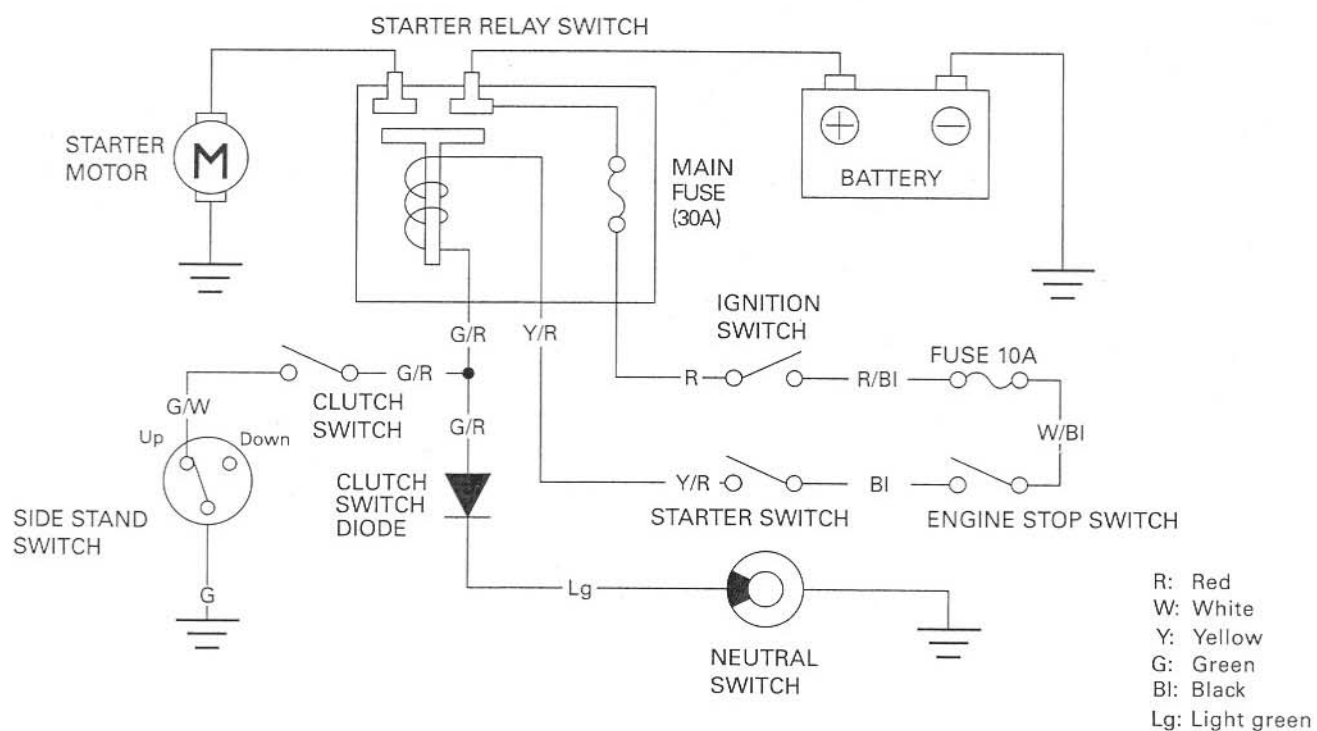
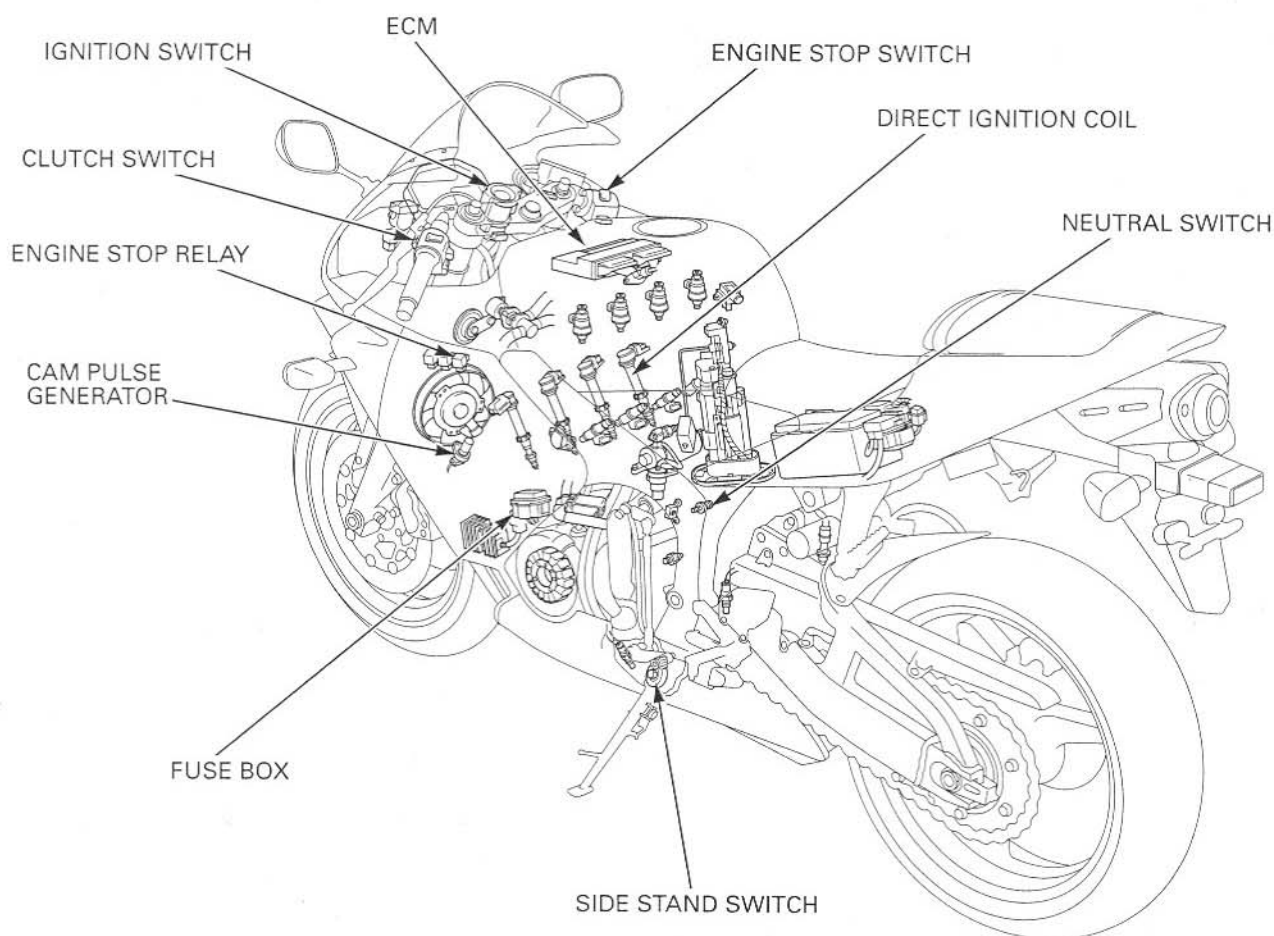


