to Blk Wht/Blue to Blk Wht/Yel to Blk Wht/Brn to Blk	140	1.87-2.53	8.93-12.08 K	None
300	2004	6	2	LZ/VZ/Z HPDI	CDI OUTPUT		265		Red to Blk/Wht		294-398	3.5	Wht/Red to Blk Wht/Grn to Blk Wht/Blk to Blk Wht/Blue to Blk Wht/Yel to Blk Wht/Brn to Blk	265	1.36-1.84	7.31 - 9.89 K	None

Glossary of Terms

ADI – **Alternator Driven Ignition**, consists of a flywheel, stator, trigger and ignition module.

ADTC - **After Top Dead Center** Reference on ignition timing.

BTDC - **Before Top Dead Center** Reference on ignition timing.

CD Ignition – **Capacitive Discharge Ignition**. The capacitor stores the power developed by a stator or inverter and uses a SCR to deliver the power to the ignition coil.

CDM – **Capacitive Discharge Module**. The CDM is a combination of the switch box and ignition coil.

Crank - Refers to the engine being turned over with the starter, not running. Spark plug wires are usually connected to a spark gap tester.

DVA – **Direct Voltage Adapter**. Also known as Peak voltage. The term refers to the peak voltage as read by a specialized meter or a multimeter using a adapter to convert the peak voltage in the ignition system to a DC value. Regular meters cannot read the voltages due to the frequency and duration of the pulses in the system.

Power Pack – Term used by Johnson/Evinrude for the ignition module.

RPM – **Revolutions per minute**. The number of times the engine rotates in one minute.

S.L.O.W. – **Speed Limiting Oil Warning** system. Limits the RPM of the engine to approximately 2500 RPM in order to reduce the damage to the engine caused by a no oil or overheat condition.

Spark Tester - Device used to check for spark from the ignition coil to the spark plug. Testers are normally available in 1, 4, 6 and 8 cylinder configurations.

Switch Box – Term used for Force, Mariner and Mercury ignition modules.

W.O.T. – **Wide Open Throttle**.

CDI ELECTRONICS
OUTBOARD SERVICE BULLETIN

12/06/2003 **CDI Bulletin # 2276 Rev.1**

Models affected: Johnson/Evinrude 60 HP 1986 (CE) through 1994 (ER)
Johnson/Evinrude 65 HP 1987 (CU) through 1994 (ER)
Johnson/Evinrude 70 HP 1989 (CD) through 1994 (ER)

Problem:

The engine and electrical system can become damaged by overheating 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 regulator (also damaging the stator). Air can become trapped when:

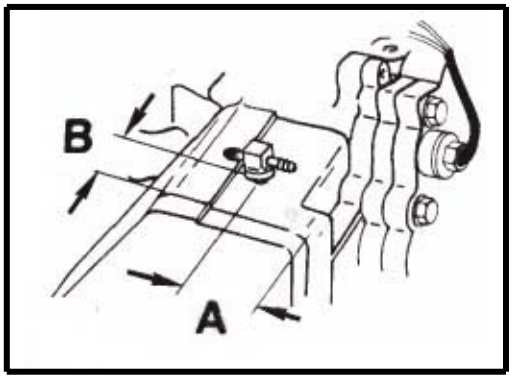
1. The engine is idling with a blocked or restricted thermostat bypass hole.
2. The engine is operated in aerated water, such as a pontoon or deck boat wakes.

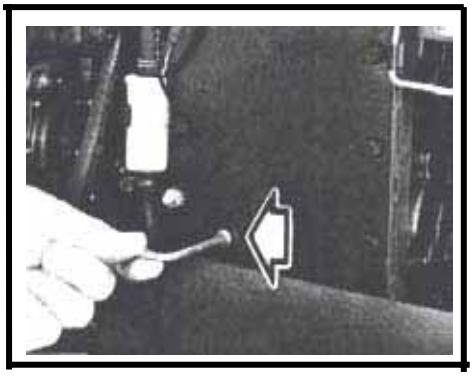
SOLUTION:

