

IGNITION/HEADLAMP SWITCH

GENERAL

⚠ WARNING

DO NOT modify the ignition/headlamp switch wiring to circumvent the automatic-on headlamp feature. Visibility is a major concern for motorcyclists. Failure to have proper headlamp operation could lead to personal injury.

See [Figure 7-5](#). The three-position combination ignition/headlamp switch is not repairable. Replace the unit if it fails.

Switch positions are explained in [Table 7-1](#).

⚠ CAUTION

When turning off the ignition, verify that the key is removed in the LOCK position or that the lights are not left on. If the rider stops the engine and inadvertently removes the key in the OFF position, the battery will be drained of its charge if the vehicle is left standing too long.

NOTE

The key locks the ignition system and is removable in both the LOCK and OFF positions. The OFF position is located between the LOCK and IGNITION positions and allows the rider to remove the key while leaving the lights on. When the key is placed in the OFF position, several indicator markers are or can be activated. See [Table 7-2](#).

REMOVAL

1. Remove seat and fuel tank. See [FUEL TANK, REMOVAL](#) in Section 4.

⚠ WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

⚠ CAUTION

Hold battery cable when loosening battery terminal hardware. Failure to hold cable may cause battery damage.

2. Disconnect battery cables, negative cable first.
3. Cut cable strap securing main wiring harness to frame.
4. See [Figure 7-6](#). Disconnect ignition connector [P8] from main wiring harness.
5. See [Figure 7-5](#). Remove ignition switch face nut.
6. Remove ignition switch.

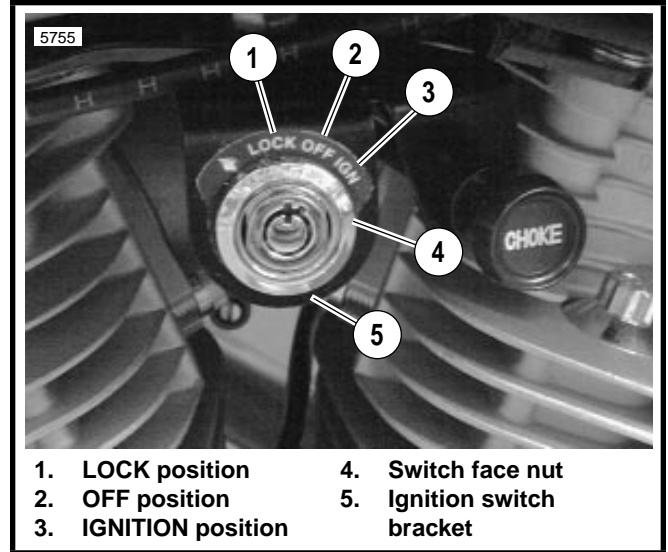


Figure 7-5. Ignition/Headlamp Switch

Table 7-1. Ignition Positions

LABEL	NAME	IGN.	LAMPS	REMOVE KEY
LOCK	locked	off	off	yes
OFF	markers	off	See note & Table 7-2.	yes
IGN	ignition	on		no

Table 7-2. Indicator Markers

ITEM	OFF	IGN
Headlamp position marker	on	on
Headlamp high/low beam	off	on
License plate lamp	on	on
Speedometer illumination lamp	on	on
Tachometer illumination lamp	off	on
Stop lamp	can be activated	
Front and rear turn signals	can be activated	
Horn	can be activated	

INSTALLATION

1. Insert ignition switch into hole of switch bracket. The word "TOP" stamped on the switch body should face upward toward the lettering on the switch position decal. Loosely install face nut.
2. See [Figure 7-6](#). Attach ignition switch connector [P8] to main wiring harness.
3. Tighten face nut to secure switch within cover.
4. Secure main wiring harness to frame with a **new** cable strap.

⚠ WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

⚠ CAUTION

Hold battery cable when tightening battery terminal hardware. Failure to hold cable may cause battery damage.

5. Install battery cables, positive cable first.
6. Install fuel tank and seat. See [FUEL TANK, INSTALLATION](#) in Section 4.

⚠ WARNING

Check for proper headlamp operation before riding motorcycle. Visibility is a major concern for motorcyclists. Failure to have proper headlamp operation could lead to personal injury.