19. ELECTRIC STARTER

SYSTEM DIAGRAM.....	19-2	STARTER MOTOR.....	19-6
SERVICE INFORMATION	19-3	STARTER RELAY SWITCH.....	19-12
TROUBLESHOOTING	19-4	DIODE.....	19-14

ELECTRIC STARTER

SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

NOTICE

If current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.

- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-4).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- Refer to the starter clutch servicing (page 10-17).
- Refer to the following components informations.
 - Ignition switch (page 20-19)
 - Engine stop switch (page 20-20)
 - Starter switch (page 20-20)
 - Neutral switch (page 20-22)
 - Side stand switch (page 20-22)
 - Clutch switch (page 20-21)

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

TORQUE VALUES

Starter motor terminal nut 12 N·m (1.2 kgf·m, 9 lbf·ft)

ELECTRIC STARTER

TROUBLESHOOTING

Starter motor does not turn

1. Fuse Inspection

Check for blown main fuse or sub fuse.

Is the fuse blown?

YES – Replace the fuse

NO – GO TO STEP 2.

2. Battery Inspection

Make sure the battery is fully charged and in good condition.

Is the battery in good condition?

YES – GO TO STEP 3.

NO – Replace the battery

3. Starter Relay Switch Operation

Check the starter relay switch operation.

You should hear the relay "CLICK" when the starter switch button is depressed.

Is there a "CLICK"?

YES – GO TO STEP 4.

NO – GO TO STEP 5.

4. Starter Motor Inspection

Apply battery voltage to the starter motor directly and check the operation.

Does the starter motor turn?

