IGNITION SYSTEM

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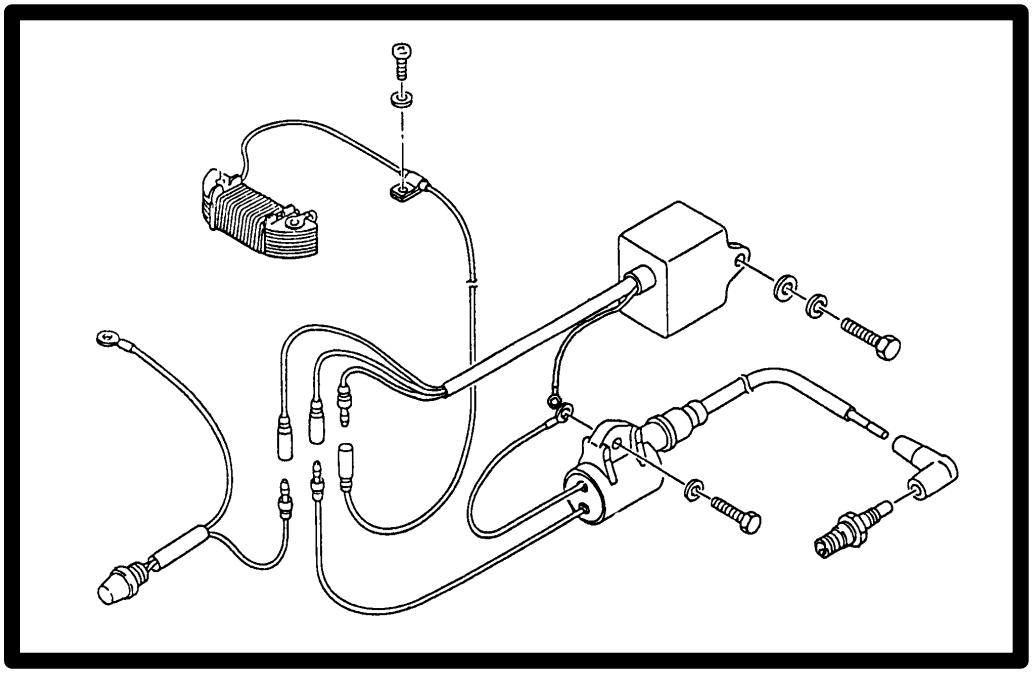

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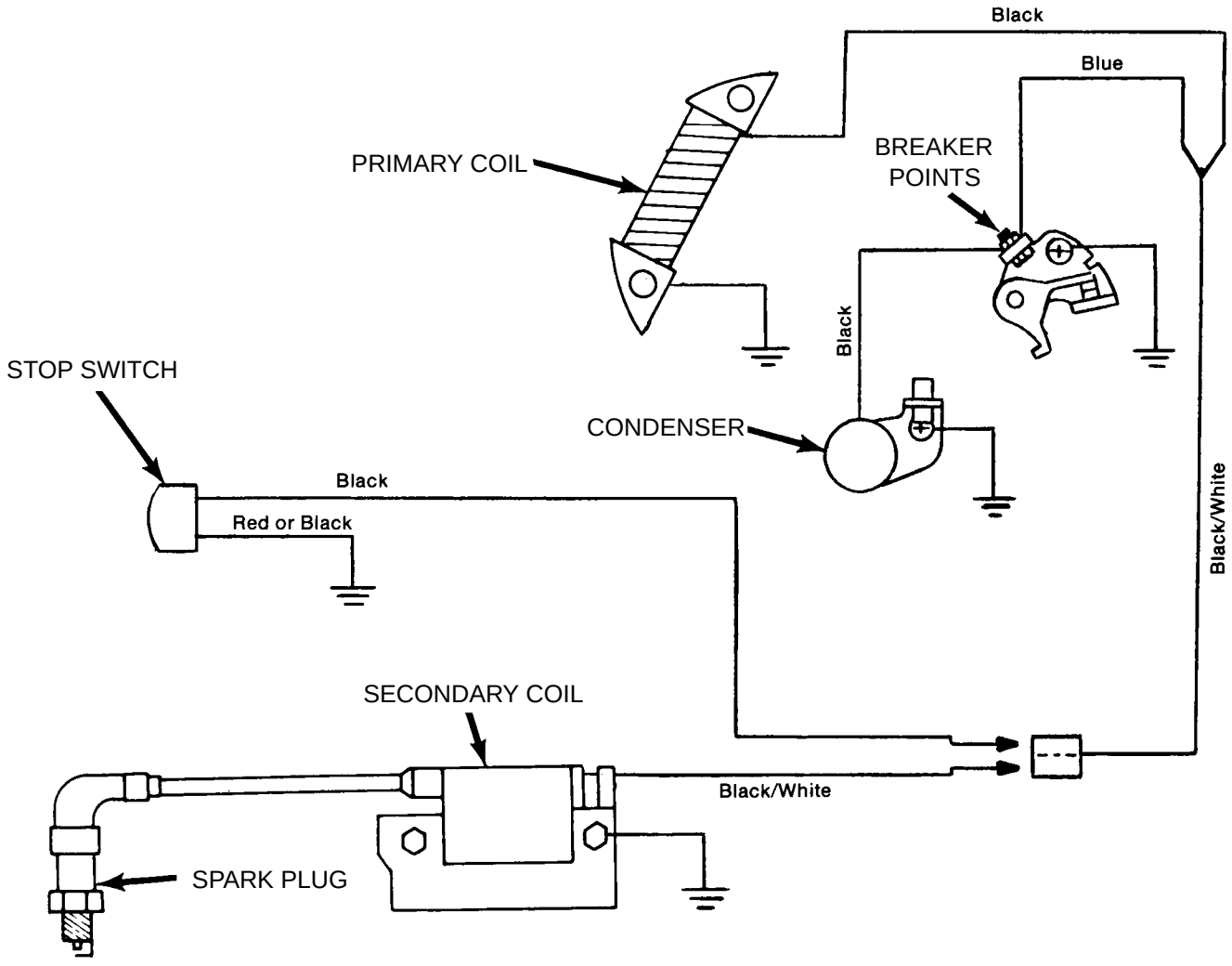
Magneto Ignition System (Models - 2.2/2.5/3.0 - 1992 and Earlier)

