Chapter 5
Ignition system

Contents

Specifications

Ignition coil (1988 and 1989, 1991 through 1996 VT600 only*)

Primary resistance	1.89 to 2.32 ohms
Secondary resistance	
With plug wires attached	23.55 to 30.45 k-ohms
Without plug wires attached	19.8 to 24.2 k-ohms

Ignition pulse generator(s) (1988 and 1989, 1991 through 1996 VT600 only*)

Coil resistance	450 to 550 ohms

Ignition timing

VT600	
1988, 1989, 1991 through 1996	6.2 degrees BTDC at idle
1997 on	6.5 degrees BTDC at idle
VT750	8 degrees BTDC at idle

** 1997 and later VT600 and all VT750 models must be tested by a Honda dealer.*

Torque specifications

Ignition pulse generator bolts	12 Nm (108 in-lbs)

1 General information

These motorcycles are equipped with a battery-operated, fully transistorized, breakerless ignition system. The system consists of the following components:

Ignition control module
Ignition pulse generator(s) and timing rotor
Battery and fuse
Ignition coils
Spark plugs
Ignition (main) and engine kill (stop) switches
Primary and secondary circuit wiring

The ignition pulse generators are the timing devices that enable the ignition control module to control the primary voltage to the ignition coils. VT600 models are equipped with two ignition pulse generators, one for each cylinder. VT750 models use one pulse generator for both cylinders. Every time a tip of the timing rotor sweeps by the ignition pulse generator, the pulse generator produces a low-voltage output signal to the ignition control module. The module switches primary voltage to the coils on and off in accordance with these signals from the pulse generator(s). With the exception of spark plug replacement, ignition system service is eliminated.

Ignition system components can be checked but they can't be repaired. If ignition system problems occur, the faulty component(s) must be replaced. Most electrical parts cannot be returned, so don't buy anything until you're sure that you have identified the problem.

2 Ignition system - check

Warning: *Because of the very high voltage generated by the ignition system, extreme care should be taken when these checks are performed.*

1 If the ignition system is the suspected cause of poor engine performance or failure to start, a number of checks can be made to isolate the problem.

2 Make sure the engine kill switch is in the Run position.

Engine will not start

3 Disconnect one of the spark plug wires (there are two for each cylinder), connect the wire to a spare spark plug and lay the plug on the engine with the threads of the plug in contact with the engine. If necessary, hold the spark plug with an insulated tool. Crank the engine over and make sure a well-defined, blue spark occurs between the spark plug electrodes. **Warning:** *Don't remove one of the spark plugs from the engine to perform this check - atomized fuel being pumped out of the open spark plug hole could ignite, causing severe injury!*

4 If no spark occurs, repeat the same test on the *other* spark plug lead of the same coil.

5 If the plug sparks when the second lead is attached, then the first plug wire or cap is defective. Install a new wire and cap and retest.

6 If neither plug wire produces a spark on a 1988, 1989 or 1991 through 1996 VT600 model, check and, if necessary, replace the coil (see Section 3).

7 If neither plug wire produces a spark on a 1997 or later VT600 model, or on any VT750 model, try swapping the coils (see Section 3). If the plug wires of the second coil produce a good spark, replace the first coil. No further testing of the ignition coil on these later models is possible without a special diagnostic tester. The coils must be checked by a Honda service department with the necessary diagnostic equipment.

8 Repeat Steps 3 through 5 for the other ignition coil.

9 If both coils are operating satisfactorily, inspect the rest of the ignition system. Make sure that all electrical connectors are clean and tight. Check all wires for shorts, opens and make sure that they're correctly installed.