7. Check ignition/headlamp switch for proper operation.

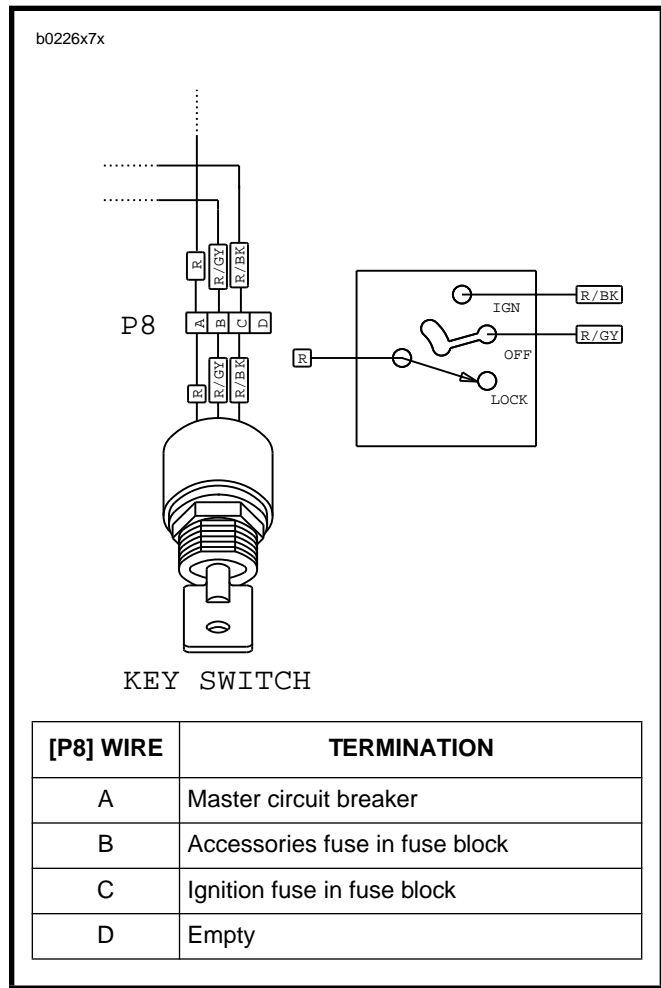


Figure 7-6. Ignition Switch Connector [P8]

IGNITION MODULE

GENERAL

See [Figure 7-7](#). The ignition module is located on a plate which is a portion of the frame. The ignition module is not repairable. Replace the unit if it fails.

See [IGNITION SYSTEM](#) on [page 7-3](#) for information on the function and testing of the ignition module.

REMOVAL

1. Remove seat and tail section. See [TAIL SECTION, REMOVAL](#) in Section 2.

⚠WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

⚠CAUTION

Hold battery cable when loosening battery terminal hardware. Failure to hold cable may cause battery damage.

2. Disconnect battery cables, negative cable first.
3. Cut cable strap which secures main wire harness to side frame member.
4. See [Figure 7-8](#). Disconnect ignition module connector [P10] from main wiring harness.
5. See [Figure 7-7](#). Remove screws and washers to detach module from frame.

INSTALLATION

1. See [Figure 7-7](#). Fasten module to frame using screws and washers.
2. See [Figure 7-8](#). Attach ignition module connector [P10] to main wiring harness.
3. Secure main wiring harness to frame member with a new cable strap.

⚠WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury and/or property damage.

⚠CAUTION

Hold battery cable when tightening battery terminal hardware. Failure to hold cable may cause battery damage.

4. Install battery cables, positive cable first.

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control and personal injury.

5. Install tail section and seat. See [TAIL SECTION, INSTALLATION](#) in Section 2.
6. Test engine for proper ignition system operation.