Description

When the breaker points are closed, a magnetic field is built up in the primary coil (located below flywheel) as the flywheel permanent magnets pass the coil. When breaker points open, the magnetic field of the primary coil collapses, discharging voltage into the primary winding of the secondary coil. At this time the condenser also discharges its stored voltage into the primary circuit. This current creates an extremely high voltage in the secondary coil that will jump the spark plug gap.



Stop Switch Test (All Models)

1. Disconnect stop switch leads.
2. Use ohmmeter and connect leads to switch leads.
3. Meter should show “continuity” with switch depressed.
4. If meter shows other than in step 3, replace switch.

Magneto Ignition System

Breaker Points Cleaning and Inspection

CLEANING

1. Dirty contact points should be dressed with a clean, fine-cut contact file. File should not be used on other metals and should not be allowed to become greasy or dirty. Normal point condition is overall grey color.

NOTE: DO NOT use emery cloth to clean contact points.

2. After use, contact surfaces may not appear bright and smooth. This is not necessarily an indication that points are not functioning satisfactorily. Do not attempt to remove all roughness nor dress point surfaces down smooth. Remove scale and dirt only.
3. Badly burned or pitted contact points should be replaced.

ABNORMAL POINT WEAR

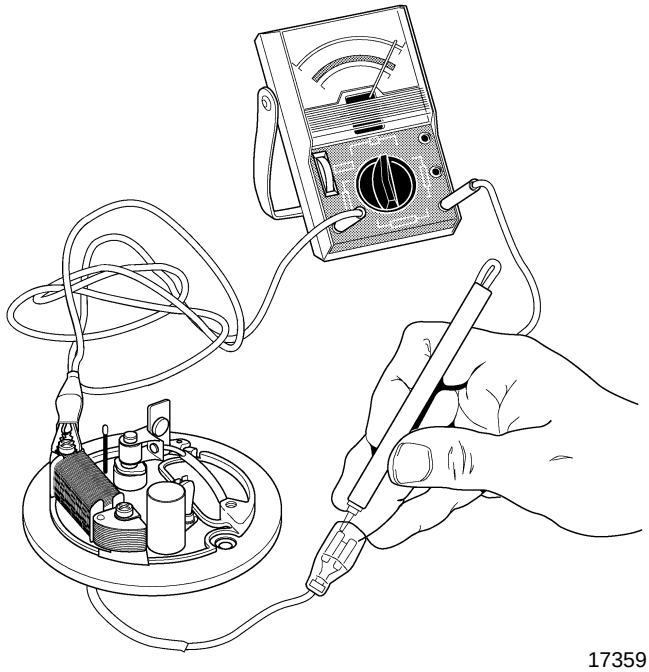
1. Under normal operating conditions, contact points will provide many hundreds-of-hours of service.
2. Points, which have been operated for a period of time, develop a rough surface.
3. If the roughness between points match enough that a large contact area is maintained, the points will continue to provide satisfactory service until most of the tungsten is worn off.
4. If points burn or pit they must be replaced. Ignition system must be inspected to determine the cause of failure. If cause is not corrected, new points will quickly burn or pit.

BURNING OF POINTS

1. Contact point burning results from high voltage, presence of oil or other foreign material, defective condenser and improper point adjustment.
2. Oil or crankcase vapors on point surfaces cause points to burn rapidly. The presence of oil will produce a smudgy line under contact points.
3. If contact point opening is too small, points will be closed for too much operating time. Average current flow thru points will be too high resulting in rapid burning. Arcing will occur between points and result in low secondary voltage and engine miss.
4. High series resistance in condenser circuit will prevent normal condenser action, so contact points will burn rapidly. This resistance may be caused by a loose condenser mounting or lead connection or by poor connections inside condenser.