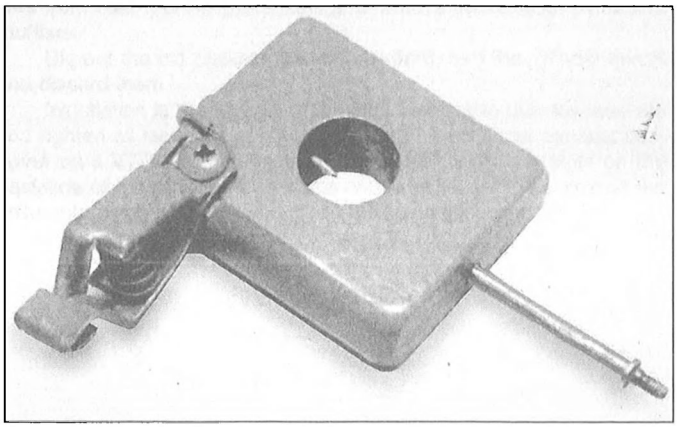
10 Check the battery voltage with a voltmeter and - on models equipped with batteries having removable filler caps - check the specific gravity with a hydrometer (see Chapter 1). If the voltage is less than 12-volts or if the specific gravity is low, recharge the battery.

11 Check the ignition fuse and the fuse connections (see Chapter 9). If the fuse is blown, replace it; if the connections are loose or corroded, clean or repair them.

12 Check the ignition switch, engine kill switch, neutral switch and sidestand switch.

13 On 1988, 1989 or 1991 through 1996 VT600 models, check the ignition pulse generator resistance (see Section 4).

14 On 1997 and later VT600 models, and on VT750 models, no testing of the ignition pulse generator(s) is possible without a special diagnostic tester. Have the pulse generator(s) checked by a Honda service department with the necessary diagnostic equipment.



2.16 A simple spark gap testing fixture can be made from a block of wood, a large alligator clip, two nails, a screw and a piece of wire

Engine starts but misfires

Refer to illustration 2.16

15 If the engine starts but misfires, make the following checks before deciding that the ignition system is at fault.

16 The ignition system must be able to produce a spark across a six millimeter (1/4-inch) gap (minimum). A simple test fixture **(see illustration)** can be constructed to make sure the minimum spark gap can be jumped. Make sure the fixture electrodes are positioned six millimeters apart.

17 Connect one of the spark plug wires to the protruding test fixture electrode, then attach the fixture's alligator clip to a good engine ground/earth.

18 Crank the engine over (it will probably start and run on the remaining cylinders) and see if well-defined, blue sparks occur between the test fixture electrodes. If the minimum spark gap test is positive, the ignition coil for that cylinder is functioning properly. Repeat the check on one of the spark plug wires connected to the other coil. If the spark will not jump the gap during either test, or if it is weak (orange colored), refer to Steps 3 through 8.

3 Ignition coils - check and replacement

Check

Refer to illustration 3.4

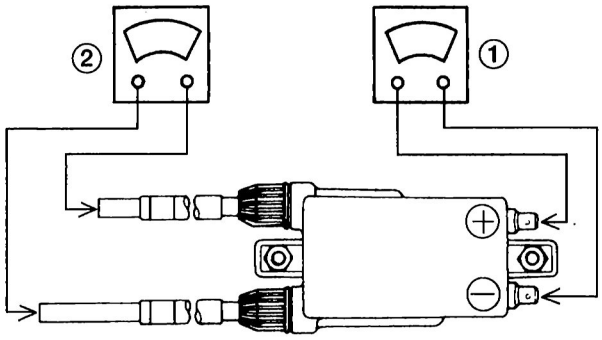
1 Inspect the coils for cracks and other damage. If either coil is obviously damaged, replace it. If the coils are undamaged, proceed to the next Step.

2 The following tests apply only to the ignition coils used on 1988 and 1989 and 1991 through 1996 VT600 models. To determine whether an ignition coil on a 1997 or later VT600 model, or a VT750 model, is defective, have it tested by a Honda dealer service department equipped with the necessary diagnostic equipment.

3 To access the coil for the front cylinder, remove the fuel tank (see Chapter 4) and remove the crankcase breather separator (see Chapter 4). (The separator is the white plastic tank above the coil; it's part of the crankcase emission control system.) To check or replace the coil for the rear cylinder, remove the right side cover (see Chapter 8).

4 To check the primary resistance of a coil, unplug the electrical connectors from the primary terminals and, using an ohmmeter, measure the resistance between these two terminals **(see illustration)**. Compare your measurement to the primary resistance listed in this Chapter's Specifications. If the indicated primary resistance is outside the specified range, replace the coil. If the primary resistance is within range, check the coil secondary resistance.

