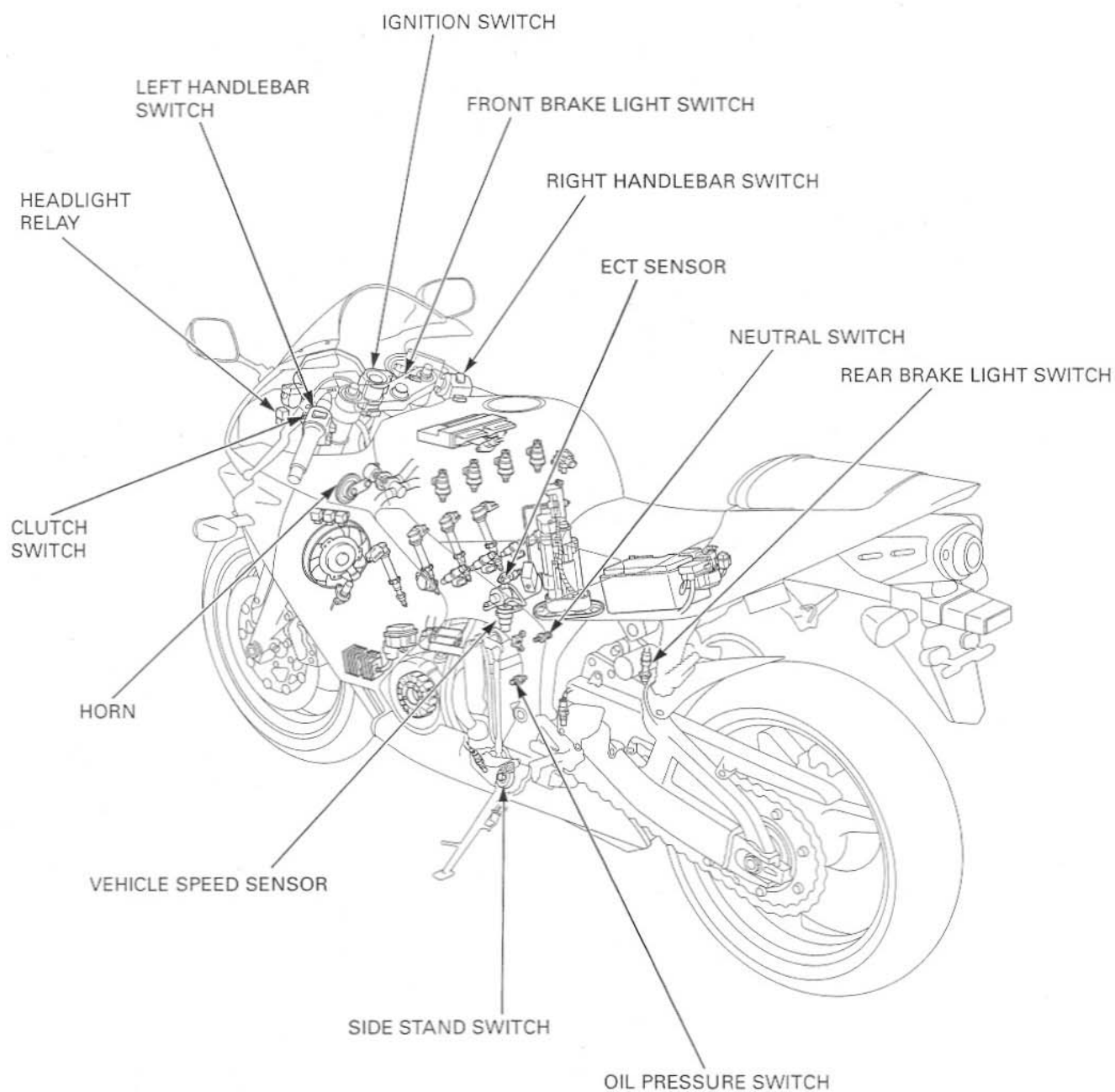


20. LIGHTS/METERS/SWITCHES

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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.
- 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 it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with denatured alcohol to prevent its early failure.
 - Be sure to install the dust cover after replacing the bulb.
- Use an electric heating element to heat the water/coolant mixture for the ECT sensor inspection. Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- 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 – 55 W
		Lo	12V – 55 W
	Position light		12V – 5 W
	Brake/tail light		LED
	Turn signal light		12V – 21 W X 4
	Instrument light		LED
	Turn signal indicator		LED
	High beam indicator		LED
	Neutral indicator		LED
	PGM-FI warning indicator		LED
Fuse	Main fuse		30 A
	PGM-FI fuse		20 A
	Sub fuse		10 A X 4, 20 A X 2
Tachometer peak voltage			10.5 V minimum
ECT sensor resistance		80 °C (176 °F)	2.1 – 2.6 kΩ
		120 °C (248 °F)	0.65 – 0.73 kΩ

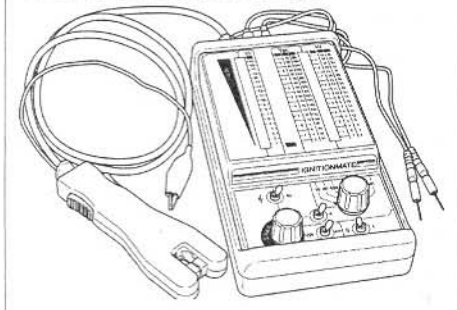
TORQUE VALUES

ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Side stand switch bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt; replace with a new one
Ignition switch mounting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	Replace with a new one
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	

LIGHTS/METERS/SWITCHES

TOOLS

IgnitionMate Peak Voltage tester
MTP07-0286 (U.S.A. only)



TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The speedometer and odometer/trip meter indicates "----".

Faulty E²-ROM in ECM

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

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

The speedometer operates abnormally

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. Vehicle Speed Sensor Power Input Voltage Inspection (Speed Sensor Side)

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

With the ignition switch ON, and measure the voltage at the VSS connector.

Is there Battery Voltage?

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

YES – GO TO STEP 4.

4. Vehicle 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 or Green wires between the battery and speedometer

YES – GO TO STEP 5.

5. Vehicle Speed Sensor Signal Line Inspection

With the ignition switch OFF, check for continuity of the Pink wire between the terminals of the VSS and speedometer.

Is there continuity?

NO – Open circuit in Pink wire

YES – GO TO STEP 6.

6. Vehicle 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?

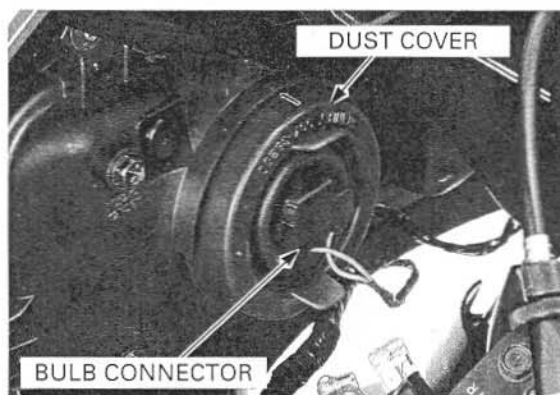
NO – • Faulty VSS
• Loose VSS mounting bolts

YES – Faulty speedometer

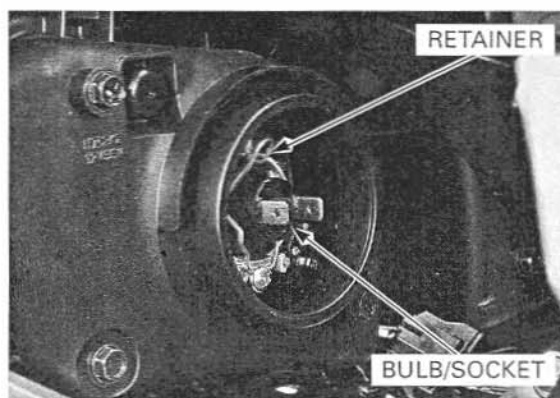
HEADLIGHT

BULB REPLACEMENT

Disconnect the headlight bulb connector.
Remove the dust cover.