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

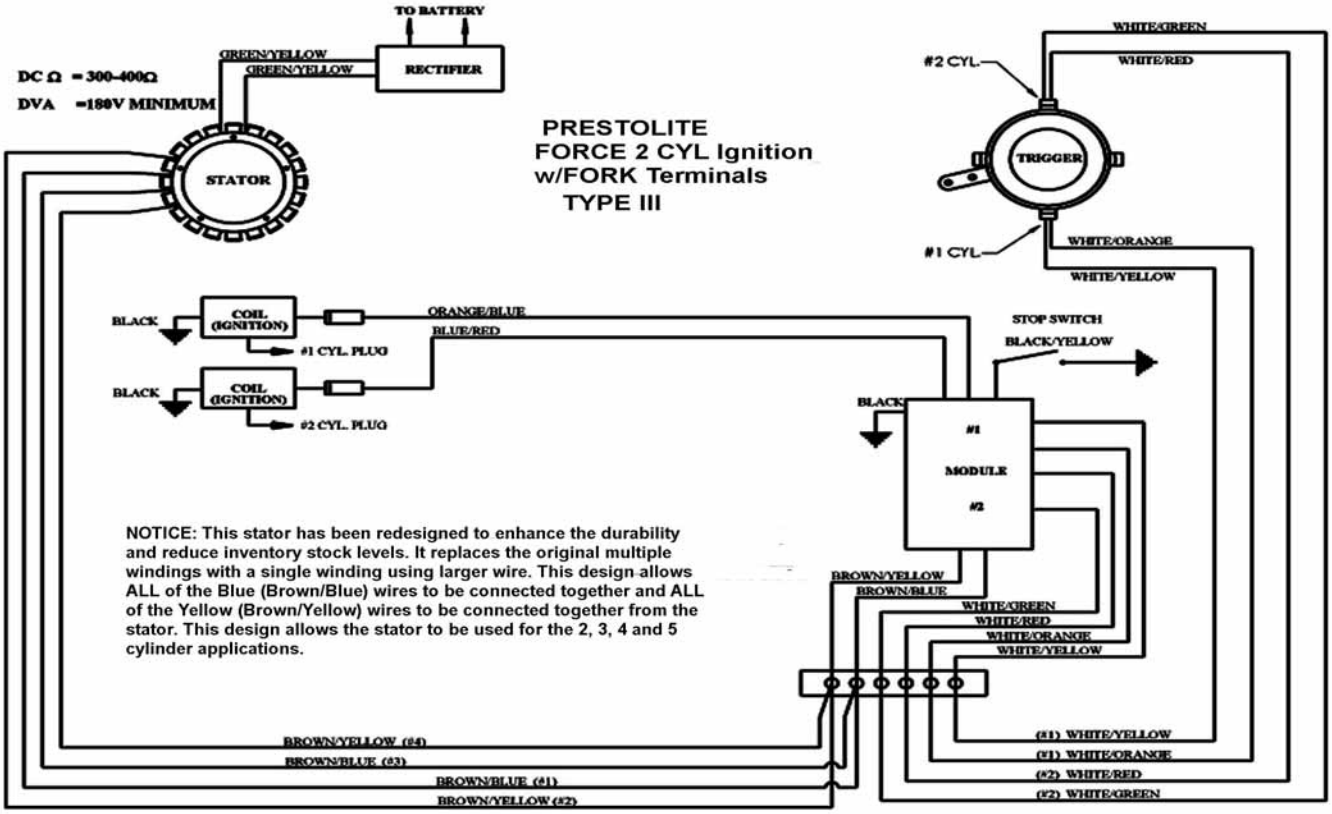
If the engine does not have a threaded hole located in the top of the cylinder block, please follow the steps below:

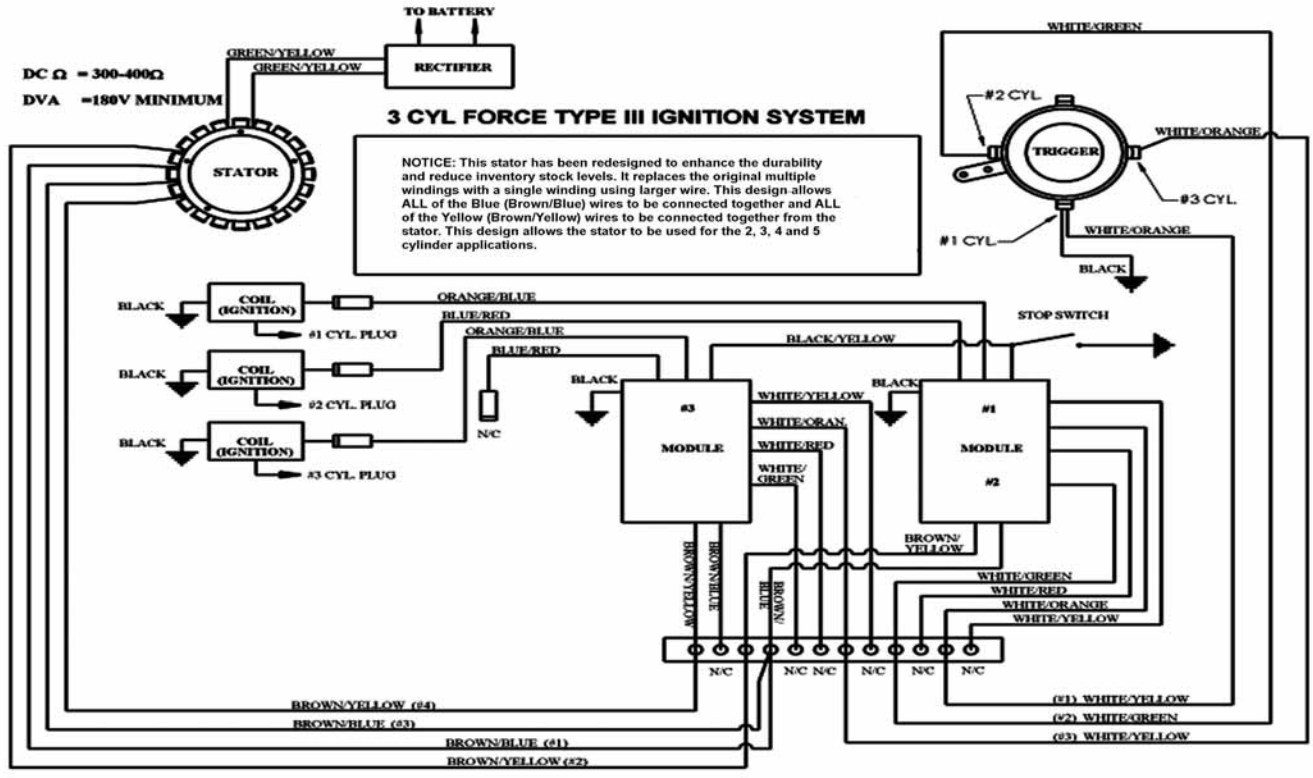
1. Remove the indicator hose from the outlet tee and discard.
2. Remove the outlet tee.
3. Install a 1/8th inch NPT brass or aluminum pipe plug into the hole where the tee was located (use gel-seal on the threads). (See fig. 1)
4. Measure 2 inches forward from the rear corner of the exhaust manifold cover (ref "A") and 1-3/8th inches from the exhaust cover gasket (Ref to "B"). Mark the intersection with a center punch. (See fig. 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 and drill a hole through the casting. The grease will help prevent shavings from entering the cooling system.
6. Grease the tip of an 1/8th NPT tap and thread the hole.
7. Apply gel-seal to the threads of the original tee and install it in the hole you just tapped. Position the tee so that the indicator nipple is facing the back of the engine.
8. Install a new piece of 3/16th hose (19 inches long) from the tee to the indicator.



