

Introduction

The information contained in this Troubleshooting Guide has been compiled from various sources within the marine industry. Any reference to a specific product or brand is not intended for commercial purposes. References to test equipment and products are based upon the information available to the staff of CDI Electronics. **This information is designed for use as a reference guide by a professional marine technician.** CDI Electronics cannot be held liable for the misuse or abuse of the information contained herein. The staff tries to make the information as accurate as possible. However, CDI Electronics cannot assume responsibility for either the data accuracy or the consequences of the data's application.

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Safety Issues

Always remember to treat the outboard engine with respect. The engine uses high voltage for ignition and contains several moving components. Always be aware of moving mechanical parts, the surrounding area, and the position of your hands and body near the engine.

- **Never touch electrical components with wet hands.**
- **Whenever the power source is not needed, disconnect the cable from the negative terminal.**
- **Never reverse the battery leads when you connect the battery or disconnect the terminals while the engine is running.**
- **Never touch high-tension leads (spark plug leads) with any ungrounded tools while the engine is running.**
- **Never install equipment with requirements exceeding the generating power of the engine. Reference the service manual for values.**
- **Attempt to protect the electronic components from water.**
- **Insure fuel lines, harnesses, and oil lines are properly routed. Failure to follow this rule could result in a fire hazard.**
- **Make sure all ground leads are clean and tight.**

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	Meter has voltage, amperage, diode check and ohms
	Includes 511-9773 DVA Adapter	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 from 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 Evinrude.

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

Yel = Yellow

Wht = White

Blk = Black

Gry = Gray

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/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, readings 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, readings 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 #3 (Firing #4 and #5 Cylinders)	
Pack: White/Orange Stripe	Trigger: White/Orange Stripe	Pack: White/Orange Stripe	Trigger: White/Orange Stripe
White/Yellow	White/Yellow (a)	White/Yellow	White/Yellow (a)
White/Red	White/Red (a)	White/Red	White/Red (a)
White/Green Stripe	White/Green Stripe	White/Green Stripe	White/Green Stripe
Pack: Brown/Yellow Stripe	Stator: Brown/Yellow Stripe	Pack: Brown/Yellow Stripe	Stator: Brown/Yellow Stripe
Brown/Blue Stripe	Brown/Blue Stripe	Brown/Blue Stripe	Brown/Blue Stripe
Pack: Orange/Blue	Coil: White	Pack: Orange/Blue	Coil: White
Blue/Red	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, readings 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, readings 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:

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

Pack #1 (Firing #1 and #2 Cylinders)		Pack #2 (Firing #3 and #4 Cylinders)	
Pack:	White/Orange Stripe White/Yellow White/Red White/Green Stripe	Trigger:	White/Orange Stripe White/Yellow (a) White/Red (a) White/Green Stripe
Pack:	Brown/Yellow Stripe Brown/Blue Stripe	Stator:	Brown/Yellow Stripe Brown/Blue Stripe
Pack:	Orange/Blue Blue/Red	Coil:	White White
Pack #2 (Firing #3 Cylinder)			
Pack:	White/Orange Stripe White/Yellow White/Red White/Green Stripe	Trigger:	White/Orange Stripe White/Yellow (a) No Connection No Connection
Pack:	Brown/Yellow Stripe Brown/Blue	Stator:	Brown/Yellow Stripe No Connection (must be connected to the blue terminal on pack 1)
Pack:	Orange/Blue Blue/Red	Coil:	White 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 #2 (Firing #3 and #4 cylinders)	
Pack:	White/Orange Stripe White/Yellow White/Red White/Green Stripe	Pack:	White/Orange Stripe White/Yellow Stripe White/Red White/Green Stripe
Pack:	Yellow Blue	Pack:	Yellow Blue
Pack:	Orange/Blue	Pack:	Orange/Blue
Pack:	Blue/Red	Pack:	Blue/Red
Trigger:	White/Orange Stripe No Connection No Connection White/Green Stripe	Trigger:	White/Orange Stripe No Connection No Connection White/Green Stripe
Stator:	Yellow Blue	Stator:	Yellow Blue
Coil #1:	White	Coil #3:	White
Coil #2:	White	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 #3 (Firing #4 and #5 Cylinders)	
Pack: White/Orange Stripe	Trigger: White/Orange Stripe	Pack: White/Orange Stripe	Trigger: White/Orange Stripe
White/Yellow	White/Yellow (a)	White/Yellow	White/Yellow (a)
White/Red	White/Red (a)	White/Red	White/Red (a)
White/Green Stripe	White/Green Stripe	White/Green Stripe	White/Green Stripe
Pack: Brown/Yellow Stripe	Stator: Brown/Yellow Stripe	Pack: Brown/Yellow Stripe	Stator: Brown/Yellow Stripe
Brown/Blue Stripe	Brown/Blue Stripe	Brown/Blue Stripe	Brown/Blue Stripe
Pack: Orange/Blue	Coil: White	Pack: Orange/Blue	Coil: White
Blue/Red	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. If 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.