5 To check the coil secondary resistance, measure the resistance between the two spark plug leads and compare your measurement to



3.4 Test 1: Check coil primary resistance between the primary terminals. Test 2: Check secondary resistance between the two spark plug wire caps, then unscrew the plug leads from the coil and check secondary resistance between the two high tension terminals

the secondary resistance listed in this Chapter's Specifications. If the indicated secondary resistance is outside the specified range, unscrew the spark plug leads from the coil, measure the resistance between the two coil high tension terminals and compare your measurement to the secondary resistance listed in this Chapter's Specifications. If the indicated secondary resistance is now within the specified range, replace the spark plug high tension leads. If the indicated resistance is still not within the specified range, replace the coil.

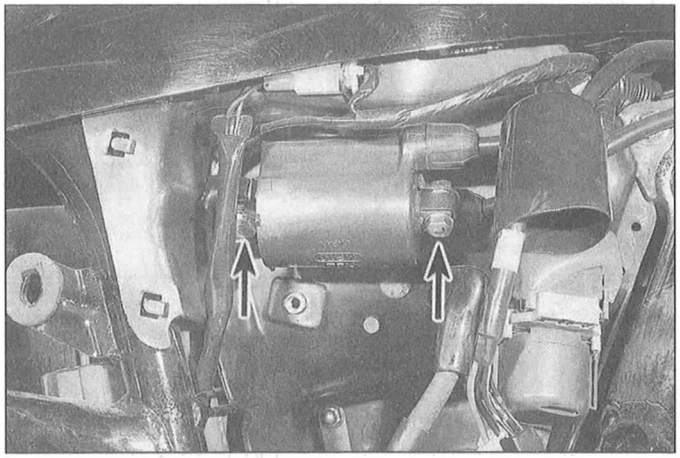
Replacement

Refer to illustrations 3.6 and 3.7

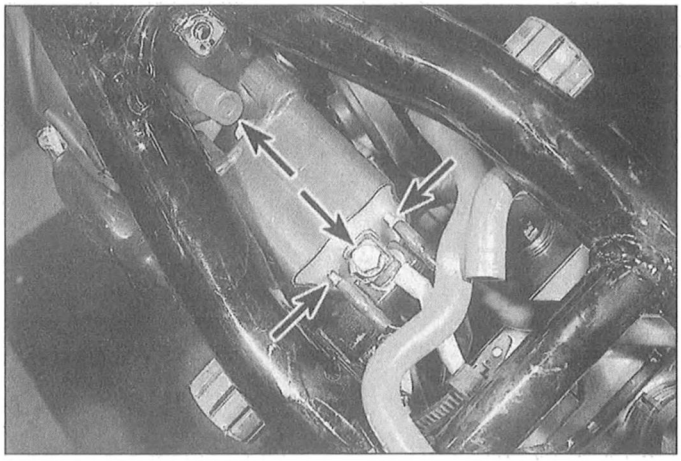
6 To replace the coil for the front cylinder, remove the fuel tank (see Chapter 4) and remove the crankcase breather separator (see Chapter 4). (The separator is the white plastic tank above the coil; it's part of the crankcase emission control system.) Before detaching the coil, clearly label the primary electrical connectors **(see illustration)**, then unplug them from the primary terminals. Detach the spark plug caps from the front cylinder plugs, remove the two coil mounting bolts, pull back the ground wire eyelet (attached to the rear mounting bolt) and remove the coil. (The accompanying photo depicts the front coil on a VT600 model. The front coil on VT750 models is also located in the same general location; it's bolted to the left side of the upper frame tube.)

7 To replace the coil for the rear cylinder, remove the right side cover (see Chapter 8). The rear coil **(see illustration)** is removed basically the same way as the front coil. (The accompanying photo depicts the rear coil on a VT600 model. The rear coil on VT750 models is also located behind the right side cover, except that it's mounted vertically.)