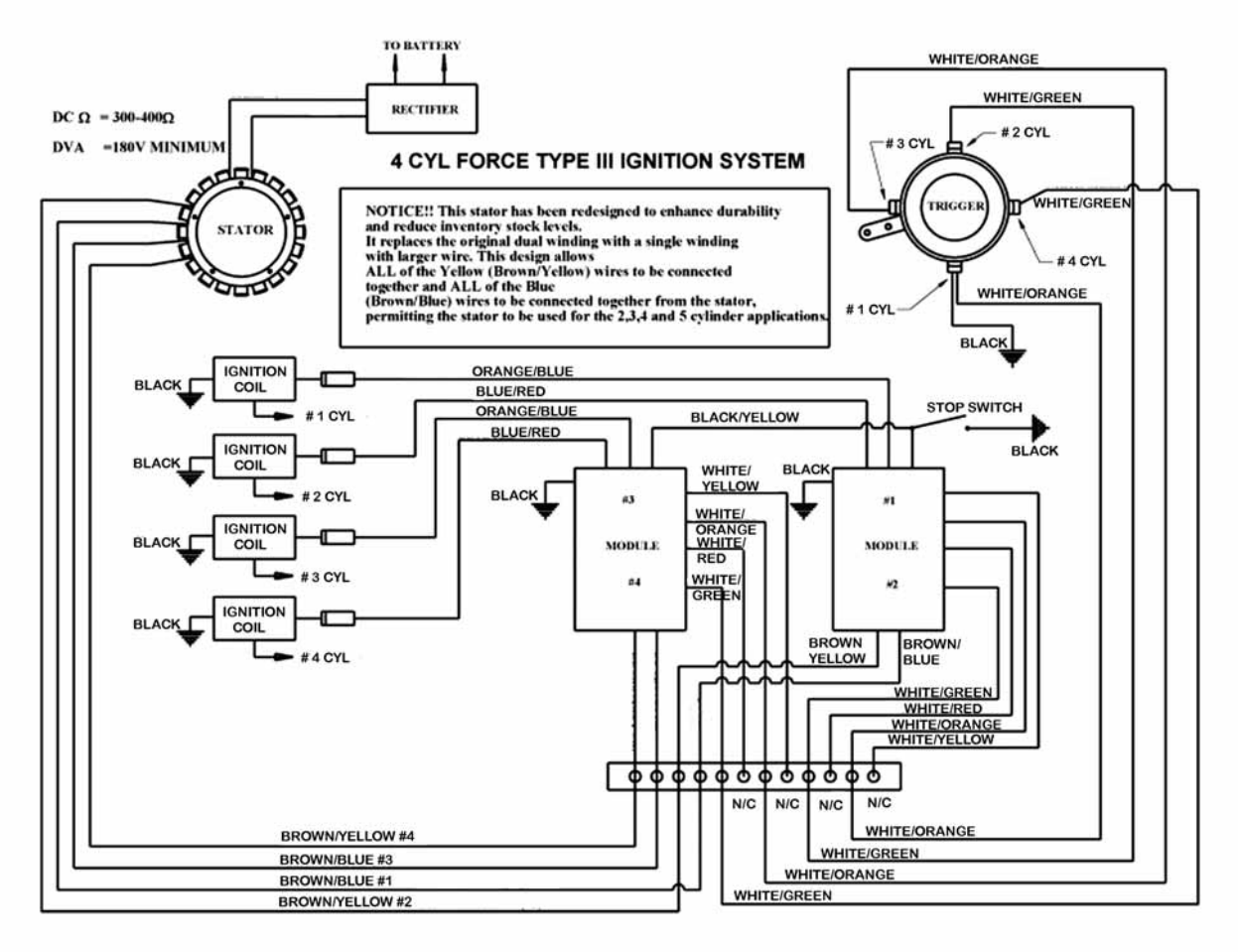


Modified Engine Wiring Diagrams for CDI