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

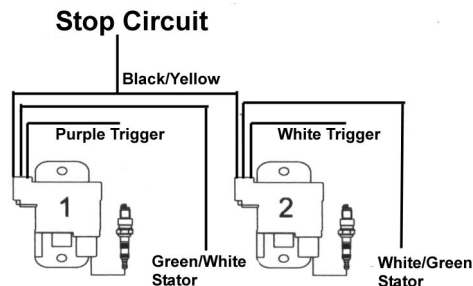
3. If # 1 is not sparking, swap the White/Green and Green White stator wire and retest. If the problem moves to the #2 cylinder, the stator is likely bad. If no change, swap locations with #2 and see if the problem moves. If it does, the module is bad. A continued no spark condition on the same cylinder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

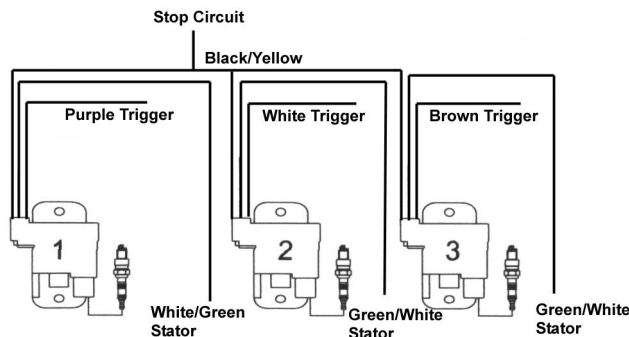
Wire Color	Check to Wire Color	Resistance	DVA Reading
Purple wire	Engine GND	Open	1V or more
White wire	Engine GND	Open	1V or more
Brown wire	Engine GND	Open	1V or more

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 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:

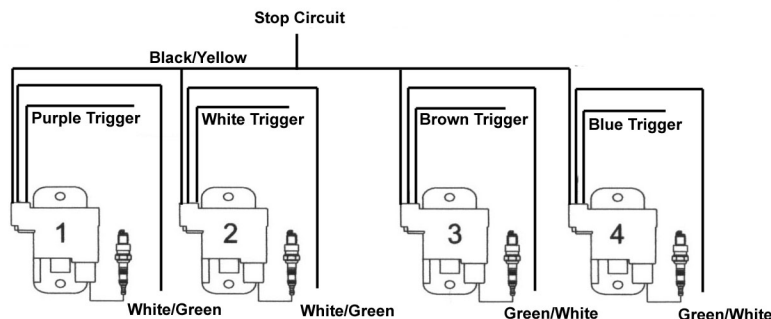
Wire Color	Check to Wire Color	Resistance	DVA Reading
Purple wire	Engine GND	Open	3V or more
White wire	Engine GND	Open	3V or more
Brown wire	Engine GND	Open	3V or more
White/Black wire	Engine GND	Open	3V or more