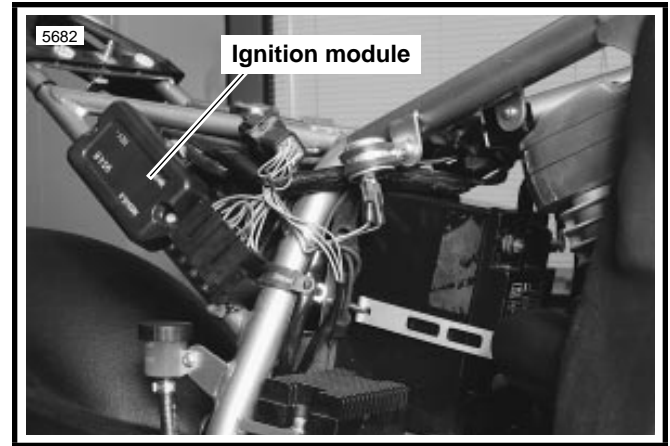


Figure 7-7. Ignition Module

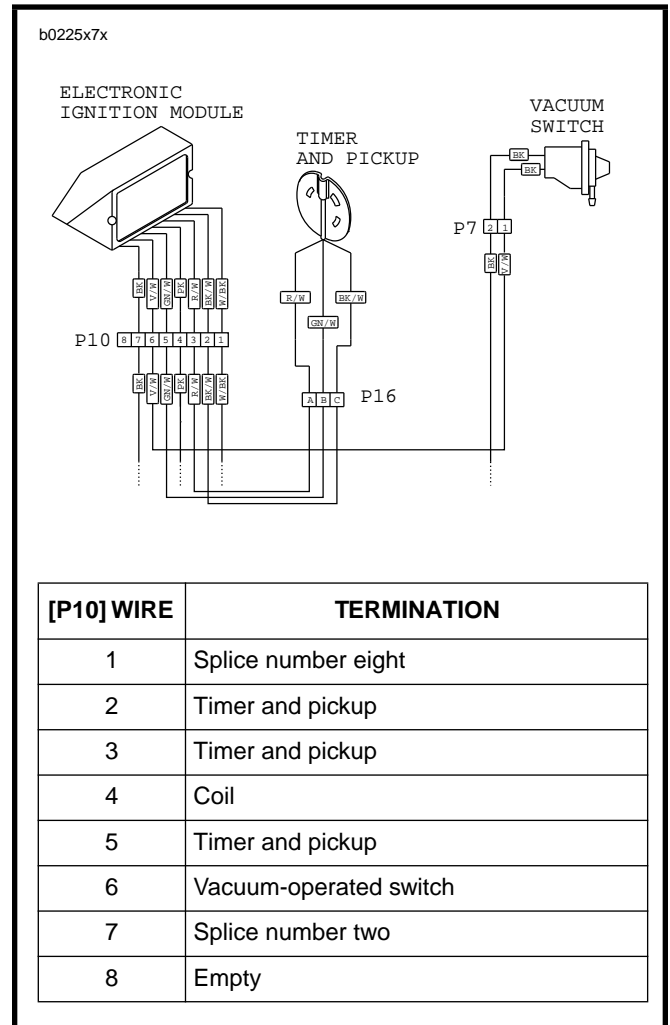


Figure 7-8. Ignition Module Connector [P10]

IGNITION SENSOR PLATE AND ROTOR

GENERAL

See Figure 7-9. The ignition sensor plate assembly (8) and trigger rotor (9) are located in the gearcase cover (11) on the right side of the vehicle. The rotor is mounted on the camshaft and operates at one-half crankshaft speed. The sensor plate wiring is connected to the ignition module (23) wiring harness. See **IGNITION SYSTEM** on page 7-3 for information on the function, testing and adjustment of the ignition sensor plate and trigger rotor assembly.

REMOVAL

⚠WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

⚠CAUTION

Hold battery cable when loosening battery terminal hardware. Failure to hold cable may cause battery damage.

