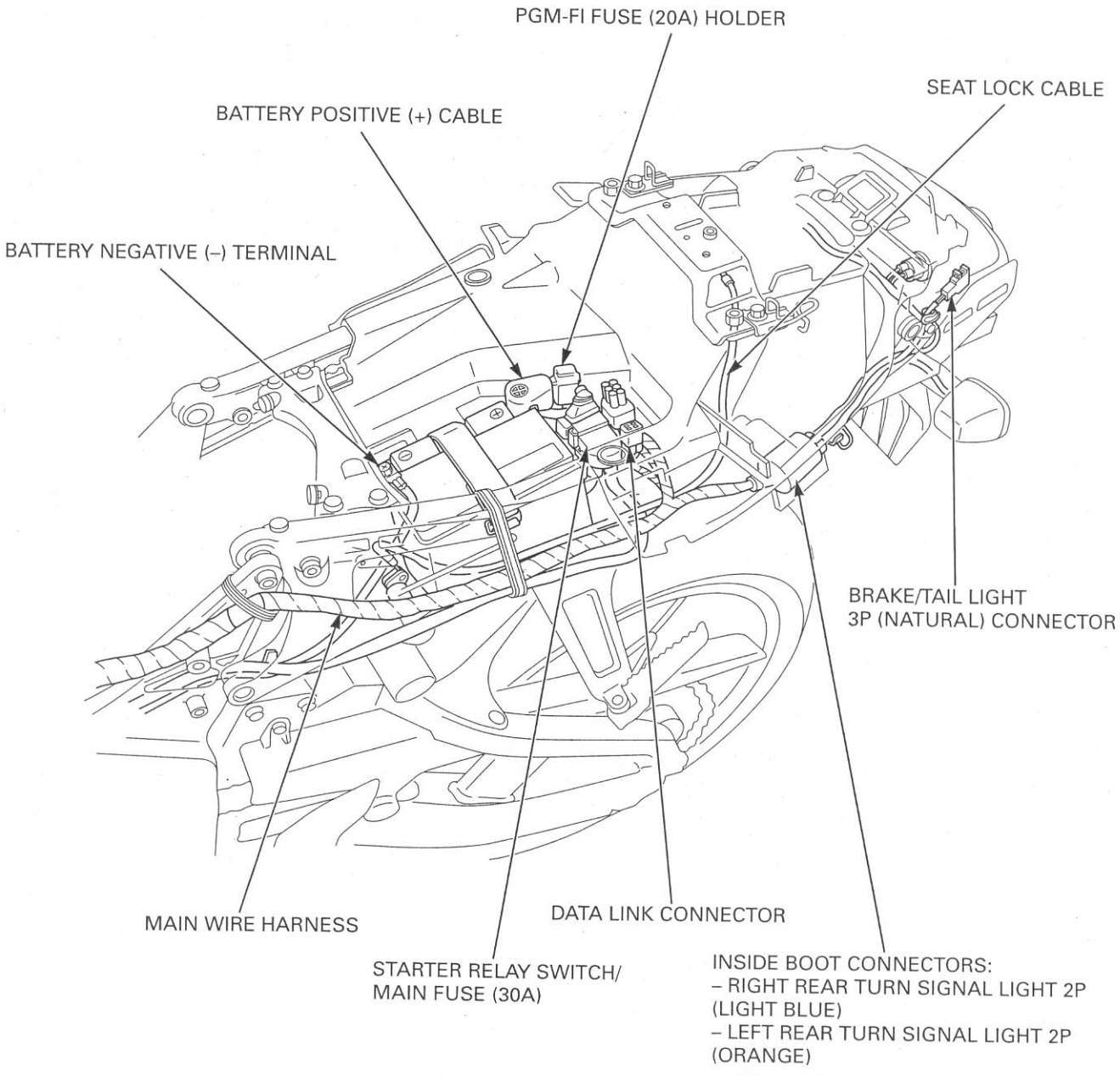
1. GENERAL INFORMATION

LIGHTS/METERS/SWITCHES 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

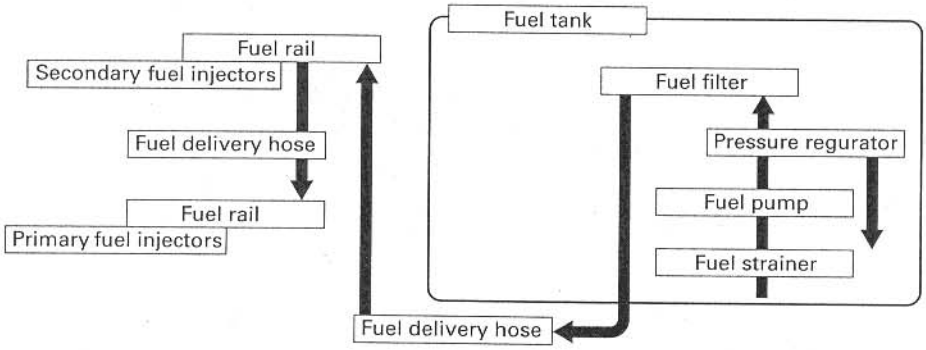
FRAME

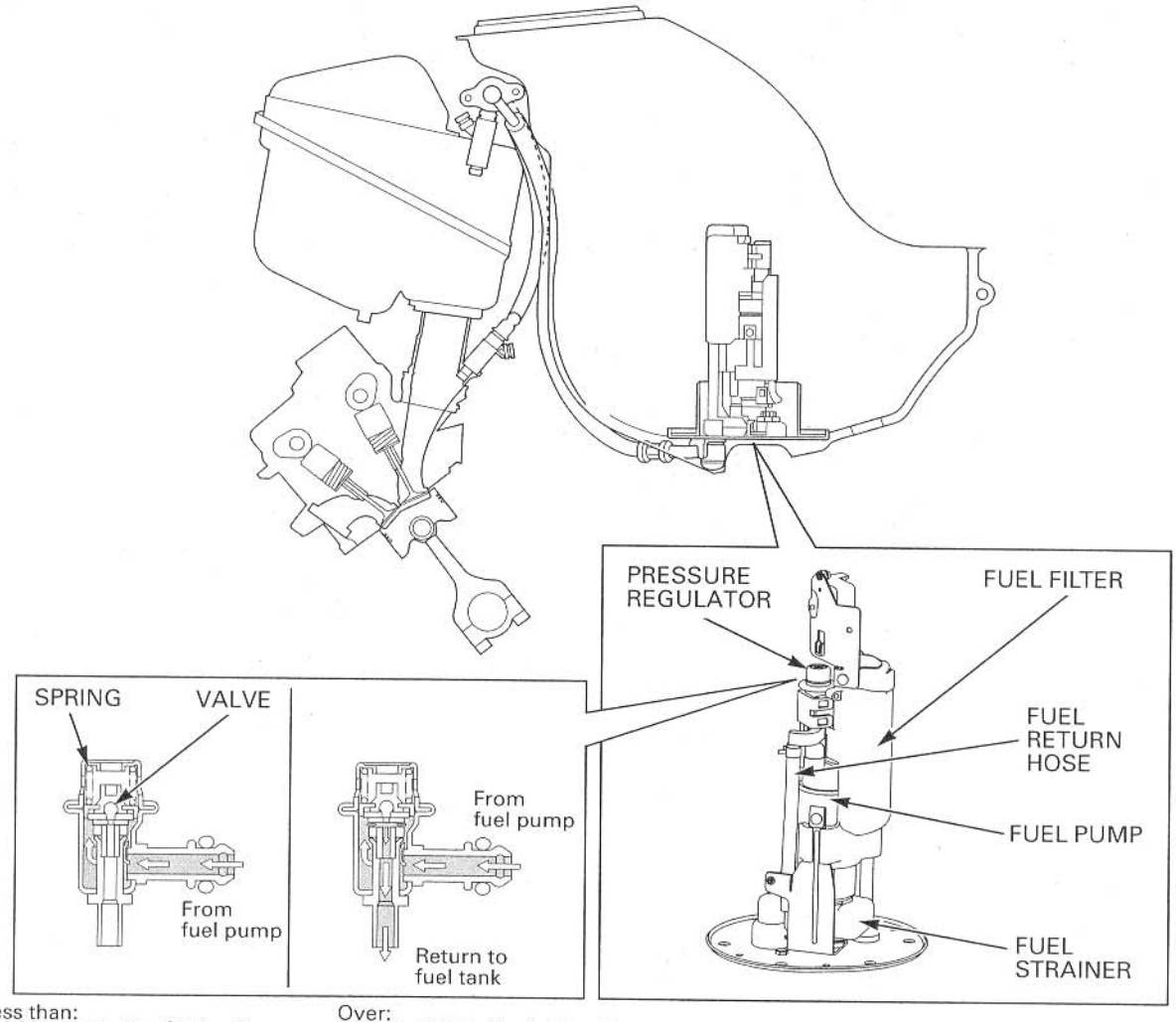
LOCATION	MATERIAL	REMARKS
Seat catch hook sliding area Front wheel dust seal lips Final driven flange-to-rear wheel hub mating surface and O-ring Rear wheel dust seal lips Rear wheel side collar inner surface Throttle grip pipe flange Clutch lever pivot bolt sliding area Rear brake pedal pivot sliding area Gearshift pedal link tie-rod ball joints Gearshift pedal pivot Driver footpeg sliding area Pillion footpeg sliding area Side stand pivot Center stand pivot	Multi-purpose grease	
Steering head bearing sliding surface Steering head dust seal lips	Urea based multi-purpose grease with extreme pressure (example: EXCE-LIGHT EP2 manufactured by KYODO YUSH1, Japan), Shell stamina EP2 or equivalent	
Swingarm pivot bearings Swingarm pivot dust seal lips Shock arm and shock link needle bearings Shock arm and shock link dust seal lips Shock absorber needle bearings Shock absorber dust seal lips	Multi-purpose grease (Shell Alvania EP2 or equivalent)	
Throttle cable A, B outer inside Clutch cable outer inside Clutch cable outer inside	Cable lubricant	
Handlebar grip rubber inside	Honda bond A or Honda hand Grip Cement (U.S.A. only)	
Steering bearing adjustment nut threads	Engine oil	
Front brake lever-to-master piston contacting area Front brake lever pivot Rear master brake master piston-to-push rod contacting area Brake caliper dust seals Rear brake caliper boot inside Rear brake caliper pin boot inside	Silicone grease	
Brake master piston and cups Brake caliper piston and piston seals	Honda DOT 4 brake fluid	
Fork cap O-ring Fork dust seal and oil seal lips	Pro Honda Suspension Fluid SS-8	
Rear brake reservoir hose joint screw threads Front brake caliper assembly bolt threads Rear brake caliper pin bolt threads	Locking agent	


PGM-FI FUSE (20A) HOLDER
SEAT LOCK CABLE
BATTERY POSITIVE (+) CABLE
BATTERY NEGATIVE (–) TERMINAL
BRAKE/TAIL LIGHT
3P (NATURAL) CONNECTOR
MAIN WIRE HARNESS
DATA LINK CONNECTOR
STARTER RELAY SWITCH/
MAIN FUSE (30A)
INSIDE BOOT CONNECTORS:
– RIGHT REAR TURN SIGNAL LIGHT 2P
(LIGHT BLUE)
– LEFT REAR TURN SIGNAL LIGHT 2P
(ORANGE)

ABSOLUTE PRESSURE FUEL SUPPLY SYSTEM

The fuel delivery system consists of the following components: fuel tank, fuel strainer, fuel pump, fuel filter, internal pressure regulator, fuel delivery hoses, fuel rails and injectors.
This system is equipped with the absolute fuel pressure. There is no external fuel return hose or vacuum pressure regulator with this system.
The fuel pressure in the fuel delivery system is regulated by the internal pressure regulator and always kept absolute; 343 kPa (3.5 kgf/cm^2, 50 psi).
The internal pressure regulator returns the fuel by opening a valve when the fuel pressure increases more than 343 kPa (3.5 kgf/cm^2, 50 psi).
This system optimizes injection volume by the ECM control.