8 Installation is the reverse of removal.



3.7 To remove the coil for the rear cylinder, unplug the primary leads from the rear end of the coil (not visible in this photo) and remove the coil mounting bolts (arrows) (VT600 shown, VT750 similar, except that coil is installed vertically)



3.6 To remove the coil for the front cylinder, unplug the primary leads (arrows) and remove the coil mounting bolts (arrows); don't forget to reattach the ground wire attached to the rear bolt when installing the coil (VT600 shown, VT750 similar)

4 Ignition pulse generator(s) - check and replacement

Check

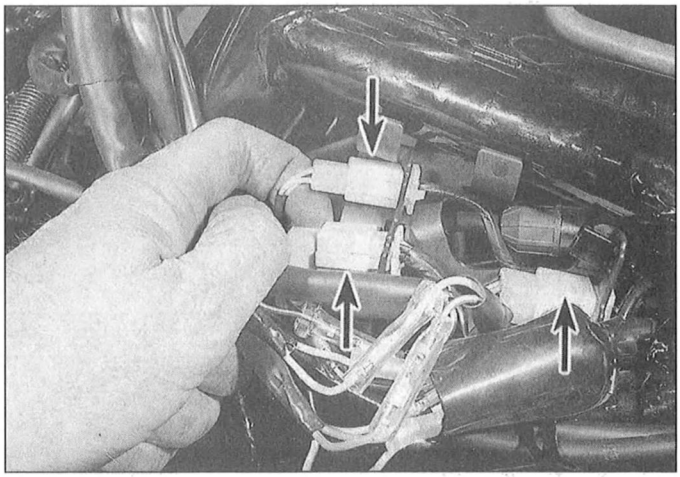
Refer to illustration 4.3

1 The following test applies only to the pulse generators used on 1988 and 1989 and 1991 through 1996 VT600 models. In order to determine whether one of the ignition pulse generators on a 1997 or later VT600 model, or the single pulse generator on a VT750 model, is defective, have it tested by a Honda dealer service department equipped with the necessary diagnostic equipment.

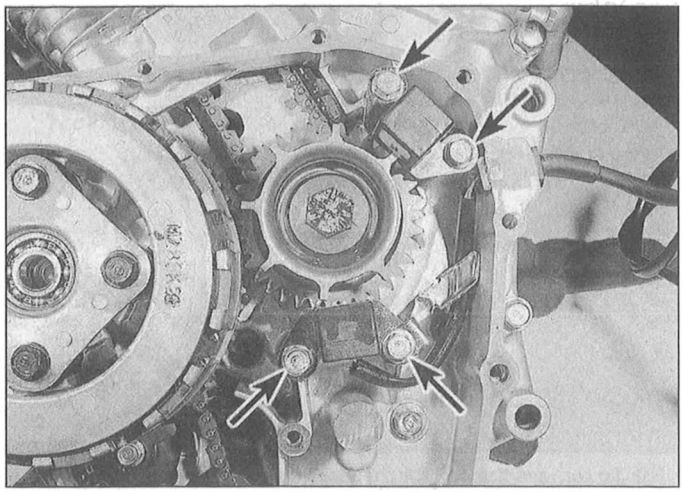
2 Remove the fuel tank (see Chapter 4) and the left steering head cover (see Chapter 8).

3 Unplug the white four-pin connector for the ignition pulse generators **(see illustration).**

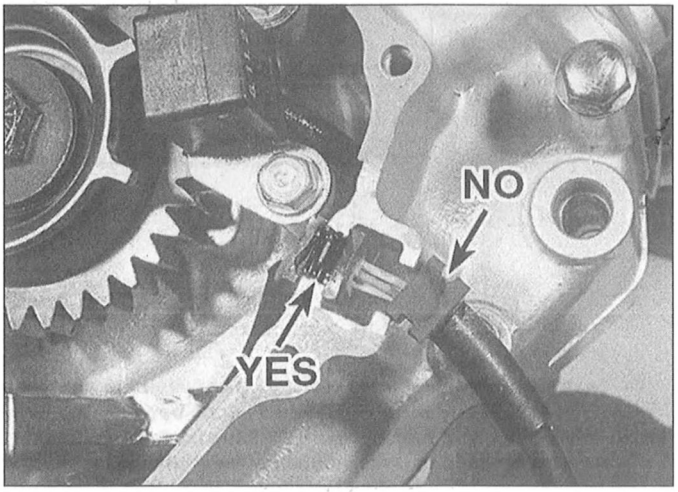
4 Using an ohmmeter, measure the resistance between the white/yellow wire and the yellow wire (front ignition pulse generator),