YES – • Poorly connected starter motor cable
• Faulty starter relay switch (page 19-12)

NO – Faulty starter motor (page 19-6)

5. Relay Coil Ground Wire Lines Inspection

Disconnect the starter relay switch connector, and check the relay coil ground wire lines as below for continuity:

1. Green/red terminal – clutch switch diode – neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/red terminal – clutch switch – side stand switch line (in any gear except neutral, and with the clutch lever pulled in and the side stand up).

Is there continuity?

NO – • Faulty neutral switch (page 20-22)
• Faulty neutral diode (page 19-14)
• Faulty clutch diode (page 19-14)
• Faulty clutch switch (page 20-21)
• Faulty side stand switch (page 20-22)
• Loose or poor contact connector
• Open circuit in wire harness

YES – GO TO STEP 6.

6. Starter Relay Voltage Inspection

Connect the starter relay switch connector.

With the ignition switch ON and the starter switch pushed, measure the voltage at the starter relay switch connector (between Yellow/red (+) and body ground (-)).


Is the starter relay switch operation correct?

NO – • Faulty ignition switch (page 20-19)
• Faulty starter switch (page 20-20)
• Faulty engine stop switch (page 20-20)
• Loose or poor contact connector
• Open circuit in wire harness

YES – GO TO STEP 7.

7. Starter Relay Switch Continuity Inspection

Connect the starter relay switch connector.

Turn the ignition switch ON and the engine stop switch "  ", check for continuity at the starter relay switch terminals when the starter switch is pushed.

Is there continuity?

NO – Faulty starter relay switch

YES – Loose or poor contact starter relay switch connector

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.

1. Clutch Switch Inspection

Check the clutch switch operation.

Is the clutch switch operation normal?

NO – Faulty clutch switch

YES – GO TO STEP 2.

2. Side Stand Switch Inspection

Check the side stand switch operation.

Is the side stand switch operation normal?

NO – Faulty side stand switch (page 20-22)

YES – • Open circuit in wire harness
• Loose or poor contact connector

Starter motor turns engine slowly

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

Starter motor turns, but engine does not turn

- Starter motor is running backwards
 - Case assembled improperly
 - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear, driven gear and/or reduction gear

Starter relay switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problems

ELECTRIC STARTER

STARTER MOTOR

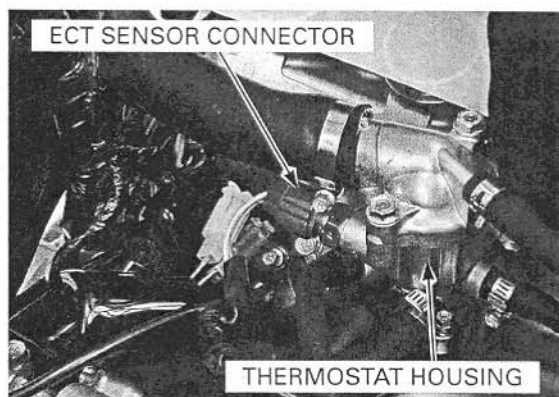
REMOVAL

- With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Drain the coolant (page 7-6).

Remove the throttle body (page 6-72).

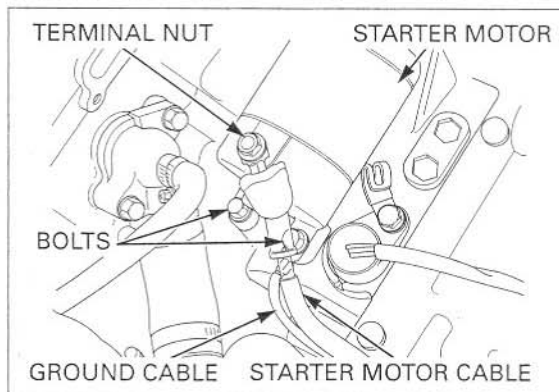
Disconnect the ECT sensor connector and remove the thermostat housing (page 7-9).



Remove the terminal nut and starter motor cable from the starter motor.

Remove the starter motor mounting bolts and ground cable.

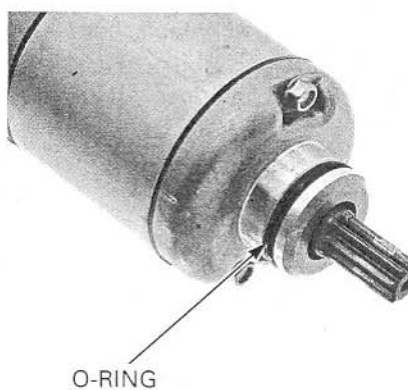
Pull the starter motor out of the crankcase.