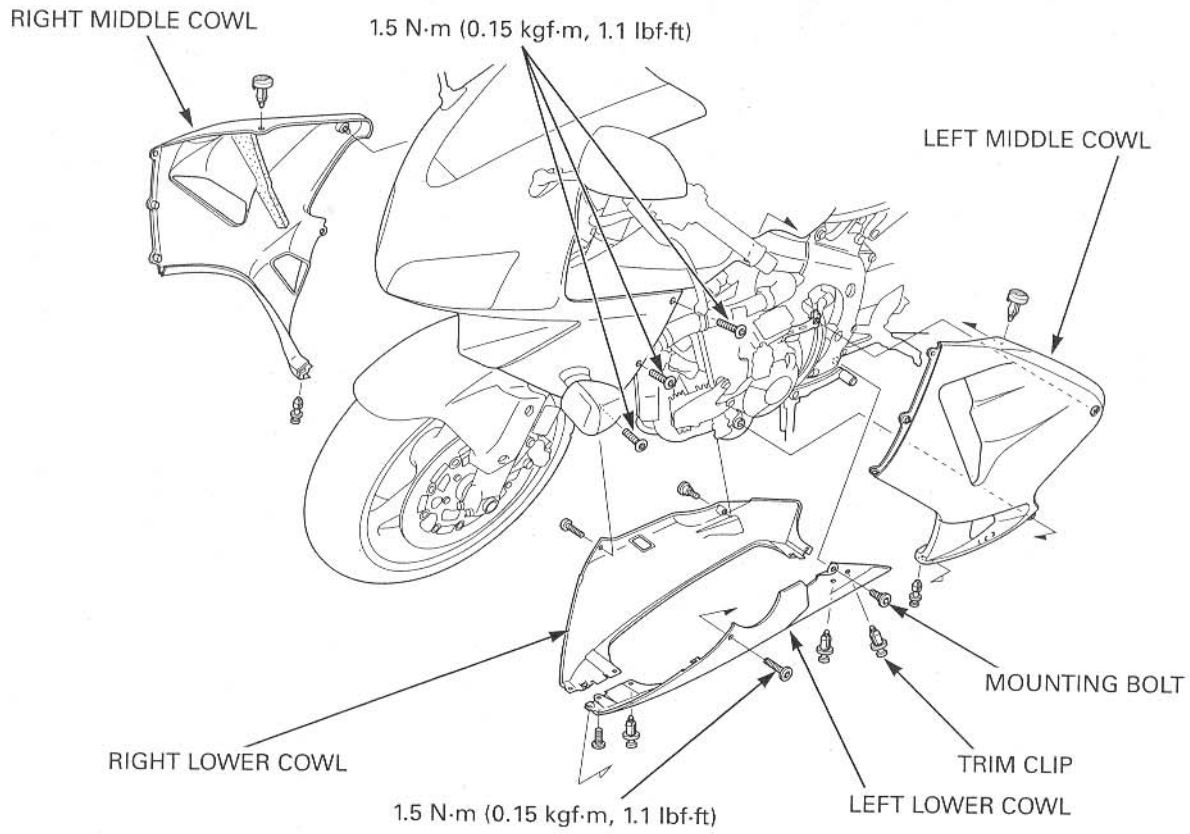


Less than:
343 kPa (3.5 kgf/cm^2, 50 psi)

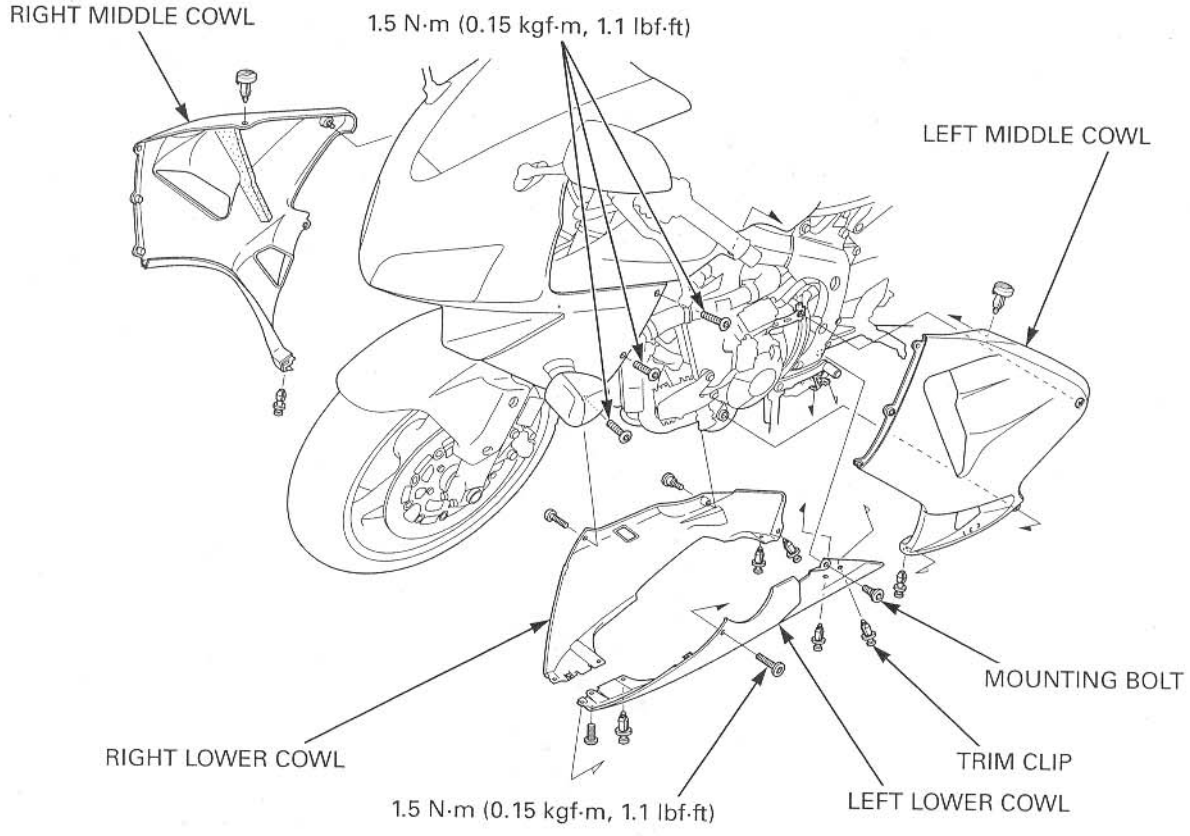
Over:
343 kPa (3.5 kgf/cm^2, 50 psi)

INSTALLATION

Except California type:

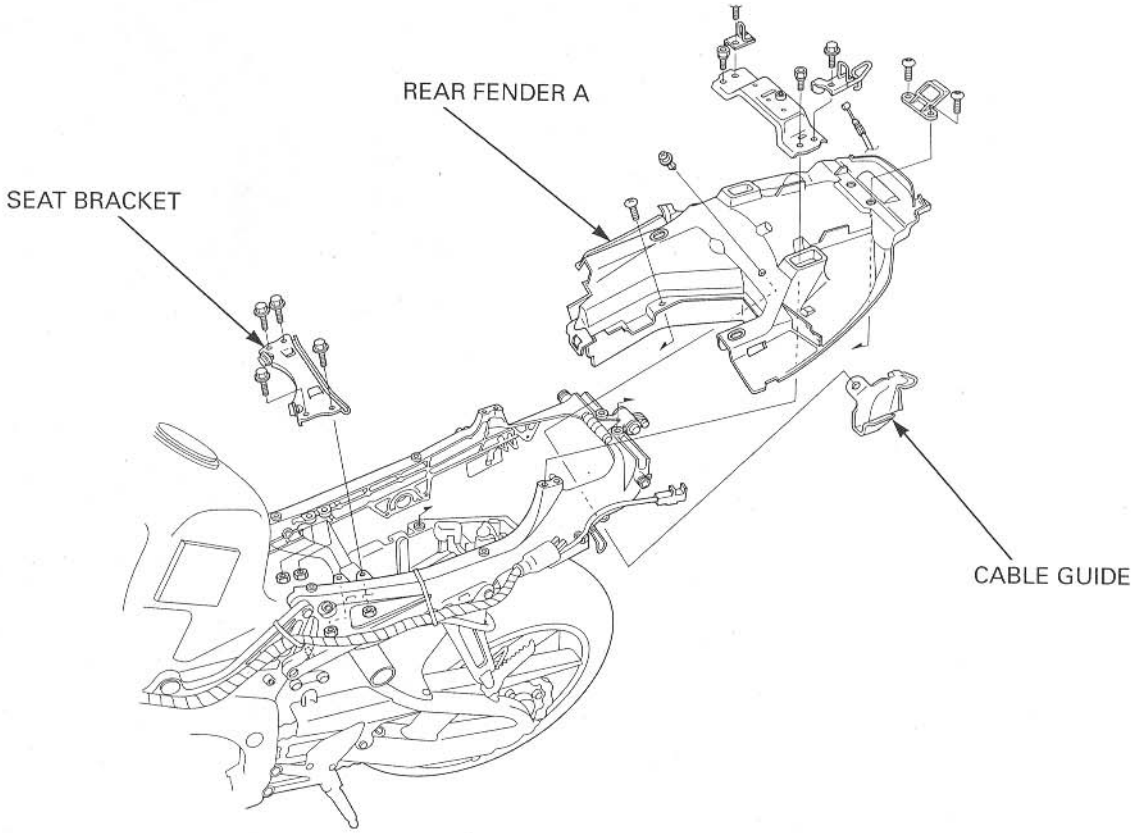


California type:



INSTALLATION

Installation is in the reverse order of removal.



SEAT RAIL

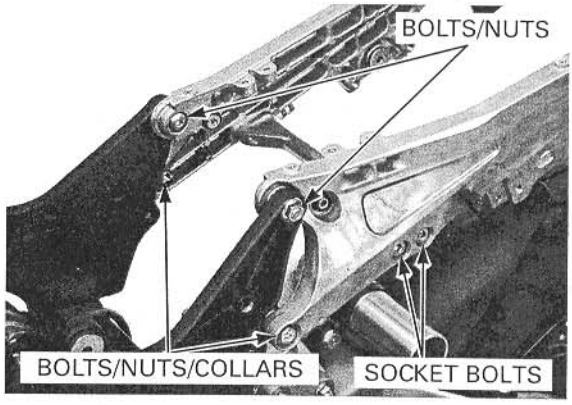
REMOVAL

Remove the following:

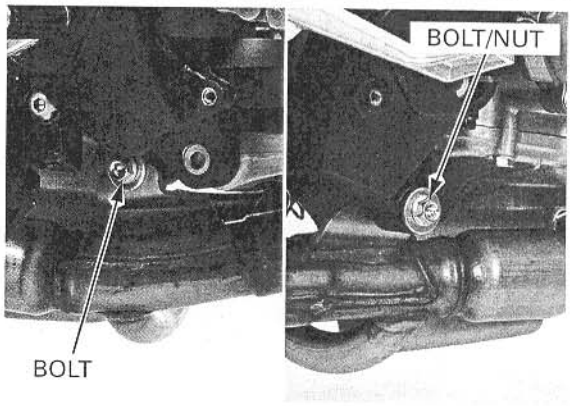
- Muffler (page 3-20)
- Rear fender (page 3-16)
- Fuel tank (page 6-61)
- Battery tray (page 17-7)

Loosen the four seat rail brace socket bolts.

Remove the seat rail upper mounting bolts/nuts and lower mounting bolts/collars/nuts, then remove the seat rail.

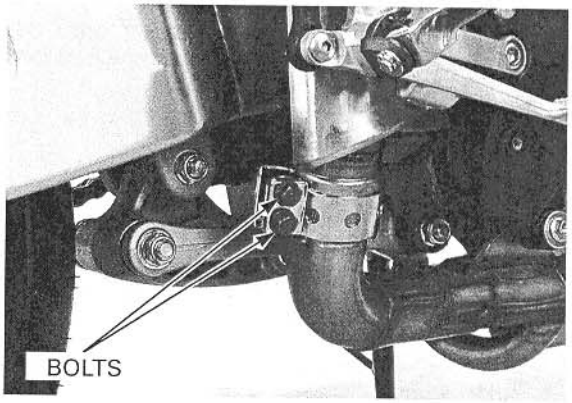


2. Tighten the exhaust pipe mounting bolts/nut securely.

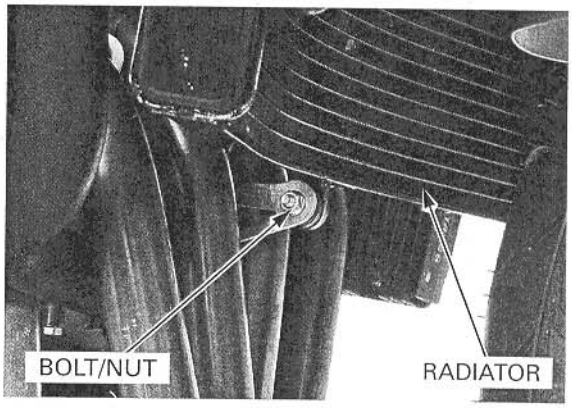


3. Tighten the muffler band flange bolts to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



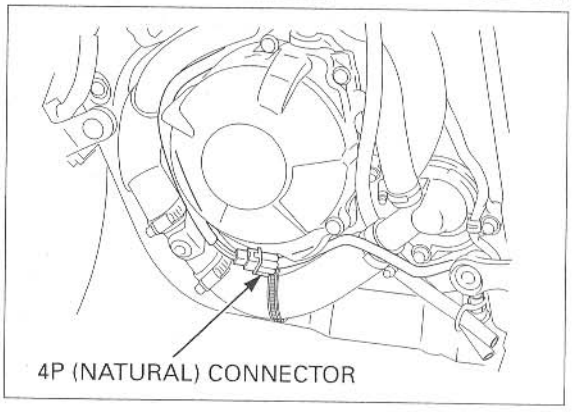
Install the radiator lower mounting bolt/nut and tighten the nut.



California type only: Route the O_2 sensor wire into the frame.
Connect the O_2 sensor 4P (Natural) connectors.

