

# CDI Electronics®

## Force

### Mercury Designed Ignitions 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 POWER PACK and retest. If the engine's ignition sparks, 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 of less than 250-RPM will not allow the system to spark properly. This can be caused by a weak battery, dragging starter, bad battery cables or a mechanical problem inside the engine.
4. Inspect and clean all engine and ignition ground connections.
5. Check the stator resistance and DVA output as follows:

##### Black Stator

WIRE	READ TO	OEM RESISTANCE	CDI RESISTANCE	DVA (Connected)	DVA (Disconnected)
Blue	Engine GND	3250-3650	500-600	180-400 V	180-400 V (*)
Red	Engine GND	75-90	28-32	25-100 V	25-100 V (*)

##### Red Stator Kit

WIRE	READ TO	OEM RESISTANCE	CDI RESISTANCE	DVA (Connected)	DVA (Disconnected)
White/Green	Green/White	500-700	500-600	180-400 V	180-400 V (*)
Blue	Engine GND	OPEN	OPEN	180-400 V	180-400 V (*)

(\*) This reading can be used to determine if a stator or pack has a problem. For instance, if you have no spark on any cylinder and the stator's DVA reading is low – disconnect the stator wires and recheck the DVA output. If the reading stays low – the stator is bad. If the reading is now within spec – the pack is bad.

6. Check the center hub triggering magnet in the flywheel. A loose magnet can cause this problem.
7. Check the triggering and charge coil flywheel magnets for cracked, broken and loose magnets.

##### NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS:

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

WIRE	READ TO	RESISTANCE	DVA (Connected)	DVA (Disconnected)
Brown	White/Black	800-1400	4 V +	4 V + (#)
White	White/Black	800-1400	4 V +	4 V + (#)
Purple	White/Black	800-1400	4 V +	4 V + (#)
Brown	Engine GND	Open	1 V +	N/A
White	Engine GND	Open	1 V +	N/A
Purple	Engine GND	Open	1 V +	N/A

(#) 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 trigger's DVA reading for that cylinder is low – disconnect the trigger wires and recheck the DVA output. If the reading stays low – the trigger is bad. If the reading is now within spec – the pack is bad.

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 (while connected) 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.
3. 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.
4. Visually inspect the ignition coils for burned or discolored areas and cracks in the casing (indicating arcing inside the coil).
5. Swap the ignition coil with one that is sparking correctly.
6. Rare causes include a weak trigger magnet. If possible, try another flywheel.

##### SWITCH BOX OR TRIGGER REPEATEDLY BLOWS ON SAME CYLINDER:

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

##### ENGINE WILL NOT SHUT OFF:

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

##### WILL NOT ACCELERATE BEYOND 3000-4000 RPM:

1. Disconnect the Yellow wires from the stator to the rectifier and retest. If the engine now has good spark, replace the rectifier.
2. Connect a DVA meter between the stator's Blue wire and engine ground. Run the engine up to the RPM where the problem is occurring. DVA voltage should increase with RPM. A sharp drop in DVA right before the problem occurs usually indicates a bad stator. (Read from Blue to engine ground if the engine has a Red stator kit installed).

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3. Connect a DVA meter between the stator's Red wire and engine ground. 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.
4. 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.
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. Check the triggering and charge coil flywheel magnets for cracked, broken and loose magnets.

## **MISS AT ANY RPM:**

1. Disconnect the Yellow wires from the stator to the rectifier and retest. If the miss clears, replace the rectifier.
2. In the water or on a Dynameters, check the DVA output on the Green wires from the switch box while connected to the ignition coils. You should have a reading of at least 150V DVA or more, increasing with engine RPM until it reaches 300-400V DVA maximum. A sharp drop in DVA right before the miss becomes apparent on all cylinders will normally be caused by a bad stator. A sharp drop in DVA on less than all cylinders will normally be the switch box or trigger.
3. Connect an inductive tachometer to each cylinder in turn and try to isolate the problem. A high variance in RPM on one cylinder usually indicates a problem in the switch box or ignition coil. Occasionally a trigger will cause this same problem. Check the trigger DVA voltage (see NO SPARK OR INTERMITTENT SPARK ON ONE OR MORE CYLINDERS above).
4. Perform a high-speed shutdown and read the spark plugs. Check for water. A crack in the block can cause a miss at high speed when the water pressure gets high, but a normal shutdown will mask the problem.
5. Check the triggering and charge coil flywheel magnets for cracked, broken and loose magnets.
6. Rotate the stator one bolt hole in either direction and retest.