1. Disconnect battery cables, negative cable first.

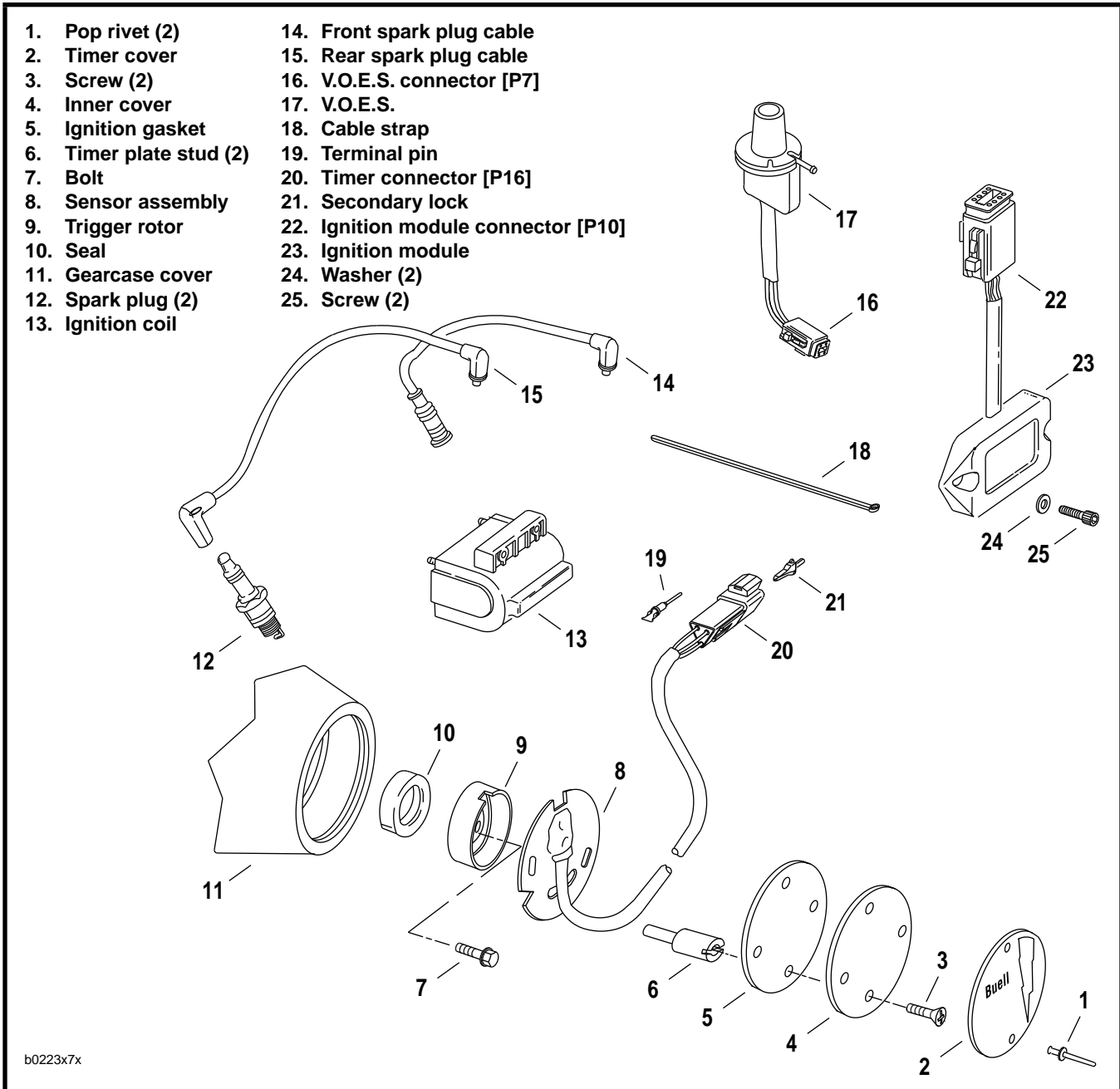


Figure 7-9. Ignition Components

2. Remove sprocket cover. See [SPROCKET COVER](#) in Section 2.
3. Cut cable straps holding sensor plate wiring at the following locations:
 - a. Top of starter.
 - b. Edge of gearcase cover.
 - c. Oil line.
4. See [Figure 7-9](#). Disconnect sensor plate (8) wiring at connector (20) [P16] located below the starter motor.
5. Note position of each sensor plate wiring terminal in plug end of connector (20).
6. Remove terminals. See [DEUTSCH ELECTRICAL CONNECTORS](#) on [page 7-46](#).
7. Drill off heads of outer timer cover pop rivets (1) using a 3/8 in. (9.525 mm) drill bit. Tap remaining rivet shafts inboard through holes in timer cover (2) and inner cover (4). Remove timer cover.
8. Remove inner cover screws (3), inner cover (4) and ignition gasket (5). Carefully remove any remaining pieces of rivets from gearcase cover timer bore.
9. See [Figure 7-10](#). To obtain approximate ignition timing during installation, mark position of timer plate studs on sensor plate.
10. See [Figure 7-9](#). Remove timer plate studs. Carefully remove sensor plate. Remove bolt (7) and trigger rotor (9).
11. Carefully remove camshaft oil seal (10) if damaged or if there is any evidence of oil leakage past the seal.