Install the following:

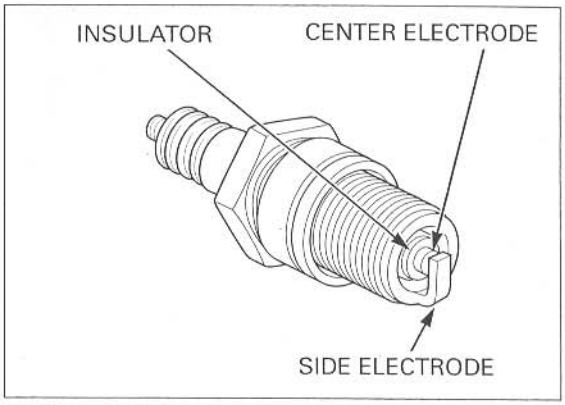
- Upper cowl (page 3-12)
- Middle cowls (page 3-8)
- Lower cowls (page 3-6)



INSPECTION

Check the following and replace if necessary (recommended spark plug: page 4-2)

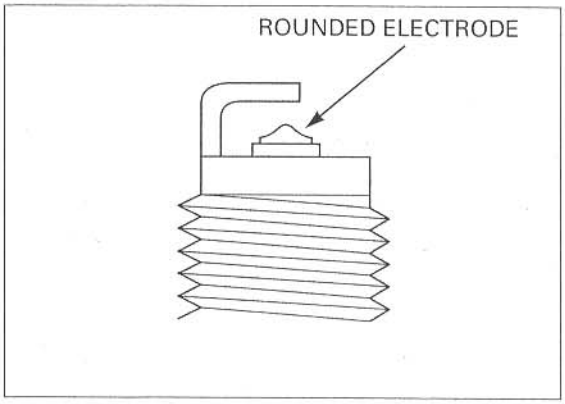
- Insulator for damage
- Electrodes for wear
- Burning condition, coloration



This motorcycle's spark plug equipped with iridium center electrode. Replace the spark plug if the electrodes are contaminated.

If the electrodes are contaminated with accumulated objects or dirt, replace the spark plug.

Replace the plug if the center electrode is rounded as shown in the illustration.



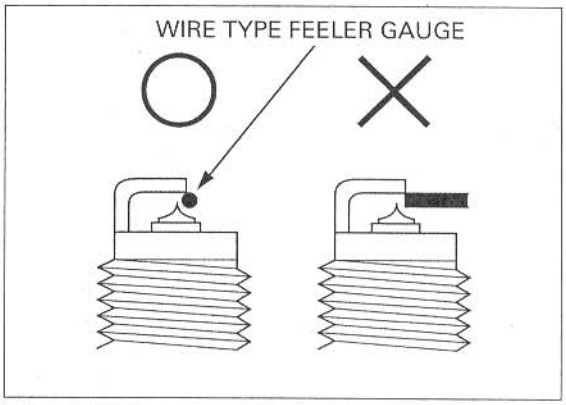
Always use specified spark plugs on this motorcycle.

SPECIFIED SPARK PLUG: IMR9C-9HE (NGK)

To prevent damaging the iridium center electrode, use a wire type feeler gauge to check the spark plug gap.

Check the gap between the center and side electrodes with a wire type feeler gauge.

Make sure that the ϕ 1.0 mm (0.04 in) plug gauge does not insert between the gap.

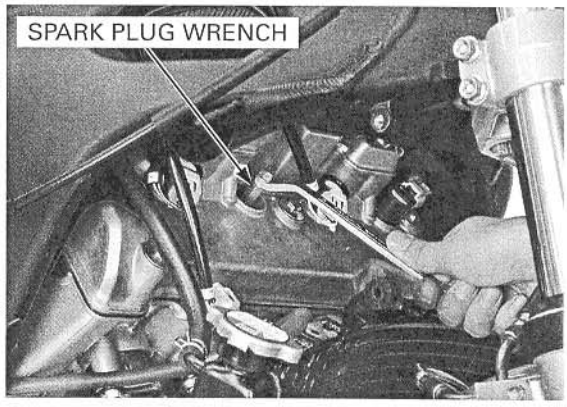


Do not adjust the spark plug gap. If the gap is out of specification, replace with a new one.

If the gauge can be inserted into the gap, replace the plug with a new one.

Reinstall the spark plug in the cylinder head and hand tighten, then torque to specification.

TORQUE: 16 N·m (1.6 kgf·m, 12 lbf·ft)



If using the new plug, install as follows:

Do not over tighten the plug.

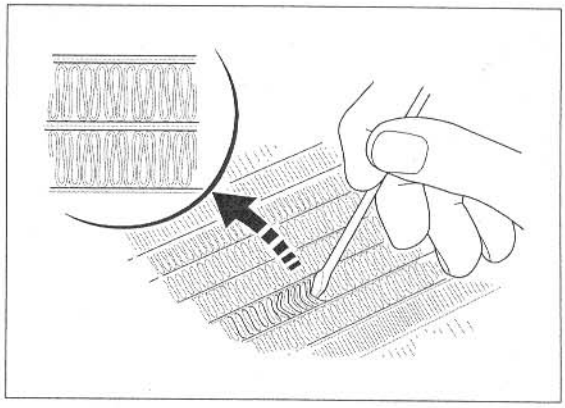
Install and hand tighten the new spark plug, then tighten it about 1/2 turn after the sealing washer contacts the seat of the plug hole.

COOLING SYSTEM

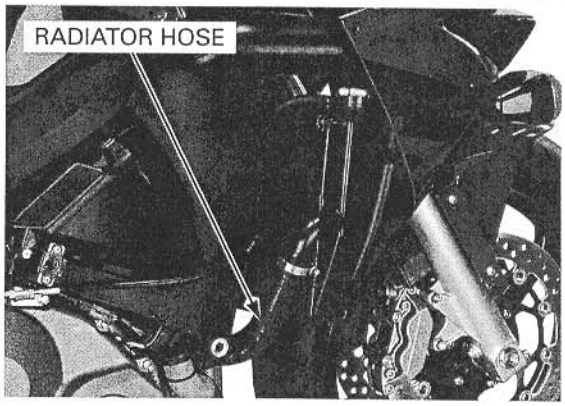
Remove the following:

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

Check the radiator air passages for clogging or damage.
Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



Inspect the radiator hoses for cracks or deterioration, and replace them if necessary.
Check the tightness of all hose clamps and fasteners.



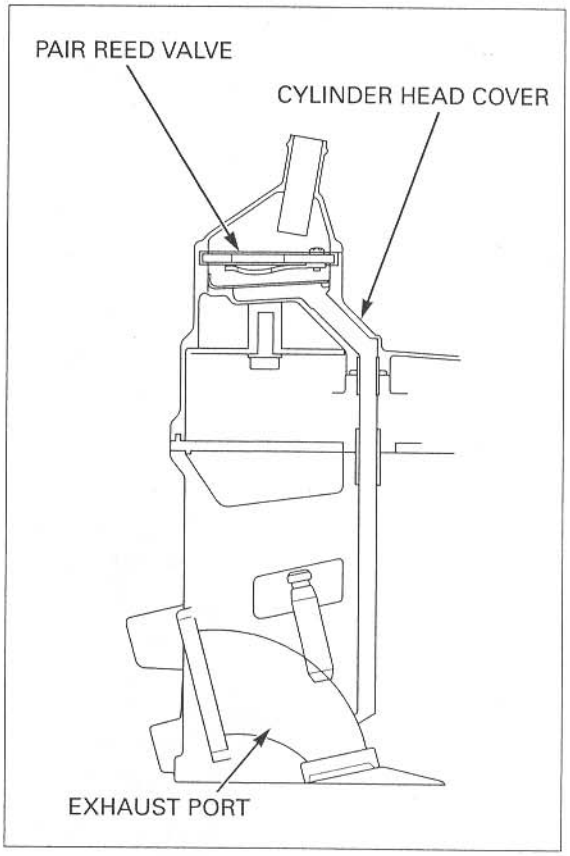
SECONDARY AIR SUPPLY SYSTEM

- This model is equipped built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

Remove the air cleaner housing (page 6-64).

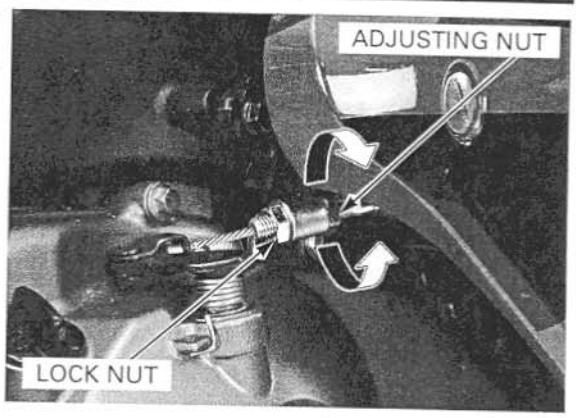
If the hoses show any signs of heat damage, inspect the PAIR reed valves in the PAIR check valves for damage.

Check the PAIR (pulse secondary air injection) hoses between the PAIR control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.



Major adjustment is performed at the clutch lifter lever.
Loosen the lock nut and turn the adjusting nut to adjust the free play.
Tighten the lock nut while holding the adjusting nut.

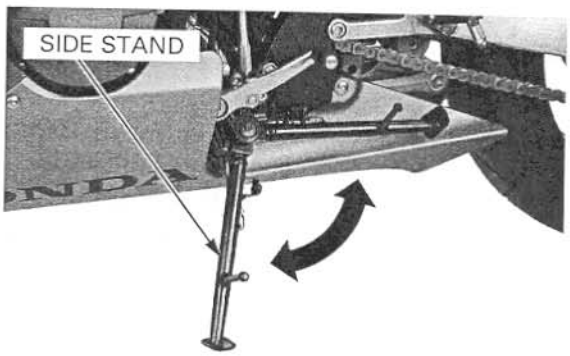
If proper free play cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch (page 10-7).



SIDE STAND

Support the motorcycle on a level surface.

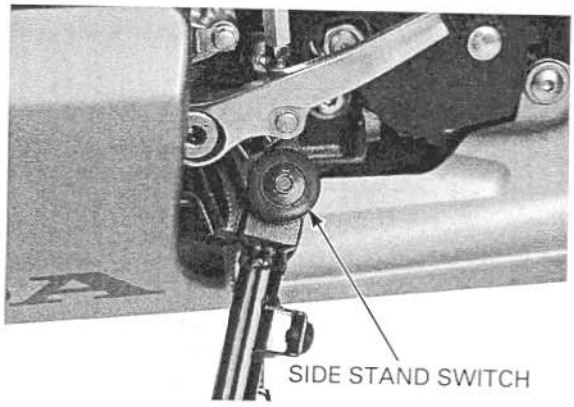
Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.



Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand full down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 20-22).



SUSPENSION

FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes and compressing the front suspension several times.
Check the entire assembly for signs of leaks, damage or loose fasteners.

Loose, worn or damaged suspension parts impair motorcycles stability and control.

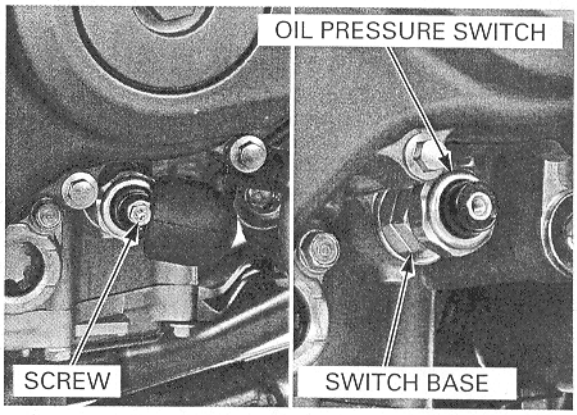
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.
Refer to page 14-18 for fork service.

OIL PRESSURE INSPECTION

If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.

Remove the lower cowls (page 3-6).

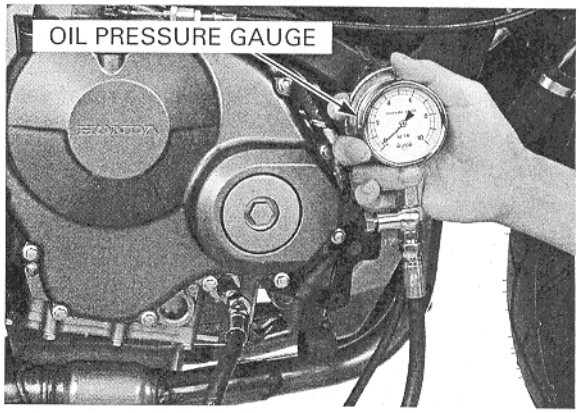
Remove the screw and disconnect the oil pressure switch wire.
Remove the oil pressure switch while holding the switch base.



Install the oil pressure gauge attachment to the switch base.
Connect the oil pressure gauge to the oil pressure gauge attachment.

TOOLS:

Oil pressure gauge set	**07506-3000001 or equivalent commercially available in U.S.A.**
Oil pressure gauge attachment	**07406-0030000 or equivalent commercially available in U.S.A.**



Check the oil level (page 4-15).

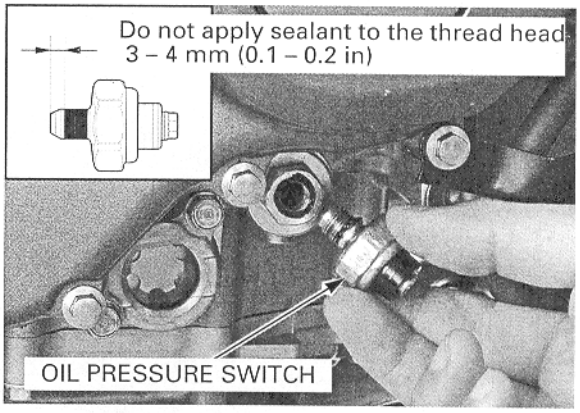
Warm the engine to normal operating temperature (approximately 80°C/176°F) and increase the engine speed to 6,000 min^{-1} (rpm) and read the oil pressure.

OIL PRESSURE:
540 kPa (5.5 kgf/cm², 78 psi) at 6,000 rpm/ (80°C/176°F)

Stop the engine and remove the tools.