Electronics Components

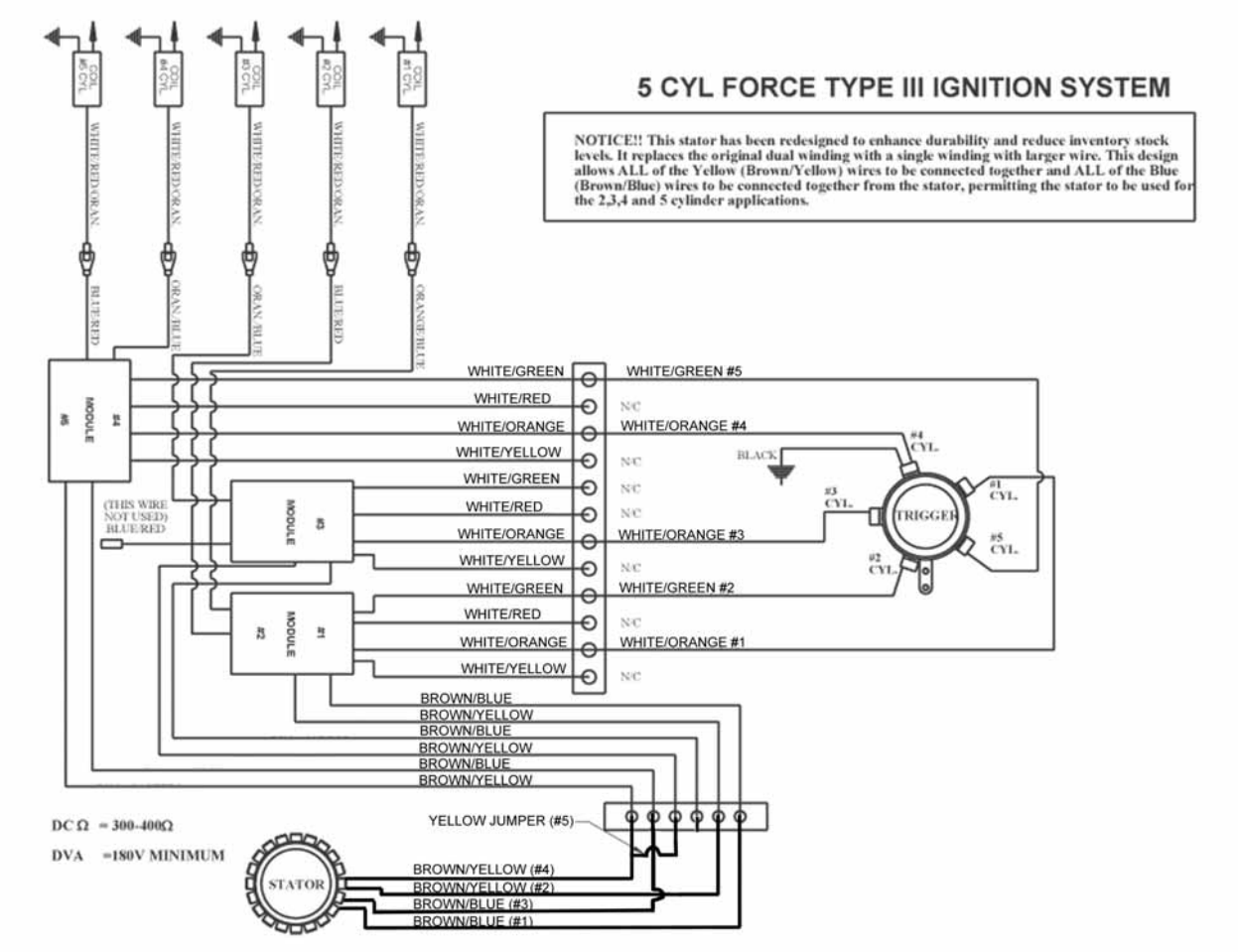




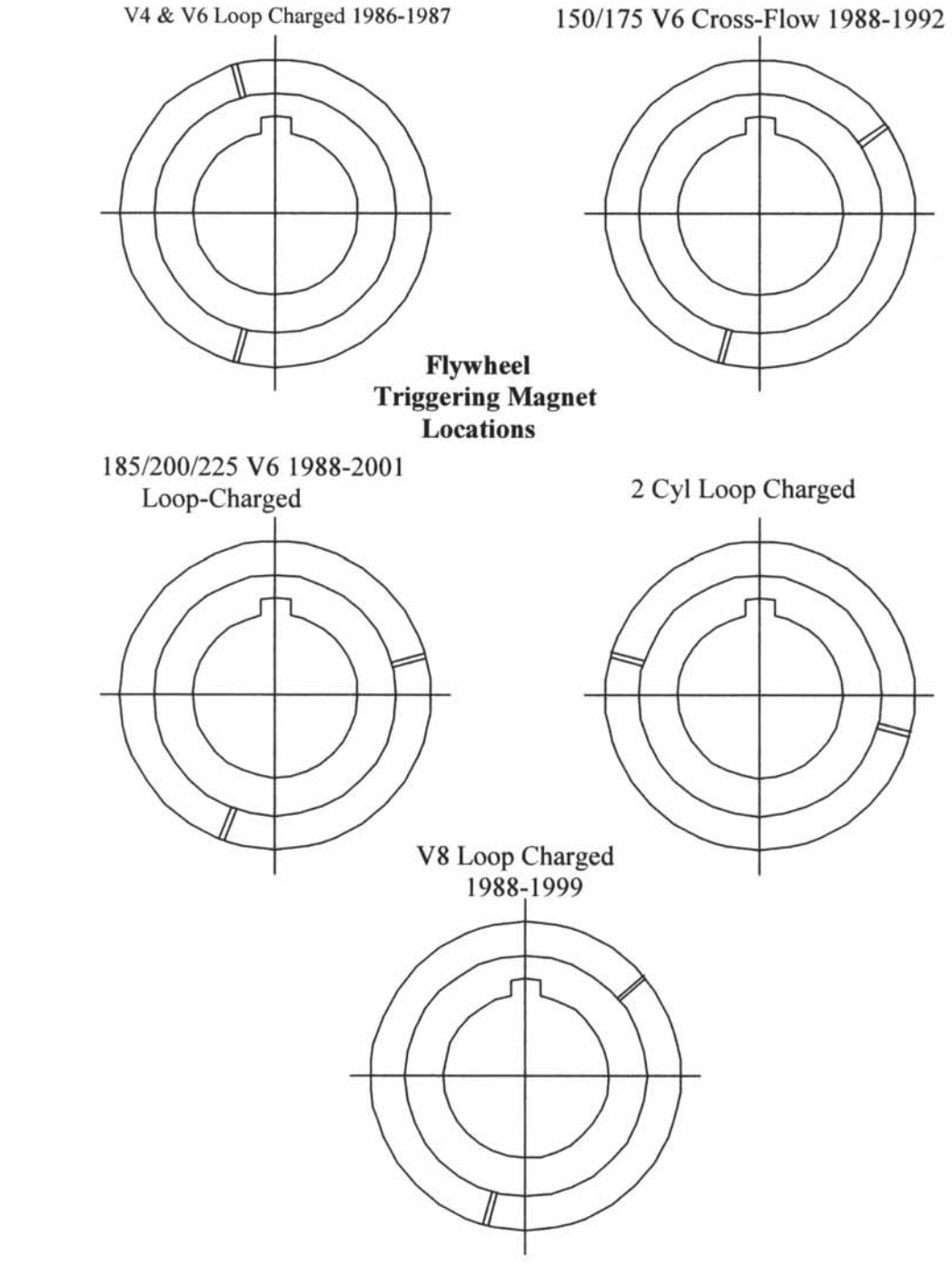
Modified Engine Wiring Diagrams for CDI Electronics Components