Primary Ignition Coil Test

Breaker Points Must Be Open When Testing Coil		
Test	**Meter Range**	**Ohm Reading**
Connect (+) Ohmmeter Lead to Coil BLACK/ WHITE Lead and (–) Lead to Coil Ground	x 1	1.5 Ohms

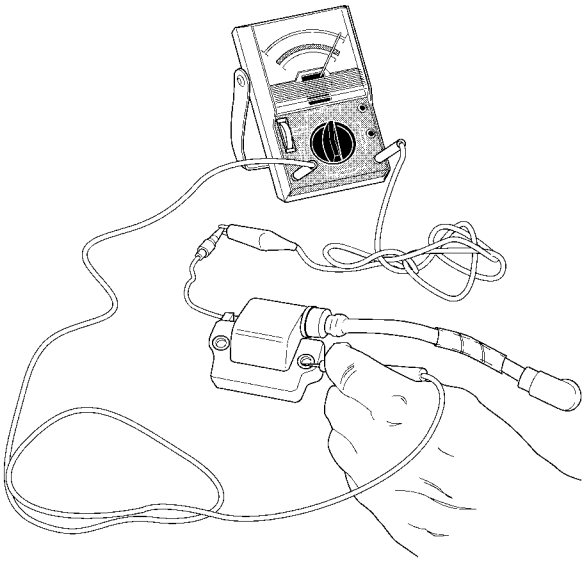


17359

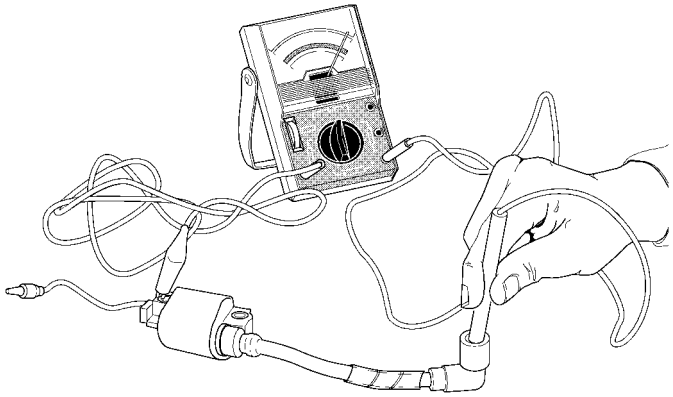
Secondary Ignition Coil Test

IMPORTANT: Ohmmeter test can only detect certain faults in the secondary ignition coil. Replace ignition coil if ohmmeter reading listed in chart are not as specified. If coil tests OK, and coil is still suspected of being faulty, use a magneto analyzer to thoroughly check coil. Follow coil test outlined in analyzer manual.

Test	Meter Range	Ohm Reading
Primary Winding Test Connect (+) Ohmmeter Lead to Coil BLACK/WHITE Lead and (–) Lead to Coil Ground	x 1	.81 to 1.09 Ohms
Secondary Winding Test Connect (+) Ohmmeter Lead to Spark Plug Lead Terminal and (–) Lead to Coil Ground	x 100	4.250 to 5.750 Ohms



Testing Primary Winding 17356



Testing Secondary Winding 17360

Condenser Test

Check condenser using a magneto analyzer. Perform condenser tests outlined in analyzer manual. When checking condenser capacity, reading should be 0.22 to 0.28 microfarads.

Capacitor Discharge Ignition System (Models - 2.5/3.3 - 1993)