DISASSEMBLY

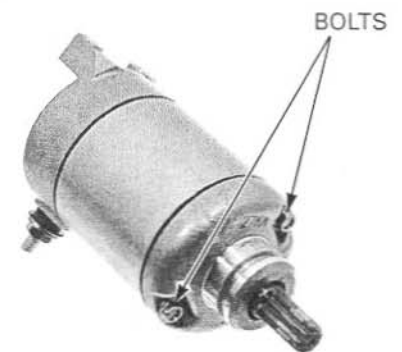
Remove the following:

- O-ring

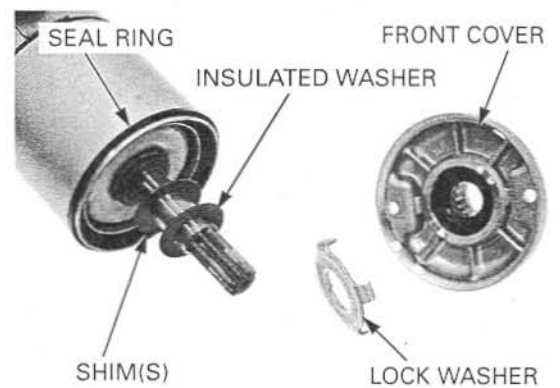


ELECTRIC STARTER

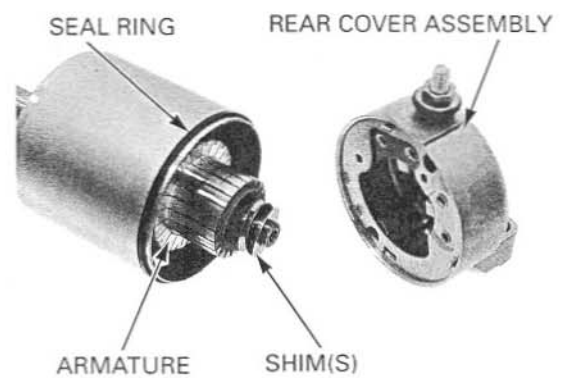
- Starter motor case bolts and O-rings



- Record the location and number of shims.*
- Front cover
 - Seal ring
 - Lock washer
 - Insulated washer
 - Shim (s)



- Record the location and number of shims.*
- Rear cover assembly
 - Seal ring
 - Shim (s)
 - Armature



INSPECTION

Check the bushing in the rear cover for wear or damage.

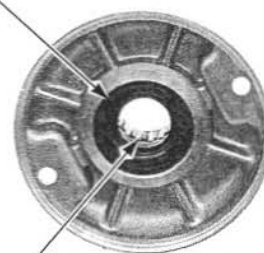


ELECTRIC STARTER

Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.

OIL SEAL

NEEDLE BEARING



Do not use emery or sand paper on the commutator.

Check the commutator bars of the armature for discoloration.

COMMUTATOR BARS

ARMATURE



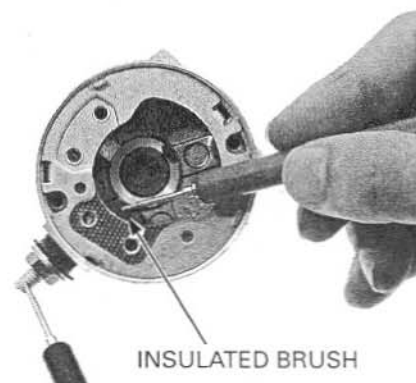
Check for continuity between pairs of commutator bars. There should be continuity.



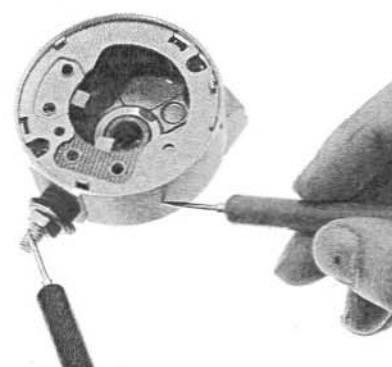
Check for continuity between each commutator bar and the armature shaft. There should be no continuity.



Check for continuity between the insulated brush and cable terminal.
There should be continuity.



