



Ignition Test Procedures

Direct Voltage Adapter (DVA) Test for Stator

⚠ WARNING

DANGER - HIGH VOLTAGE/SHOCK HAZARD! Do not touch ignition components and/or metal test probes while engine is running and/or being "cranked". STAY CLEAR OF SPARK PLUG LEADS. To assure personal safety, each individual spark plug lead should be grounded to engine.

⚠ WARNING

When testing or servicing the ignition system, high voltage is present. **DO NOT TOUCH OR DISCONNECT** any ignition parts while engine is running, while key switch is on or while battery cables are connected.

⚠ CAUTION

Failure to comply with the following items may result in damage to the ignition system.

1. DO NOT reverse battery cable connections. The battery negative cable is (-) ground.
2. DO NOT "spark" battery terminals with battery cable connections to check polarity.
3. DO NOT disconnect battery cables while engine is running.
4. DO NOT crank engine when CDMs or TPM are not grounded to engine.

⚠ CAUTION

To protect against meter and/or component damage, observe the following precautions:

- 400 VDC* test position (or higher) **MUST BE** used for all tests.
- **INSURE** the Positive (+) lead/terminal of DVA is connected to the Positive (+) receptacle of meter

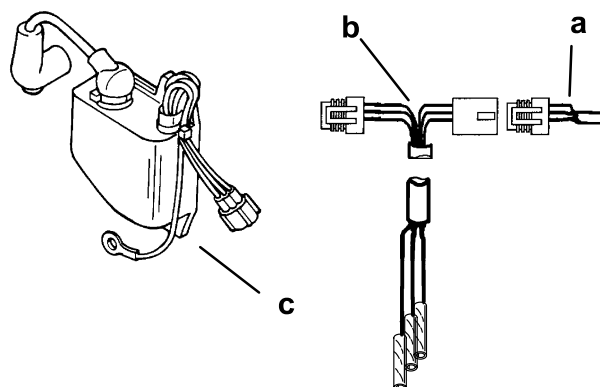
- **DO NOT CHANGE** meter selector switch position while engine is running and/or being "cranked".
- **ALL COMPONENTS MUST BE GROUNDED** during tests. Running or "cranking" engine with TPM or CDM ungrounded may damage components.

*If using a meter with a built-in DVA, the DVA/400 VDC (or higher) test position should be used.

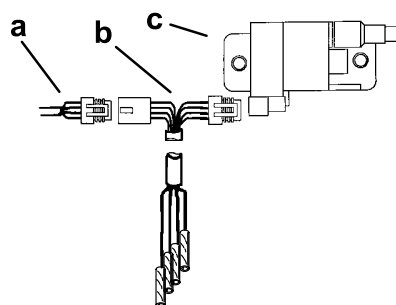
NOTE: Test leads are not supplied with the DVA. Use test leads supplied with meter.

Test procedures and specifications are provided for **checking primary ignition voltage** while the engine is **running** and/or being **"cranked"** with all **harnesses connected**.

Install test harness between ignition harness and CDM as shown.



- a - Stator/Trigger Harness
b - Test Harness (P/N 91-825207A1)
c - Capacitor Discharge Module (P/N 822779)



- a - Stator/Trigger Harness
b - Test Harness (P/N 91-825207A2)
c - Capacitor Discharge Module (P/N 827509)

TEST	Selector Switch Position	RED Lead	BLACK Lead	Voltage Reading* @ (300 - 4000) RPM
Stator	400 DVA	Red Test Harness (Green/White)	Ground	190 - 320
Stator	40 DVA	Green or White/Green	Ground	20 - 40

* If voltage is low, disconnect one Capacitor Discharge Module (CDM) connector at a time while monitoring voltage reading.

If voltage rises, replace that CDM. If voltage does not rise, replace stator.



Ignition Diagnostic Procedures

TROUBLESHOOTING TIP: With engine running, use inductive timing light to check spark advance of each cylinder as throttle is opened and closed. If timing advances and retards smoothly on each cylinder, ignition system is MOST LIKELY functioning properly.