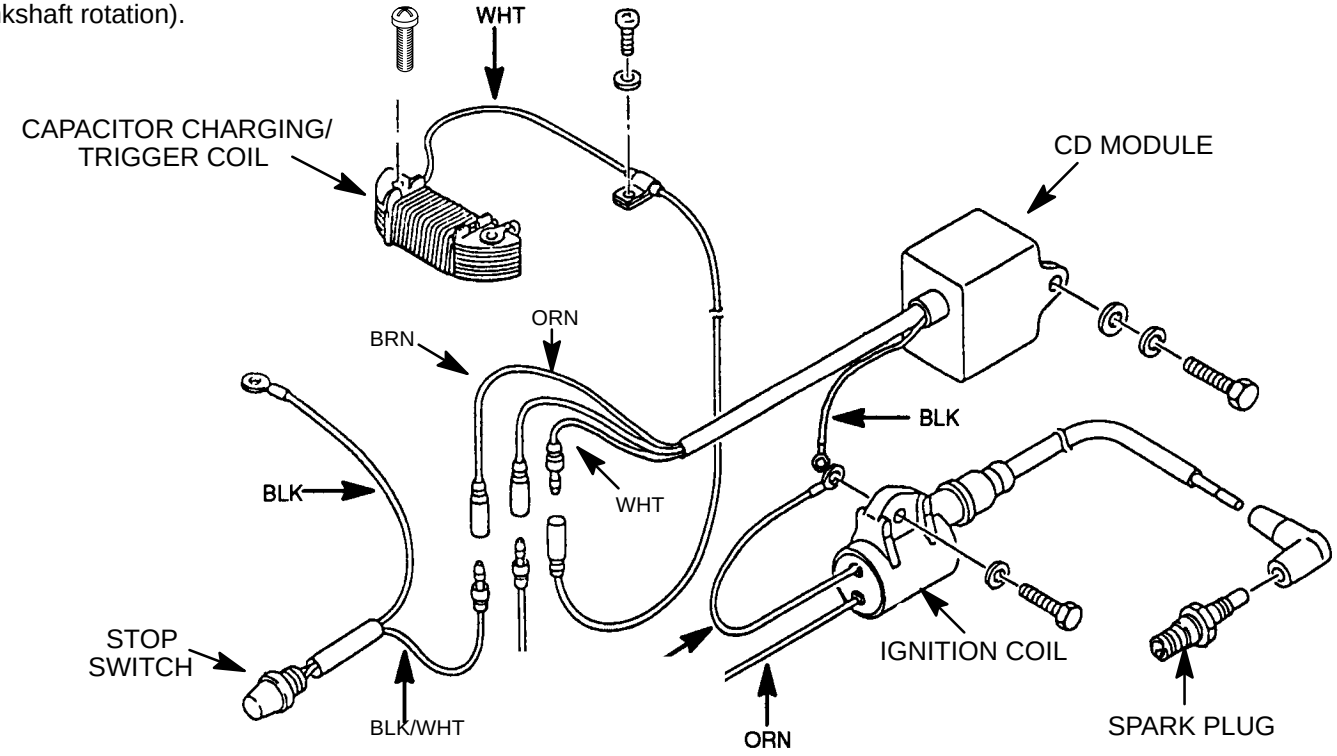
Description

The flywheel contains 4 magnets. As a north/south polarity magnet passes the capacitor charging/trigger coil, (located under flywheel), a magnetic field is built up within the windings and voltage is sent to the capacitor discharge (CD) module to be stored. As a south/north polarity magnet passes the capacitor charging/trigger coil, a triggering voltage is sent to the CD module. A bias/trigger circuit within the CD module controls the release of this voltage to the secondary ignition coil. The secondary coil increases this voltage through its primary and secondary windings. The secondary coil fires the spark plug at both the top of the piston stroke and the bottom of the stroke (or every 180° of crankshaft rotation).

There is no timing advance or timing adjustment in this system.

If engine will not idle down to trolling speed (runs excessively fast with throttle closed), the bias circuit within the CD module may have failed. Replace the CD module.

If engine will not start (no spark at spark plug), use the DVA chart, following, to determine the serviceabilty of each ignition component.



TOOL: MULTIMETER/DVA TESTER 91-99750

Tested Part	Multimeter Wires	Connected To	Selector Position	Reading at 300 - 2000 RPM
Ignition Coil PRI	RED BLACK	GROUND ORANGE	400 VDC	100 - 320
Capacitor Charging Coil/ Trigger Coil	RED BLACK	GROUND WHITE	400 VDC	120 - 320
Stop Circuit	RED BLACK	BLACK BLACK/WHITE	400 VDC	120 - 320

Capacitor Discharge Ignition Tests (1993 Model - 2.5/3.3)

Capacitor Charging/Trigger Coil Test

CHECK	METER RANGE	OHM READING
Connect (+) Ohm Lead to WHITE Lead. Connect (–) Ohm Lead to GROUND.	R x 100	300-400

Secondary Ignition Coil Test

CHECK	METER RANGE	OHM READING
PRIMARY WINDING TEST Connect (+) Ohm Lead to ORANGE Lead. Connect (–) Ohm Lead to GROUND.	R x 1	Less Than 1 Ohm
SECONDARY WINDING TEST Connect (+) Ohm Lead to Spark Plug Lead. Connect (–) Ohm Lead to Ground.	R x 1K	3000-4000

CD Module Test (Diode Test)

CHECK	METER RANGE	OHM READING
Connect (+) Ohm Lead to WHITE Lead. Connect (–) Ohm Lead to ORANGE Lead.	R x 1K	Continuity
Connect (+) Ohm Lead to ORANGE Lead. Connect (–) Ohm Lead to WHITE Lead.	R x 1K	No Continuity

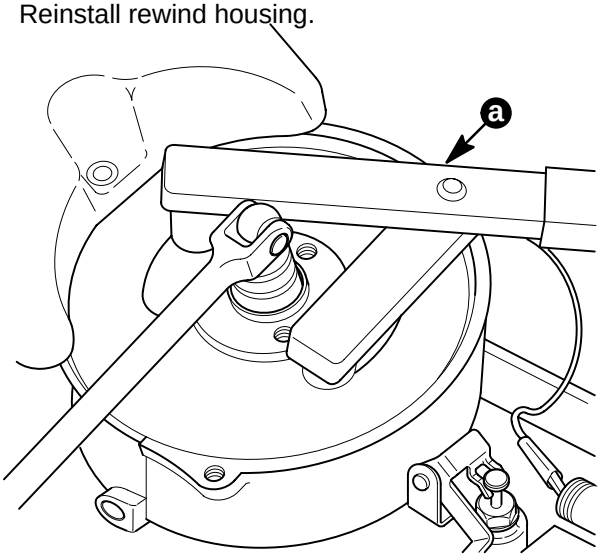
Flywheel Removal and Installation (All Models)

Flywheel Removal

1. Remove rewind housing.
2. Remove rope cup.
3. Hold flywheel using Flywheel Holder 91-83163M.
4. Remove flywheel using Flywheel Puller 91-83164M.