Apply a sealant to the oil pressure switch threads as shown.
Install and 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)

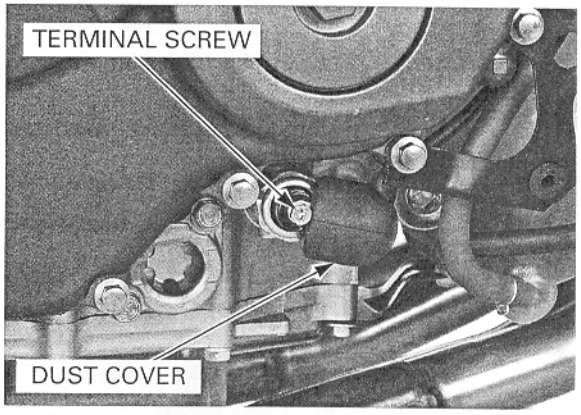


Connect the oil pressure switch wire terminal to the switch and tighten the screw to the specified torque.

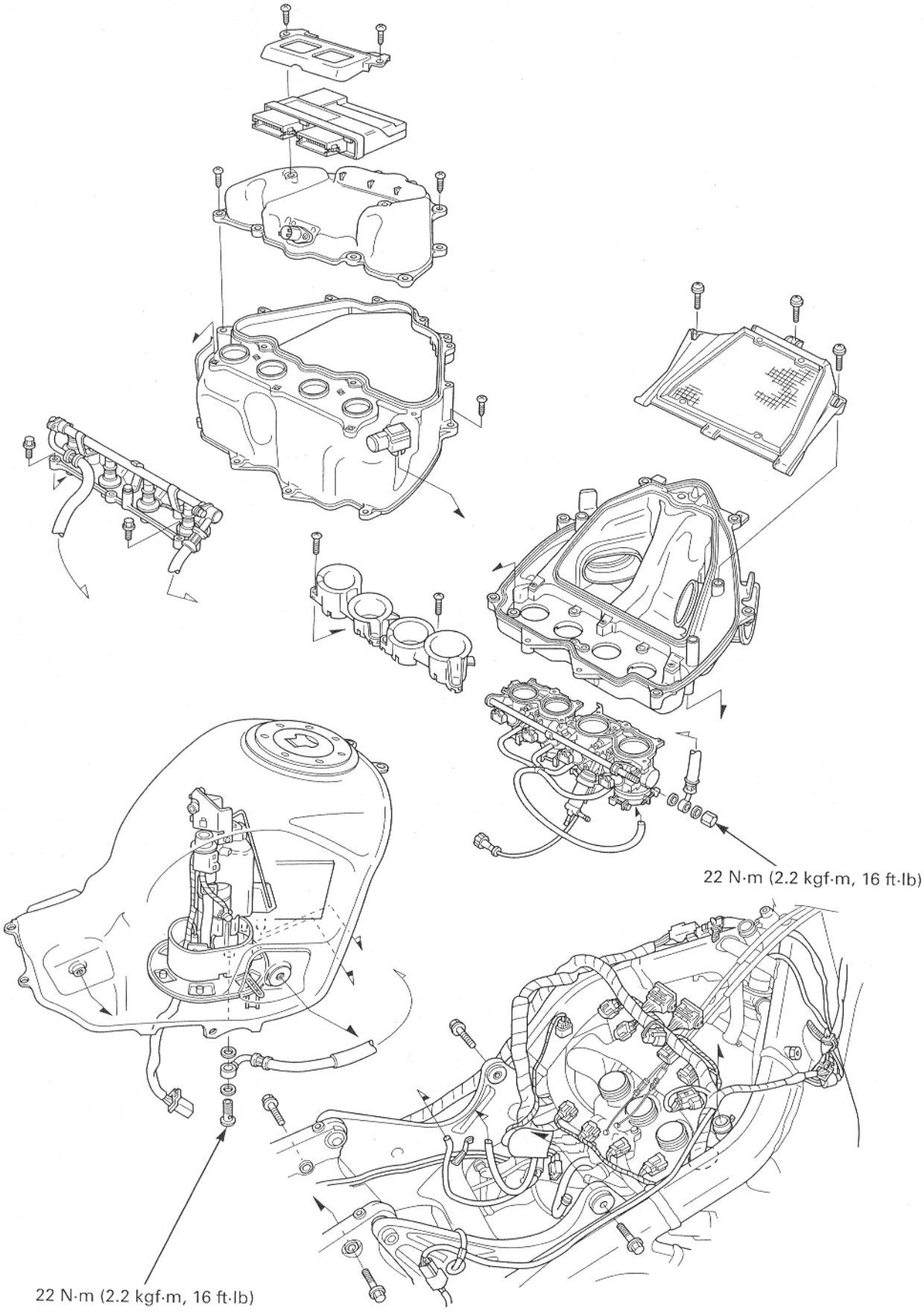
TORQUE: 2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)

Install the dust cover.

Install the lower cowls (page 3-6).



COMPONENT LOCATION



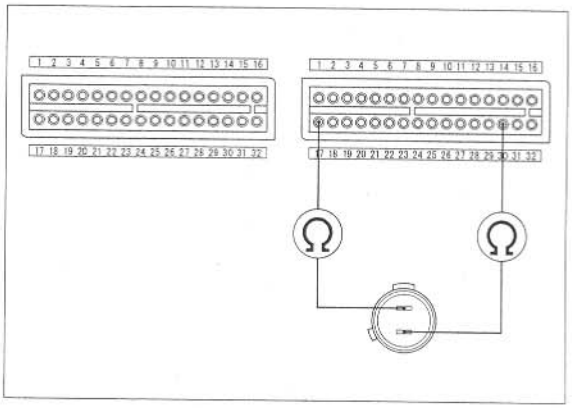
MIL CODE INDEX

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 49). When the indicator lights for 1.3 seconds, it is equivalent to ten blinks. For example, a 1.3 second illumination and two blinks (0.5 second x 2) of the indicator equals 12 blinks. Follow code 12 troubleshooting (page 6-24).
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 (page 6-15) and 2 (page 6-16) troubleshooting.

MIL	Function Failure	Causes	Symptoms	Refer to
No blinks	ECM malfunction	• Faulty ECM	• Engine does not start	6-94
No blinks	ECM power/ ground circuits malfunction	• Open circuit at the power input wire of the ECM • Faulty bank angle sensor • Open circuit in bank angle sensor related circuit • Faulty engine stop relay • Open circuit in engine stop relay related wires • Faulty engine stop switch • Open circuit in engine stop switch related wires • Faulty ignition switch • Blown PGM-FI fuse (20 A) • Blown sub-fuse (10A) (Starter, Bank angle sensor)	• Engine does not start	6-94
No blinks	ECM output line malfunction	• ECM output voltage line (Yellow/ red wire) short circuit	• Engine does not start	–
No blinks	MIL circuit malfunction	• Faulty ECM • Open or short circuit in MIL wire	• Engine operates normally	6-8
Stays lit	Data link circuit malfunction	• Short circuit in data link connector • Faulty ECM • Short circuit in data link connector wire	• Engine operates normally	–
1 Blink	MAP sensor circuit malfunction	• Loose or poor contact on MAP sensor connector • Open or short circuit in MAP sensor wire • Faulty MAP sensor	• Engine operates normally	6-15
2 Blinks	MAP sensor performance problem	• Loose or poor connection of the MAP sensor vacuum hose • Faulty MAP sensor	• Engine operates normally	6-16
7 Blinks	ECT sensor circuit malfunction	• Loose or poor contact on ECT sensor • Open or short circuit in ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (Simulate using numerical values; 90 °C/ 194 °F)	6-17
8 Blinks	TP sensor circuit malfunction	• Loose or poor contact on TP sensor connector • Open or short circuit in TP sensor wire • Faulty TP sensor	• Poor engine performance response and when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°)	6-19
9 Blinks	IAT sensor circuit malfunction	• Loose or poor contact on IAT sensor • Open or short circuit in IAT sensor wire • Faulty IAT sensor	• Engine operates normally (Simulate using numerical values; 25 °C/ 77 °F)	6-21
11 Blinks	Vehicle speed sensor circuit malfunction	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor wire • Faulty vehicle speed sensor	• Engine operates normally	6-22

4. **IAT Sensor Open Circuit Inspection**

Turn the ignition switch OFF.
Check for continuity at the Gray/blue and Green/orange wires between the IAT sensor 2P connector terminal and the ECM 32P (Light gray) connector.



Are there continuity?

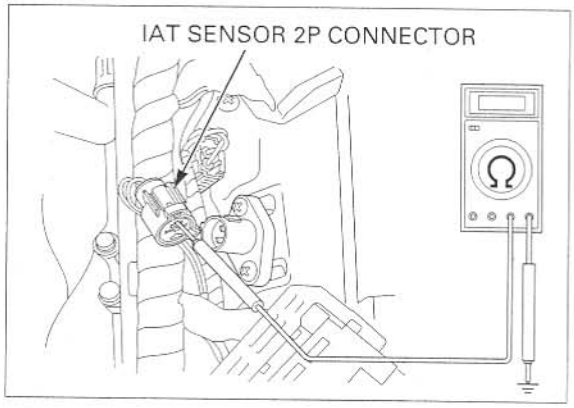
YES – GO TO STEP 5.

NO – • Open circuit in Gray/blue wire
• Open circuit in Green/orange wire

5. **IAT Sensor Output Line Short Circuit Inspection**

Check for continuity between the IAT sensor 2P connector terminal of the wire harness side and ground.

Connection: Gray/blue – Ground



Is there continuity?

YES – Short circuit in Gray/blue wire

NO – Replace the ECM with a known good one and recheck.

MIL 11 BLINKS (VEHICLE SPEED SENSOR)

- Before starting the inspection, check for loose or poor contact on the vehicle speed sensor connector and recheck the MIL blinking.

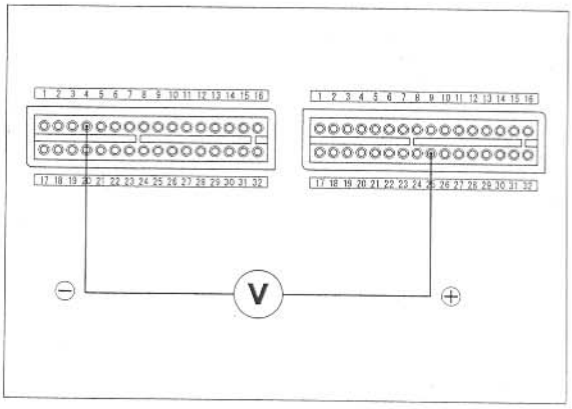
1. **Vehicle Speed Sensor Pulse Inspection**

Turn the ignition switch OFF.
Connect the ECM test harness to the ECM connectors (page 6-10).

Support the motorcycle securely and place the rear wheel off the ground.

Shift the transmission into gear.

Measure the voltage at the test harness terminals with the ignition switch ON and engine stop switch " ⟳ " while slowly turning the rear wheel by hand.



Connection: B25 (+) – A4 (–)
Standard: Repeat 0 to 5 V

Is there standard voltage?

YES – • Intermittent failure
• Loose or poor contact on the ECM connectors

NO – GO TO STEP 2.

MIL 33 BLINKS (E^2-PROM)

1. **Recheck MIL Blinks 1**

   Reset the self-diagnosis memory data (page 6-9).
   Turn the ignition switch ON and engine stop switch " ⟳ ".
   Check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – Replace the ECM with a known good one, and recheck.

   NO – GO TO STEP 2.

2. **Recheck MIL Blinks 2**

   Turn the ignition switch OFF.

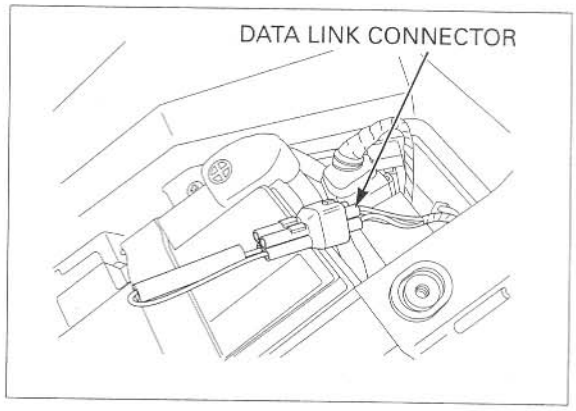
   Short the data link connector with the SCS service connector (070PZ-ZY30100).

   Turn the ignition switch ON and engine stop switch " ⟳ ".
   Check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – GO TO STEP 3.

   NO – Intermittent failure



3. **Recheck MIL Blinks 3**

   Reset the self-diagnosis memory data (page 6-9).
   Turn the ignition switch ON and engine stop switch " ⟳ ".
   Check that the MIL blinks.

   Does the MIL blink 33 times?

   YES – Replace the ECM with a known good one, and recheck.

   NO – Intermittent failure

DTC 8-1 (TP SENSOR LOW VOLTAGE)

- Before starting the inspection, check for loose or poor contact on the TP sensor connector and recheck the DTC.

1. **TP Sensor System Inspection**

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

   Check the TP sensor with the HDS when the throttle fully closed.

   Is about 0 V indicated?

   YES – • Intermittent failure
   • Loose or poor contact on the MAP sensor connector

   NO – GO TO STEP 2.

2. **TP Sensor Input Voltage Inspection**

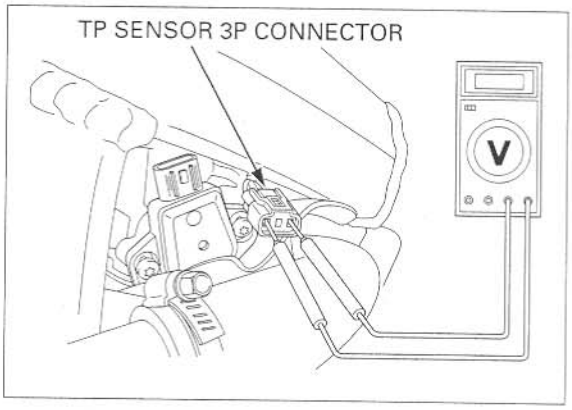
   Turn the ignition switch OFF.
   Disconnect the TP sensor 3P connector.