IMPORTANT: If outboard appears to have an ignition system failure, it is recommended that before beginning in-depth troubleshooting:

- Check ground leads on Timing Protection Module, Capacitor Discharge Modules and ground lead between ignition plate and engine block for proper continuity.
- Disconnect and reconnect ignition harness connectors to verify proper continuity.

PROBLEM	CORRECTION
1. No Spark or Weak Spark on Both Cylinders	No Spark - Trigger, Stator or Timing Protection Module (TPM) Weak Spark - Stator
2. No Spark or Weak Spark on 1 Cylinder	Capacitor Discharge Module (CDM)
3. Timing Fluctuates - Note: It is normal for timing to fluctuate 2°-3° @ Idle. - If engine over-heats [above 190° F (88° C)], TPM will limit engine RPM to 2500. - If engine RPM exceeds 5800, TPM will retard timing from 25 BTDC TO 14° BTDC. - If RPM exceeds 6500 RPM, TPM will momentarily shut ignition off until RPM drops below 6500. - If engine RPM drops below 600, idle stabilizer in TPM will advance timing to as high as 10° BTDC @ cranking speed of 300 RPM.	Defective Engine Temperature Sensor Defective TPM
4. Timing will not Advance on both Cylinders	Defective TPM
5. Timing will not Advance on 1 Cylinder	Check wiring between CDM and TPM. If wiring is OK, replace CDM.
6. Engine Misfires @ High RPM	Defective CDM Defective TPM
7. Engine Hard to Start when Cold	Defective Fuel Enrichment Valve Defective TPM
8. Engine Misfires @ Low RPM but Runs Smooth @ High RPM	Defective Harness (loose connections) between TPM and CDM Defective CDM Defective TPM Defective Stator
9. Engine Starts Hard when Hot	Defective TPM
10. Engine will not Run over 2500 RPM and is not Over-Heating.	Defective Temperature Sensor Defective TPM
11. Engine Occasionally Misfires	Replace Standard Spark Plug with Inductor Plug

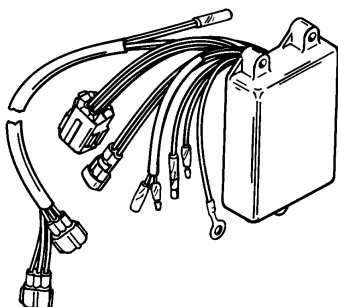


Testing Ignition Components

Resistance Tests

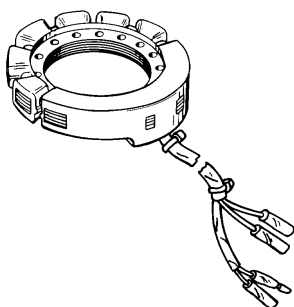
TIMING PROTECTION MODULE

Normally, if timing advances and retards with corresponding changes in RPM, most likely the TPM is functioning correctly. Refer to “**Ignition Diagnostic Procedures**” preceding, for individual failure scenarios.



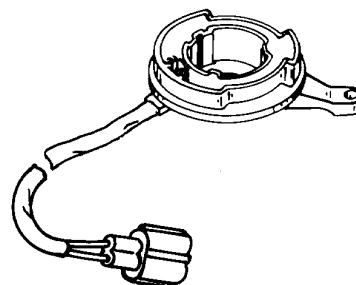
STATOR

A resistance check can be made on charge coils. Ohmmeter should indicate as follows:
Black Stator between GREEN/WHITE and GREEN leads (525-625 ohms)
Red Stator between GREEN/WHITE and WHITE/GREEN leads (660-710 ohms).

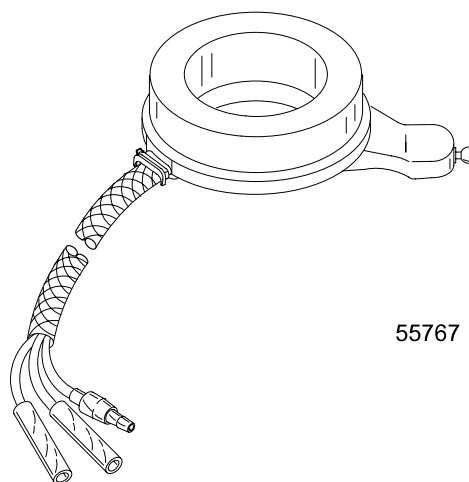


TRIGGER (S/N-0G589999 & BELOW)

A resistance check can be made on trigger coil between WHITE/BLACK and WHITE leads. Ohmmeter should indicate between 1100 - 1300 ohms.