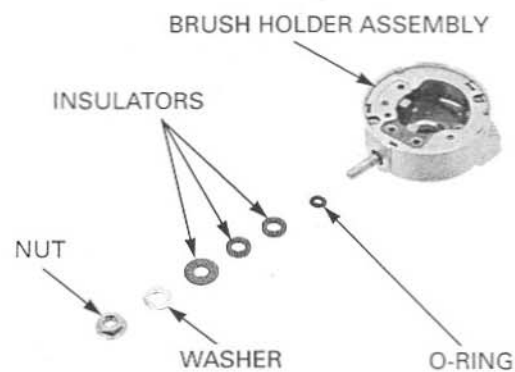
Check for continuity between the cable terminal and the rear cover.
There should be no continuity.



Record the location and number of insulators.

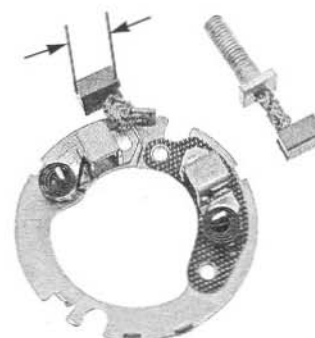
Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal



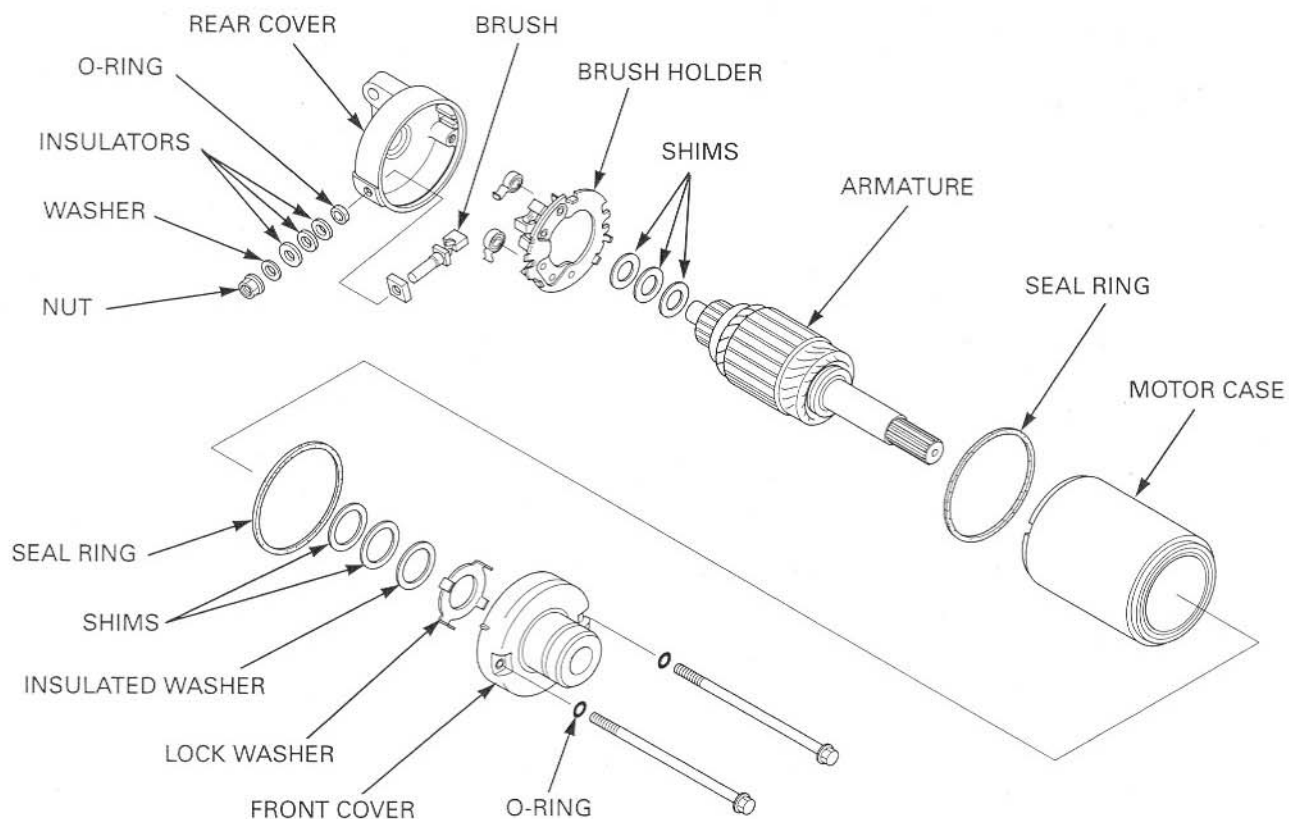
Inspect the brushes for damage and measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)