   Turn the ignition switch ON and engine stop switch " ⌒ ".
   Measure the voltage at the wire harness side.
   Connection: Yellow/red (+) – Green/orange (–)

   Is the voltage within 4.75 – 5.25 V?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.



3. **TP Sensor Circuit Inspection**

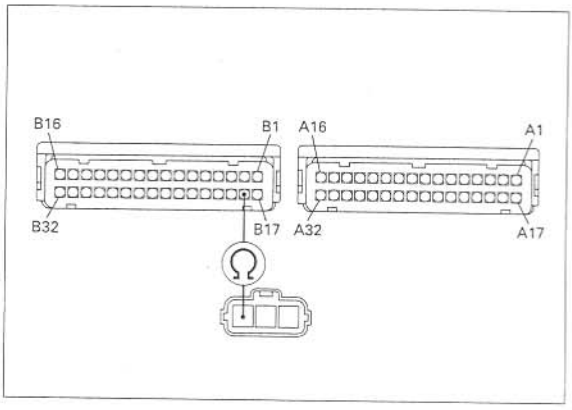
   Disconnect the ECM 32P connectors.
   Check for continuity at the Yellow/red wire between the TP sensor 3P connector terminal and the ECM 32P (Light gray) connector.

   Connection: B18 – Yellow/red

   Is there continuity?

   YES – Replace the ECM with a known good one, and recheck

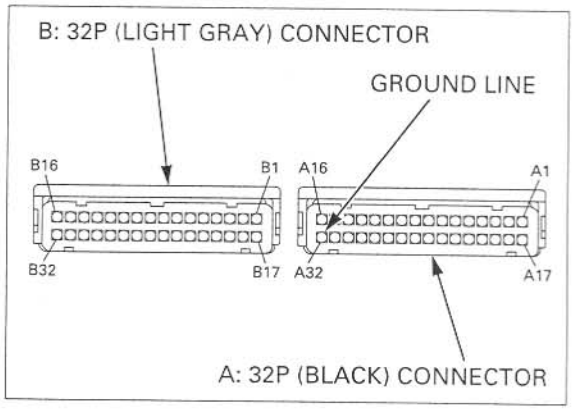
   NO – Open circuit in Yellow/red wire



DTC 21-1 (No.1 O_2 SENSOR): California type only

- Before starting the inspection, check for loose or poor contact on the O_2 sensor connector and recheck the DTC.

DTC	O_2 SENSOR	GROUND LINE	SIGNAL LINE	SIGNAL AT ECM
21-1	No.1 O_2 Sensor	Green/ orange	Black/red	B13
22-1	No.2 O_2 Sensor	Green/ orange	Black/ orange	B28



1. **O_2 Sensor System Inspection 2**

   Turn the ignition switch ON and engine stop switch " ⟳ ".
   Warm the engine until the coolant temperature is 80 °C (176 °F).

   Check the O_2 sensor with the HDS.

   Standard: 0.1 – 0.3 V

   Is the voltage as specified?

   YES – Check the fuel pressure (page 6-56). If the system is correct, GO TO STEP 4.

   NO – GO TO STEP 2.

2. **O_2 Sensor Open Circuit Inspection**

   Turn the ignition switch OFF.

   Disconnect the O_2 sensor 4P connector and the ECM connectors.

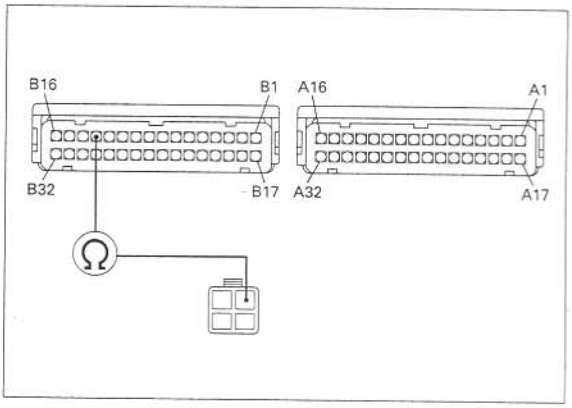
   Check the continuity between the ECM connector terminals and the O_2 sensor 4P connector.

   Connection: SIGNAL LINE – SIGNAL AT ECM

   Is there continuity?

   YES – GO TO STEP 3.

   NO – • Open circuit in the at SIGNAL LINE wire
   • Open circuit in the GROUND LINE wire



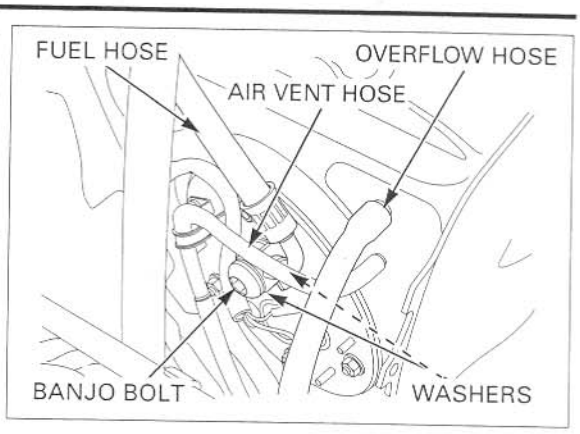
Disconnect the fuel tank air vent and overflow hoses.

Cover the fuel hose banjo bolt with a rag or shop towel.

Slowly loosen the banjo bolt and catch the remaining fuel using a approved gasoline container.

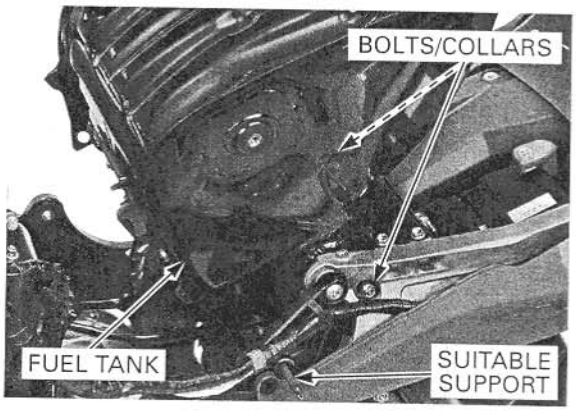
Remove the fuel hose banjo bolt and sealing washers, then disconnect the fuel hose.

- Before disconnecting fuel hoses, release the fuel pressure by loosening the fuel hose banjo bolt at the fuel tank.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washers when the fuel hose banjo bolt is removed or loosened.

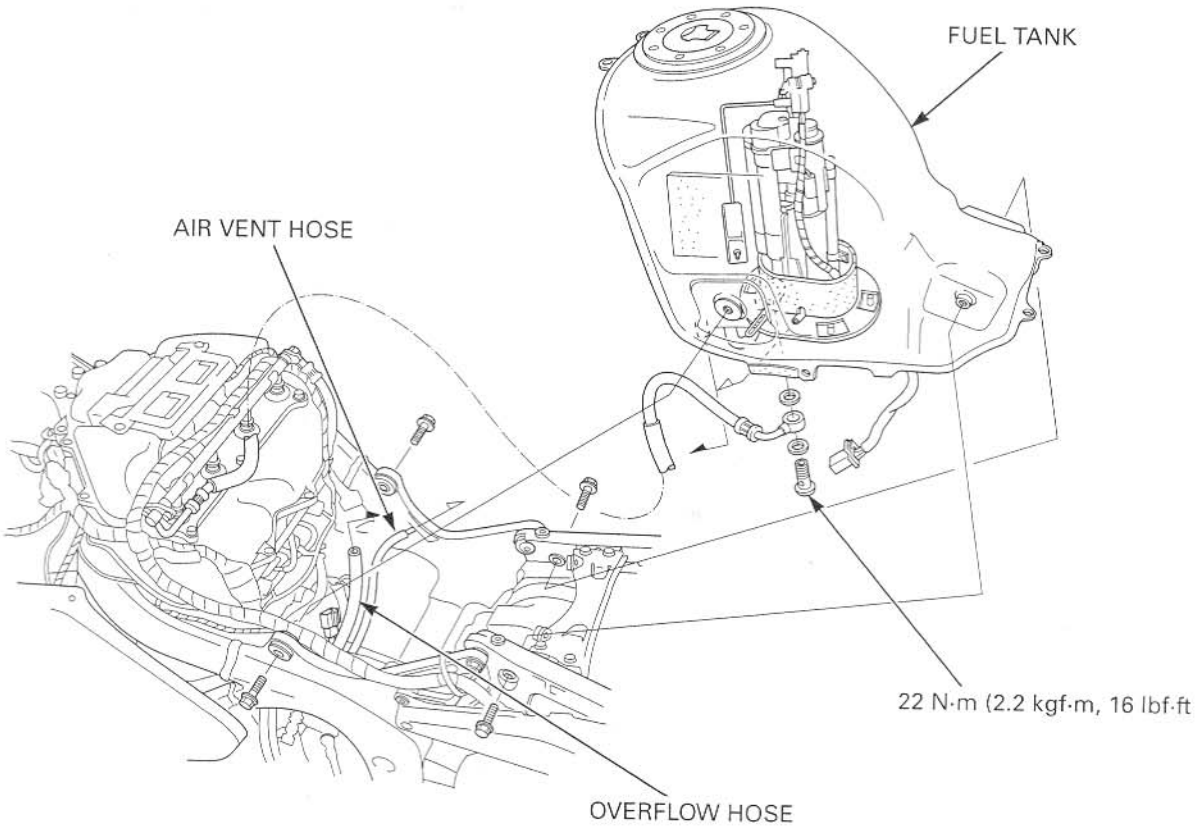


Remove the fuel tank pivot bolts, collars and fuel tank.

Refer to procedures for fuel pump unit removal (page 6-59).



INSTALLATION



THROTTLE BODY

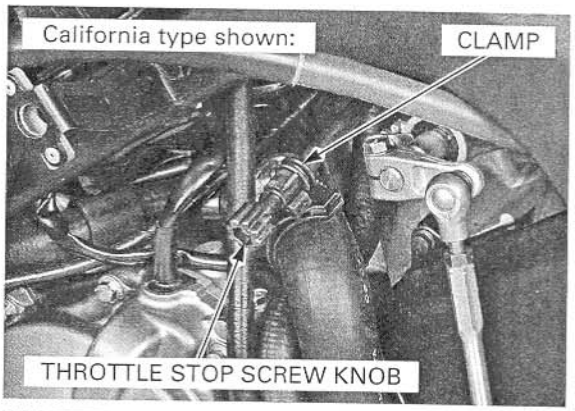
REMOVAL

- Before disconnecting the fuel line, release the fuel pressure by loosening the fuel hose banjo bolt.
- Failure to release the fuel pressure could result in fuel spilling onto painted or plastic parts, which will be damaged.
- Always replace the sealing washer when the fuel hose banjo bolt is removed or loosened.

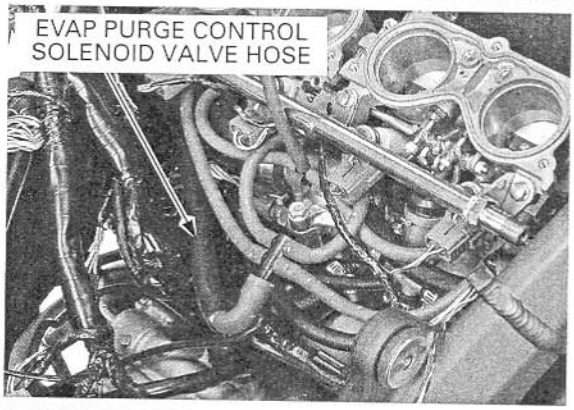
Drain the coolant from the cooling system (page 7-6).

Remove the following:
- Lower cowls (page 3-6)
- Middle cowls (page 3-7)
- Fuel tank (page 6-61)
- Air cleaner housing (page 6-64)

Release the throttle stop screw knob from the clamp.

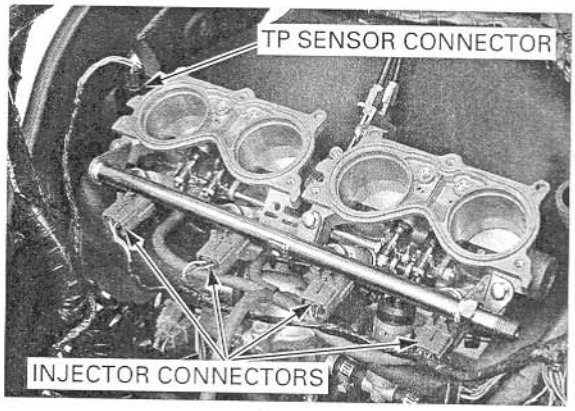


California type only: Disconnect the EVAP purge control solenoid valve hose from the 5-way joint.