Modified Engine Wiring Diagrams for CDI Electronics Components

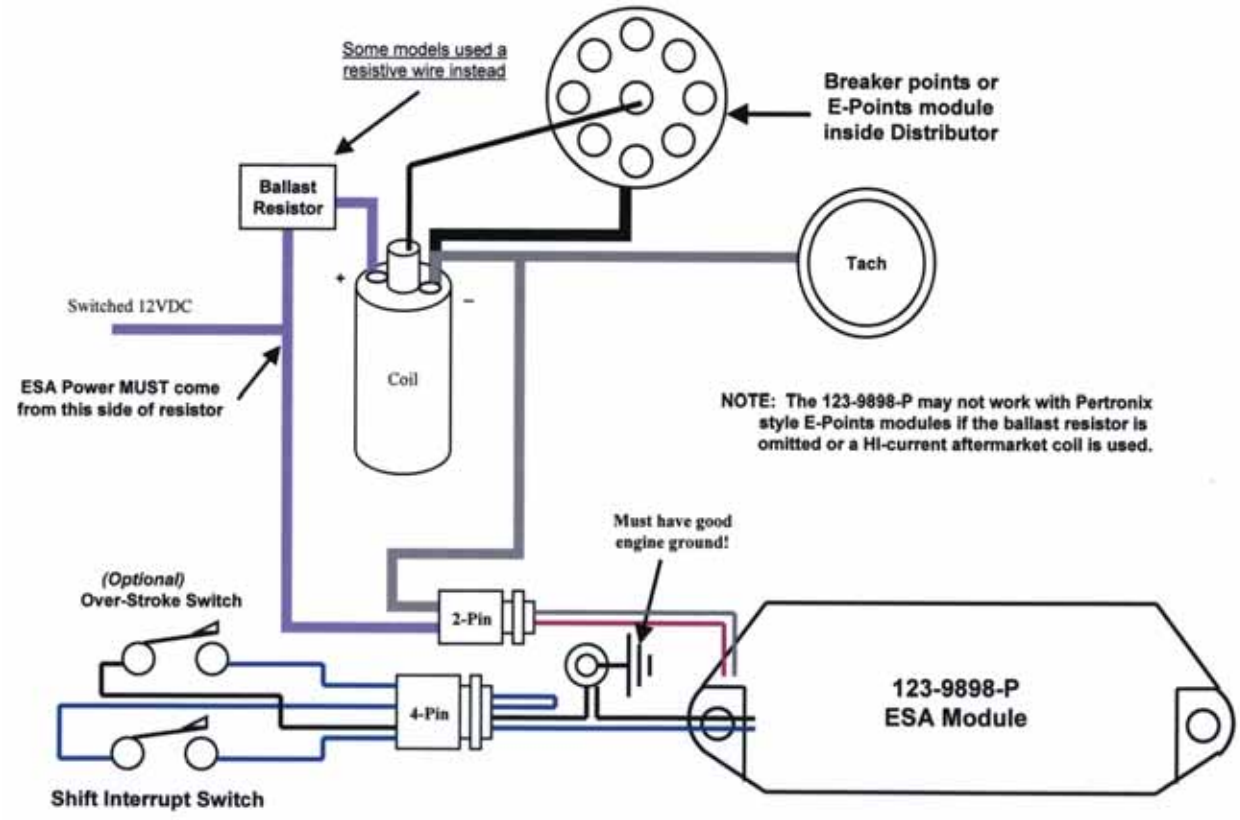


This drawing is to be used to determine if the flywheel sensor magnet has moved from it's original location only.