4.3 To check the ignition pulse generators, measure resistance at the white four-pin connector (on the left side, right behind the steering head)



4.8 To detach either ignition pulse generator, remove the two retaining bolts (arrows)



4.9a When installing the ignition pulse generator(s), make sure that the grommets are correctly installed (left grommet); do not install the right crankcase cover with the grommets unseated (right grommet), or water will get into the crankcase (and oil will get out!)

and between the white/blue wire and the blue wire (rear ignition pulse generator). Compare your measurements to the ignition pulse generator coil resistance listed in this Chapter's Specifications. If the resistance of either coil is outside the specified range, replace that ignition pulse generator.

Replacement

Refer to illustrations 4.8, 4.9a and 4.9b

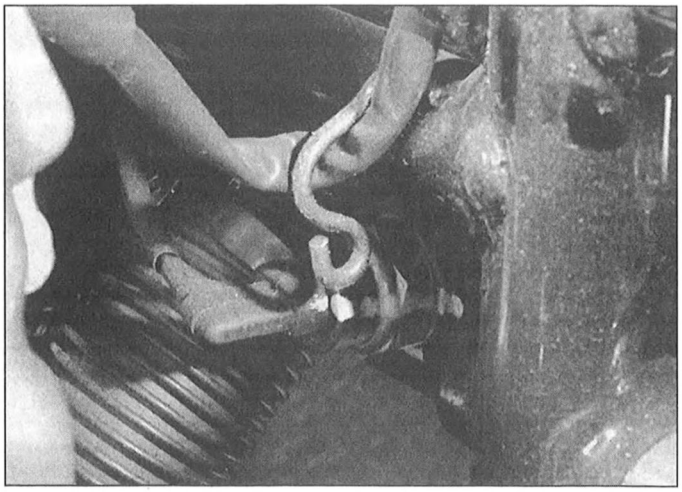
5 Remove the fuel tank (see Chapter 4) and the left steering head cover (see Chapter 8).

6 Unplug the white four-pin connector for the ignition pulse generators **(see illustration 4.3)**. Carefully pull the harness down the right frame tube. If the connector snags on anything, stop and disengage it before pulling the harness down.

7 Remove the right crankcase cover (see "Clutch - removal and installation" in Chapter 2).

8 Remove the ignition pulse generator mounting bolts **(see illustration)** and remove the ignition pulse generator(s).

9 Installation is the reverse of removal. Tighten the pulse generator mounting bolts to the torque listed in this Chapter's Specifications. The wires for the ignition pulse generators exit the engine through a hole in the crankcase, right in front of the pulse generators. Make sure that the two grommets are correctly installed **(see illustration)** before installing the right crankcase cover. And before routing the harness up the right frame tube and plugging in the electrical connector up top, be sure to route the harness through the harness guide welded onto the frame **(see illustration)**.



4.9b Before plugging in the electrical connector for the ignition pulse generators, make sure that the harness is routed correctly through this guide, then up the right frame tube

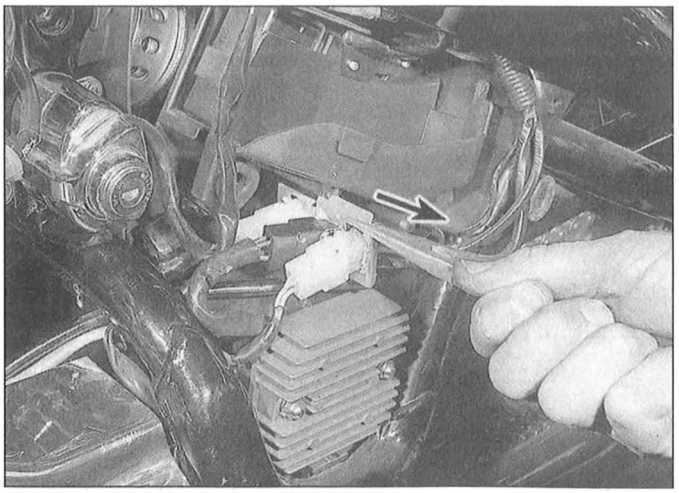
5 Timing rotor - removal and installation