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



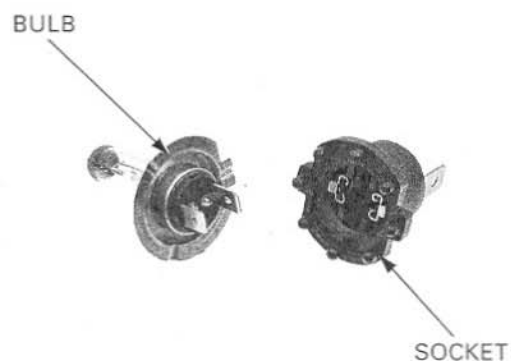
NOTICE

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

Remove the headlight bulb from the socket.

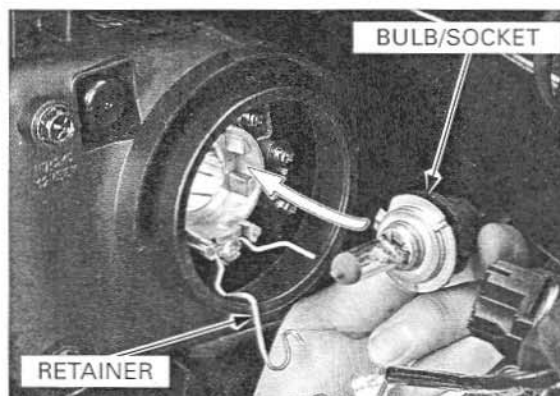
Install a new bulb into the socket.

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



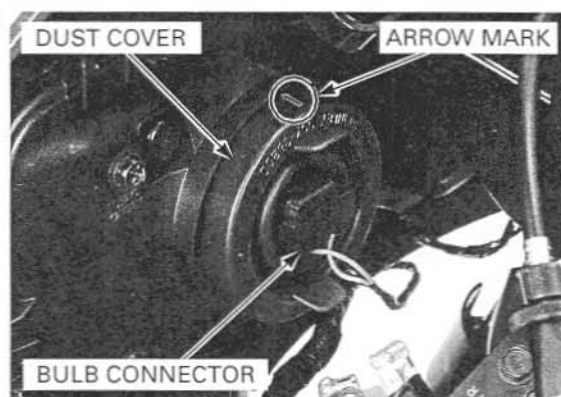
Install the new headlight bulb/socket aligning its tab with the groove in the headlight unit.

Hook the bulb retainer into the headlight unit groove.



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

Connect the headlight bulb connector.



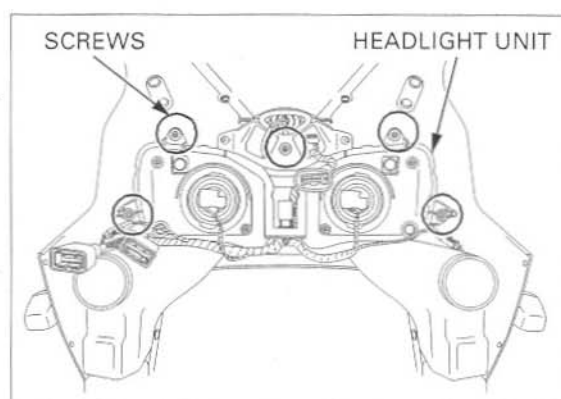
REMOVAL/INSTALLATION

Remove the upper cowl (page 3-9).

Remove the five screws and headlight unit.

Install the headlight unit in the reverse order of removal.

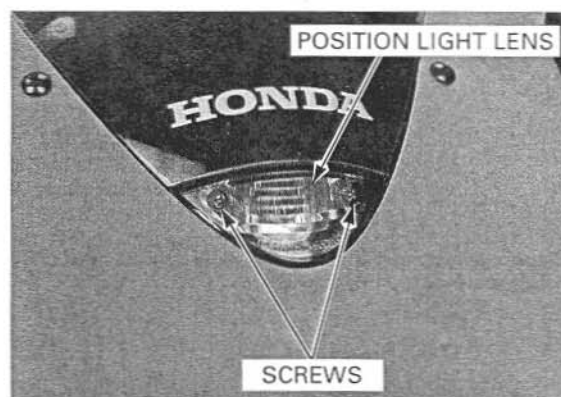
Rout the wire harness properly (page 1-22).



POSITION LIGHT

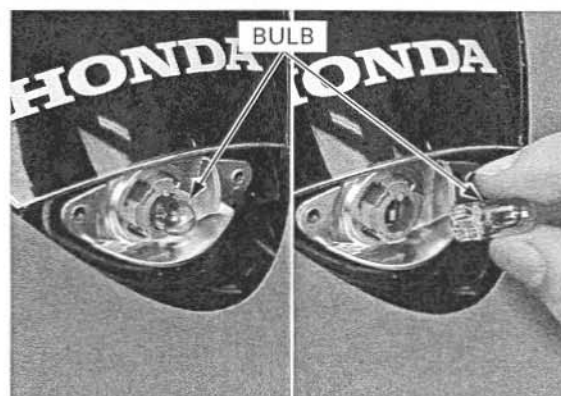
BULB REPLACEMENT

Remove the screws and position light lens.



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

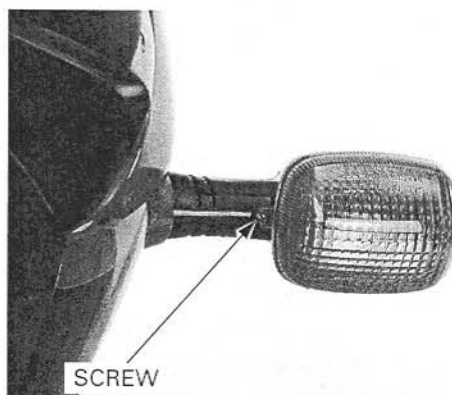
Install the position light lens in the reverse order of removal.



TURN SIGNAL

BULB REPLACEMENT

Remove the screw.

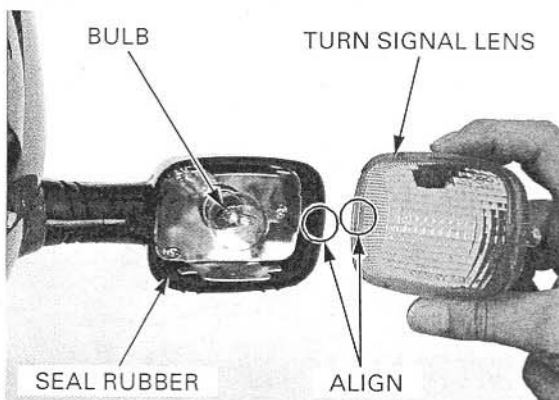


Remove the turn signal lens and seal rubber.

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

Install the seal rubber on the lens.

Install the lens by aligning the lens tab with the turn signal unit groove.



REMOVAL/INSTALLATION

For front turn signal unit removal, see upper cowl disassembly (page 3-11).

For rear turn signal removal, remove the rear fender B (page 3-16).

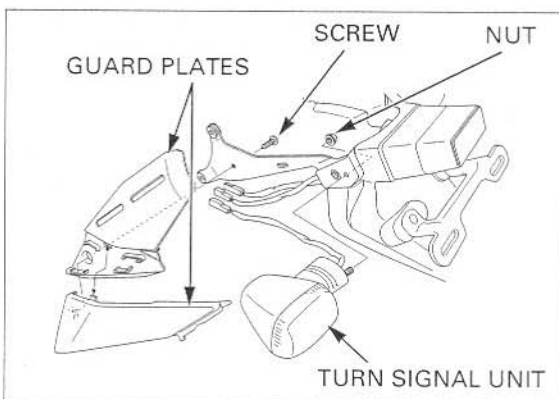
Remove the screw and guard plates.

Remove the turn signal mounting nut.

Release the turn signal wire and remove the turn signal unit.

Route the turn signal wire properly (page 1-22).

Install the turn signal unit in the reverse order of removal.



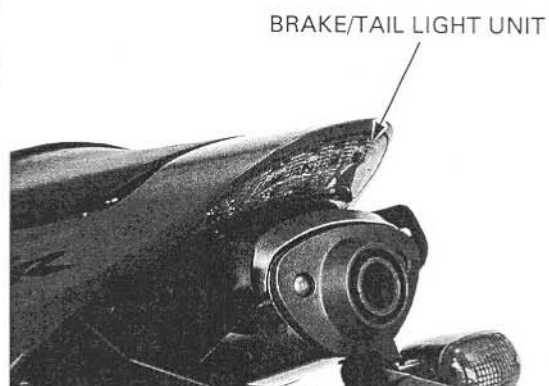
BRAKE/TAIL LIGHT

INSPECTION

Turn the ignition switch ON, and check the tail light operation.