ELECTRIC STARTER

ASSEMBLY



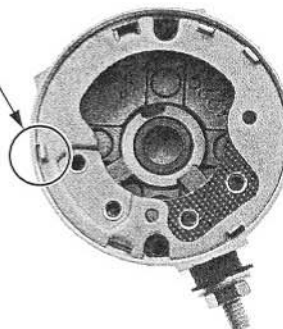
Install the brushes into the brush holder.
Install the cable terminal and brush holder into the rear cover, aligning the holder tab with the rear cover groove.

Install the insulators properly as noted during removal.

Install the following:

- New O-ring
- Insulators
- Washer
- Nut

ALIGN

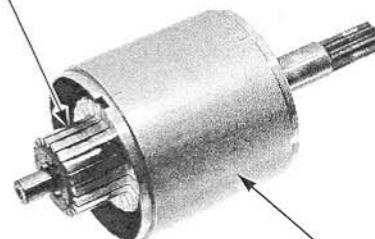


Install the armature in the motor case.
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

NOTICE

The coil may be damaged if the magnet pulls the armature against the case.

ARMATURE



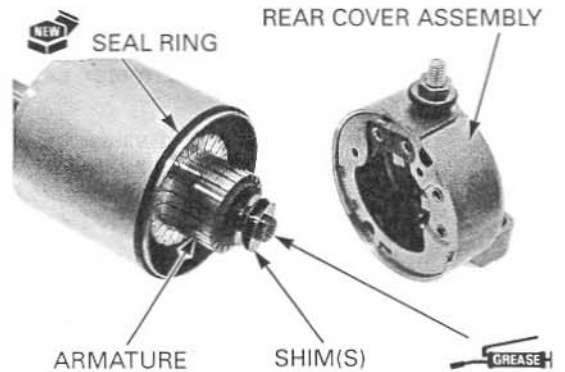
MOTOR CASE

ELECTRIC STARTER

Install the shims properly as noted during removal.

Install a new seal ring onto the motor case.
Install the shim(s) onto the armature shaft.
Apply thin coat of grease to the armature shaft end.

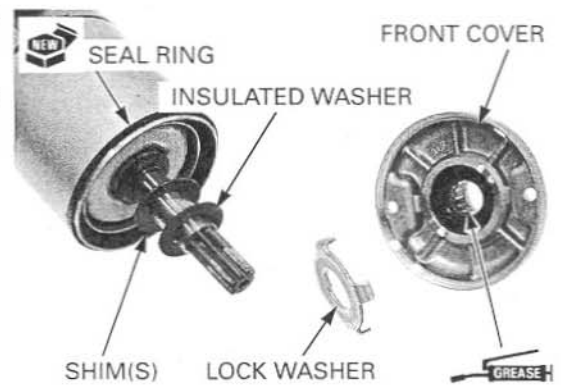
Install the rear cover assembly, while pushing in the brushes into the brush holder and aligning the brush holder tab with the motor case groove.



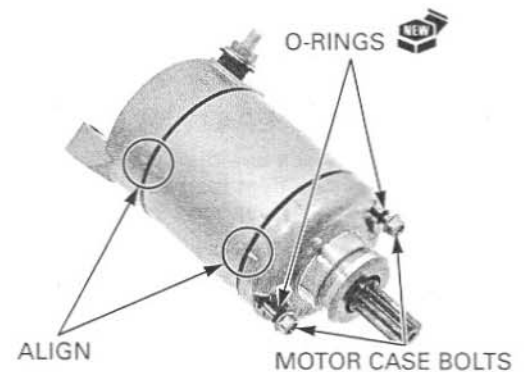
Install the shims properly as noted during removal.

Install the shim(s) and insulated washer onto the armature shaft.
Install a new seal ring onto the motor case.
Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover.
Install the front cover.



Make sure the index lines are aligned.
Install the new O-rings onto the motor case bolts.
Install and tighten the case bolts securely.



Coat a new O-ring with oil and install it into the starter motor groove.



ELECTRIC STARTER

INSTALLATION

Install the starter motor into the crankcase.