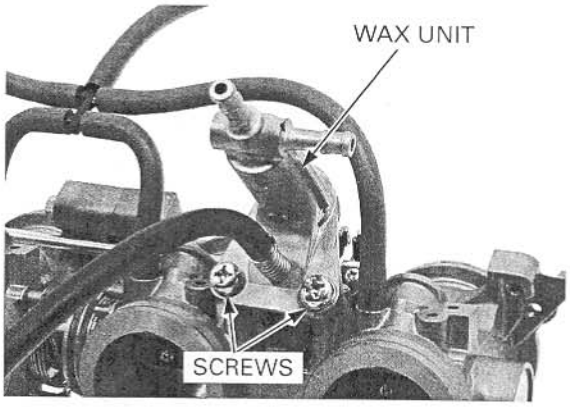
Disconnect the primary injector connectors.

Disconnect the TP sensor connector.



Tighten the wax unit mounting screws to the specified torque.

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

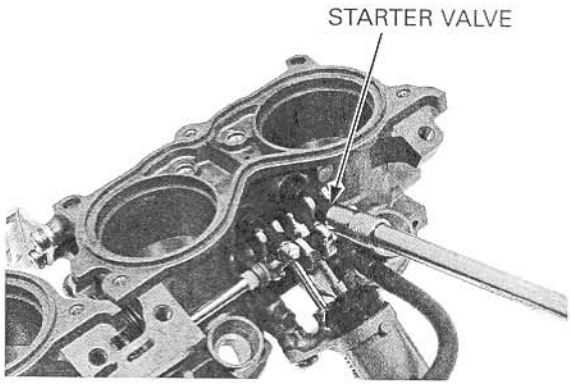


STARTER VALVE

DISASSEMBLY

Remove the throttle body (page 6-72).
Remove the fuel rail and primary injectors (page 6-79).

Turn each starter valve adjusting screw in, recording the number of turns until it seats lightly.



No.1/2 starter valve:

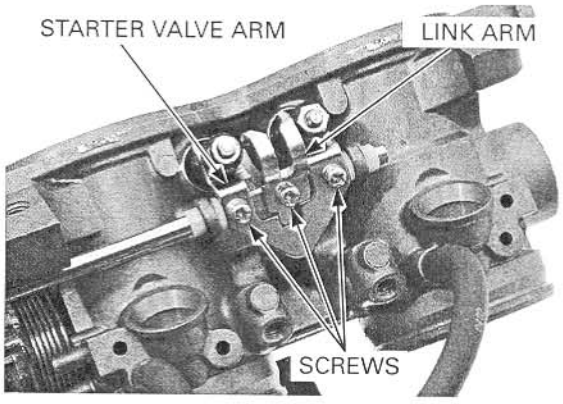
Remove the starter valve arm screws and starter valve arms.

No.3/4 starter valve:

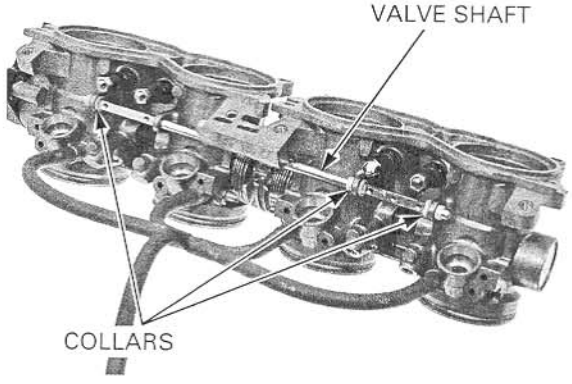
Remove the fast idle wax unit (page 6-81).

Remove the starter valve arm screws and starter valve arm.

Remove the screw and fast idle wax unit link arm.



Remove the starter valve shaft and three collars.

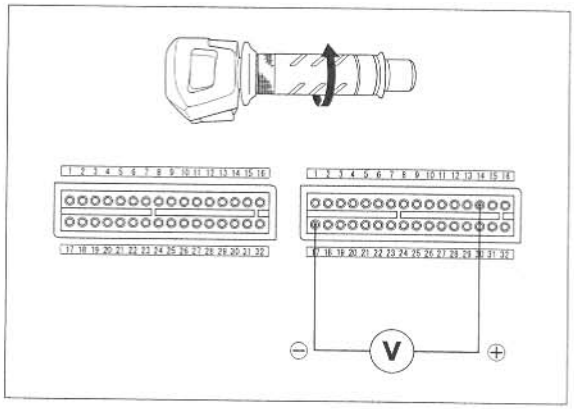


OUTPUT VOLTAGE INSPECTION WITH THE THROTTLE FULLY CLOSED

Turn the ignition switch ON and measure and record the output voltage with the throttle fully closed.

Connection: B14 (+) – B17 (–)

Measuring condition:
At throttle fully closed



CALCULATE RESULT COMPARISON

Compare the measurement to the result of the following calculation.

With the throttle fully opened:
Measured input voltage X 0.824 = Vo

The sensor is normal if the measurement output voltage is within 10% of Vo.

With the throttle fully closed:
Measured input voltage X 0.1 = Vc

The sensor is normal if the throttle closed output voltage is within 10% of Vc.

Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

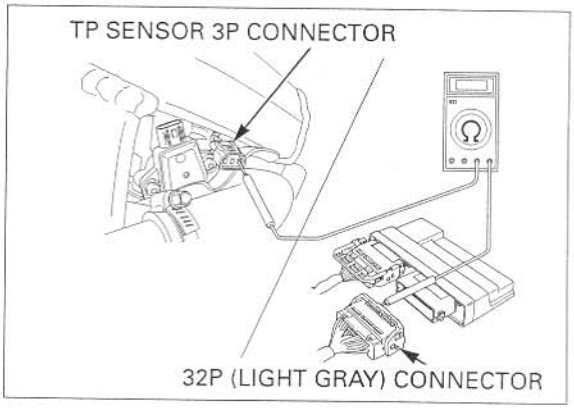
CONTINUITY INSPECTION

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

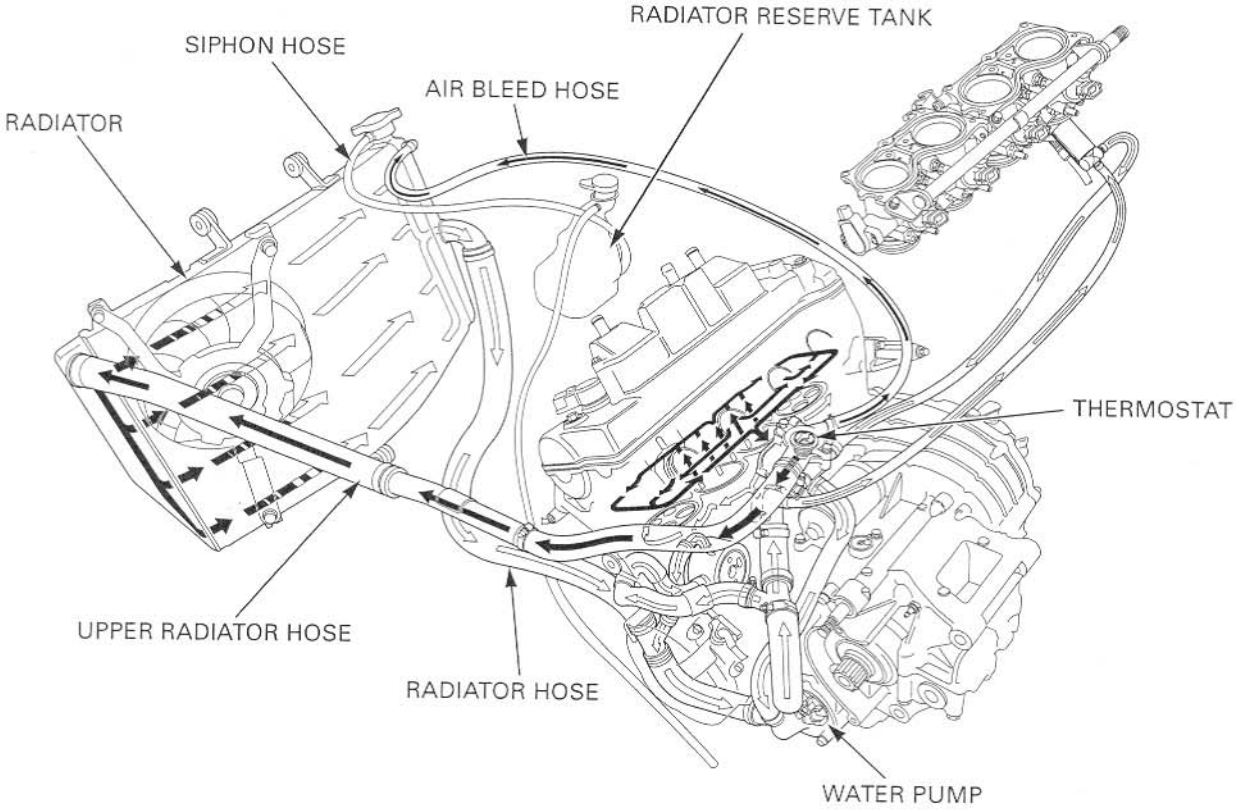
Disconnect the ECM 32P connectors and the TP sensor 3P connector.
Check for continuity between the ECM 32P (Light gray) connector and TP sensor 3P connector terminal of the wire harness.

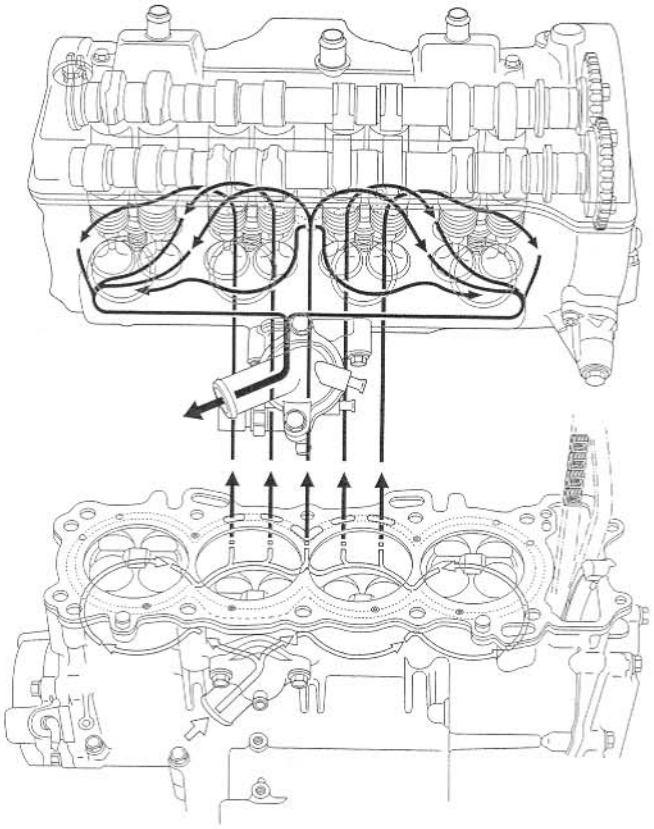
Connection: Yellow/red – B14

If there is no continuity, check the open or short circuit in wire harness.



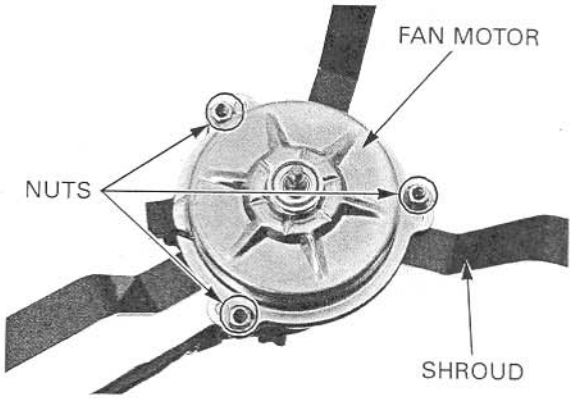
SYSTEM FLOW PATTERN



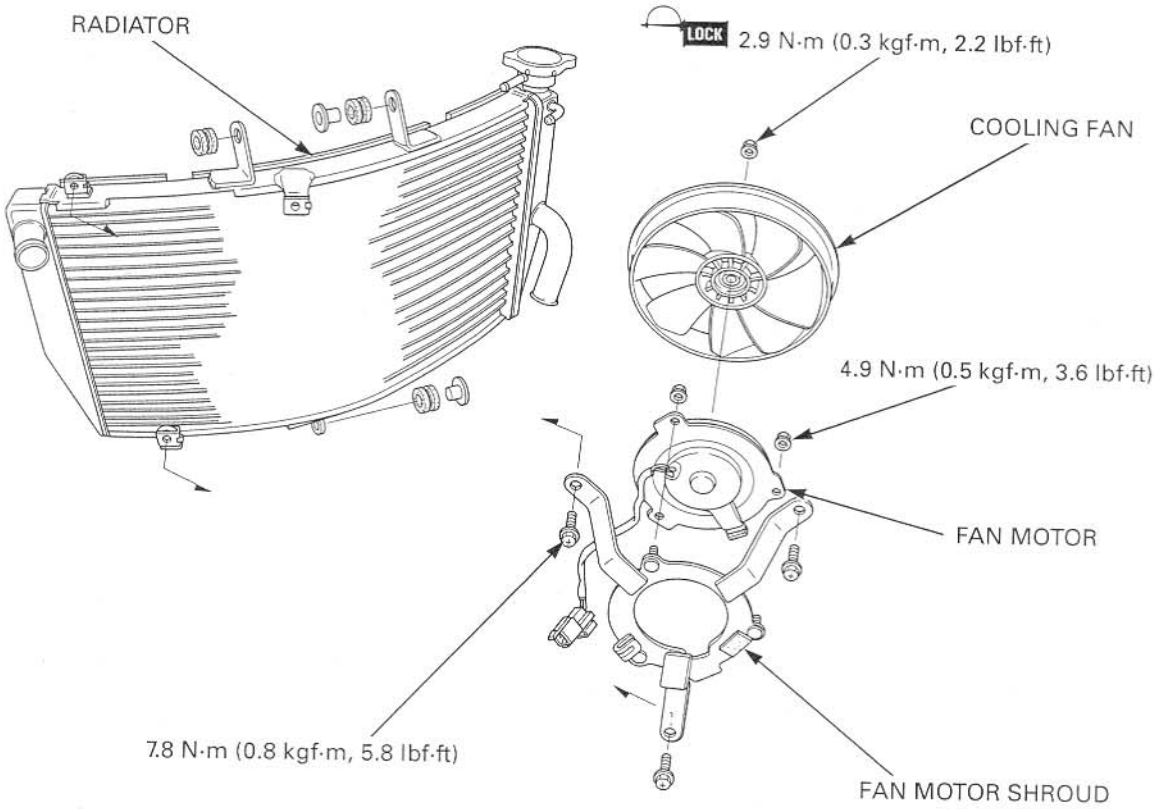


Remove the nuts and fan motor from the fan motor shroud.