Check that all LED in the brake/tail light unit light illuminate with the front brake lever and/or rear brake pedal applied.

If any LED does not turn on, replace the brake/tail light assembly.

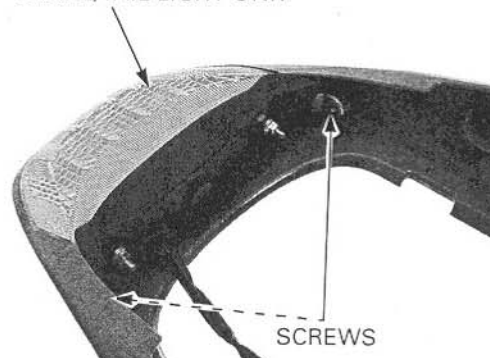


REMOVAL/INSTALLATION

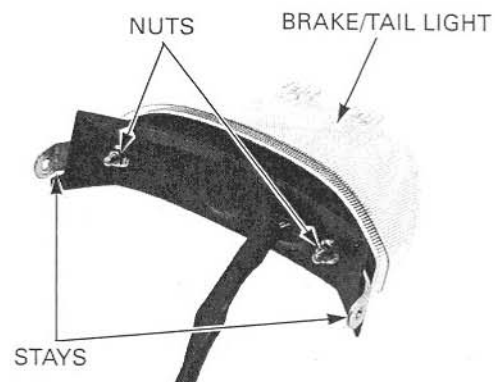
Remove the rear cowl (page 3-5).

Remove the brake/tail light unit mounting screws. Pull out the tabs from the grooves of rear cowl, then remove the brake/tail light unit.

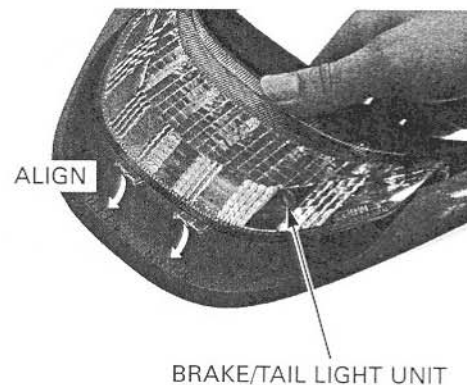
BRAKE/TAIL LIGHT UNIT



Remove the two nuts, two stays and brake/tail light.



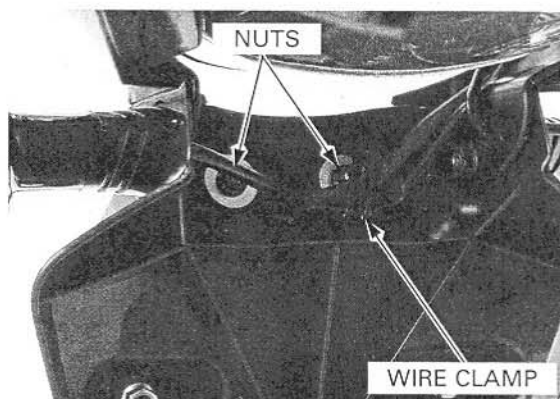
Install the brake/tail light unit onto the rear cowl while aligning the tabs with groove of the rear cowl. Installation is in the reverse order of removal.



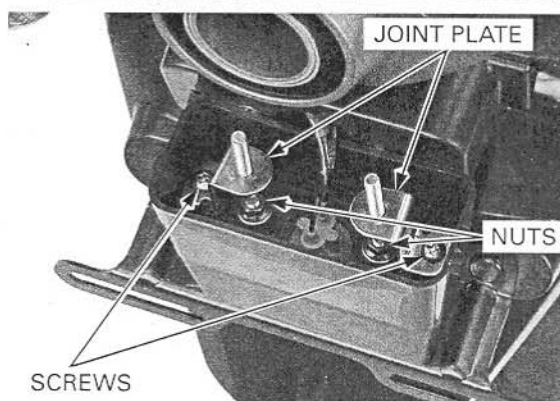
LICENCE LIGHT

REMOVAL/INSTALLATION

Remove the two nuts and wire clamp.

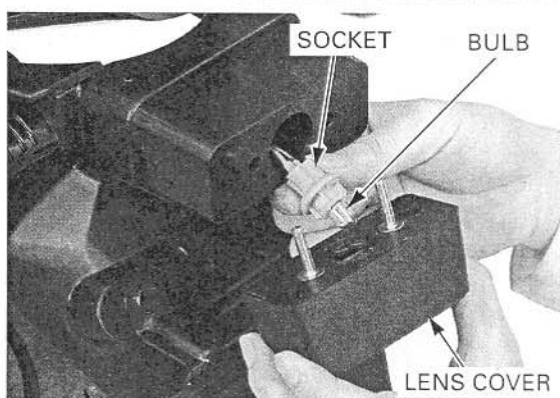


Remove the two screws and joint plates.
Remove the two nuts and lens cover.

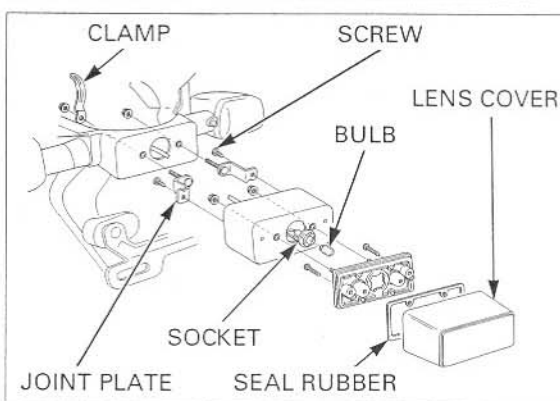


Turn the licence light bulb socket counterclockwise and remove it from the lens cover.

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



Install the licence light bulb socket in the reverse order of removal.

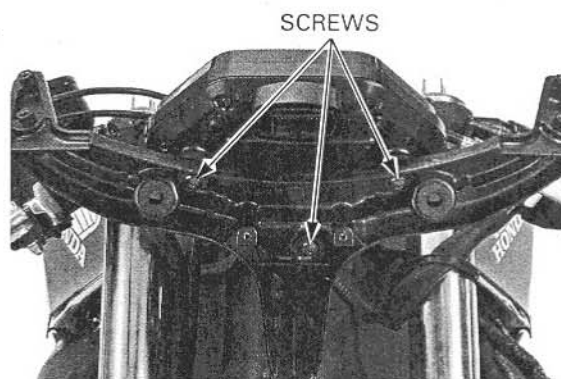


COMBINATION METER

REMOVAL

Remove the upper cowl (page 3-9).

Remove the three screws and combination meter from the bracket.

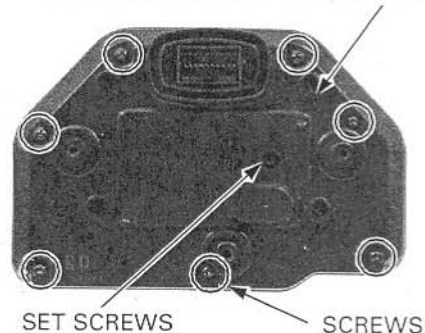


DISASSEMBLY/ASSEMBLY

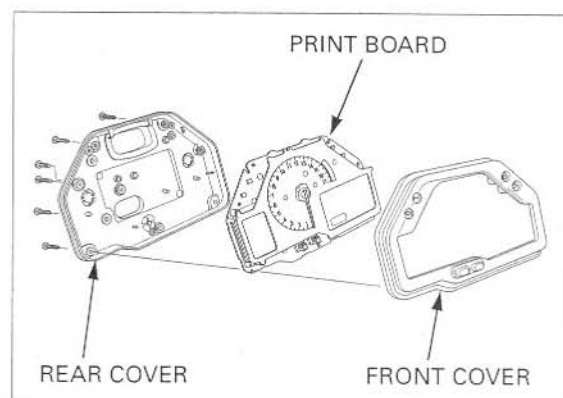
Remove the screws and separate the front cover from the rear cover.