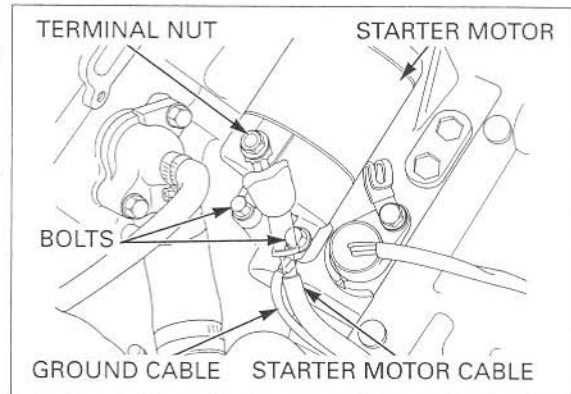
Route the starter motor cable and ground cable properly.

Install the ground cable and mounting bolts, and tighten the bolts securely.

Install the starter motor cable, then tighten the terminal nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

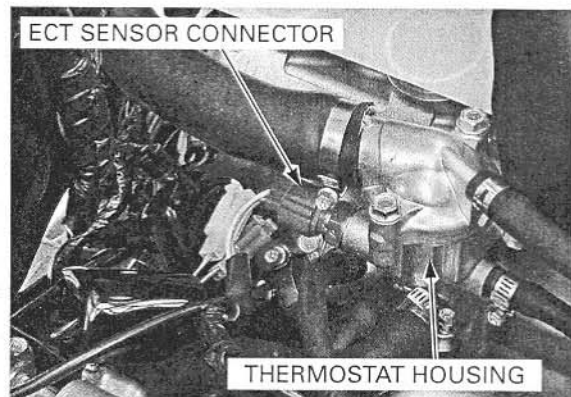
Install the rubber cap securely.



Install the following:

- Thermostat housing (page 7-9)
- Throttle body (page 6-77)

Fill the cooling system with the recommended coolant (page 7-6).



STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the following:

- Seat (page 3-4).
- Rear cowl (page 3-5).

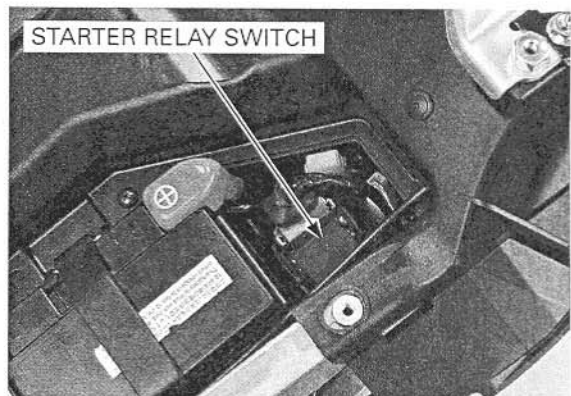
Shift the transmission into neutral.

Turn the ignition switch ON and engine stop switch "Q".

Press the starter switch button.

The coil is normal if the starter relay switch "clicks".

If you don't hear the switch "click", inspect the relay switch using the procedure below.

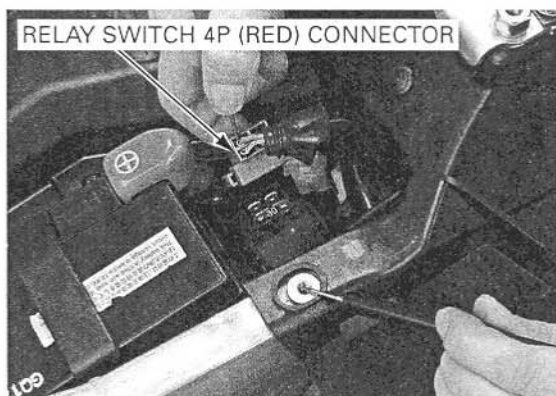


GROUND LINE INSPECTION

Disconnect the starter relay switch 4P (Red) connector.

Check for continuity between the Green/red wire (ground line) and ground.

If there is continuity when the transmission is in neutral and clutch lever released or when the clutch lever pulled and the side stand up, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).