Refer to the fan control relay information (page 7-18).



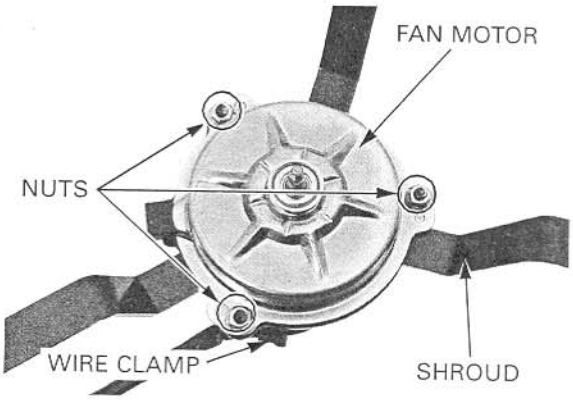
ASSEMBLY



Install the fan motor onto the fan motor shroud and tighten the nuts to the specified torque.

TORQUE: 4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the fan motor wire onto the wire clamp.



SERVICE INFORMATION

GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- Do not use the oil filter and oil cooler as a jacking point.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- The following components can be serviced with the engine installed in the frame.
  - Alternator (page 11-4)
  - Clutch (page 10-7)
  - Camshaft (page 9-8)
  - Gearshift linkage (page 10-22)
  - Oil cooler (page 5-12)
  - Oil pump (page 5-8)
  - Water pump (page 7-15)
- The following components require engine removal for service.
  - Cylinder head (page 9-13)
  - Crankshaft (page 13-5)
  - Piston/cylinder (page 13-13)
  - Shift fork/shift drum/Transmission (page 12-7)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.

SERVICE DATA

ITEM		SPECIFICATIONS
Engine dry weight		58.3 kg (128.5 lbs)
Engine oil capacity	After disassembly	3.5 liter (3.7 US qt, 3.1 Imp qt)
Coolant capacity	Radiator and engine	3.2 liter (3.4 US qt, 2.8 Imp qt)

TORQUE VALUES

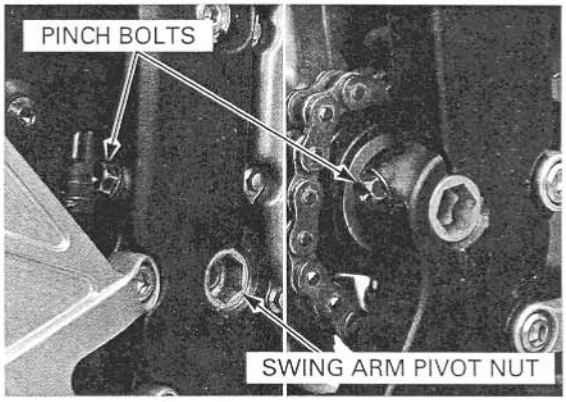
Front engine hanger bolt (left side)	54 N·m (5.5 kgf·m, 40 lb·ft)	
Front engine hanger nut (right side)	54 N·m (5.5 kgf·m, 40 lb·ft)	
Front engine hanger pinch bolt	27 N·m (2.7 kgf·m, 20 lbf·ft)	
Rear engine hanger adjusting bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)	
Rear engine hanger lock nut	54 N·m (5.5 kgf·m, 40 lb·ft)	
Rear engine hanger nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Lower engine hanger pinch bolt	27 N·m (2.7 kgf·m, 20 lbf·ft)	
Lower engine hanger nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Swingarm pivot pinch bolt	27 N·m (2.7 kgf·m, 20 lbf·ft)	
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lb·ft)	
Starter motor terminal nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Side stand bracket socket bolt	39 N·m (4.0 kgf·m, 33 lbf·ft)	ALOC bolt
Oil pressure switch wire terminal screw	2.0 N·m (0.2 kgf·m, 1.4 lbf·ft)	

Install and tighten the swingarm pivot nut while holding the pivot shaft to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

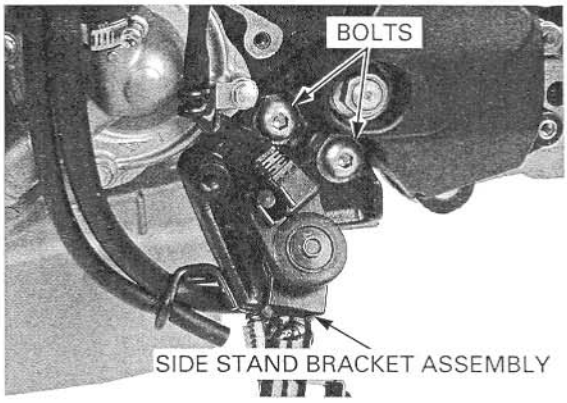
Tighten the pinch bolts to the specified torque.

TORQUE: 27 N·m (2.7 kgf·m, 20 lbf·ft)

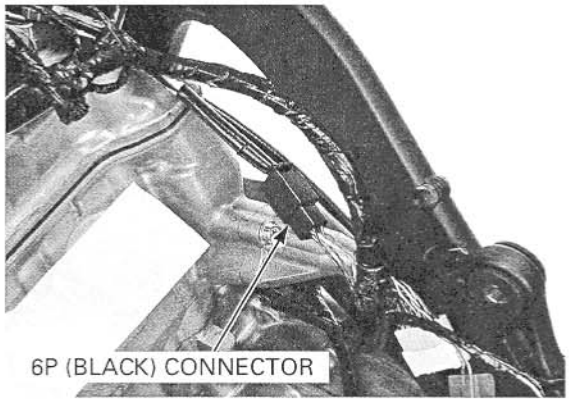


Install the side stand bracket assembly and tighten the socket bolts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 33 lbf·ft)



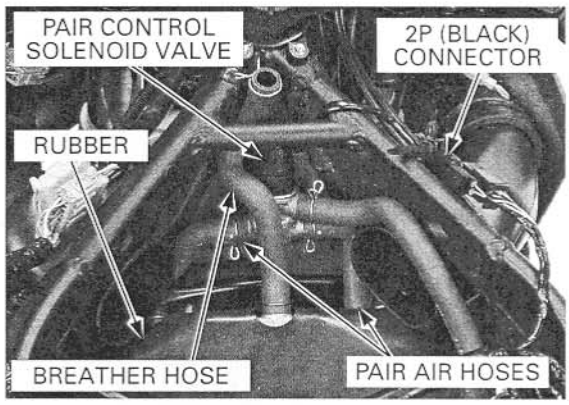
Connect the direct ignition coil 6P (Black) connector.



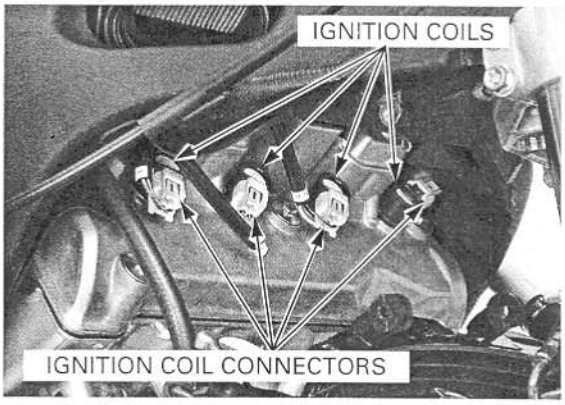
Connect the PAIR control solenoid valve 2P (Black) connector.

Install the heat guard rubber.
Connect the PAIR air hoses into the cylinder head and install the PAIR control solenoid valve.

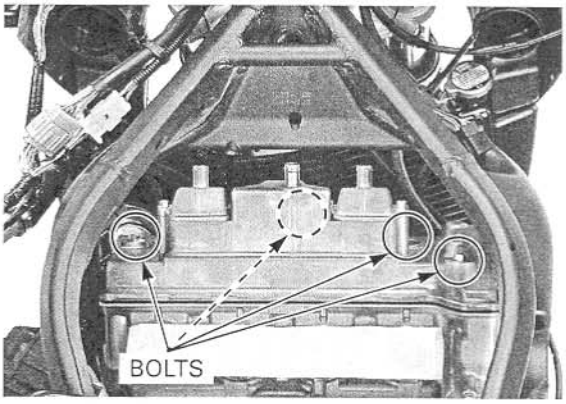
Install the crankcase breather hose.



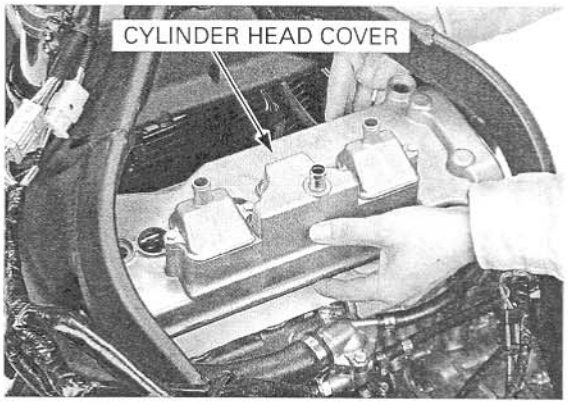
Disconnect the ignition coil connectors and remove the direct ignition coils.



Remove the cylinder head cover bolts.



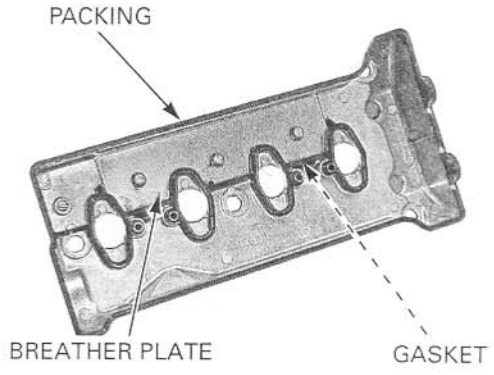
Remove the cylinder head cover from the cylinder head.



CYLINDER HEAD COVER DISASSEMBLY

Remove the cylinder head cover packing.

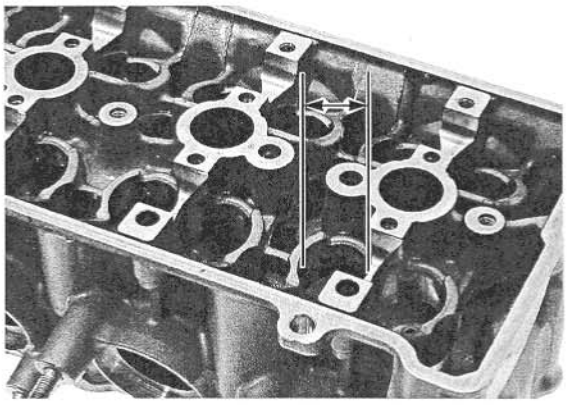
Remove the bolts and breather plate and gasket.



VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.
Measure the each valve lifter bore I.D.

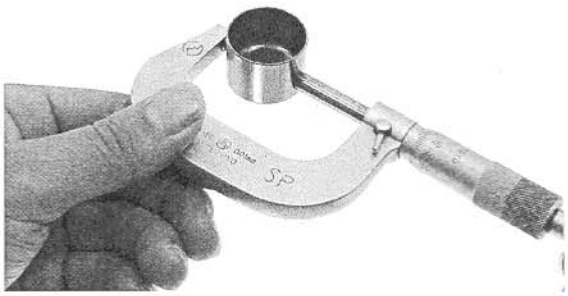
SERVICE LIMIT: 26.04 mm (1.025 in)



VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.
Measure the each valve lifter O.D.

SERVICE LIMIT: 25.97 mm (1.022 in)



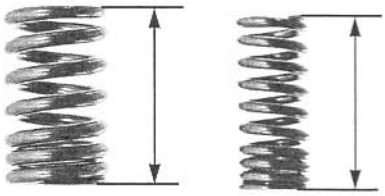
VALVE SPRING

Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:

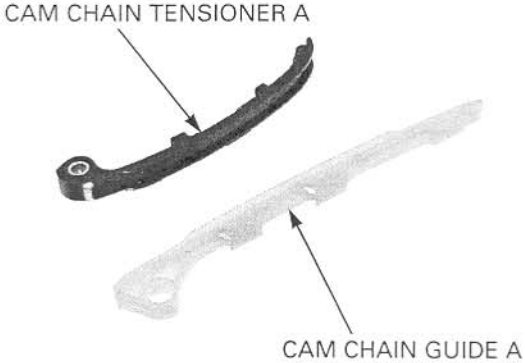
IN:	**Inner:**	**35.1 mm (1.38 in)**
	Outer:	**38.8 mm (1.53 in)**
EX:	**Inner:**	**34.4 mm (1.35 in)**
	Outer:	**38.1 mm (1.50 in)**

Replace the springs if they are shorter than the service limits.