TRIGGER (S/N-0G590000 & ABOVE)



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A resistance test is not used on the trigger. Test trigger as outlined under “Trigger Output Test”.

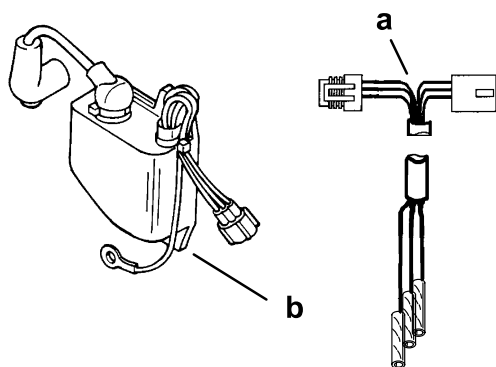
Trigger Output Test		20 DVA Scale
Positive Meter Lead (+)	Negative Meter Lead (-)	DVA Reading
White Test Harness Lead	Black Test Harness Lead	2 - 8 Volts

If reading is below specifications replace trigger. If reading is above specifications check CDM.

NOTE: If voltage remains low after installing a new trigger, replace CDM.



CAPACITOR DISCHARGE MODULE P/N822779



a - Test Harness P/N 91-825270A1

b - Capacitor Discharge Module P/N 822779

A resistance check can be made of the CDM as follows:

CAPACITOR DISCHARGE MODULE RESISTANCE CHECK-ANALOG METER

Connect Positive (+) Meter Lead To:	Connect Negative (-) Meter Lead To:	Ohms Scale	Reading
Ground Lead	White Pin or White Test Harness Lead	R X 1	40 ± 10
GRN/WHT Pin or Red Test Harness Lead	Ground Lead	R X 1* Diode Reading	Continuity
Ground Lead	GRN/WHT Pin or Red Test Harness Lead	R X 1K* Diode Reading	No Continuity
GRN/WHT Pin or Red Test Harness Lead	BLK/YEL Pin or Black Test Harness Lead	R X 1K* Diode Reading	No Continuity
BLK/YEL Pin or Black Test Harness Lead	GRN/WHT Pin or Red Test Harness Lead	R X 1* Diode Reading	Continuity
Coil Tower	Ground Lead	R X 10	1000 ± 300

NOTE: Due to the differences in test meters battery polarity, results other than specified may be obtained. In such a case, reverse meter leads and re-test. If test results then read as specified on all tests CDM is O.K.. The diode measurements above will be opposite if using a Fluke® equivalent multimeter.

CAPACITOR DISCHARGE MODULE RESISTANCE CHECK-DIGITAL METER

Connect Positive (+) Meter Lead To:	Connect Negative (-) Meter Lead To:	Ohms Scale	Reading
Ground Lead	White Pin or White Test Harness Lead	Ω or 200	40 ± 10 Ohms
GRN/WHT Pin or Red Test Harness Lead	Ground Lead	→ * Diode Reading	OL or OUCH
Ground Lead	GRN/WHT Pin or Red Test Harness Lead	→ * Diode Reading	.400-.900
GRN/WHT Pin or Red Test Harness Lead	BLK/YEL Pin or Black Test Harness Lead	→ * Diode Reading	.400-.900
BLK/YEL Pin or Black Test Harness Lead	GRN/WHT Pin or Red Test Harness Lead	→ * Diode Reading	OL or OUCH or 1.
Coil Tower	Ground Lead	Ω or 2K	.800-1.200 KΩ

NOTE: Due to the differences in test meters battery polarity, results other than specified may be obtained. In such a case, reverse meter leads and re-test. If test results then read as specified on all tests CDM is O.K.. The diode measurements above will be as specified if using a Fluke® equivalent multimeter.