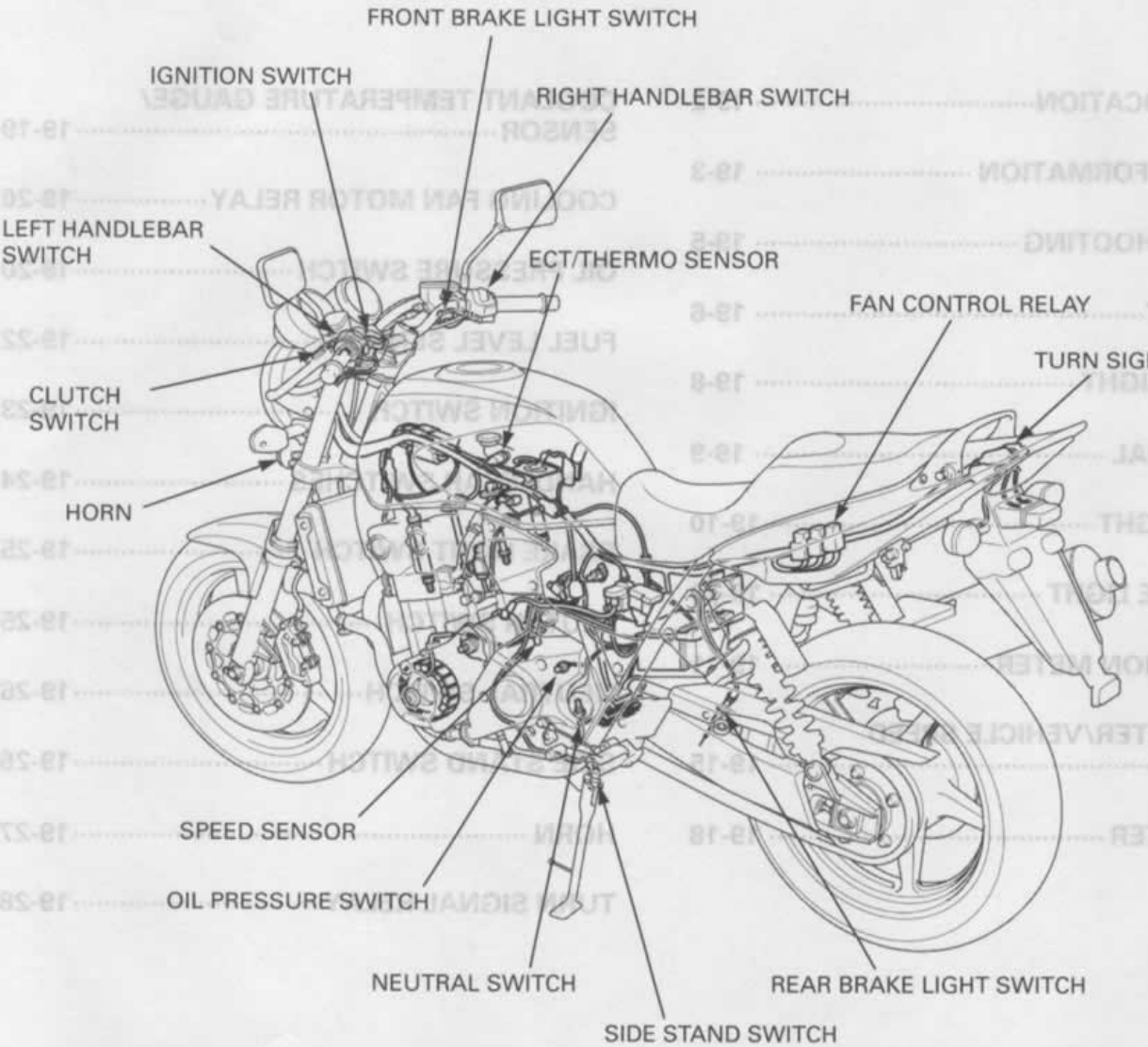
19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION



SERVICE INFORMATION

GENERAL

NOTICE

A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF.

Be sure to let it cool down before servicing.

- Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause is to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 60 W
		Lo	12V – 55 W
	Position light (except U type)		12V – 5 W
	Brake/tail light		LED (5.7 W/0.8 W)
	Turn signal light		12V – 21 W X 4
	License light		12V – 5 W
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Temperature indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI warning indicator		LED
	Immobilizer indicator		LED
Fuse	Main fuse		30 A
	Sub fuse		20 A X 2, 10 A X 4
Tachometer peak voltage			10.5 V minimum
Engine coolant temperature resistance		80°C (68°F)	47.5 – 56.8 kΩ
		120°C (248°F)	14.9 – 17.3 kΩ

TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal bolt/ washer	2 N·m (0.22 kgf·m, 1.6 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt; replace with a new one
Coolant temperature/ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	

TOOL

Peak voltage adaptor
07HGJ-0020100

with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate
Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate
Faulty odometer/trip meter

The speedometer operate is abnormal

1. **Fuse Inspection**

   Check for blown main fuse or sub fuse.

   Did the fuse blow?

   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 – Replace the fuse

   NO – GO TO STEP 3.

3. **Speed Sensor Power Input Voltage Inspection (Speed Sensor Side)**

   Check for loose or poor contact of the speed sensor 3P (Natural) connector.

   With the ignition switch ON and measure the voltage at the speed sensor connector.

   Is there Battery Voltage?

   NO – • Loose or poor contact of related terminals
   • Open circuit in Black/Brown or Green/Black wires between the battery and speed sensor

   YES – GO TO STEP 4.

4. **Speed Sensor Power Input Voltage Inspection (Combination Meter Side)**

   Check for loose or poor contact of the combination meter multi-connectors.

   With the ignition switch ON and measure the voltage at bottom of the speedometer terminals.

   Is there Battery Voltage?

   NO – • Loose or poor contact of related terminals
   • Open circuit in Black/Brown or Green/Black wires between the battery and speed sensor

   YES – GO TO STEP 5.

5. **Speed Sensor Signal Line Inspection**

   With the ignition switch OFF, check for continuity of the Pink/Green wire between the terminals of the speed sensor and speedometer.

   Is there continuity?

   NO – Open circuit in Pink/Green wire

   YES – GO TO STEP 6.

6. **Speed Sensor Signal Inspection**

   Support the motorcycle using a hoist or other support to rise the rear wheel off the ground.

   Measure the output voltage (sensor signal) at the speedometer with the ignition switch is ON while slowly turning the rear wheel by your hand.

   CONNECTION: Pink (+) – Green (-)
   STANDARD: Repeat 0 to 5 V

   Is the voltage as specified?

   NO – • Faulty speed sensor
   • Loose speed sensor mounting bolts

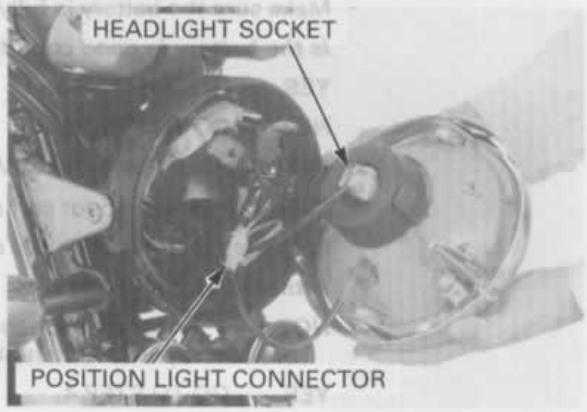
   YES – Faulty speedometer

HEADLIGHT

HEADLIGHT UNIT REMOVAL

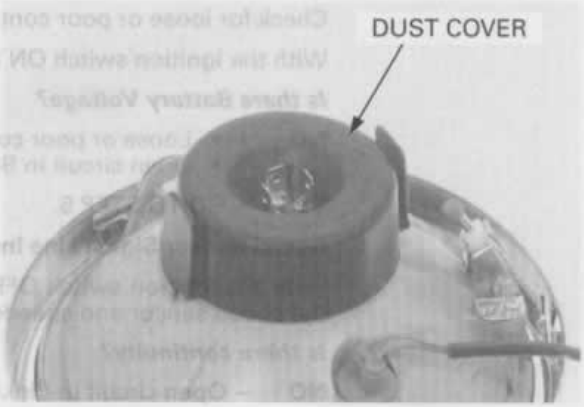
Remove the headlight unit mounting screws and headlight unit from the headlight case.

Disconnect the headlight socket and position light 2P (Natural) connector.



BULB REPLACEMENT

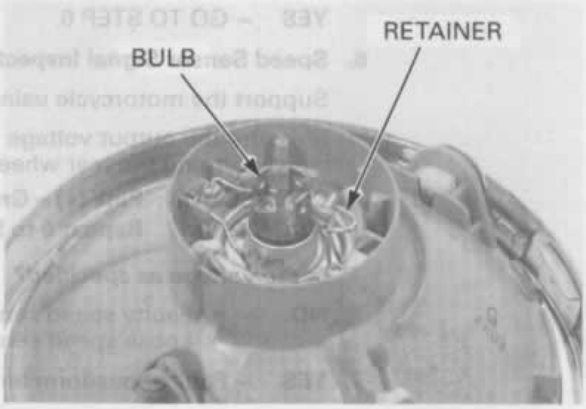
Remove the dust cover.