Remove the set screw that holds the combination meter print board to the rear cover.

COMBINATION METER REAR COVER



Assemble the combination meter in the reverse order of removal.

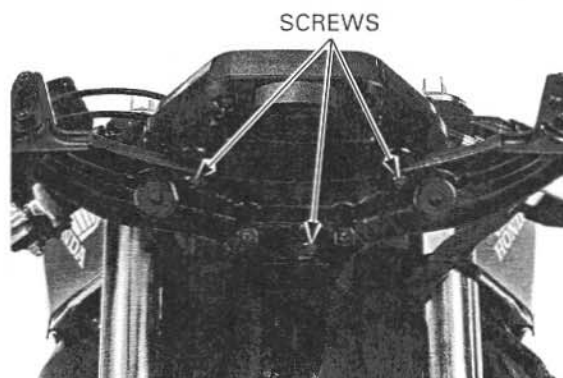


LIGHTS/METERS/SWITCHES

INSTALLATION

Install the combination meter onto the bracket.
Tighten the screws securely.

Install the upper cowl (page 3-12).



POWER/GROUND LINES INSPECTION

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 body ground (-).

There should be battery voltage with the ignition switch ON.

If there is no voltage, check the sub-fuse (10A) and Black/brown wire for a loose connection or an open circuit.

Back-up voltage line

Measure the voltage between the Red/green wire terminal (+) and body ground (-).

There should be battery voltage at all times.

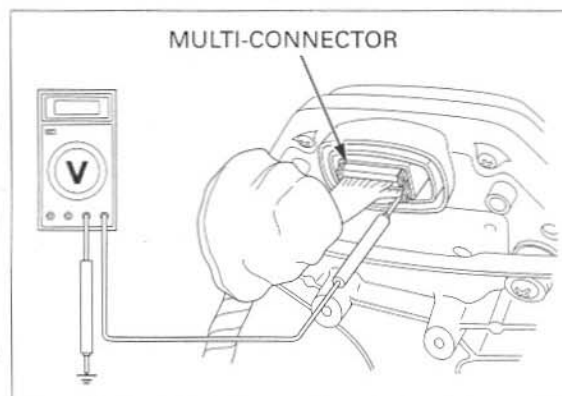
If there is no voltage, check the sub-fuse (10A) and Red/green wire for a loose connection or an open circuit.

Ground line

Measure the continuity between the Green wire terminal (+) and body ground (-).

There should be continuity.

If there is no continuity, check for open circuit in Green wire.

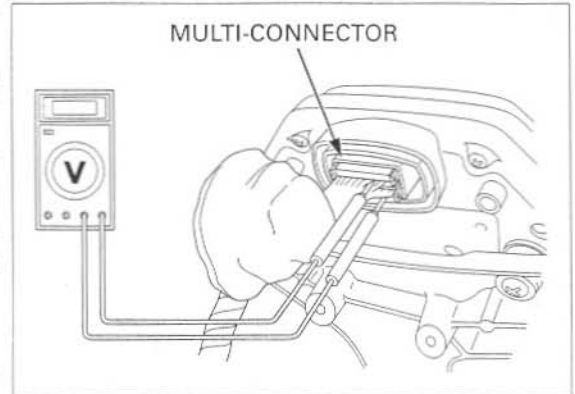


SPEEDOMETER/VEHICLE SPEED SENSOR (VSS)

SYSTEM INSPECTION

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 20-12).
- If they function, shift the transmission into neutral, disconnect the combination meter multi-connector and turn the ignition switch ON. Measure the voltage between the Pink/green (+) and Green (-) 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 the VSS (page 20-13).



VEHICLE SPEED SENSOR (VSS) INSPECTION

Lift and support the fuel tank (page 6-61).

Disconnect the VSS 3P (Natural) connector and check for loose or poor contact of the connector. Also check for loose or poor contact of the engine sub-harness 12P (Gray) connector (page 1-22).

Turn the ignition switch ON and measure the voltage at the 3P (Natural) connector at the wire harness side.

CONNECTION: Black (+) – Green (-)

STANDARD: Battery voltage

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

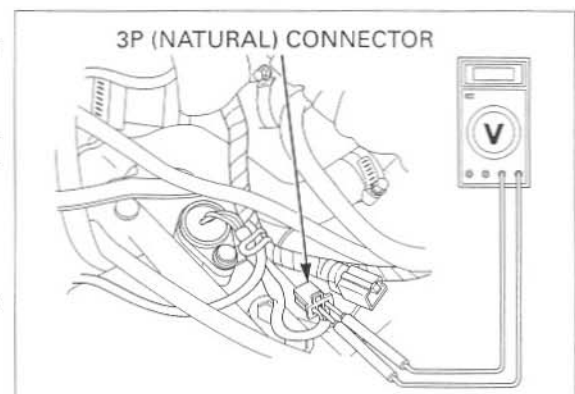
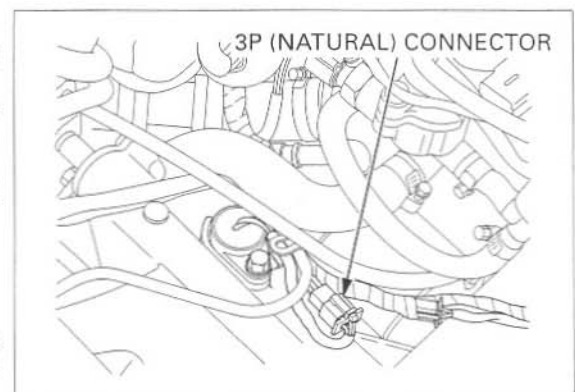
Disconnect the VSS 3P (Natural) connector. Support the motorcycle securely and place the rear wheel off the ground. Shift the transmission into neutral.

Measure the voltage at the sensor connector terminals with the ignition switch ON while slowly turning the rear wheel by hand.

CONNECTION: Pink (+) – Green (-)

STANDARD: Repeat 0 to 5V

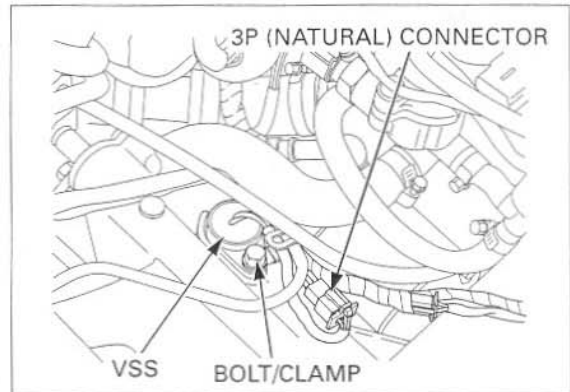
If the measurement is out of specification, replace the VSS.



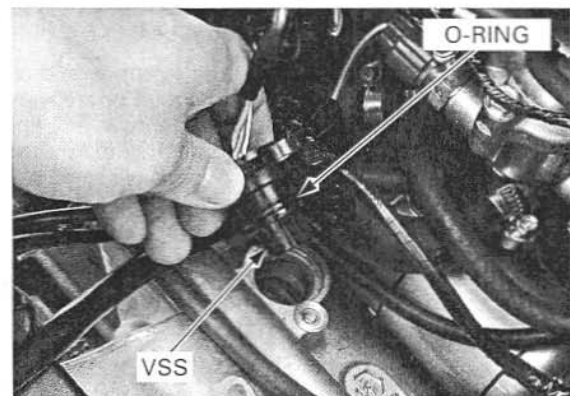
LIGHTS/METERS/SWITCHES

REMOVAL/INSTALLATION

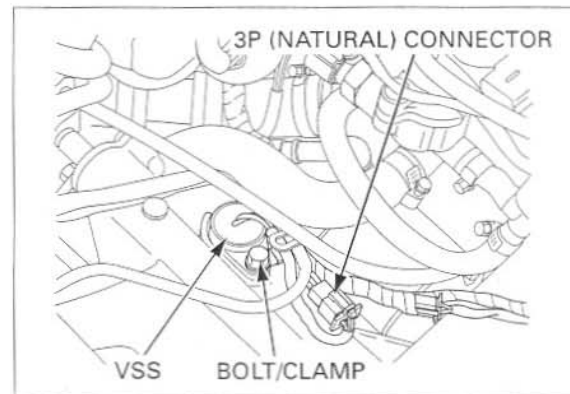
Lift and support the fuel tank (page 6-61).
Disconnect the VSS 3P (Natural) connector.
Remove the bolt, clamp and VSS.