INSTALLATION

1. See [Figure 7-9](#). With the lipped side facing inboard, install **new** camshaft oil seal (10) into gearcase cover (11), if removed. Press seal into position until flush with surface of timer bore.
2. Position trigger rotor (9) onto end of camshaft aligning notch with camshaft slot. Apply **LOCTITE THREAD-LOCKER 242** (blue) to bolt (7). Install bolt to secure rotor. Tighten bolt to **75-80 in-lbs** (8.5-9.0 Nm).
3. Install sensor plate (8) and timer plate studs (6). Rotate sensor plate to its previously marked position to obtain approximate ignition timing.

CAUTION

Route sensor plate wires about 1-1/2 in. (38 mm) forward of gearcase cover rear edge. If wires are routed too far to the rear of this position, they could contact the moving secondary drive belt and/or sprocket resulting in damage to sensor plate wiring.

4. Route sensor plate wiring leads.
 - a. Downward through hole (7 o'clock position) in timer bore of gearcase cover (11).
 - b. Upward through bottom opening between right crankcase half and rear of gearcase cover.
 - c. Route wiring around tower shaft behind gearcase cover. Route wires upward to starter motor.
 - d. Cable strap sensor plate wiring. See Step 3 of [REMOVAL](#).

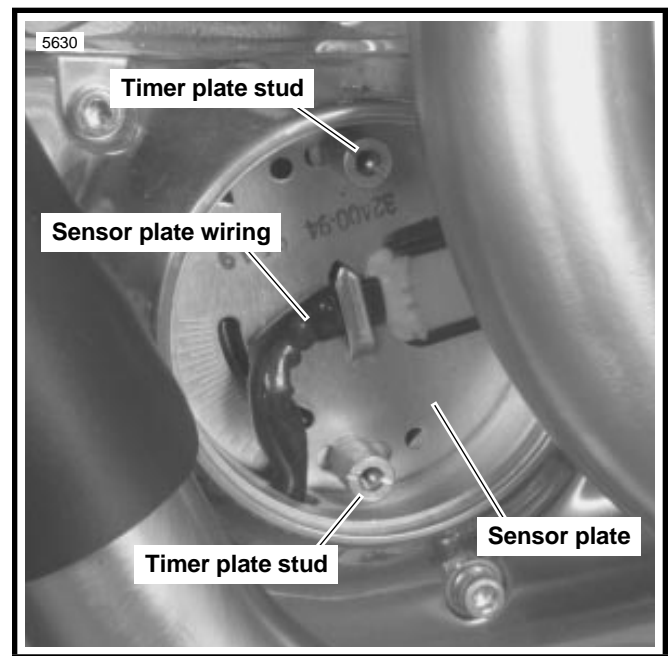


Figure 7-10. Marking Ignition Timing

5. Install sensor plate wiring terminals into correct positions in plug end of connector (20) [P16]. Red, green and black wires of plug end (from sensor plate) must match same color wires in receptacle end of connector (from ignition module wiring harness). See [Figure 7-4](#). Install terminals following procedure outlined under [DEUTSCH ELECTRICAL CONNECTORS](#) on [page 7-46](#).
6. Connect sensor plate (8) wiring to wiring harness connector (20) [P16].
7. Check ignition timing. See [IGNITION TIMING](#) in Section 1.
8. Final tighten timer plate studs (6) to **12-20 in-lbs** (1.4-2.3 Nm).
9. Install gasket (5) and inner cover (4) using screws (3). Tighten screws to **12-20 in-lbs** (1.4-2.3 Nm).

CAUTION

Use only H-D Part No. 8699 rivets to secure outer timing cover. These rivets are specially designed so that no rivet end falls off into the timing compartment. Use of regular rivets can damage ignition system components and may allow water to enter the timing compartment.

10. Secure timer cover (2) to inner cover using **new** rivets.

WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

CAUTION

Hold battery cable when tightening battery terminal hardware. Failure to hold cable may cause battery damage.

11. Install battery cables, positive cable first.

IGNITION COIL

GENERAL

The ignition coil is mounted on the frame underneath the fuel tank and behind the steering neck.