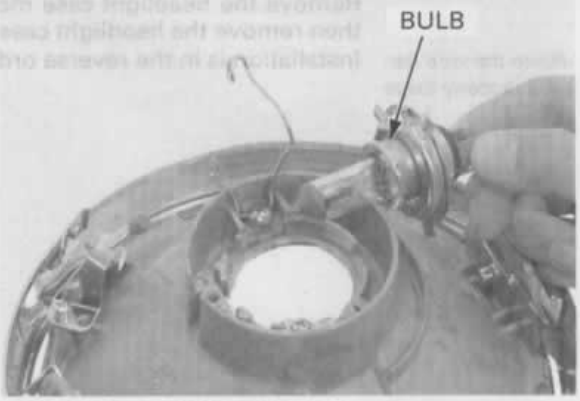
Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

Unhook the bulb retainer and remove the headlight bulb/socket.

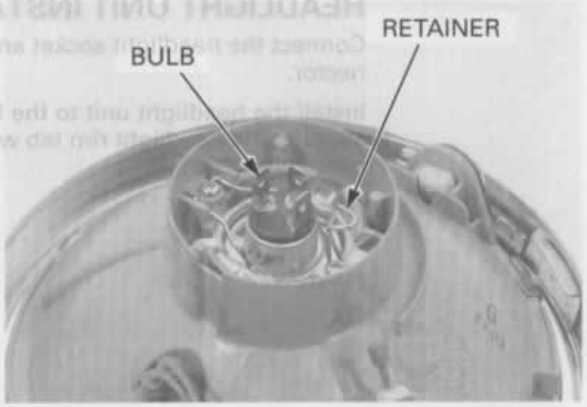
If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.



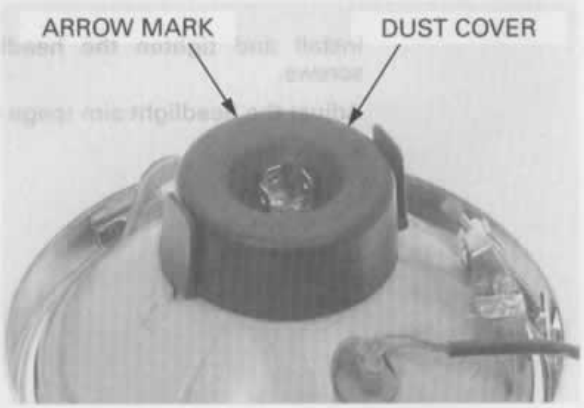
Install the new headlight bulb aligning its tabs with the groove in the headlight unit.



Hook the bulb retainer into the headlight unit groove.



Install the dust cover tightly against the headlight unit with its arrow mark facing up.



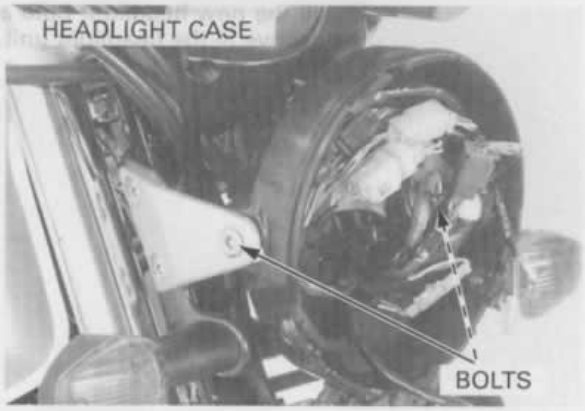
HEADLIGHT CASE REMOVAL/INSTALLATION

Remove the headlight unit (page 19-6).

Release the wire harness from the harness clamps.

Remove the headlight case mounting bolt and nut, then remove the headlight case from the stay. Installation is in the reverse order of removal.

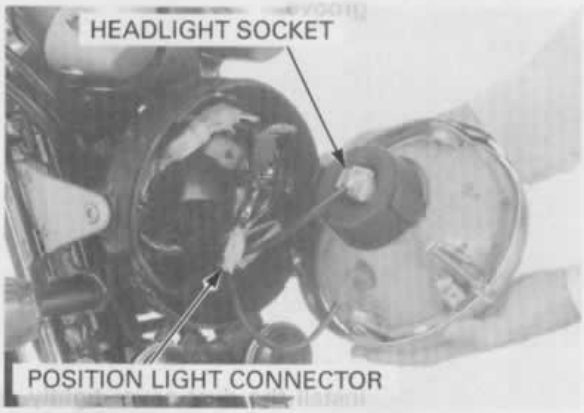
Route the wire harness properly (page 1-23).



HEADLIGHT UNIT INSTALLATION

Connect the headlight socket and position light connector.

Install the headlight unit to the headlight case while aligning the headlight rim tab with the groove in the headlight case.



Install and tighten the headlight unit mounting screws.

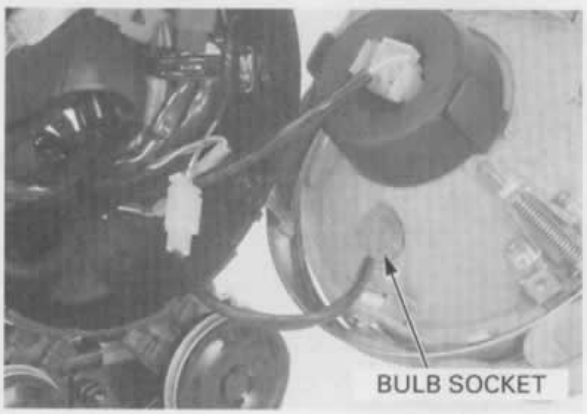
Adjust the headlight aim (page 4-27).

POSITION LIGHT

BULB REPLACEMENT

Remove the headlight unit (page 19-6).

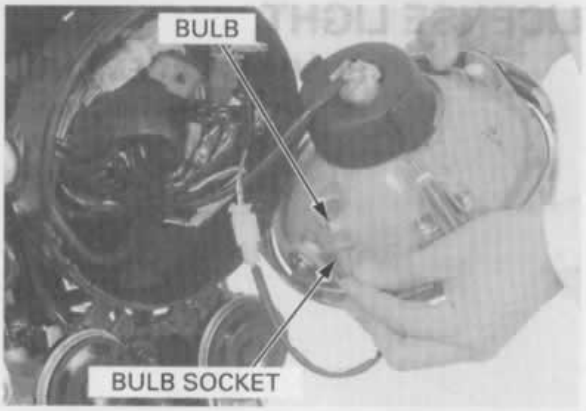
Pull out the position light bulb socket.



Remove the bulb from the socket, replace it with a new one.

Install the position light bulb socket.

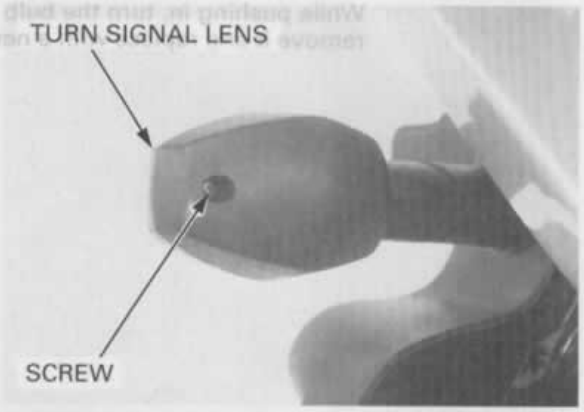
Install the headlight unit (page 19-8).



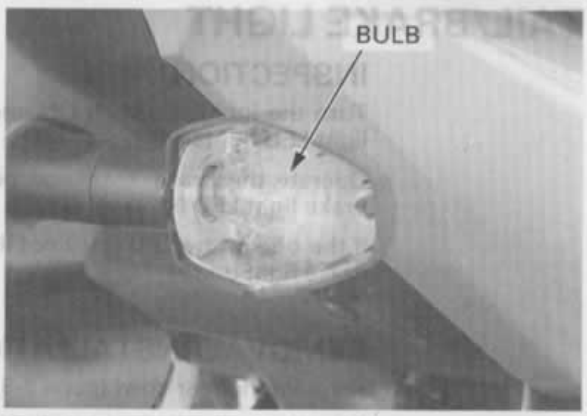
TURN SIGNAL

BULB REPLACEMENT

Remove the screw, turn signal lens and gasket.



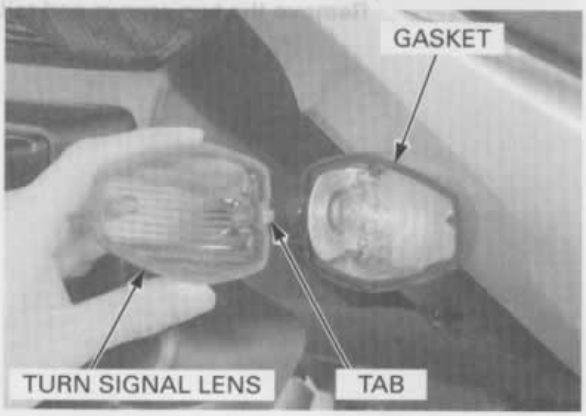
While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.



Check the turn signal lens gasket is in good condition, replace if necessary.

Install the turn signal lens while aligning it tab with the groove in the turn signal unit.

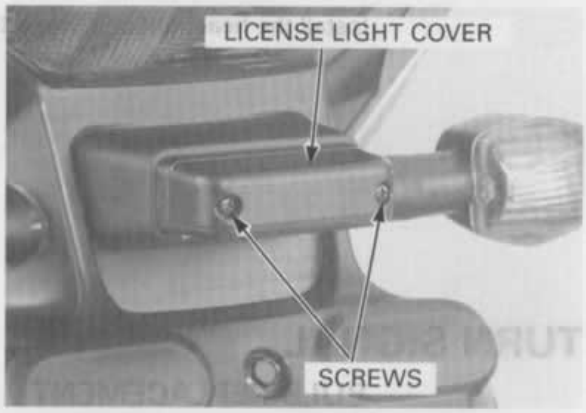
Install and tighten the screw securely.