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

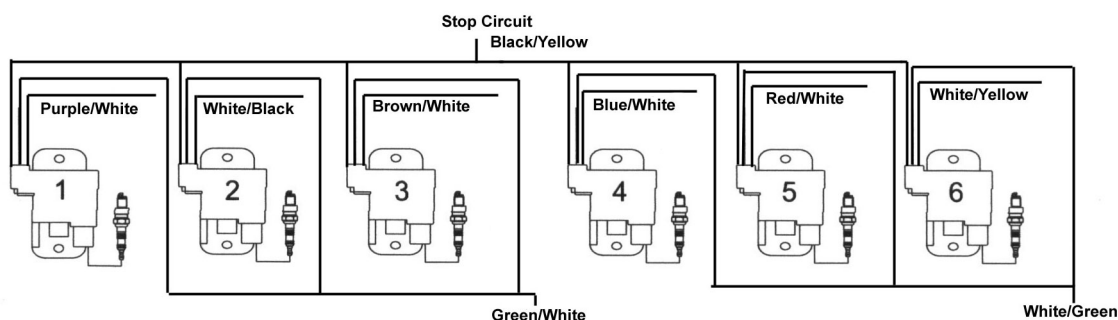
3. Using a set of piercing probes, check the trigger Resistance and DVA output as given below:

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 resistor (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.

FORCE DVA (Peak Reading) Voltage and Resistance Chart

HP	Year	Model Serial #	Ignition Part Number	Stator				Sensor			Ignition Coil		
				Ohms		DVA		Reading	Ohms	DVA	Reading	Input	Output
				Low Spd	Hi Spd	Low Spd	Hi Spd	Colors(a)					
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

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 an 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.