See Figure 7-9. The ignition coil (13) is a pulse-type transformer. Internally, the coil consists of primary and secondary windings with a laminated iron core. The contents are sealed in a waterproof insulating compound. The ignition coil is not repairable. Replace the unit if it fails.

The low-voltage ignition primary circuit consists of the coil primary winding, ignition module (23) and battery. When the circuit is closed, current flows through the coil primary winding creating a strong magnetic field in the iron core of the ignition coil.

When the ignition module receives a signal from the ignition sensor plate (8) and trigger rotor (9), the ignition module interrupts (opens) the ignition primary circuit, which causes the magnetic field in the coil core to collapse suddenly.

The collapsing magnetic field induces a high-voltage electrical discharge in the ignition secondary circuit, which consists of the coil secondary winding, spark plug cables and spark plugs (12). The high-voltage discharge produces a spark to bridge the electrode gap of each spark plug.

The ignition coil fires both spark plugs simultaneously. In one spark plug, the spark jumps from the center electrode to the outer electrode, but on the other plug, the spark jumps in the reverse direction (from the outer electrode to the center electrode).

TROUBLESHOOTING

Follow the troubleshooting procedures listed under **IGNITION SYSTEM** if the engine will not start, is difficult to start or runs roughly. Also check condition of spark plug cables. Insulation on cables may be cracked or damaged allowing high tension current to short to metal parts. This problem is most noticeable when cables are wet.

If poor starting/running condition persists, check resistance of ignition coil primary and secondary windings using an ohmmeter. See Figure 7-11. Resistance values should be within the limits shown in Table 7-3.

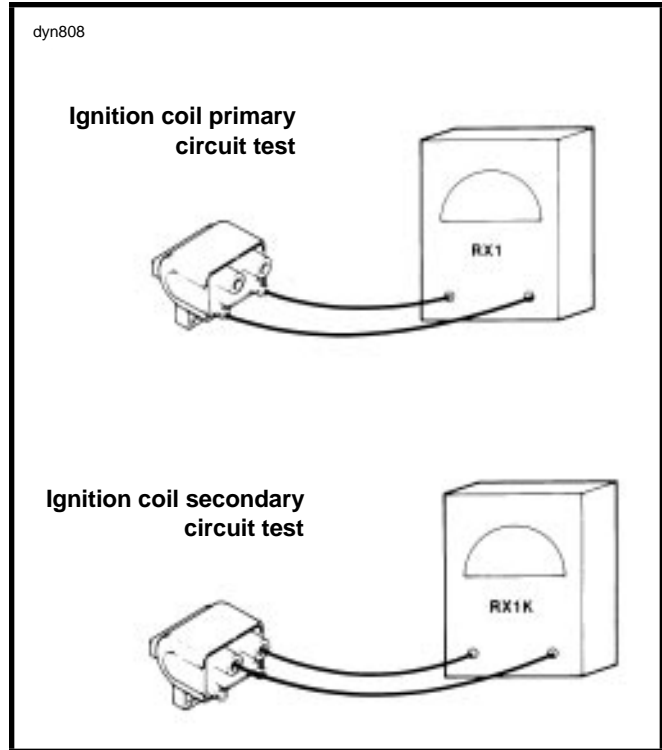


Figure 7-11. Test Ignition Coil Resistance Tests

Table 7-3. Ignition Coil Winding Resistance

IGNITION COIL WINDING	OHMMETER SCALE	NORMAL RESISTANCE RANGE (IN OHMS)
Primary	RX1	2.5-3.1
Secondary	RX1K	10,000-12,500

NOTE

- A low resistance value indicates a short in the coil winding-replace coil.
- A high resistance value might indicate that there is some corrosion/oxidation of the coil terminals. Clean the terminals and repeat resistance test. If resistance is still high after cleaning terminals, replace coil.
- An infinite ohms (∞ or no continuity) resistance value indicates an open circuit (a break in the coil winding)-replace coil.

REMOVAL

⚠WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables before proceeding. Always disconnect the negative cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

⚠CAUTION

Hold battery cable when loosening battery terminal hardware. Failure to hold cable may cause battery damage.

1. Disconnect battery cables, negative cable first.
2. Remove seat and fuel tank. See [FUEL TANK, REMOVAL](#) in Section 4.
3. See [Figure 7-12](#). Disconnect spark plug cables from ignition coil.
4. Remove nuts and lockwashers to detach pink and white wires from coil posts.
5. Remove two screws (2). Mounting plate (3), coil (1), horn bracket (4) and washer (7) will drop from frame.