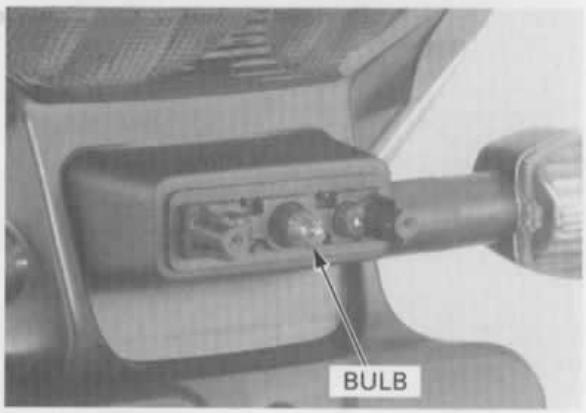
LICENSE LIGHT

BULB REPLACEMENT

Remove the screws and license light cover.



While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.



TAIL/BRAKE LIGHT

INSPECTION

Turn the ignition switch ON and check that the tail light LED lights all.

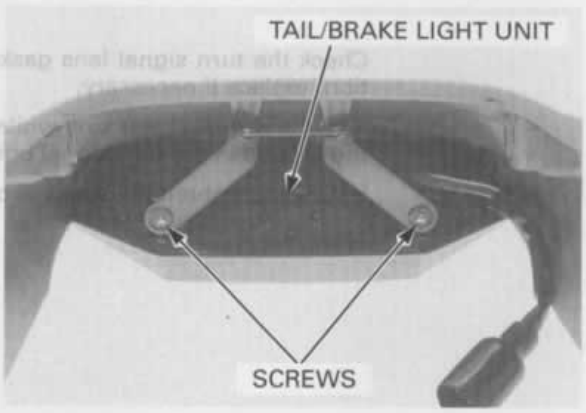
Operate the brake lever and pedal, check that the brake light LED lights all.

If the one of the LED does not light, replace the tail/brake light unit.

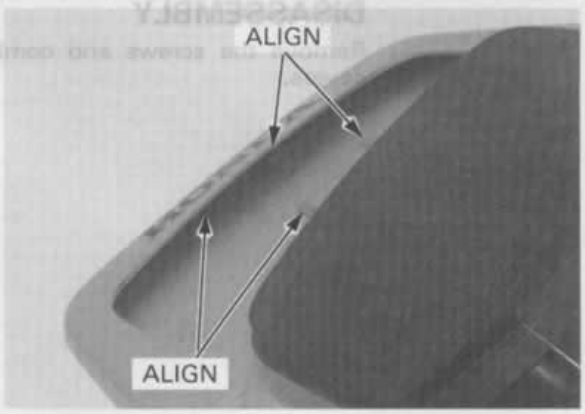
REMOVAL/INSTALLATION

Remove the rear cowl (page 3-5).

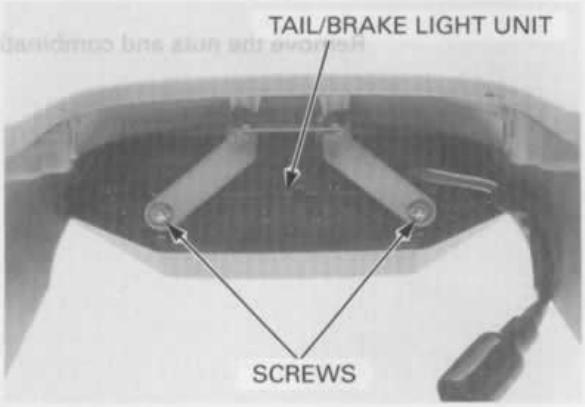
Remove the two screws and tail/brake light unit.



Install the tail/brake light unit into the rear cowl.



Install and tighten the tail/brake light unit mounting screws.

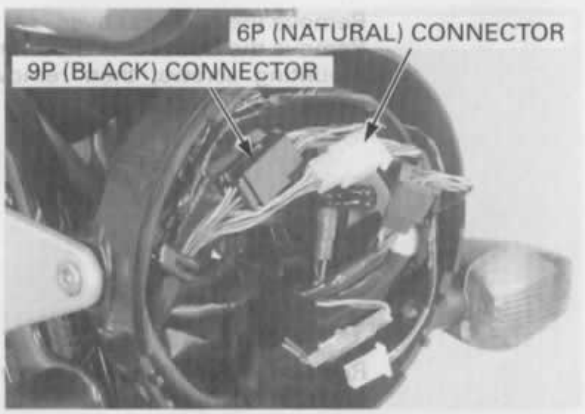


COMBINATION METER

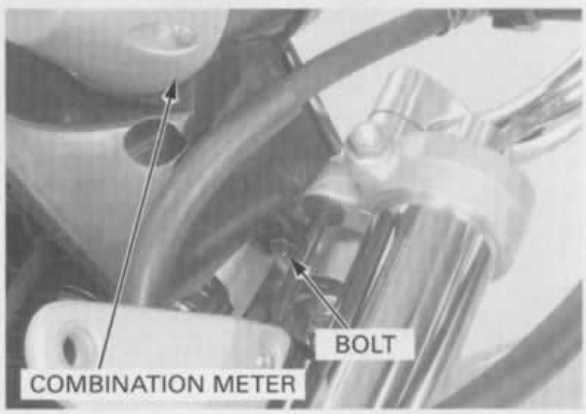
REMOVAL

Remove the headlight unit (page 19-6).

Disconnect the combination meter 9P (Black) and 6P (Natural) connectors.

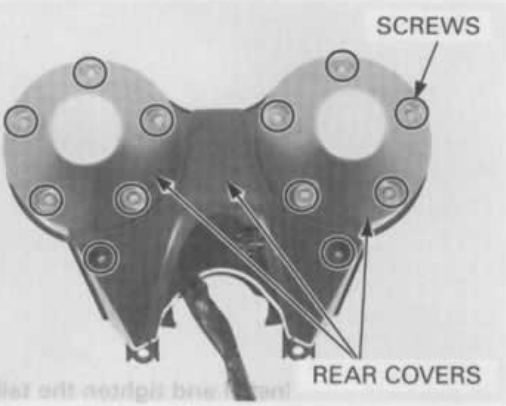


Remove the combination meter mounting bolts and combination meter.

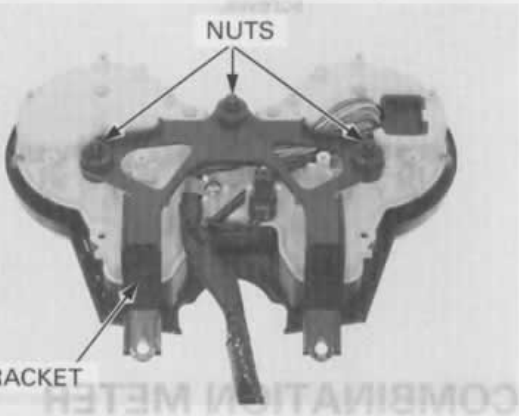


DISASSEMBLY

Remove the screws and combination meter rear covers.



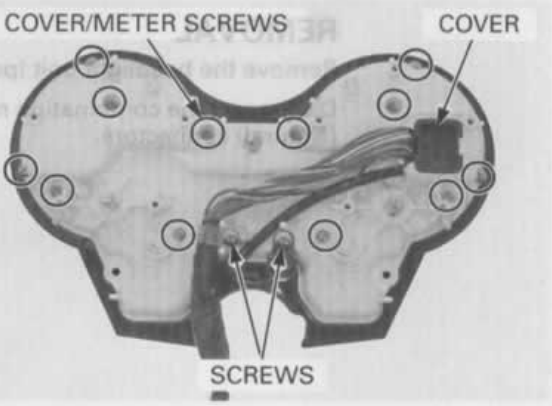
Remove the nuts and combination meter bracket.



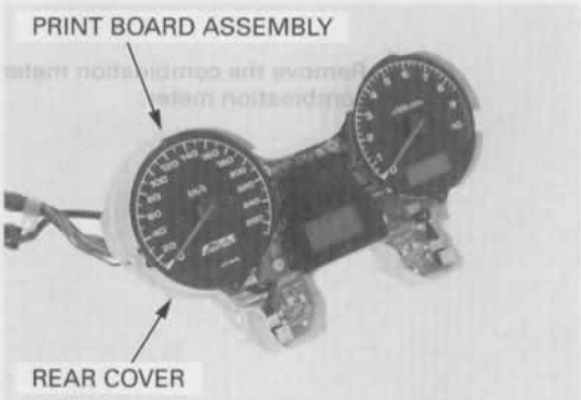
Remove the meter sub-harness clamp screw and open air temperature sensor screw.

Remove the harness cover.