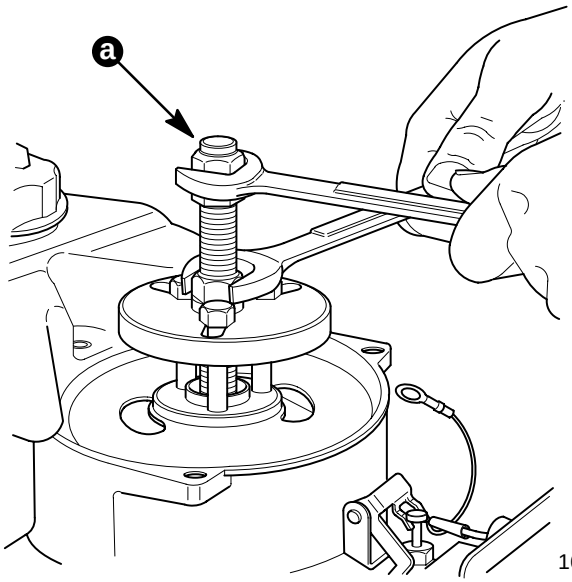
Flywheel Installation

1. Hold flywheel using Flywheel Holder 91-83163M and torque flywheel nut to 30 lb. ft. (40.6 N·m).
2. Reinstall rope guide using 3 bolts. Torque bolts securely.
3. Reinstall rewind housing.



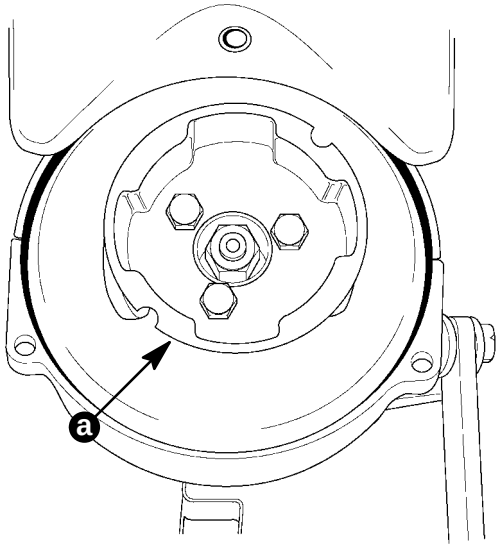
17002

a - Flywheel Holder (91-83163M)



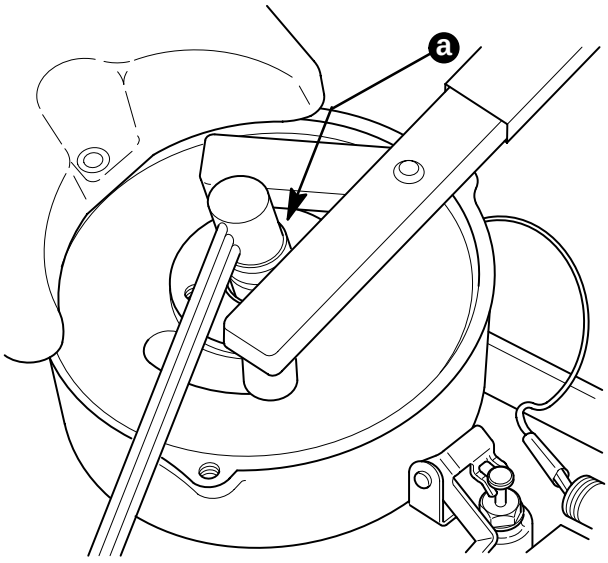
16999

a - Flywheel Puller (91-83164M)



17424

a - Rope Cup Installed



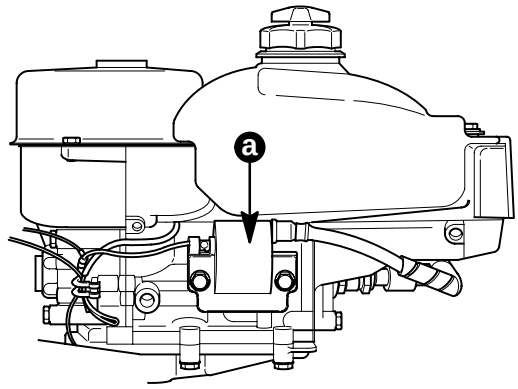
17423

a - Torqueing Flywheel Nut [30 lb. ft. (40.6 N·m)]

Secondary Coil Removal and Installation (Magneto Ignition)

Remove and install secondary coil as shown.

IMPORTANT: Coil must be grounded to engine thru the mounting bolts.