INSTALLATION

1. See [Figure 7-12](#). Place horn mounting bracket (4) on top of coil. Attach coil to frame with screws (2), washer (7) and mounting plate (3). Tighten screws (1) to 4-6 ft-lbs (5.4-8 Nm).
2. Connect ring terminal of pink wires to forward post. Connect ring terminals of white wires to rear post. Secure wires with nuts and lockwashers.
3. Connect spark plug cables to ignition coil. Longer cable attaches to rear post and rear cylinder spark plug.

⚠WARNING

After installing seat, pull upward on front of seat to be sure it is locked in position. If seat is loose, it could shift during vehicle operation and startle the rider, causing loss of control and personal injury.

4. Install fuel tank and seat. See [FUEL TANK, INSTALLATION](#) in Section 4.

⚠WARNING

Always connect the positive battery cable first. If the positive cable should contact ground with the negative cable installed, the resulting sparks may cause a battery explosion producing personal injury.

⚠CAUTION

Hold battery cable when tightening battery terminal hardware. Failure to hold cable may cause battery damage.

5. Install battery cables, positive cable first.

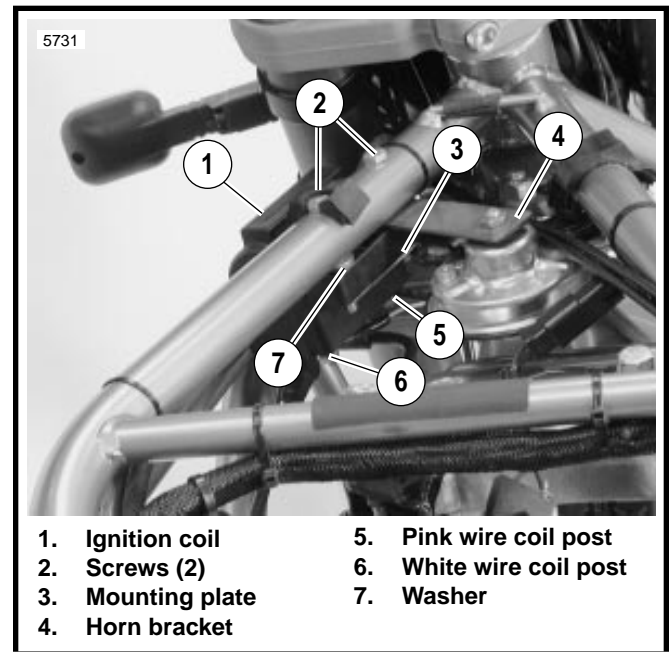


Figure 7-12. Ignition Coil

SPARK PLUG CABLES

GENERAL

Resistor-type high-tension spark plug cables have a carbon-impregnated fabric core (instead of solid wire) for radio noise suppression and improved reliability of electronic components. Use the exact replacement cable for best results.

REMOVAL

WARNING

Never disconnect a spark plug cable with the engine running. If you disconnect a spark plug cable with the engine running, you may receive a potentially fatal electric shock from the ignition system.

CAUTION

When disconnecting each spark plug cable from its spark plug terminal, always grasp and pull on the rubber boot at the end of the cable assembly (as close as possible to the spark plug terminal). Do not pull on the cable portion itself. Pulling on the cable will damage the cable's carbon core.

Disconnect spark plug cables from ignition coil and spark plug terminals.

INSPECTION

1. Inspect spark plug cables. Replace cables that are worn or damaged.
 - a. Check for cracks or loose terminals.
 - b. Check for loose fit on ignition coil and spark plugs.
2. Check cable boots/caps for cracks or tears. Replace boots/caps that are worn or damaged.
3. Check spark plug cable resistance with an ohmmeter.

Resistance must be 1625-3796 ohms for 6-1/2 in. (165 mm) cable, and 5000-11,680 ohms for 20 in. (508 mm) cable. Replace cables that do not meet resistance specifications.

INSTALLATION

Connect spark plug cables to ignition coil and spark plugs. Make sure boots/caps are secured properly; this will provide the necessary moisture-proof environment for the ignition coil and spark plug terminals.

NOTE

See Section 1 for spark plug information.