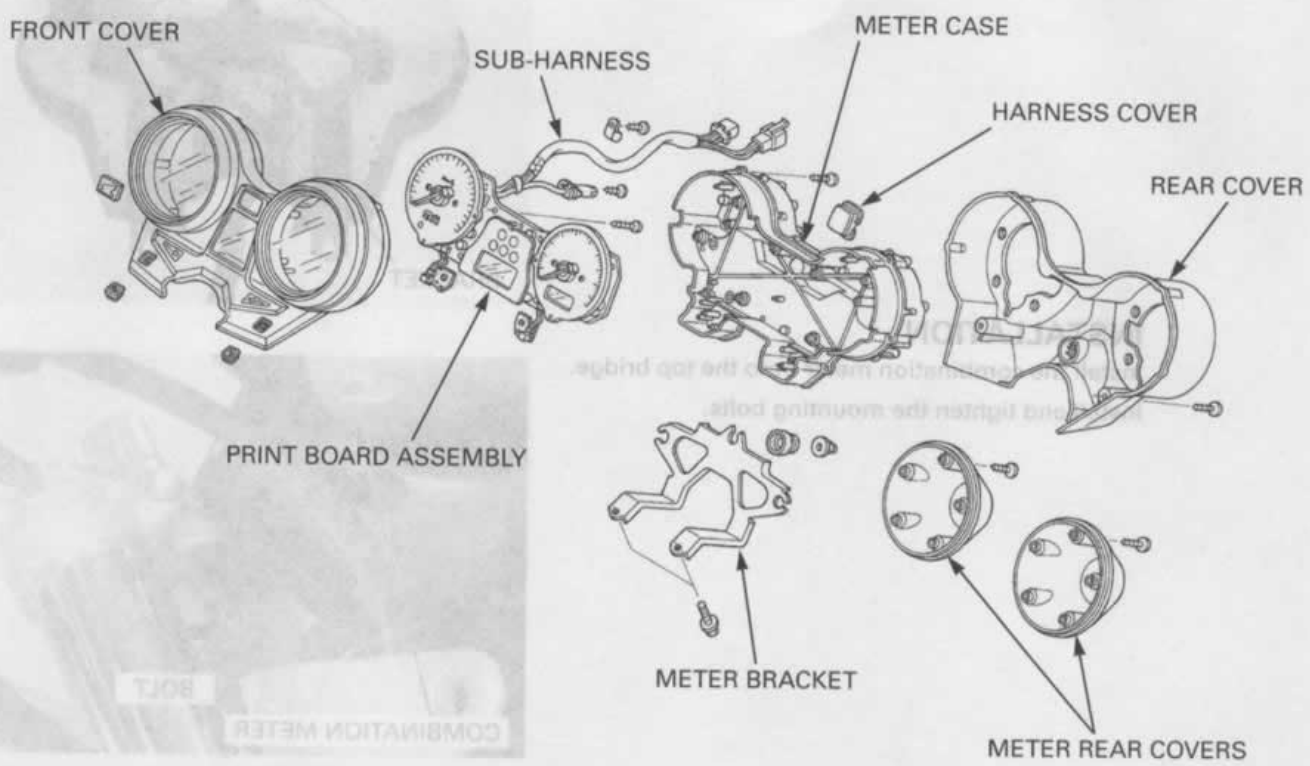
Remove the front cover mounting screws and meter mounting screws, then remove the combination meter front cover.



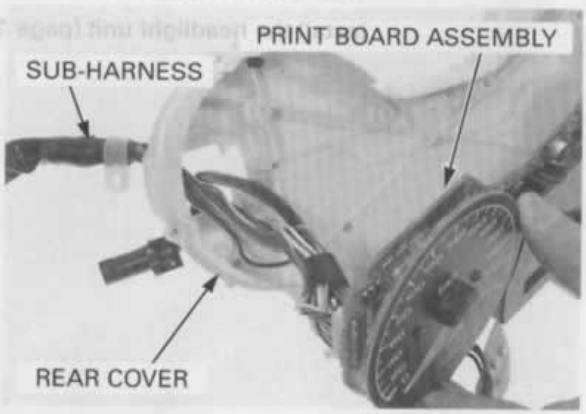
Remove the combination meter print board assembly from the rear cover.



ASSEMBLY

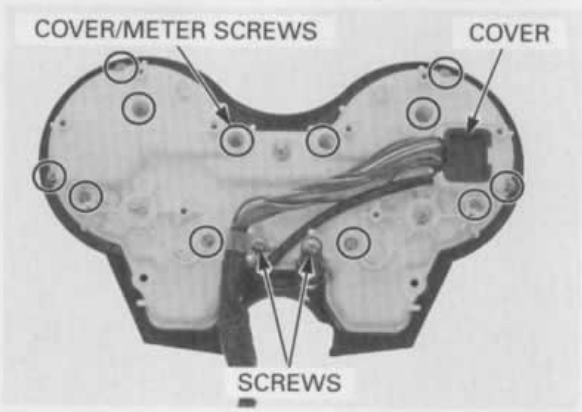


Route the meter sub-harness into the rear cover, then install the print board assembly into the rear cover.

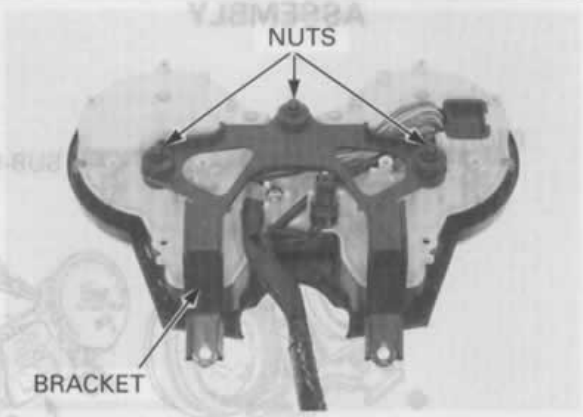


Install the front cover, then install and tighten the meter mounting screws and front cover mounting screws.
Install the harness cover.

Install the meter sub-harness clamp and open air temperature sensor, tighten the screws.



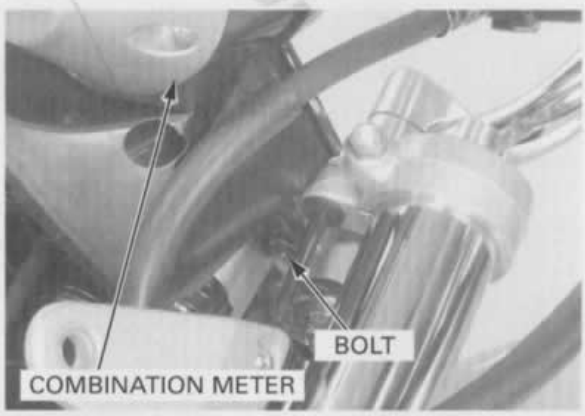
Install the combination meter bracket and tighten the nuts.



INSTALLATION

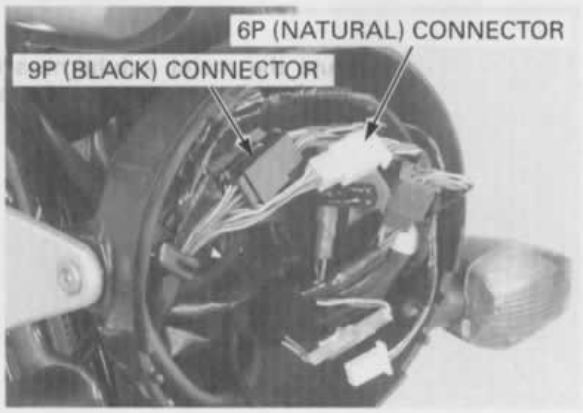
Install the combination meter onto the top bridge.

Install and tighten the mounting bolts.



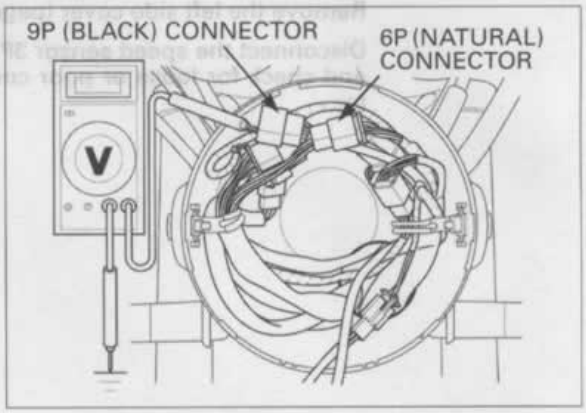
Connect the combination meter 9P (Natural) and 9P (Black) connectors.

Install the headlight unit (page 19-8).



POWER/GROUND LINE INSPECTION

Disconnect the combination meter combination meter 6P (Natural) and 9P (Black) connectors.
Check the following at the wire harness side connector terminals of the combination meter.



Power input line

Measure the voltage between the Black/Brown wire terminal (+) and Ground (–).
There should be battery voltage with the ignition switch ON.
If there is no voltage, check for open circuit in Black/Brown wire.

Back-up voltage line

Measure the voltage between the Red/Green wire terminal (+) and Ground (–).
There should be battery voltage at all times.
If there is no voltage, check for open circuit in Red/Green wire.

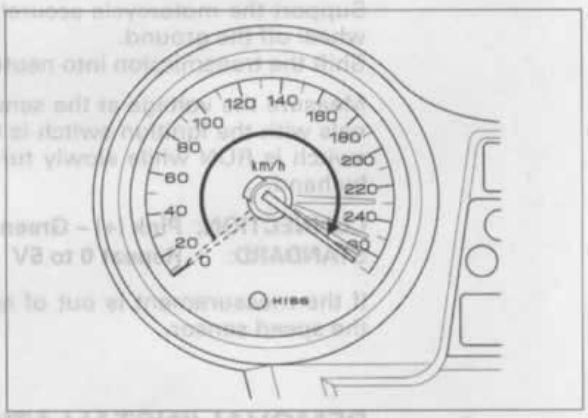
Sensor ground line

Measure the voltage between the Green/Black wire terminal (+) and Ground (–).
There should be battery voltage at all times.
If there is no voltage, check for open circuit in Green/Black wire.