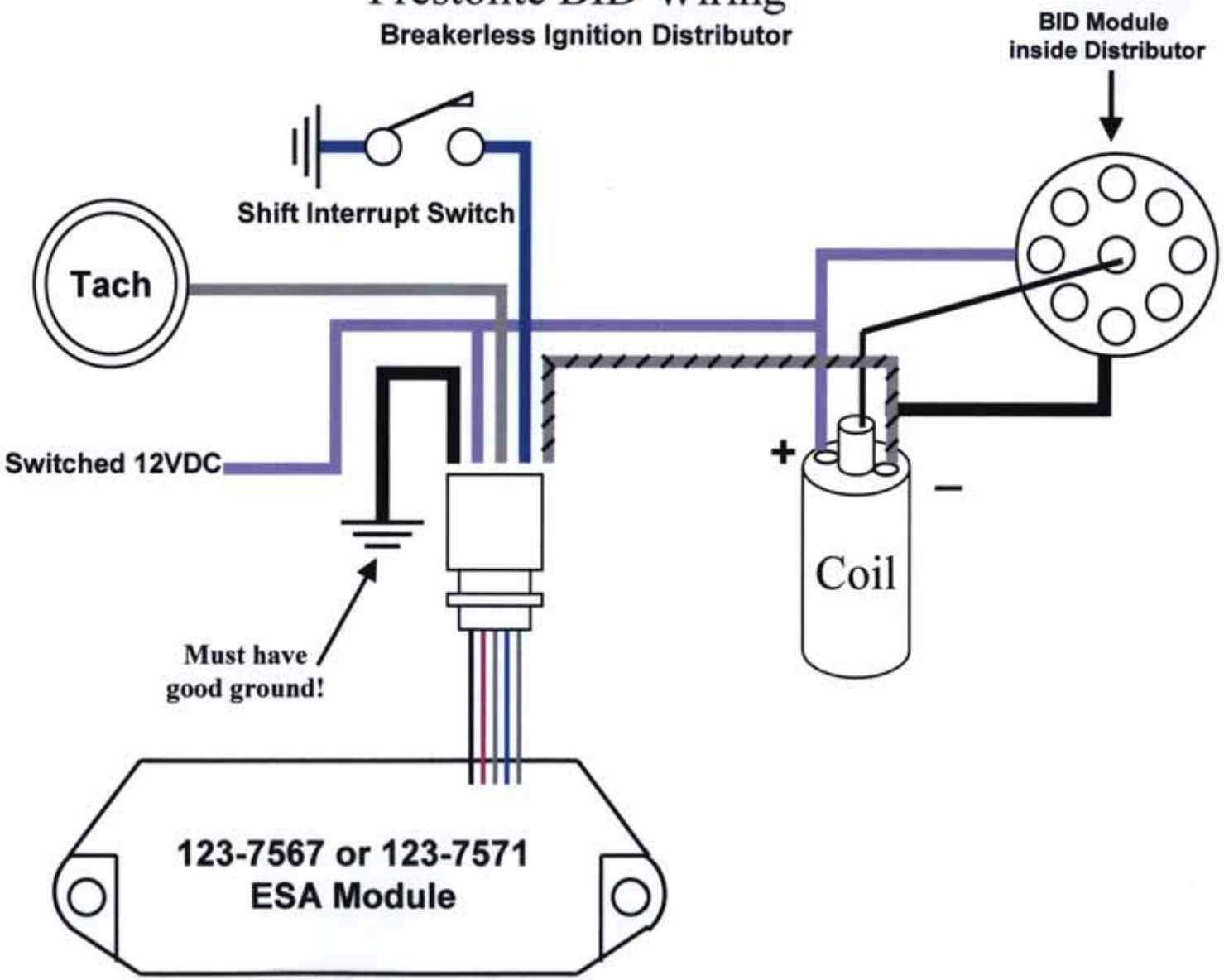
OMC Shift Assist (ESA) Applications					
OMC P/N	Ignition	CDI P/N	Superceded to	Application	Years
982749	Points	123-9898-P*		5.0, 5.7L V8	82 - 85
982755	Points	123-9898-P*		2.5, 3.0L V4	82 - 85
982774	Points	123-9898-P*		3.8, 4.3L V6	82 - 85
984036	Points	123-9898-P*	986342	4.3L V6	86 - 88
984276	Points	123-9898-P*	984730	5.0, 5.7L V8	86 - 88
984281	Points	123-9898-P*	985902	2.3, 2.5, 3.0L I4	86 - 88
984730	Points	123-9898-P*		3.5, 4.6, 5.0, 5.8L V8	89 -90
984730	Points	123-9898-P*		3.5, 4.6L V6, 7.5L V8	87 - 88
984740	Points	123-9898-P*		No data	
985902	Points	123-9898-P*	987740	2.3 3.0 I4, 2.6, 4.3L V6	89 - 90
986342	Points	123-9898-P*	987740	4.3L V6	86 - 88
986610	Delco EST	123-7878	987396	3.0, 3,0L HO I4	90
986837	Points	123-9898-P*		5.7L V8	90
987396	Delco EST	123-7878	987878	3.0, 3,0L HO I4	90 - ?
987564	Prestolite BID	123-7571		5.0, 5.8L V8	92 - 93
987566	Delco EST	123-7566		3.0, 3,0L HO I4	92 -93
987567	Prestolite BID	123-7567		4.3L V6	92 -93
987571	Prestolite BID	123-7571		5.7L V8	91 - 93
987738	Points	123-9898-P*		No data	
987739	Points	123-9898-P*		No data	
987740	Points	123-9898-P*		4.3L V6	86-91
987874	Delco EST	123-7566		3.0, 3,0L HO I4	
987878	Delco EST	123-7878		3.0, 3,0L HO I4	
* Also works with electronic points modules (Pertronix)					

Breaker Points Wiring



Prestolite BID Wiring

Breakerless Ignition Distributor



ELECTRONICS
A DIVISION OF RAPAIR, INC.

Delco EST Wiring

Electronic Spark Timing Distributor