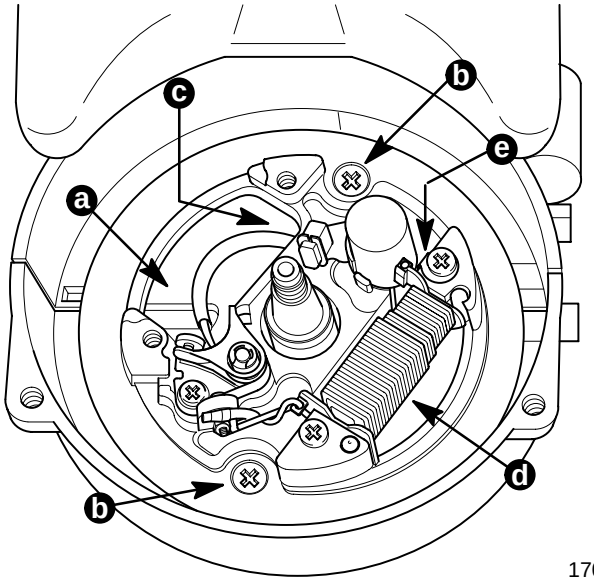
17361

a - Secondary Coil

Ignition Primary Coil (Magneto Ignition)

REMOVAL

1. Remove flywheel as outlined in **"Flywheel Removal and Installation,"** preceding.
2. Remove stator plate.
3. Remove 2 screws and clamp. Remove coil from stator plate.

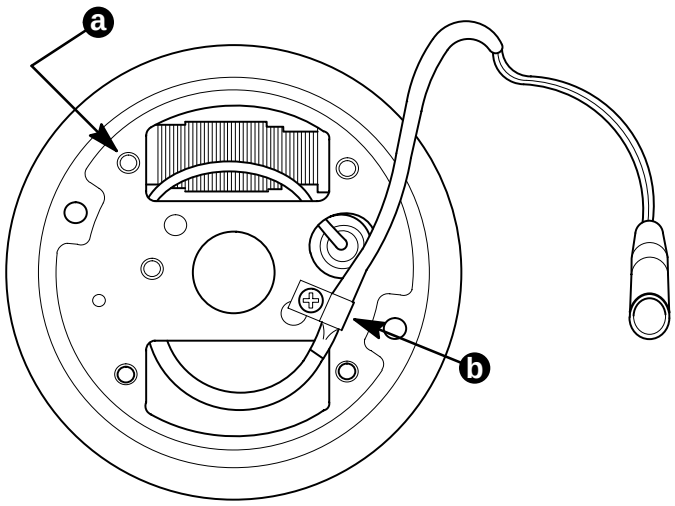


17000

a - Stator Plate
b - Screws (2)
c - Clamp
d - Coil
e - Ground Wire

INSTALLATION

1. Install primary coil to stator plate with 2 screws as shown. Verify ground wire (soldered terminal lug to coil winding) is fastened with coil mounting screw.
2. Route wire lead below breaker points and fasten to bottom side of stator plate with clamp.
3. Apply a drop of Loctite 271 to threads of stator plate mounting screws and reinstall stator plate.



17357

a - Ground Wire
b - Clamp

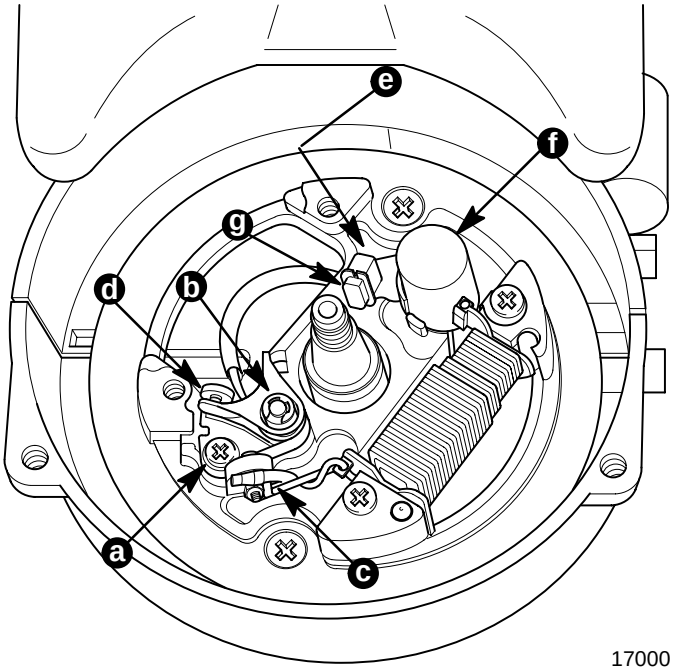
Breaker Point Assembly and Condenser

REMOVAL

1. Remove screw, retaining clip and disconnect wire.
2. Remove breaker point assembly from plate.
3. Remove screw and lift condenser from plate.

INSTALLATION

1. Position condenser at location shown and secure with screw and lockwasher.
2. Verify felt pad is in place and moistened with oil.
3. Install breaker points and connect wires as shown.