The timing rotor is attached to the primary drive gear by the primary drive gear retaining bolt. It's removed and installed with the primary drive gear (see Chapter 2).

6 Ignition control module - check and replacement

Check

1 The ignition control module is basically diagnosed by a process of elimination. It should never even be *checked* until *after absolutely all other possible causes have been checked and eliminated*. Because a new module is expensive and cannot be returned, it's a good idea to have a Honda dealer test the old module before you buy a new unit.



6.3 To detach the electrical connector plates from the underside of the tool tray, pull them straight out (VT600 models)

Replacement

VT600 models

Refer to illustration 6.3

2 Remove the left side cover (see Chapter 8). Locate the six-pin and four-pin electrical connectors for the ignition control module. The module can be identified by its wire colors, referring to wiring diagrams at the end of the book.

3 Disengage the electrical connector plates from the underside of the tool tray **(see illustration)**.

4 Remove the tool tray.

5 Unplug the six-pin and four-pin electrical connectors from the ignition control module.

6 Disengage the module from its mounting stay.

7 Installation is the reverse of removal.

VT750 models

8 Remove the seat (see Chapter 8).

9 Remove the ignition control module from the battery case cover.

10 Unplug the 16-pin or 22-pin connector and remove the module.

11 Installation is the reverse of removal.

7 Ignition timing - check

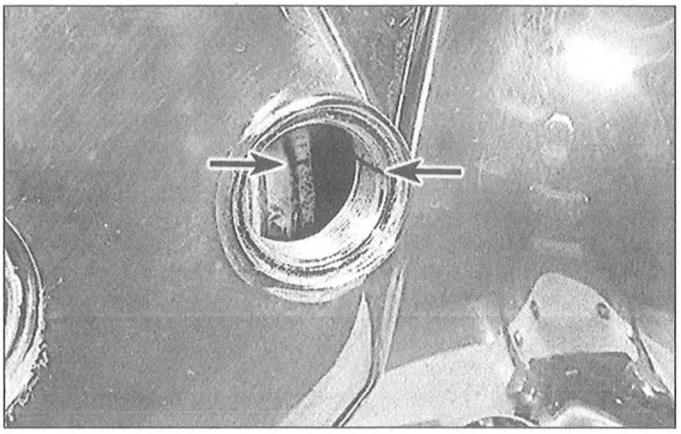
Refer to illustration 7.1

1 Remove the timing hole cap from the left side of the engine **(see illustration)**.

2 Hook up an inductive timing light in accordance with the manufacturer's instructions to one of the rear (No. 1 cylinder) spark plug wires.

3 Warm up the engine to its normal operating temperature.

4 With the engine at its normal idle speed (see Chapter 1), check the timing mark with the timing light. The ignition timing is correct if the firing (F) mark on the flywheel is aligned with the stationary index mark on the edge of the timing hole in the left crankcase cover **(see illustration 7.1)**.



7.1 Align the timing mark (left arrow) with the index mark (right arrow)

5 Increase the engine speed and verify that the advance marks on the flywheel are aligned with the stationary index mark on the edge off the timing hole.

6 Stop the engine, remove the inductive pickup from the rear cylinder spark plug wire and hook it up to one of the front (cylinder No. 2) spark plug wires.

7 Start the engine and allow it to return to its normal idle.

8 Check the timing for the front cylinder the same way (see Steps 4 and 5).

9 The ignition timing is not adjustable. If it's incorrect, either the ignition control module or an ignition pulse generator is defective. Have the system checked out by a Honda dealer with the necessary system diagnostic equipment.

Notes