SPEEDOMETER/VEHICLE SPEED SENSOR

SYSTEM INSPECTION

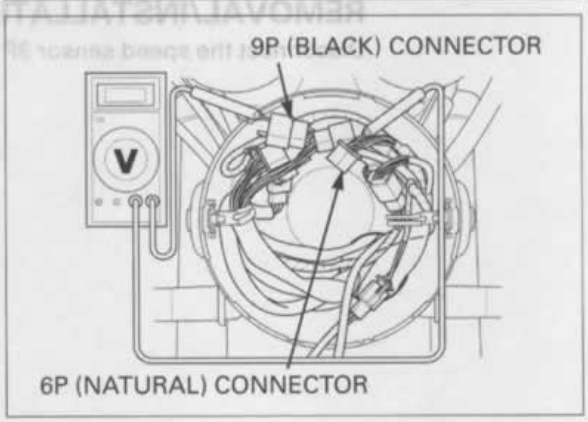
When the ignition switch turns ON, check that the Speedometer needle move to full scale and then return to zero.



If the needle does not show initial function, check for combination meter power input line (page 19-15).

Check that the tachometer and coolant temperature meter function properly.

- If they do not function, perform the power and ground line inspection of the combination meter (page 19-15).
- If they function, shift the transmission into neutral, disconnect the combination meter combination meter 9P (Black) and 6P (Natural) connectors and turn the ignition switch ON.
  Measure the voltage between the Pink/Green (+) and Green/Black (–) wire terminals of the wire harness side connector.
  Slowly turn the rear wheel by hand.
  There should be 0 to 5 V pulse voltage.



– If pulse voltage appears, replace the combination meter print circuit board.
– If pulse voltage does not appear, check for open or short circuit in Pink/Green wire.
  If the Pink/Green wire is OK, check for the speed sensor (page 19-16).

SPEED SENSOR INSPECTION

Remove the left side cover (page 3-4).

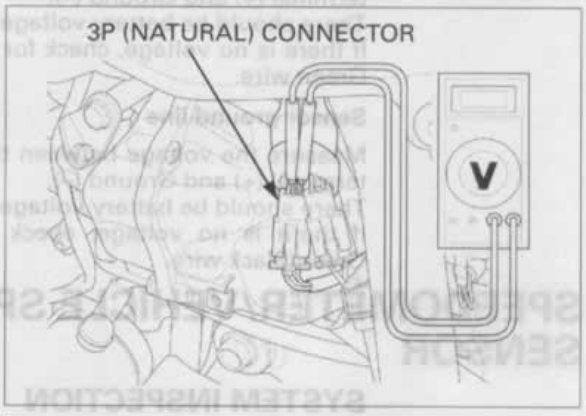
Disconnect the speed sensor 3P (Natural) connector and check for loose or poor contact of the connector.

Connect the speed sensor 3P (Natural) connector.

Turn the ignition switch is ON and measure the voltage at the 3P (Natural) connector with the connector connected.

CONNECTION: Black/Brown (+) – Green/Black (–)
STANDARD: Battery voltage

If there is no voltage, check for open circuit in Black and Green wire and loosen contact of the wire harness connectors.

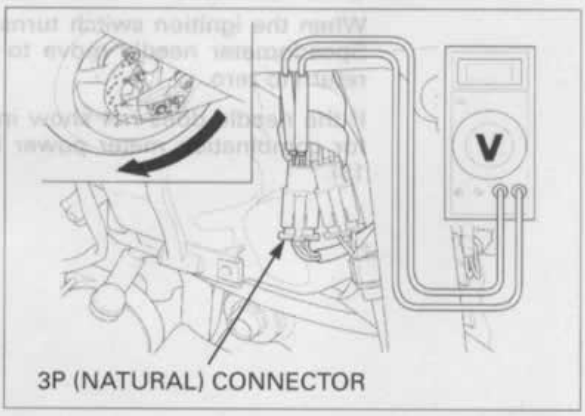


Support the motorcycle securely and place the rear wheel off the ground.
Shift the transmission into neutral.

Measure the voltage at the sensor connector terminals with the ignition switch is ON and engine stop switch is RUN while slowly turning the rear wheel by hand.

CONNECTION: Pink (+) – Green (–)
STANDARD: Repeat 0 to 5V

If the measurement is out of specification, replace the speed sensor.

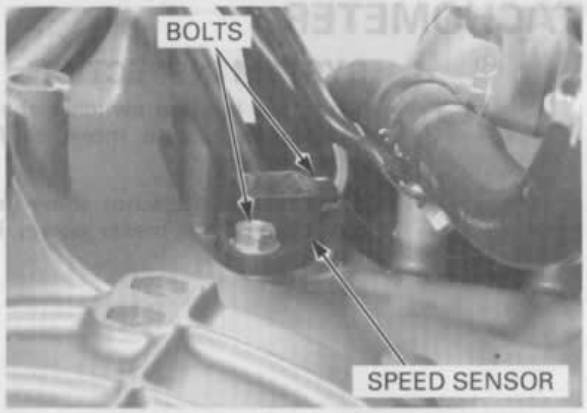


REMOVAL/INSTALLATION

Disconnect the speed sensor 3P (Natural) connector.

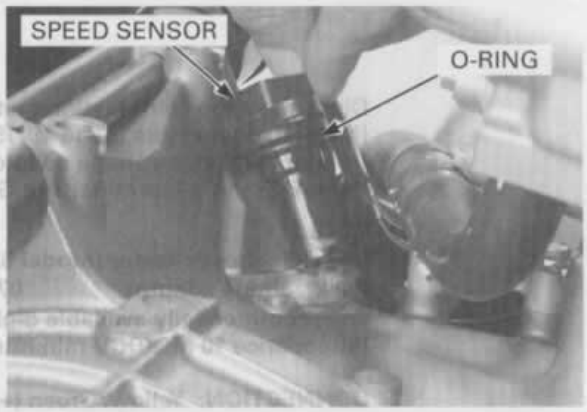
Disconnect the speed sensor 3P (Natural) connector.

Remove the bolts and speed sensor.



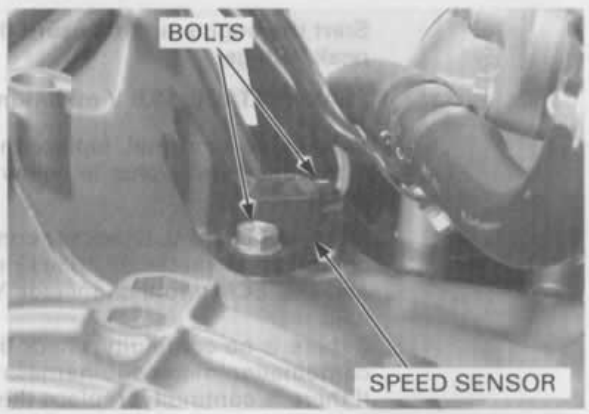
Check the O-ring is in good condition, replace if necessary.

Install the speed sensor into the upper crankcase.



Install and tighten the mounting bolts securely.

Route the sensor wire.



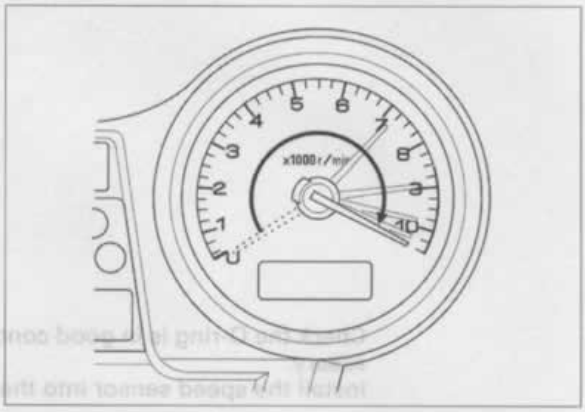
Connect the speed sensor 3P (Natural) connector.

TACHOMETER

SYSTEM INSPECTION

When the ignition switch turns ON, check that the tachometer needle move to full scale and then return to zero.

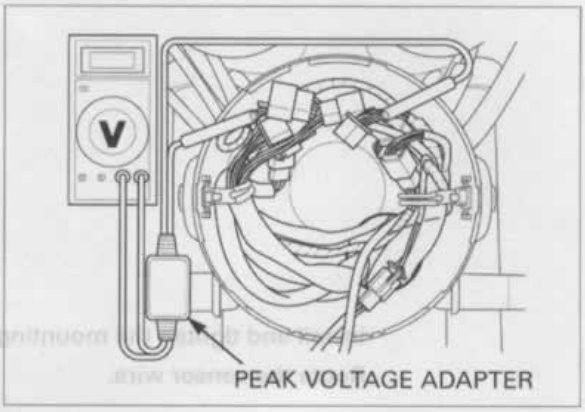
If the needle does not show initial function, check for combination meter power input line (page 19-15).



Disconnect the combination meter 9P (Black) and 6P (Natural) connectors (page 19-15).
Connect the peak voltage adaptor to the tachometer Yellow/Green (+) terminal and Green (–).

TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

CONNECTION: Yellow/Green (+) and Green (-)

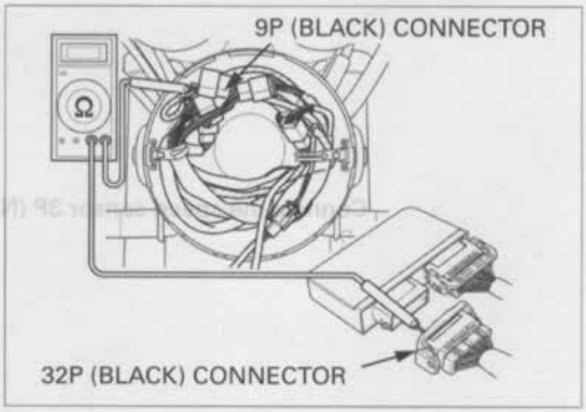


Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

If the value is normal, replace the tachometer.
If the measured value is below 10.5 V, replace the ECM.