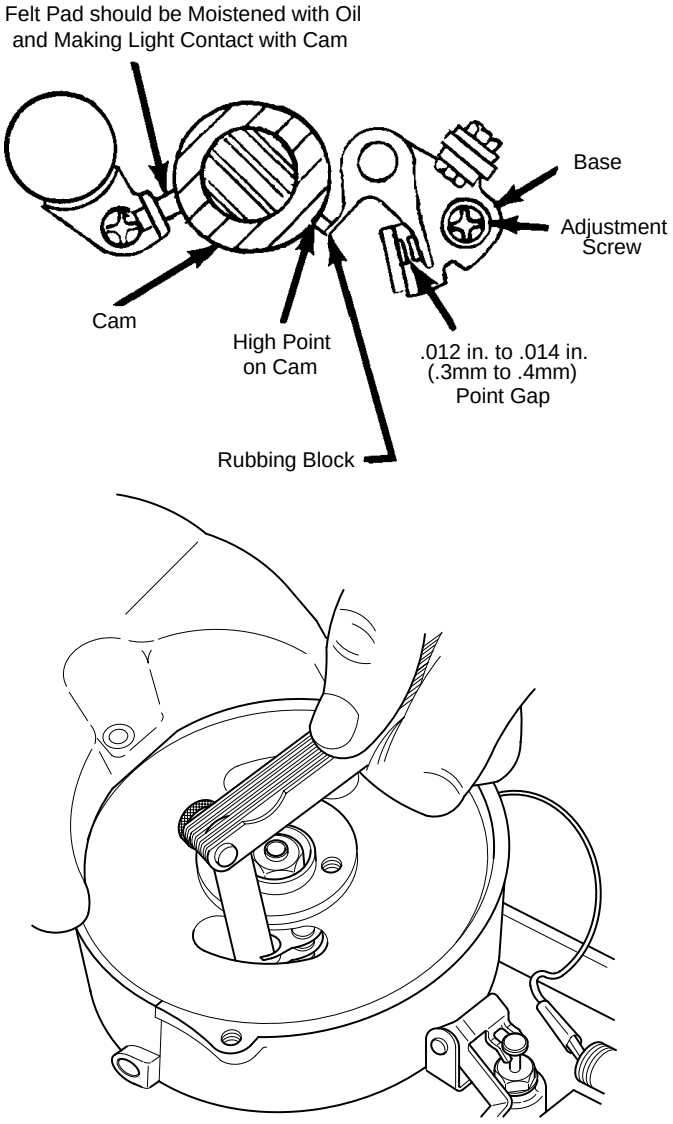


17000

a - Screw
b - Retaining Clip
c - Wire
d - Breaker Point
e - Screw
f - Condenser
g - Felt Pad

Breaker Point Adjustment

1. Reinstall flywheel as outlined in **"Flywheel Installation."**
2. Rotate flywheel to position high point on cam against the rubbing block of the breaker point assembly.
3. Check point gap using a feeler gauge. Point gap should be 0.012 in. to 0.016 in. (0.3mm to 0.4mm).
4. If necessary, loosen adjustment screw and reposition breaker point base to obtain correct point gap.
5. Verify that felt pad is making light contact with cam.



Checking Breaker Point Gap

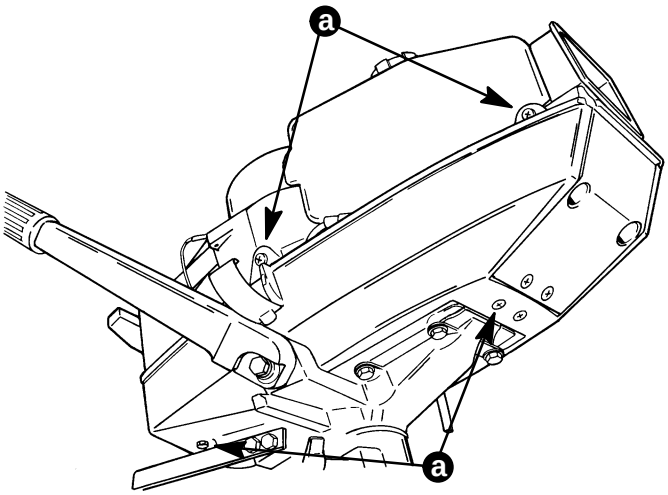
16987

Capacitor Discharge Ignition

Capacitor Charging/Trigger Coil

REMOVAL

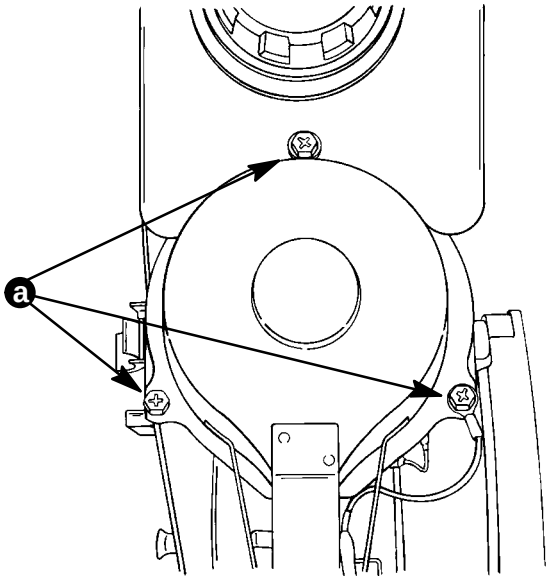
1. Remove top cowling.
2. Remove lower PORT side cowling.