Check the condition of the O-ring, replace it if necessary.
Install the VSS into the upper crankcase.



Install and tighten the clamp, bolt securely.
Route the sensor wire properly.
Connect the VSS 3P (Natural) connector.



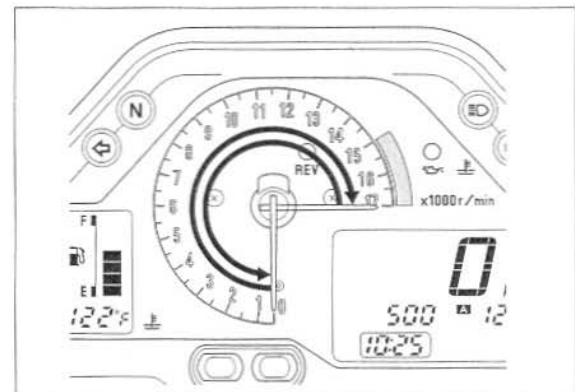
TACHOMETER

SYSTEM INSPECTION

- Check for loose or poor contact terminals at the combination meter multi-connector and sub-harness 12P connectors.

Turn the ignition switch ON, check that the tachometer needle move to full scale and then returns to zero.

If the needle does not show initial function, check the combination meter power input line (page 20-12).



Remove the upper cowl (page 3-9) and expose the combination meter multi-connector.

Connect the peak voltage adaptor to the tachometer Yellow/green terminal and ground.

TOOLS:

IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100 (not available in U.S.A.)

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

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

Start the engine and measure the tachometer input peak voltage.

PEAK VOLTAGE: 10.5 V minimum

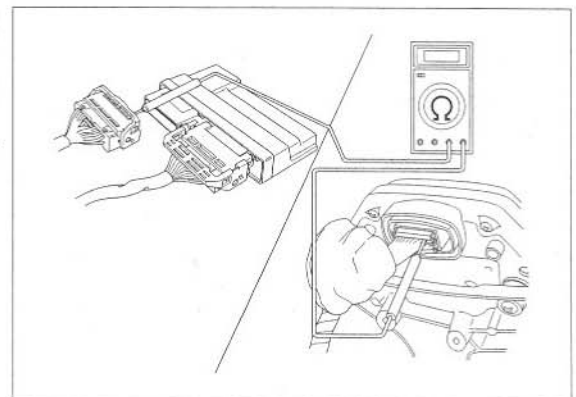
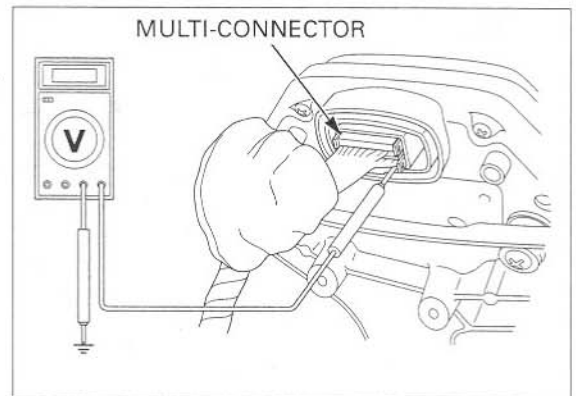
If the peak voltage is normal, replace the combination meter assembly (page 20-11).

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 multi-connector and ECM 32P (Black) 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 20-11).



ECT SENSOR

INSPECTION

Remove the ECT sensor (page 6-89).

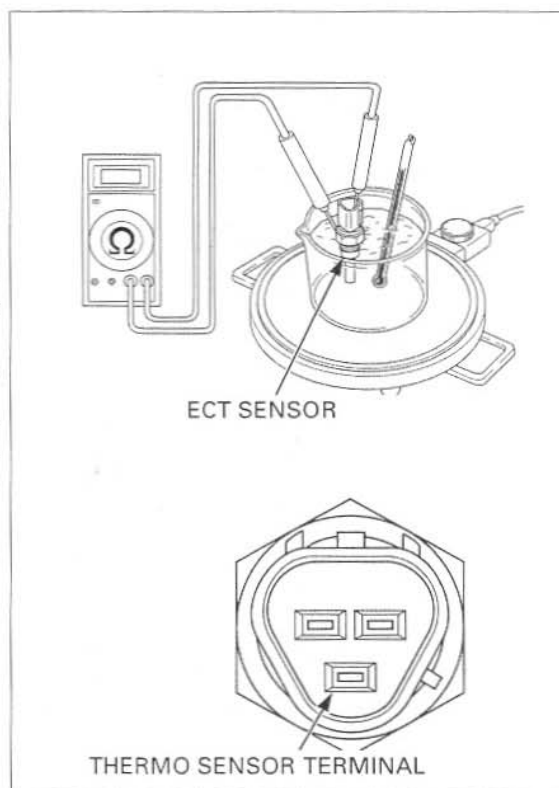
Suspend the ECT sensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT 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 sensor touch the pan.

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

Temperature	80°C (176°F)	120°C (248°F)
Resistance	2.1 – 2.6 kΩ	0.65 – 0.73 kΩ

Install the ECT sensor (page 6-89).

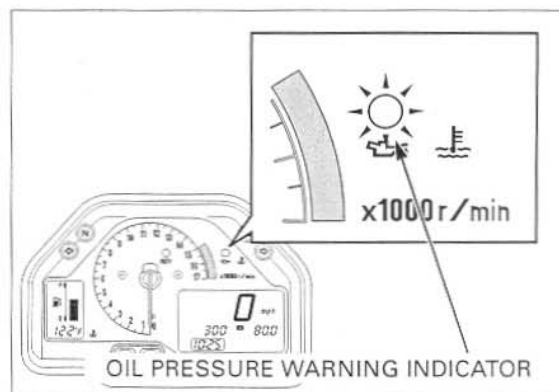


OIL PRESSURE SWITCH

INSPECTION

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

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

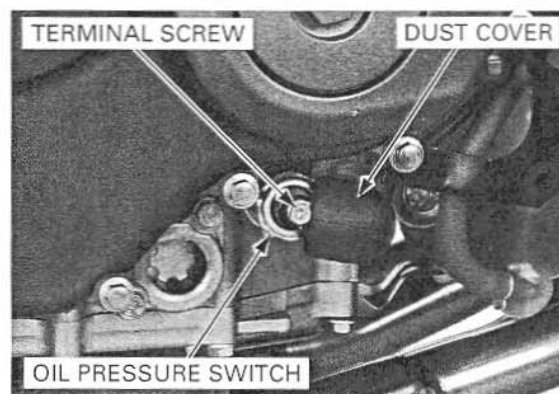


If the indicator does not come on, inspect as follows:

Remove the lower cowls (page 3-6).

Remove the dust cover.

Remove the terminal screw and oil pressure switch wire.



Short the oil pressure switch wire to ground using a jumper wire.

The oil pressure warning indicator comes on when the ignition switch is ON.

If the light does not come on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure the indicator goes out.

If the indicator does not go out, check the oil pressure (page 5-5).

If the oil pressure is normal, replace the oil pressure switch (page 20-17).