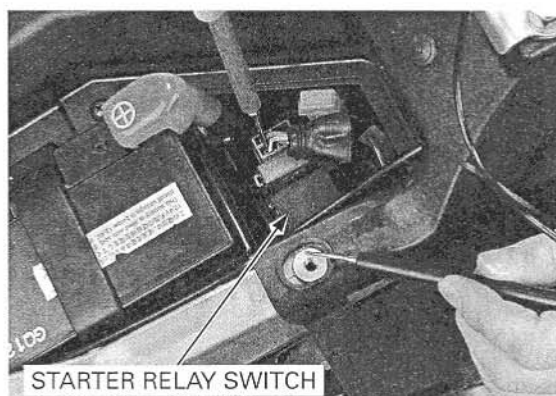
**STARTER RELAY VOLTAGE INSPECTION**

Connect the starter relay switch 4P (Red) connector.

Shift the transmission into neutral.

Measure the voltage between the Yellow/red wire terminal (+) and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch "Q", it is normal.

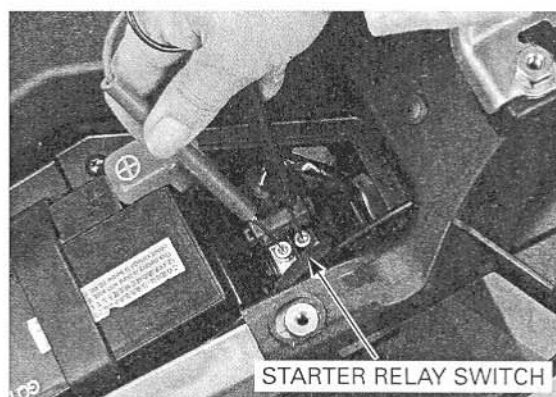
**CONTINUITY INSPECTION**

Connect an ohmmeter to the starter relay switch large terminals.

Turn the ignition switch ON and the engine stop switch "Q".

Check for continuity between the starter relay switch terminals when the starter switch is pushed.

There should be continuity when the starter switch is pushed.



ELECTRIC STARTER

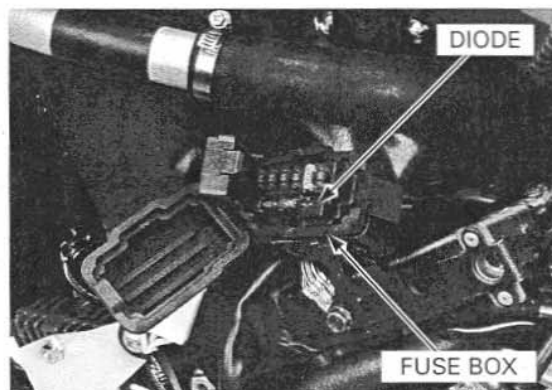
DIODE

REMOVAL

Remove the following:

- Lower cowls (page 3-6)
- Middle cowls (page 3-7)

Open the fuse box and remove the diode.



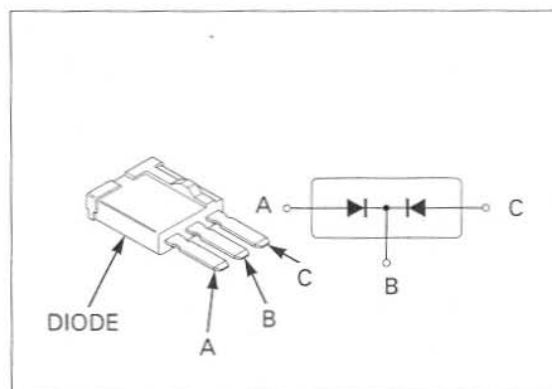
INSPECTION

Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity, in one direction, the diode is normal.

INSTALLATION

Install the diode in the reverse order of removal.



20. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION.....	20-2	ECT SENSOR	20-16
SERVICE INFORMATION	20-3	OIL PRESSURE SWITCH	20-16
TROUBLESHOOTING	20-5	FUEL LEVEL SENSOR	20-18
HEADLIGHT	20-6	IGNITION SWITCH	20-19
POSITION LIGHT	20-7	HANDLEBAR SWITCHES	20-20
TURN SIGNAL	20-8	BRAKE LIGHT SWITCH	20-21
BRAKE/TAIL LIGHT	20-9	CLUTCH SWITCH	20-21
LICENCE LIGHT.....	20-10	NEUTRAL SWITCH.....	20-22
COMBINATION METER.....	20-11	SIDE STAND SWITCH	20-22
SPEEDOMETER/VEHICLE SPEED SENSOR (VSS)	20-13	HORN	20-24
TACHOMETER	20-14	TURN SIGNAL RELAY.....	20-24
		HEADLIGHT RELAY.....	20-25

LIGHTS/METERS/SWITCHES

SYSTEM LOCATION