52053

a - Screws

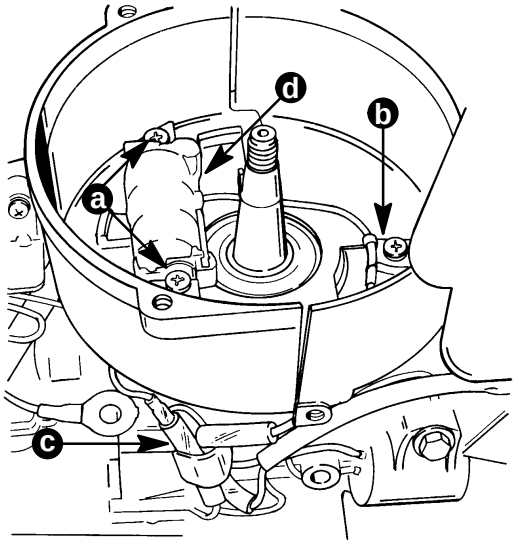
3. Remove recoil assembly.



52052

a - Bolts

4. Remove flywheel as outlined in “**Flywheel Removal and Installation**,” preceding.
5. Remove 2 screws, clamp and disconnect bullet connector. Remove charge/trigger coil from stator.



52053

a - Screws
b - Clamp
c - Bullet Connector
d - Coil

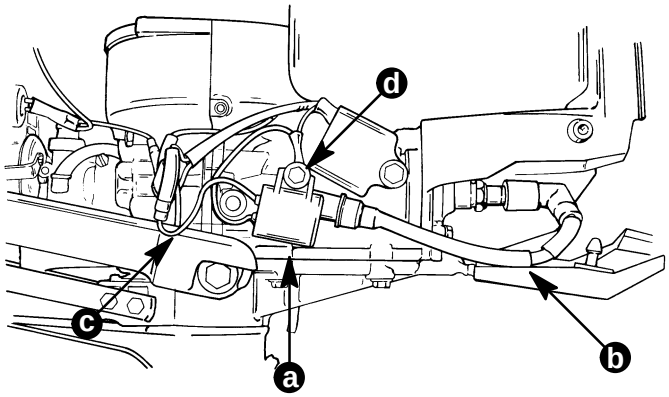
INSTALLATION

1. Secure charge/trigger coil to stator plate with 2 screws.
2. Secure coil wire lead with clamp to stator.
3. Reconnect coil bullet connector.
4. Reinstall flywheel. Refer to “**Flywheel Removal and Installation**,” preceding.
5. Reinstall recoil starter.
6. Reinstall PORT side lower cowl.
7. Reinstall top cowl.

Secondary Ignition Coil

REMOVAL

1. Remove top cowl.
2. Remove PORT side lower cowl.
3. Disconnect spark plug lead from spark plug.
4. Disconnect ORANGE bullet connector.
5. Remove bolt securing coil to block and remove coil.



52054

a - Coil
b - Spark Plug Lead
c - Orange Lead
d - Bolt

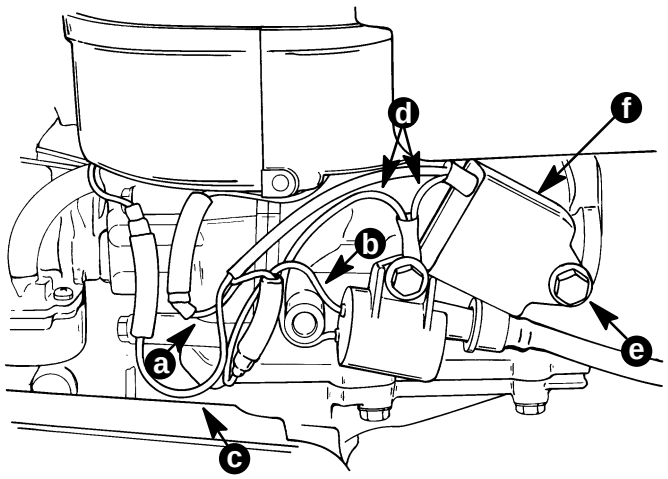
INSTALLATION

1. Position coil on block with BLACK/WHITE ground lead between coil and block. Secure both coil and ground lead with attaching bolt.
2. Connect ORANGE lead to bullet connector.
3. Connect spark plug lead to spark plug.
4. Reinstall PORT side lower cowl.
5. Reinstall top cowl.

Capacitor Discharge (CD) Module

REMOVAL

1. Remove top cowl.
2. Remove PORT side lower cowl.
3. Disconnect WHITE bullet connector.
   Disconnect ORANGE bullet connector.
   Disconnect BROWN lead from BLACK/WHITE bullet connector.
   Disconnect BLACK ground lead from secondary ignition coil attaching bolt.
4. Remove bolt securing module to block.



52054

a - WHITE Lead
b - ORANGE Lead
c - BROWN Lead
d - BLACK Lead
e - Bolt
f - Capacitor Discharge Module

INSTALLATION

1. Secure CD module to block with attaching bolt.
2. Fasten BLACK ground lead to block with secondary ignition coil attaching bolt.
3. Reconnect WHITE bullet connector.
   Reconnect ORANGE bullet connector.
   Reconnect BROWN lead to BLACK/WHITE bullet connector.
4. Reinstall PORT side lower cowl.
5. Reinstall top cowl.