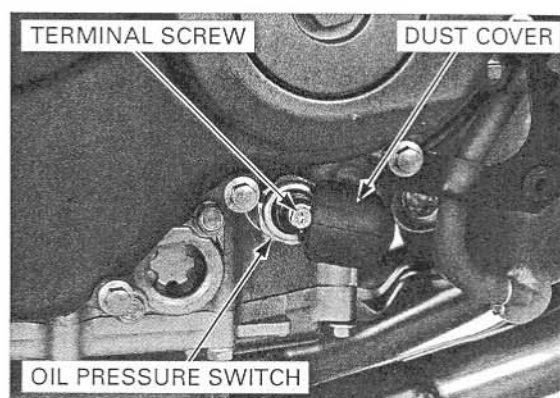
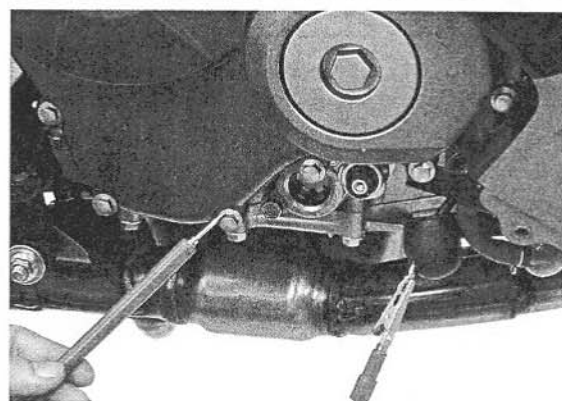
Install the lower cowls (page 3-6).

REMOVAL/INSTALLATION

Remove the lower cowls (page 3-6).

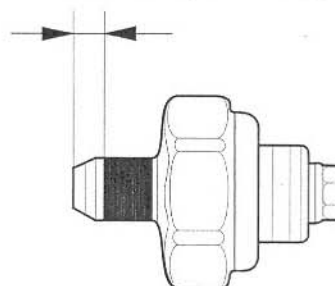
Remove the dust cover, terminal screw and wire.

Remove the oil pressure switch while holding switch base.



Apply sealant to the oil pressure switch threads as shown.

Do not apply sealant to the thread head 3 – 4 mm (0.1 – 0.2 in).



Install the oil pressure switch onto the switch base, tighten the oil pressure switch to the specified torque while holding the switch base.

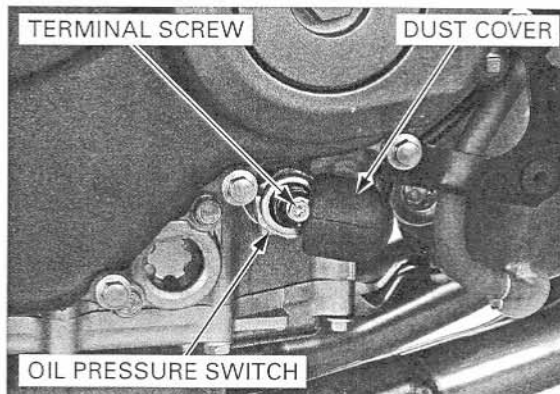
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

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

TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the dust cover.

Install the lower cowls (page 3-6).

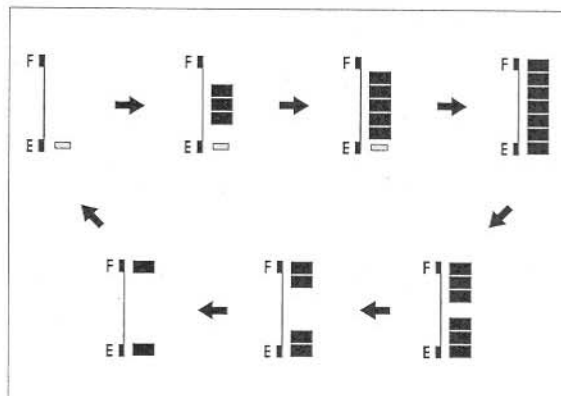


LIGHTS/METERS/SWITCHES

FUEL LEVEL SENSOR

If the fuel meter display is as shown, check for an open circuit in wire harness and the fuel level sensor.

If the wire harness and fuel level sensor are good, replace the combination meter printed circuit board (page 20-11).

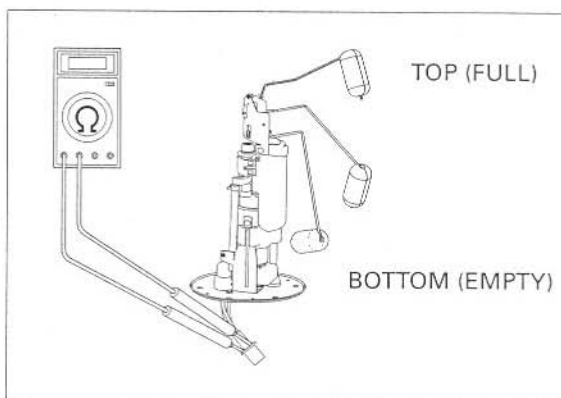


FUEL LEVEL SENSOR INSPECTION

Remove the fuel pump unit (page 6-58).

Connect an ohmmeter to the fuel pump unit 3P (Black) connector Brown/black and Green terminals. Inspect the resistance of the float at the top (full) and bottom (empty) positions.

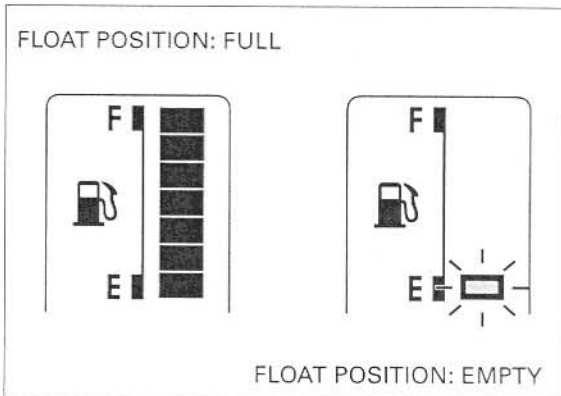
	TOP (FULL)	BOTTOM (EMPTY)
Resistance	1 – 5 k Ω	92 – 96 k Ω



FUEL METER INSPECTION

Connect the fuel pump unit 3P (Black) connector to the wire harness.

Turn the ignition switch ON and move the float from bottom (empty) to top (full) to check the fuel meter display indication.

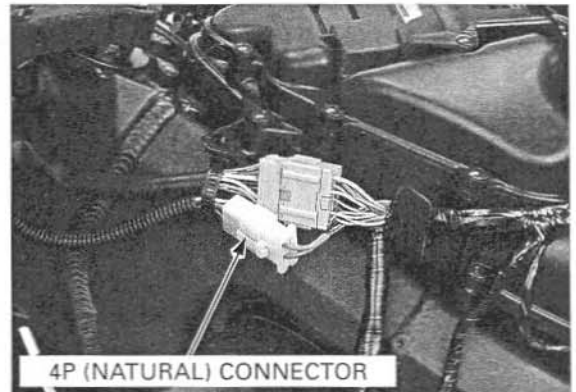


IGNITION SWITCH

INSPECTION

Remove the fuel tank cover (page 3-15).

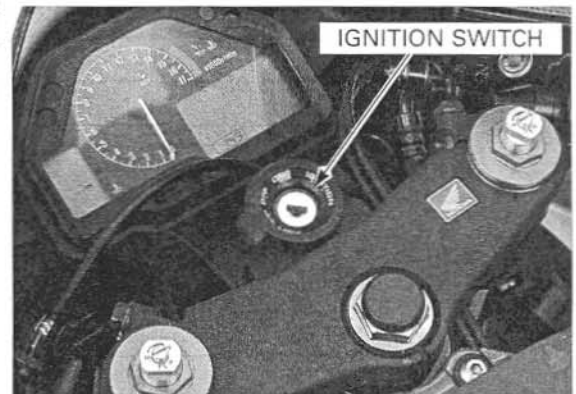
Disconnect the ignition switch wire 4P (Natural) connector.



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 follow:

	BAT	IG	IV	KEY
ON	○	○	○	KEY ON
OFF		○	○	KEY OFF
LOCK		○	○	KEY OFF LOCK PIN

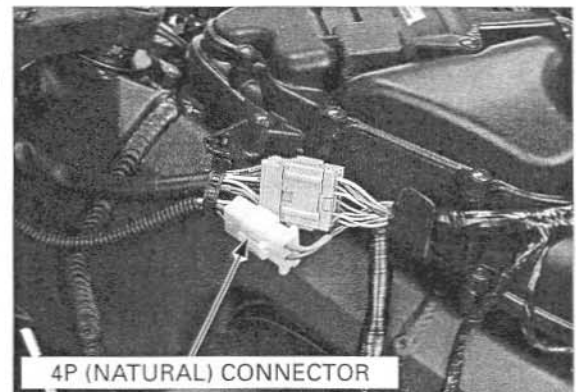


REMOVAL/INSTALLATION

Remove the fuel tank cover (page 3-15).