If the value is 0 V, check for continuity between the combination meter 9P (Black) connectors terminal and the ECM multi-connector Yellow/Green terminals.
If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit.
If there is continuity, replace the combination meter printed circuit board (page 19-11).

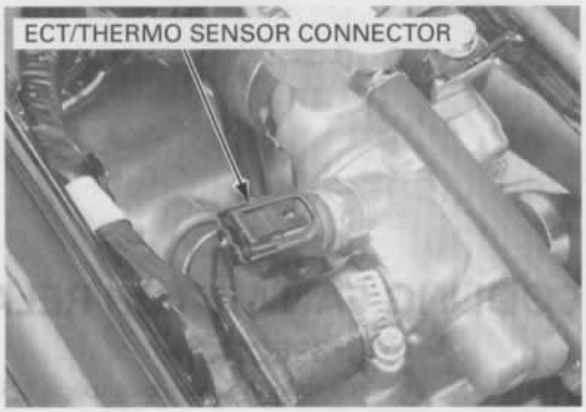


COOLANT TEMPERATURE GAUGE/ SENSOR

REMOVAL

Open and support the front end of fuel tank (page 4-5).
Drain the coolant (page 7-6).

Disconnect the wire connector from the ECT/thermo sensor and remove the sensor.



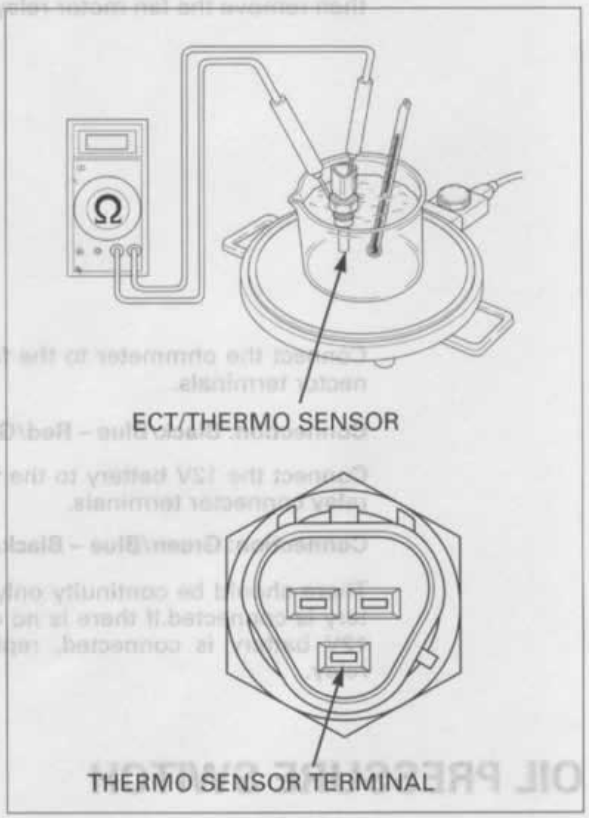
THERMO SENSOR UNIT INSPECTION

Suspend the ECT/thermo sensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT/thermo sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT/thermo sensor touch the pan.

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Temperature	80°C (68°F)	120°C (248°F)
Resistance	47.5 – 56.8 kΩ	14.9 – 17.3 kΩ



INSTALLTION

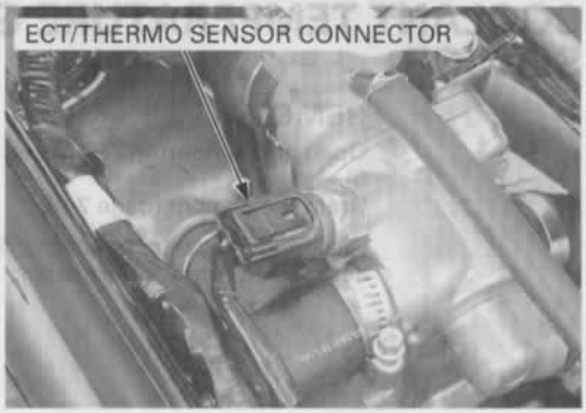
Always replace the sealing washer with a new one.

Install and tighten the ECT/thermo sensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Connect the ECT/thermo sensor connector.

Fill the system and bleed the air (page 7-6).

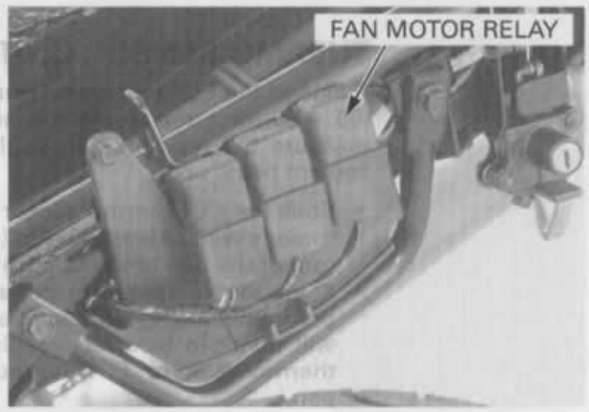


COOLING FAN MOTOR RELAY

INSPECTION

Remove the rear cowl (page 3-5).

Disconnect the fan motor relay 4P (Black) connector, then remove the fan motor relay.



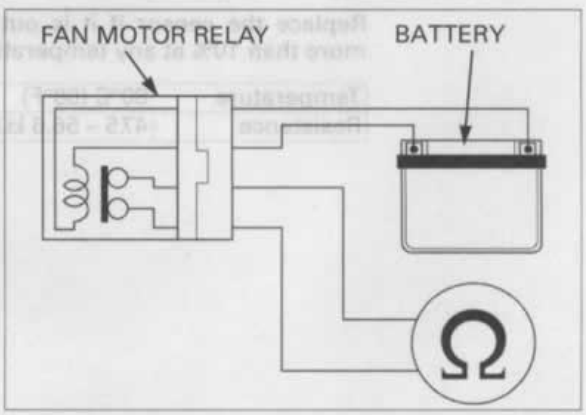
Connect the ohmmeter to the fan motor relay connector terminals.

Connection: Black/Blue – Red/Green

Connect the 12V battery to the following fan motor relay connector terminals.

Connection: Green/Blue – Black/White

There should be continuity only when the 12V battery is connected.If there is no continuity when the 12V battery is connected, replace the fan motor relay.

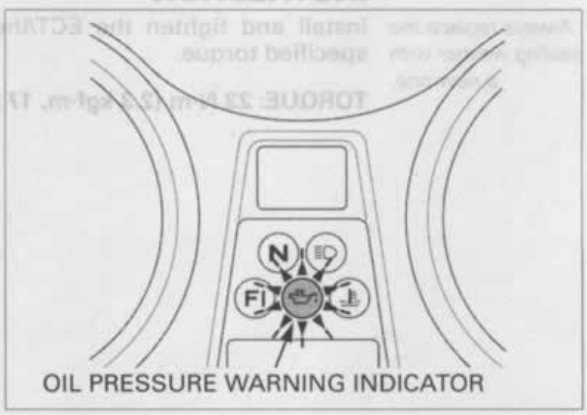


OIL PRESSURE SWITCH

INSPECTION

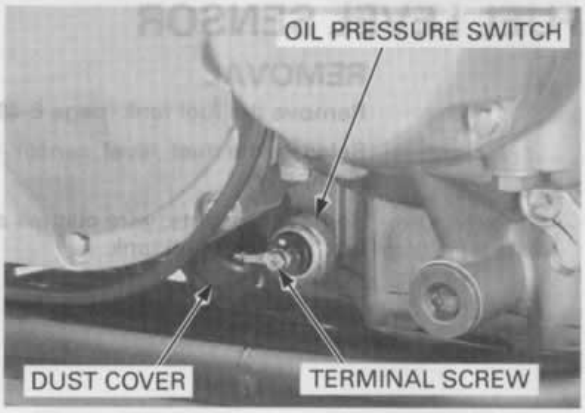
If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.

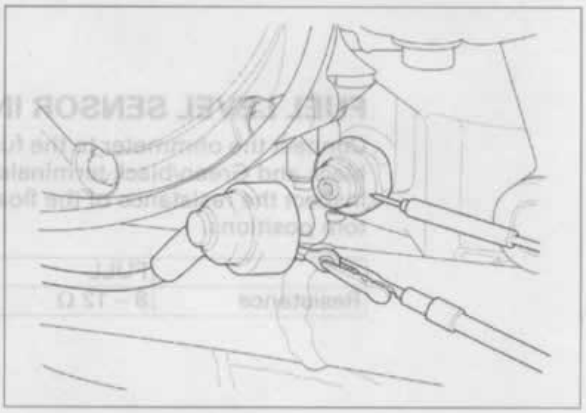


If the indicator does not come on, inspect as follow:

Remove the dust cover.
Remove the screw and oil pressure switch terminal.



Short the oil pressure switch wire terminal with the ground using a jumper wire.
The oil pressure warning indicator comes on with the ignition switch is ON.
If the light does not comes on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

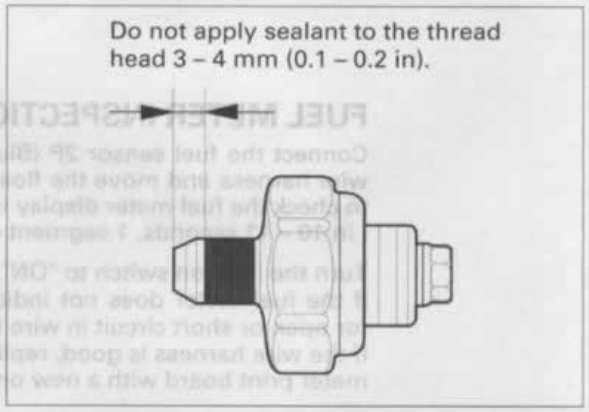


Start the engine and make sure that the light goes 0.2out.
If the light does not go out, check the oil pressure (page 5-5).
If the oil pressure is normal, replace the oil pressure switch (page 19-21).