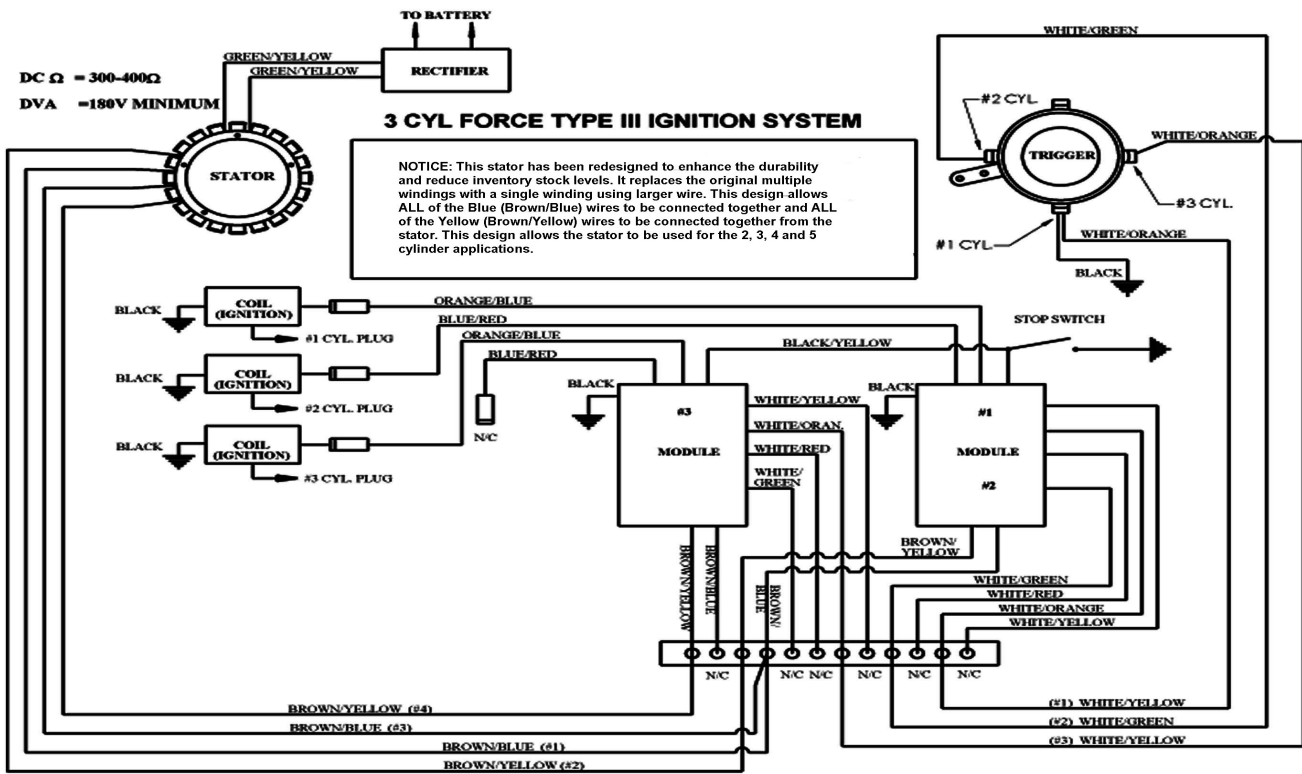
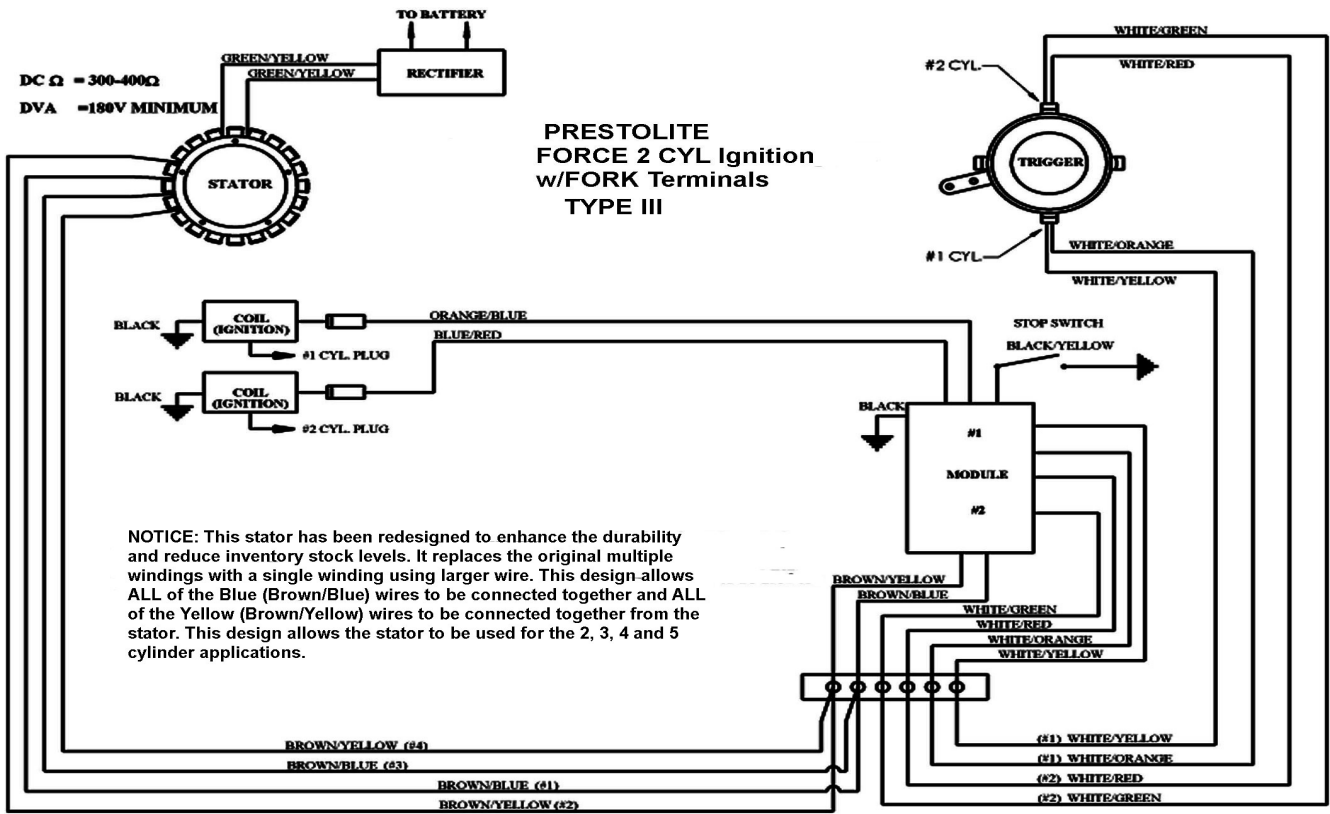
S.L.O.W. – **Speed Limiting Oil Warning** system. Limits the RPM of the engine to approximately 2500 RPM in order to reduce the damage to the engine caused by a no oil or overheat condition.