Remove the upper cowl (page 3-9).

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

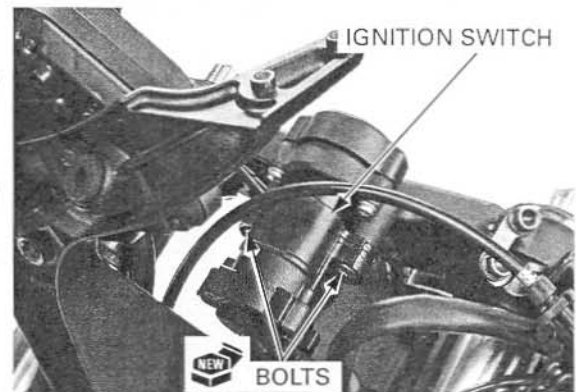


Remove the bolts and ignition switch.

Install the ignition switch to the top bridge. Tighten the new ignition switch mounting bolts to the specified torque.

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Install the removed parts in the reverse order of removal.

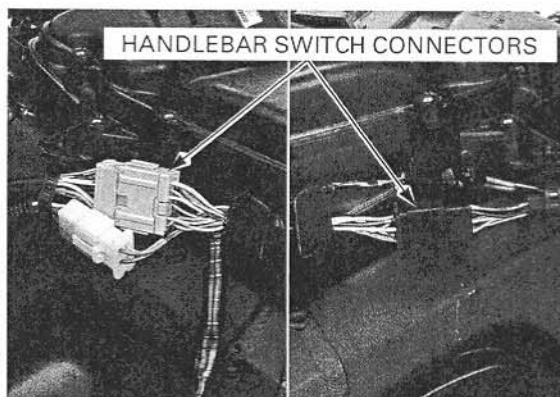


LIGHTS/METERS/SWITCHES

HANDLEBAR SWITCHES

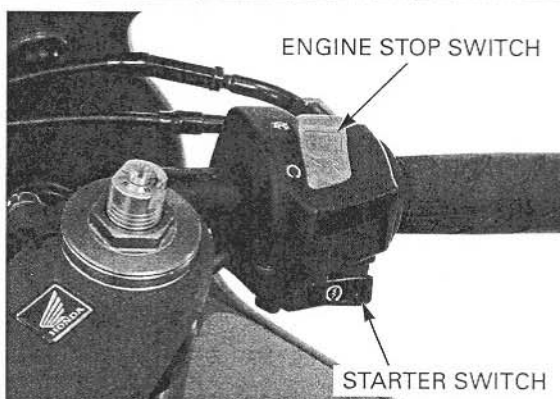
Remove the fuel tank cover (page 3-15).
Disconnect the handlebar switch connectors.

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 SWITCH

	IG	BAT
OFF		
RUN	○—○	
COLOR	BI	W/BI

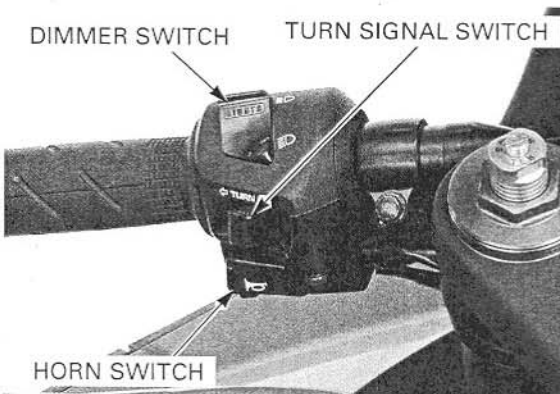


STARTER SWITCH

	ST	IG	BAT3	HL
FREE			○—○	
PUSH	○—○			
COLOR	Y/R	BI	BI/R	Bu/W

TURN SIGNAL SWITCH

	W	R	L	PAT5	PR	PL
R	○—○			○—○		
N				○—○	○—○	○—○
L	○—○		○—○	○—○		
COLOR	Gr	Lb	O	BI/Br	Lb/W	O/W



HORN SWITCH

	Ho	BAT
FREE		
PUSH	○—○	
COLOR		Lg

DIMMER SWITCHES

	HL	Lo	Hi
Lo			
(N)	○—○		○—○
Hi	○—○		○—○
COLOR	Bu/W		W

BRAKE LIGHT SWITCH

FRONT

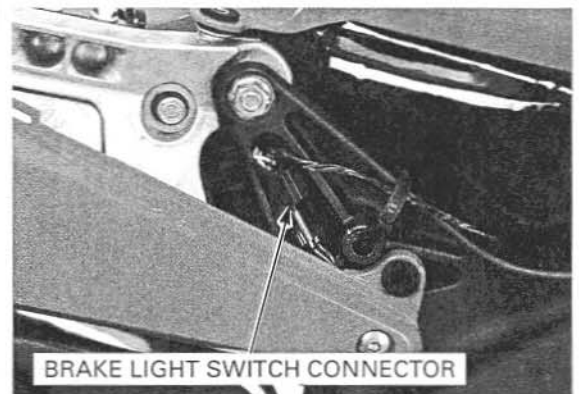
Disconnect the front brake light switch connectors and check for continuity between the terminals.

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



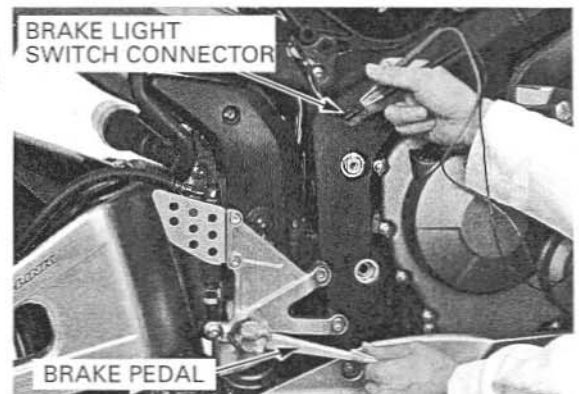
REAR

Disconnect the rear brake light switch 2P (Black) connector.



Check for continuity between the terminals.

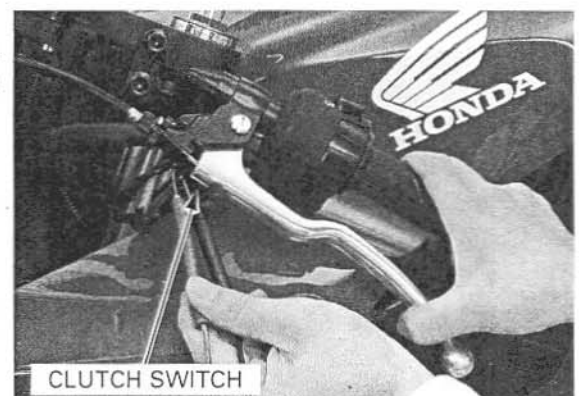
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



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.



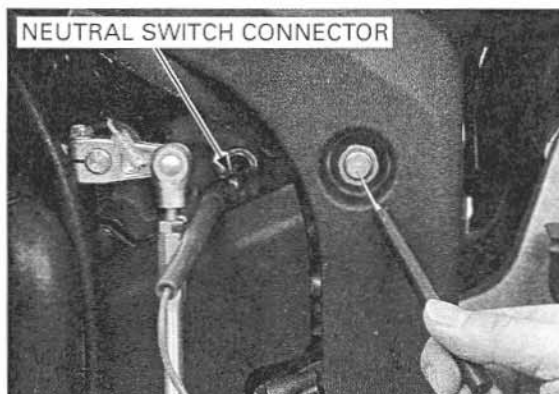
LIGHTS/METERS/SWITCHES

NEUTRAL SWITCH

Disconnect the neutral switch connector from the switch.