REMOVAL/INSTALLATION

Remove the boot, terminal screw and wire terminal (page 19-21).
Remove the oil pressure switch from the crankcase.

Apply sealant to the oil pressure switch threads as shown.



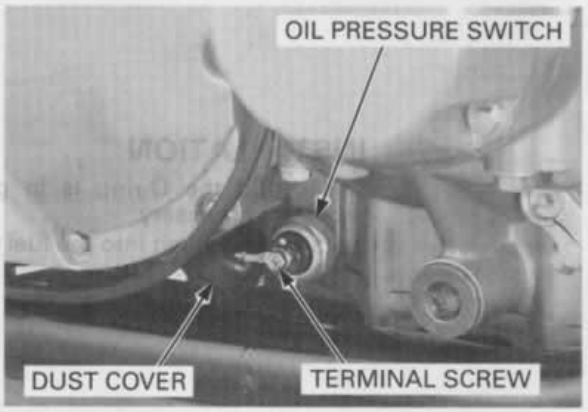
Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the oil pressure switch terminal to the switch and tighten the screw to the specified torque.

TORQUE: 2 N·m (0.22 kgf·m, 1.6 lbf·ft)

Install the dust cover.



FUEL LEVEL SENSOR

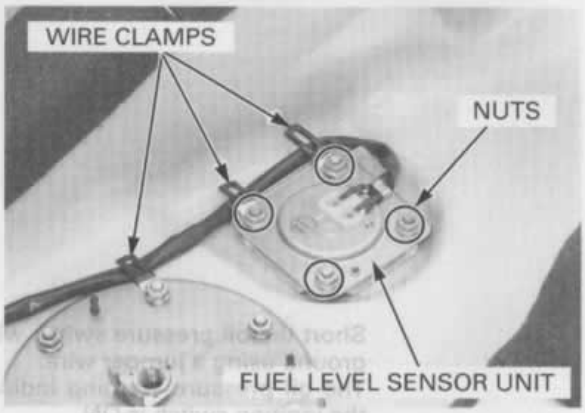
REMOVAL

Remove the fuel tank (page 6-48).

Release the fuel level sensor wire from the wire clamps.

Be careful not to damage the float arm.

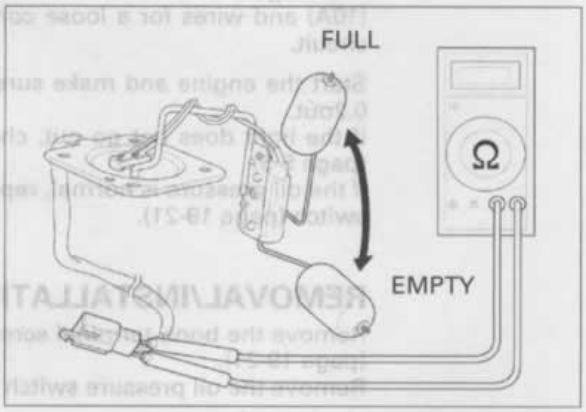
Remove the nuts, wire clamps and fuel level sensor unit from the fuel tank.



FUEL LEVEL SENSOR INSPECTION

Connect the ohmmeter to the fuel level sensor Gray/black and Green/black terminals.
Inspect the resistance of the float at the top and bottom positions.

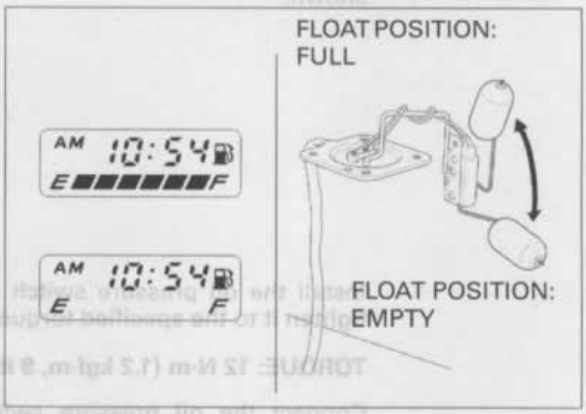
	FULL	EMPTY
Resistance	8 – 12 Ω	213 –219 Ω



FUEL METER INSPECTION

Connect the fuel sensor 2P (Blue) connector to the wire harness and move the float from empty to full to check the fuel meter display indication.
(in 10 – 11 seconds, 1 segment change)

Turn the ignition switch to "ON".
If the fuel meter does not indicate properly, check for open or short circuit in wire harness.
If the wire harness is good, replace the combination meter print board with a new one (page 19-12).

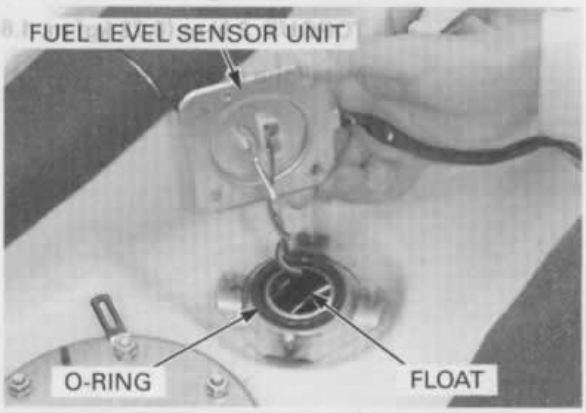


INSTALLATION

Check that the O-ring is in good condition and replace if necessary.

Be careful not to damage the float arm.

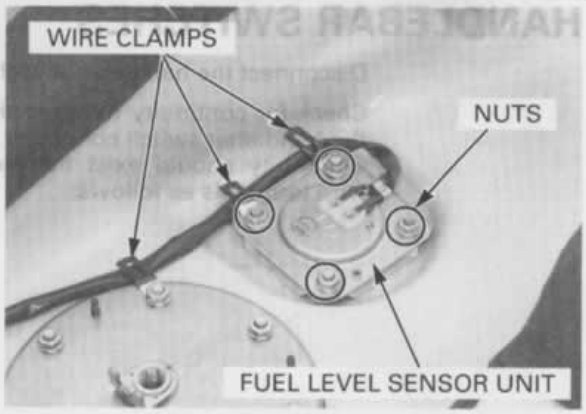
Install the fuel unit into the fuel tank.



Install the wire clamps and nuts, then tighten the nuts securely

Clamp the fuel level sensor wire with wire clamps as shown.

Install the fuel tank (page 6-50).

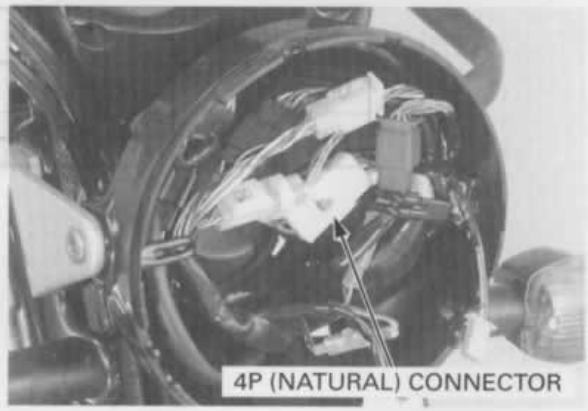


IGNITION SWITCH

INSPECTION

Remove the headlight case (page 19-6).

Disconnect the ignition switch wire 4P (Natural) connector.

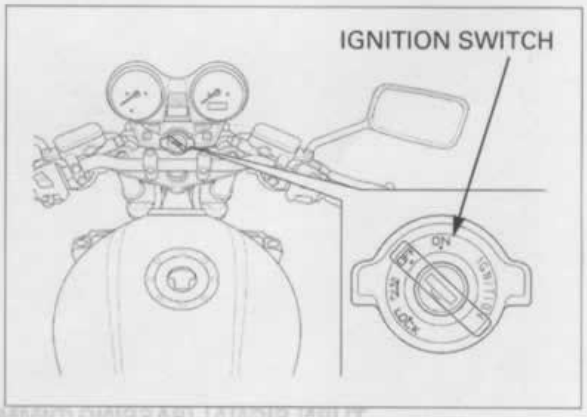


Check for continuity between the wire terminals of the ignition switch connector in each switch position.
Continuity should exist between the color coded wires as follows:

IGNITION SWITCH

IGNITION SWITCH

	IG	BAT1
ON	○—○	
OFF		
LOCK		



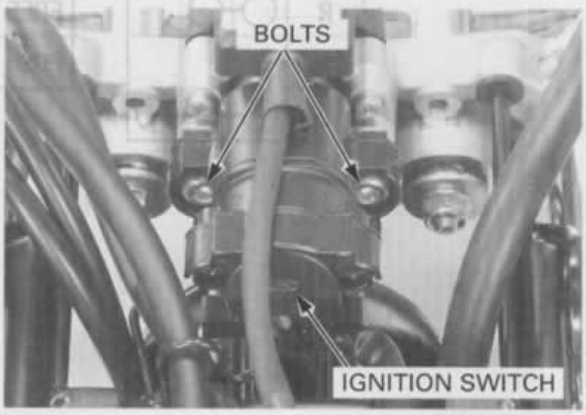
REMOVAL/INSTALLATION

Remove the headlight case (page 19-7).

Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.
Tighten the ignition switch mounting bolt to the specified torque.

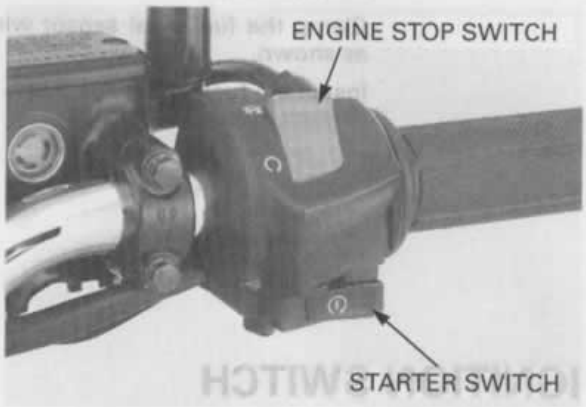
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf· ft)



HANDLEBAR SWITCHES

Disconnect the handlebar switch connectors.

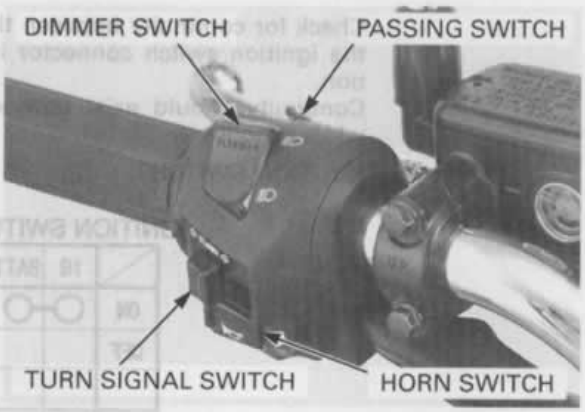
Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:



ENGINE STOP/STARTER SWITCH

	IG	BAT
OFF		
RUN	○—○	

	ST	IG	BAT4	HL
FREE			○—○	
PUSH	○—○			



TURN SIGNAL/PASSING/DIMMER/HORN SWITCH

	W	R	L
R	○—○		
N			
L	○———○		

	BAT2	Hi
FREE		
PUSH	○—○	

	HL	Lo	Hi
Lo	○—○		
(N)	○—○—○		
Hi	○———○		

	Ho	BAT3
FREE		
PUSH	○—○	

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the terminals.

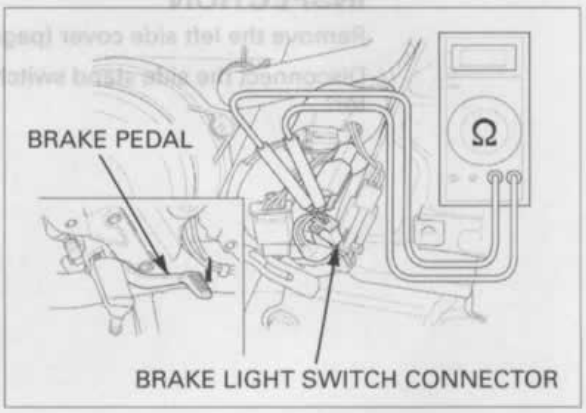
There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.

REAR

Remove the right side cover (page 3-4).

Disconnect the rear brake light switch 2P connector and check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



CLUTCH SWITCH

Disconnect the clutch switch connectors.

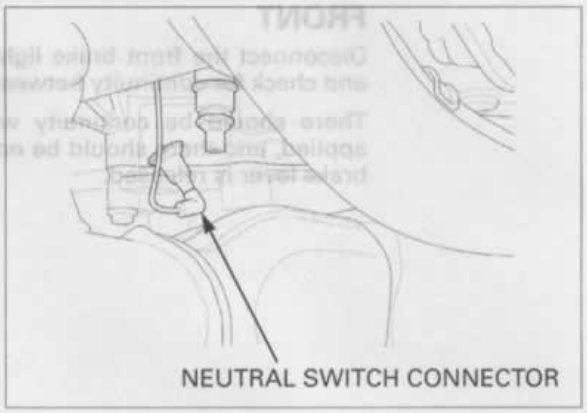
There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.

NEUTRAL SWITCH

Disconnect the neutral switch connector from the switch.

Shift the transmission into neutral and check for continuity between the Light green wire terminal and ground.

There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.



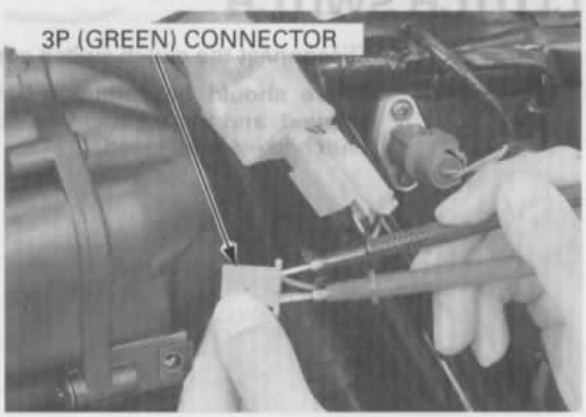
SIDE STAND SWITCH

INSPECTION

Remove the left side cover (page 3-4).

Disconnect the side stand switch 3P (Green) connector.

Check for continuity between the wire terminals of the side stand switch connector.
Continuity should exist only when the side stand is UP.

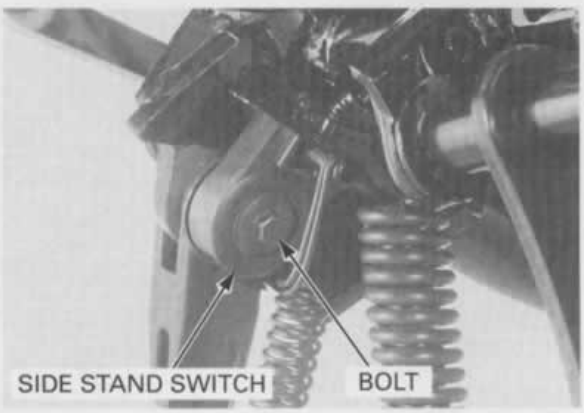


The center stand is optional equipment for this motorcycle.

REMOVAL

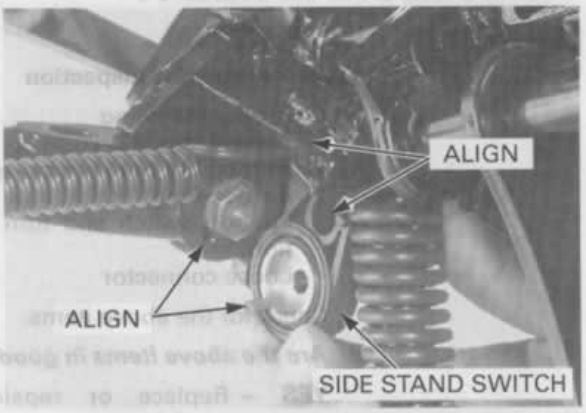
Disconnect the side stand switch 3P (Green) connector.

Remove the bolt and side stand switch.



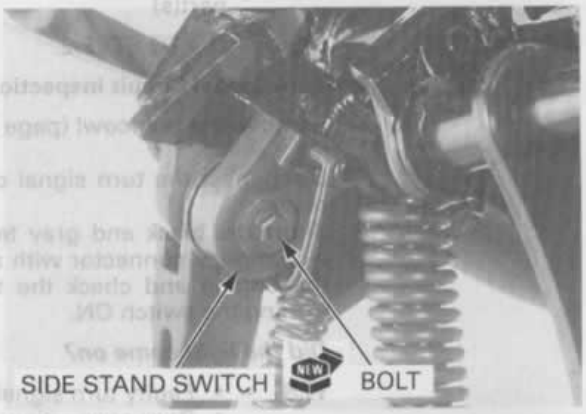
INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.



Secure the side stand switch with a new bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

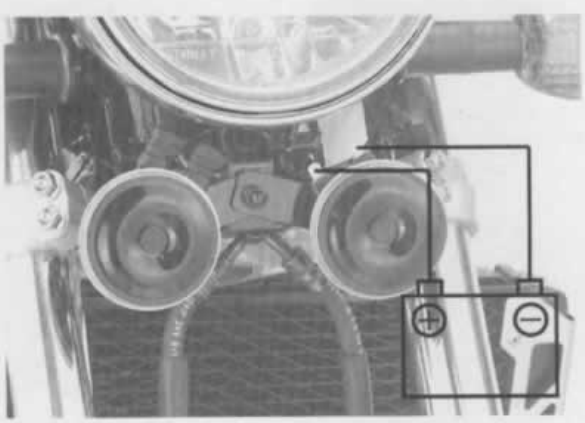


Connect the side stand switch 3P (Green) connector.

HORN

Disconnect the wire connectors from the horn.

Connect the 12V battery to the horn terminal directly.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



TURN SIGNAL RELAY

INSPECTION

1. **Recommended Inspection**

   Check the following
   - Battery condition
   - Burned out bulb or non-specified wattage
   - Burned fuse
   - Ignition switch and turn signal switch function
   - Loose connector

   Check for the above items.

   Are the above items in good condition?

   YES – Replace or repair the malfunction part(s)

   NO – GO TO STEP 2.

2. **Turn Signal Circuit Inspection**

   Remove the rear cowl (page 3-5).

   Disconnect the turn signal connectors from the relay.
   Short the black and gray terminals of the turn signal relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.

   Did the light come on?

   YES – • Faulty turn signal relay
   • Poor connection of the connector.

   NO – Broken wire harness