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.

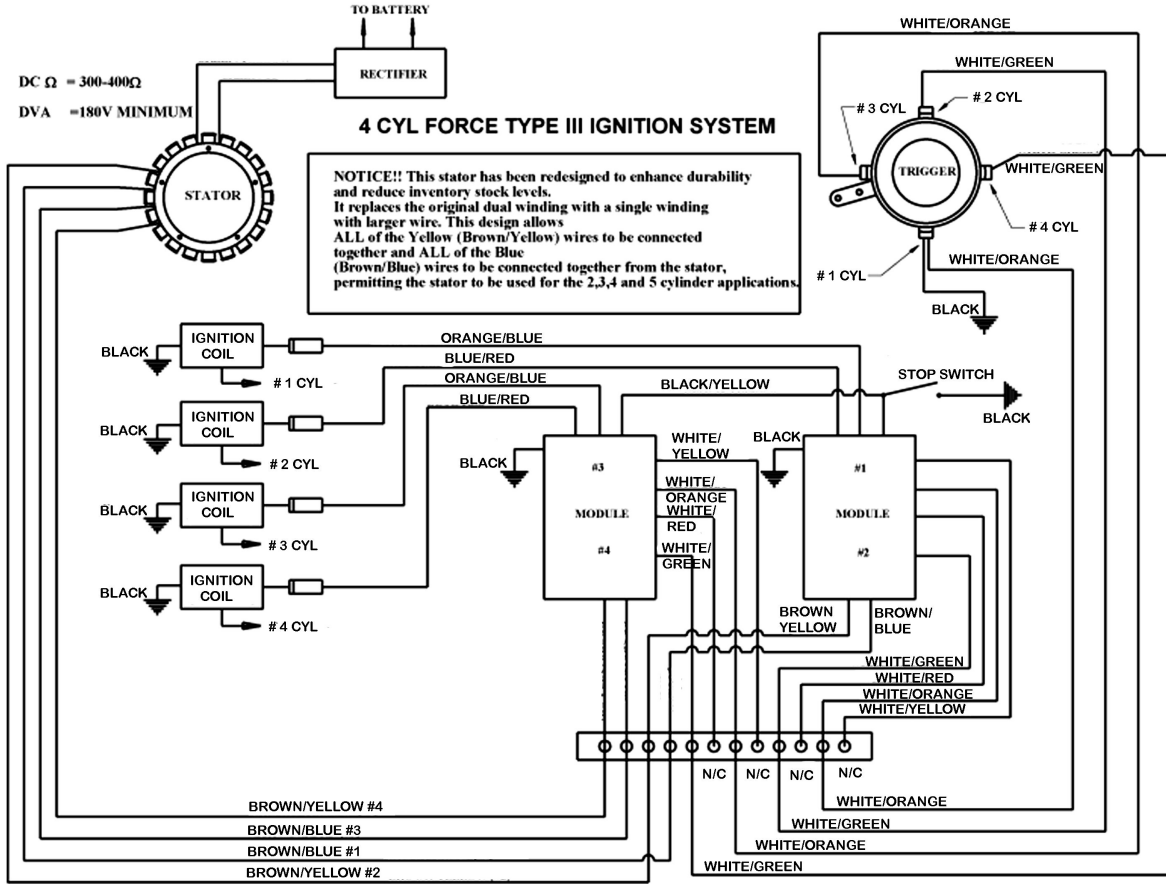
Switch Box – Term used for Force, Mariner and Mercury ignition modules.

W.O.T. – **Wide Open Throttle**.

Modified Engine Wiring Diagrams for CDI Electronics Components



Modified Engine Wiring Diagrams for CDI Electronics Components



Modified Engine Wiring Diagrams for CDI Electronics Components