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

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

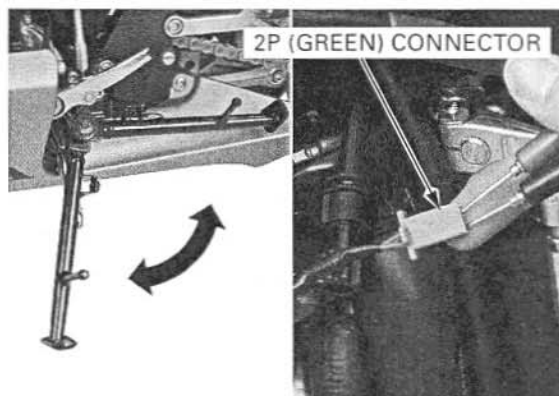
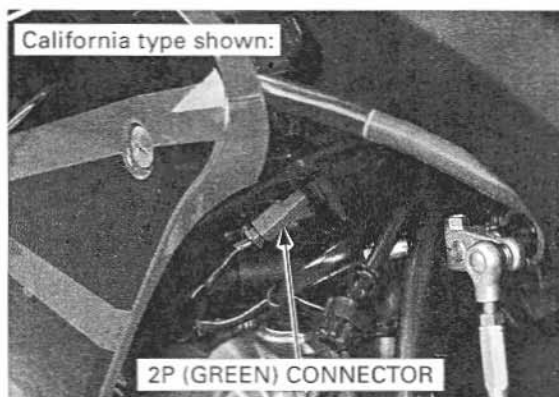


SIDE STAND SWITCH

INSPECTION

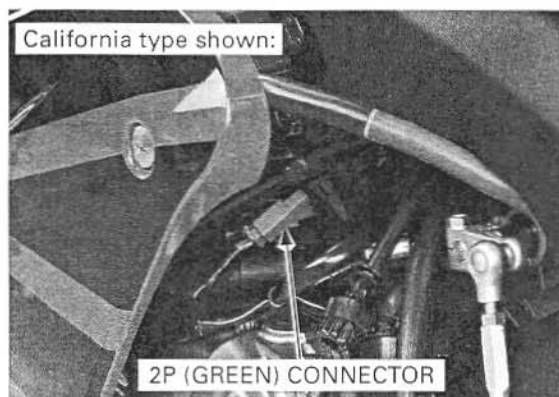
Disconnect the side stand switch 2P (Green) connector.

Check for continuity between the wire terminals of the side stand switch 2P (Green) connector. Continuity should exist only when the side stand is up.

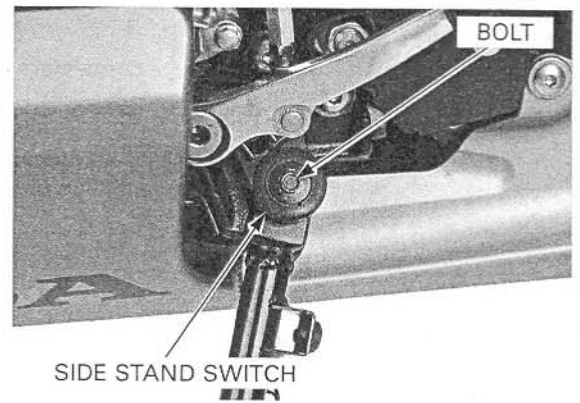


REMOVAL

Disconnect the side stand switch 2P (Green) connector.

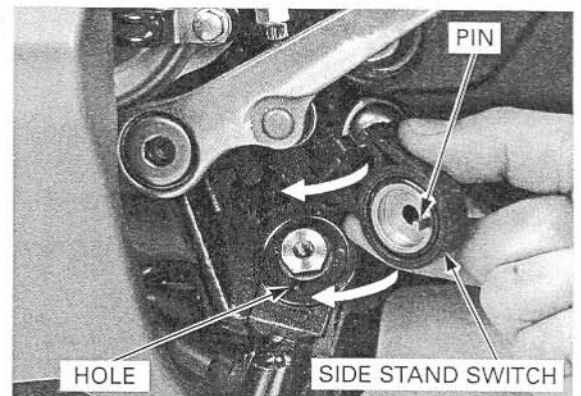


Remove the bolt and side stand switch.



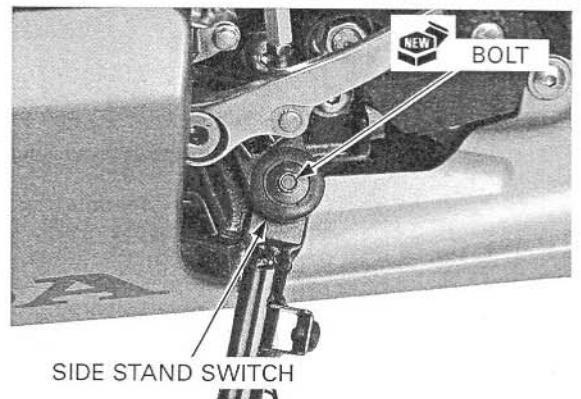
INSTALLATION

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

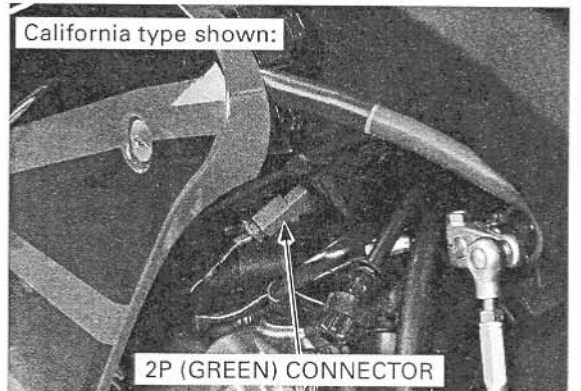


Secure the side stand switch with a new bolt.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



Connect the side stand switch 2P (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. Related Circuit Inspection

Check the following

- Burned bulb or non-specified wattage
- Blown fuse
- Ignition switch and turn signal switch function
- Loose connector

Check for the above items.

Are the above items in good condition?

NO - Replace or repair the malfunction part(s)

YES - GO TO STEP 2.

2. Turn Signal Circuit Inspection

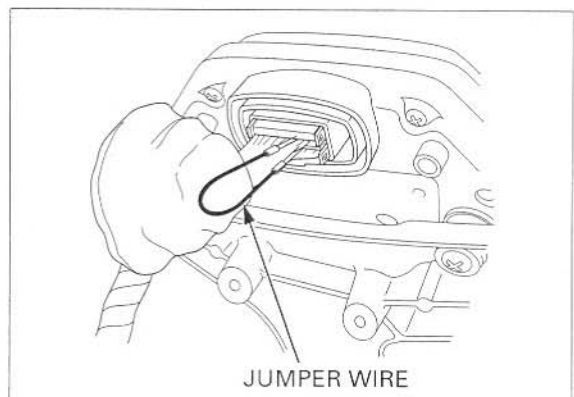
Remove the upper cowl (page 3-9).

Connect the combination meter multi-connector. Short the White/green and Gray terminals of the combination multi-connector with a jumper wire. Turn the ignition switch ON and check the turn signal light by turning the turn signal switch on.

Does the light come on?

- YES** -
- Faulty turn signal relay; replace the combination meter print board (page 20-11)
 - Poor connection of the combination meter multi-connector.

NO - Open circuit in White/green or Gray wires.

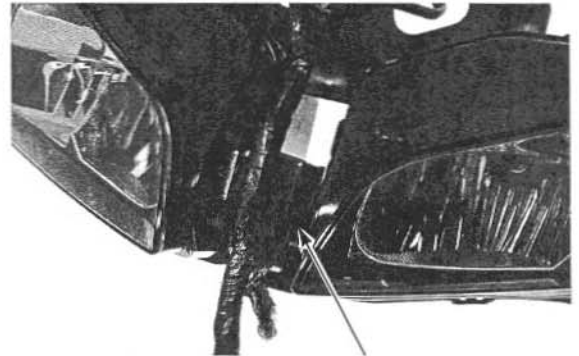


HEADLIGHT RELAY

INSPECTION

Remove the head light (page 20-7).

Disconnect the headlight relay 4P connector, then remove the headlight relay.



HEADLIGHT RELAY 4P CONNECTOR

Connect the ohmmeter to the headlight relay connector terminals.

CONNECTION: Black/red – Blue

Connect the 12V battery to the following headlight relay connector terminals.

CONNECTION: White – Green

There should be continuity only when the 12V battery is connected.

If there is no continuity when the 12V battery is connected, replace the headlight relay.