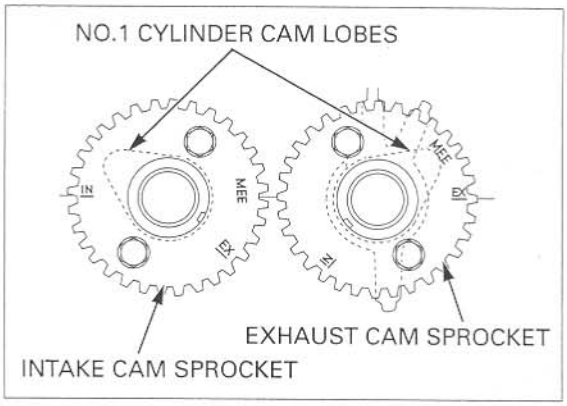
CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Inspect the cam chain tensioner A and cam chain guide A for excessive wear or damage, replace them if necessary.

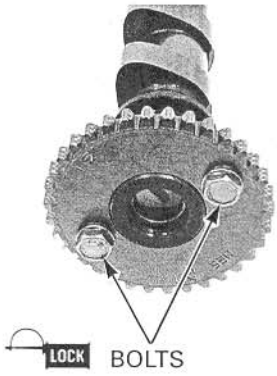


If the cam sprockets are removed, install the cam sprockets onto the camshafts.

- Install the intake cam sprocket with the timing mark (IN) facing outward and the No.1 cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No.1 cam lobes facing up and out as shown.



Clean and apply a locking agent to the cam sprocket bolt threads.
Install the cam sprockets and bolts.

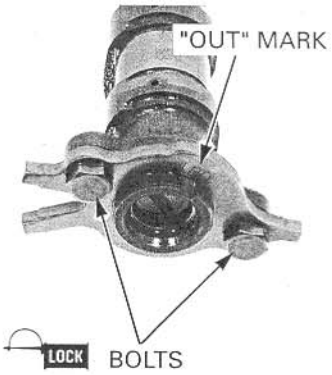


Exhaust camshaft only:

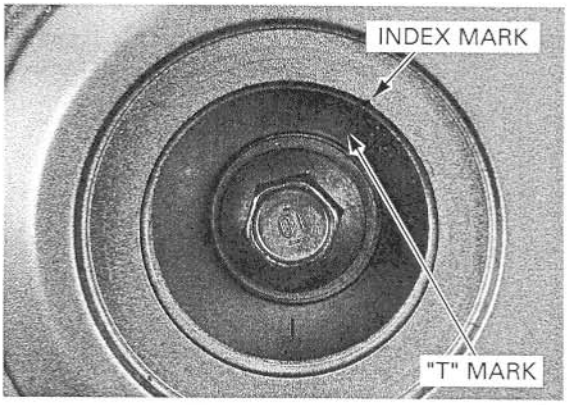
Clean and apply a locking agent to the cam pulse generator rotor bolt threads.

Install the cam pulse generator rotor and bolts.

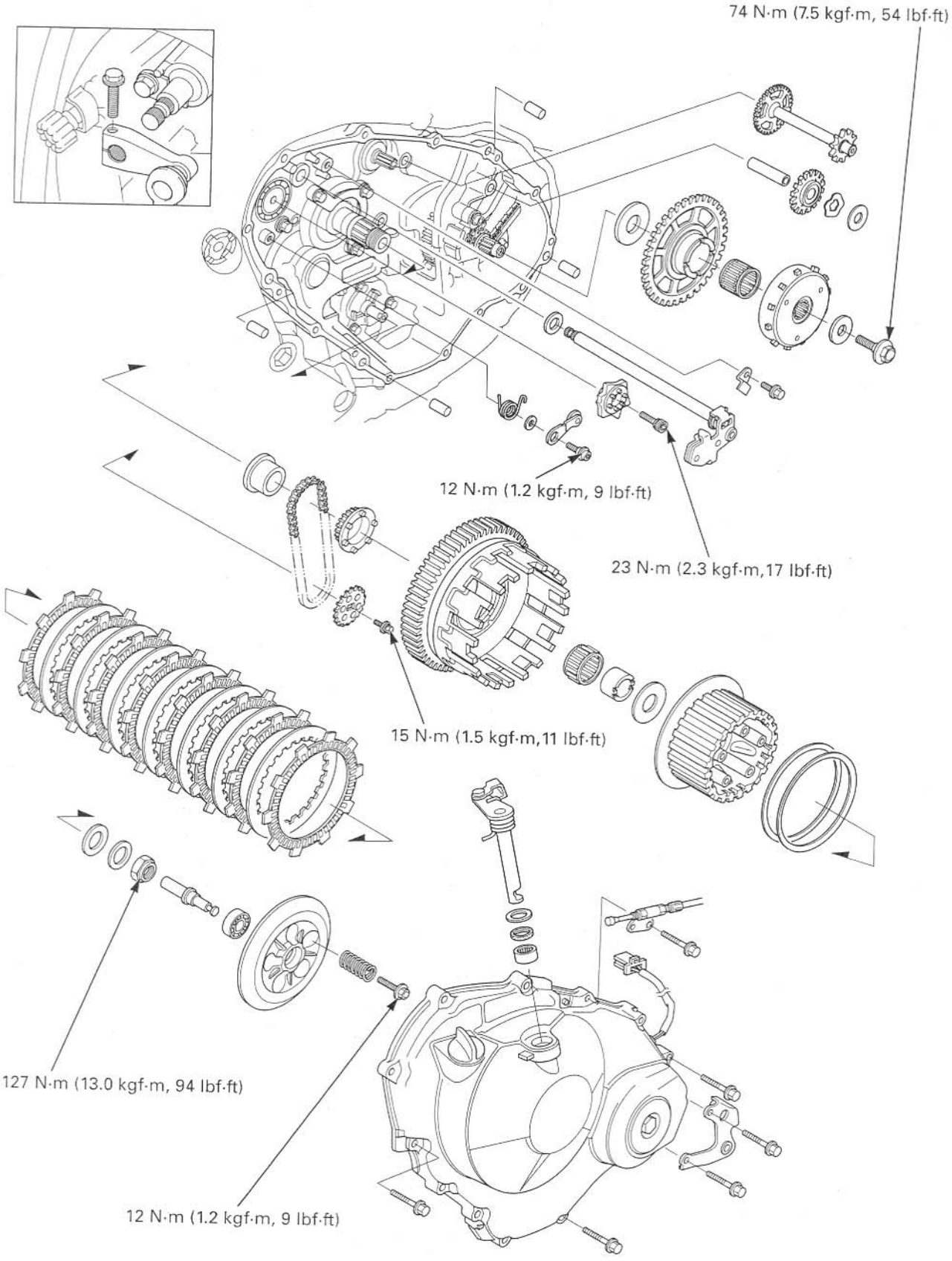
Install the cam pulse generator rotor with the No.1 cylinder cam lobes facing down and rotor "OUT" mark facing up as shown.



Turn the crankshaft clockwise and align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



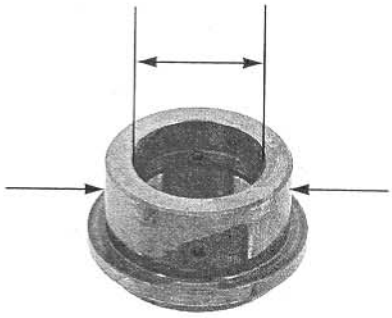
COMPONENT LOCATION



Oil pump drive sprocket guide

Measure the O.D. and I.D. of the oil pump drive sprocket guide.

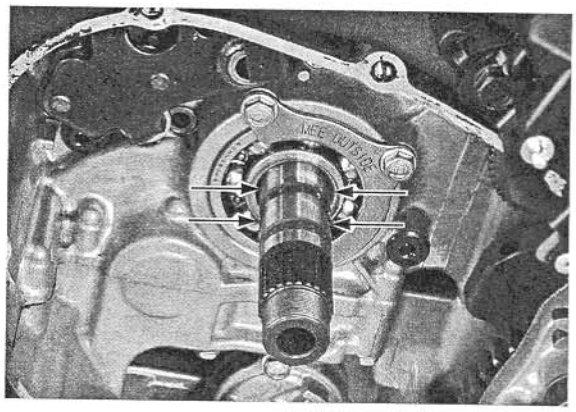
SERVICE LIMITS:
O.D.: 34.940 mm (1.3756 in)
I.D.: 25.031 mm (0.9855 in)



Mainshaft

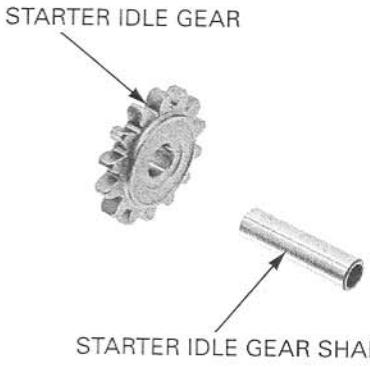
Measure the mainshaft O.D. at clutch outer guide and oil pump drive sprocket guide sliding surfaces.

SERVICE LIMITS:
Oil pump drive sprocket guide position: 24.960 mm (0.9827 in)
Clutch outer guide position: 24.960 mm (0.9827 in)



Starter idle gear/idle gear shaft

Check the starter idle gear and shaft for wear or damage, replace them if necessary.

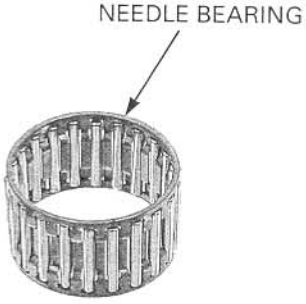


NEEDLE BEARING SELECTION

The primary driven gear has I.D. code letter as shown.

The clutch outer guide has O.D. code letter as shown.

Cross-reference the primary driven gear and clutch outer guide codes to determine the replacement needle bearing.
Refer to the selection table below for bearing selection.



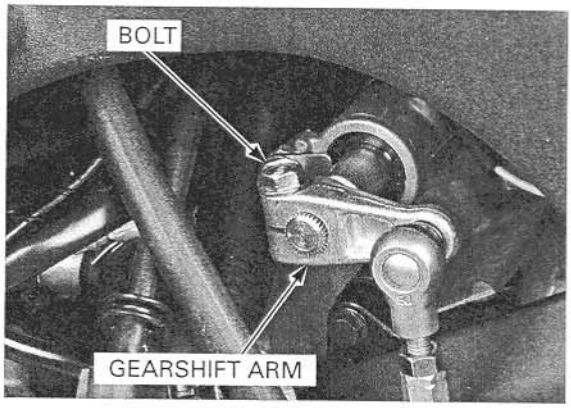
GEARSHIFT LINKAGE

REMOVAL

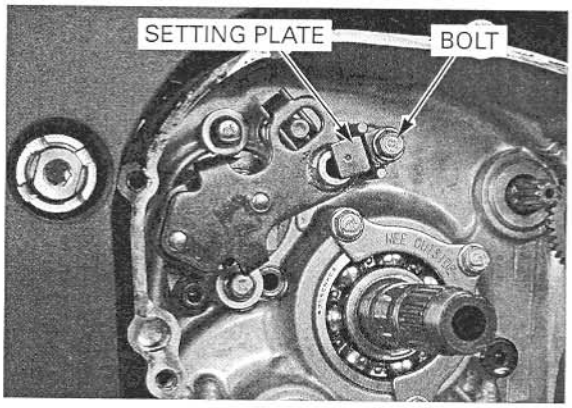
Remove the following:

- Right crankcase cover (page 10-5)
- Clutch (page 10-7)

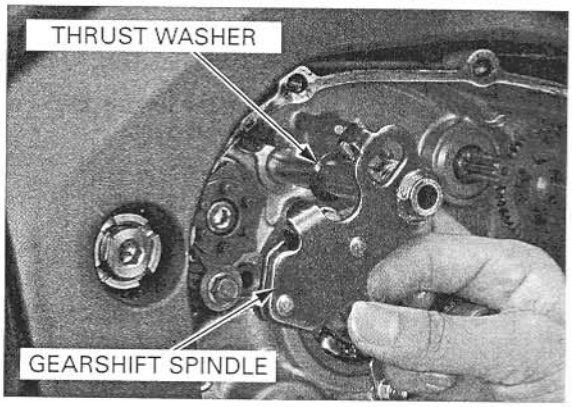
Remove the pinch bolt and disconnect the gear shift arm from the gear shift spindle.



Remove the bolt and setting plate.

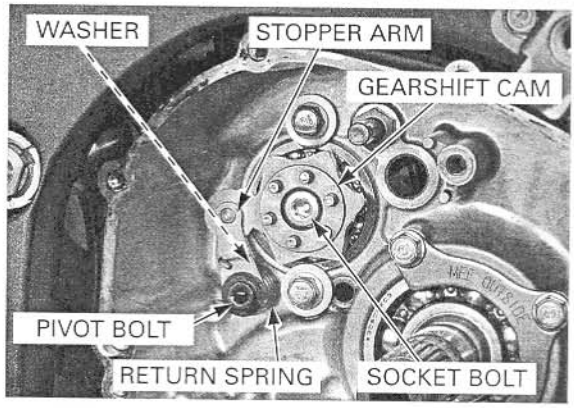


Pull the gearshift spindle assembly and thrust washer out of the crankcase.



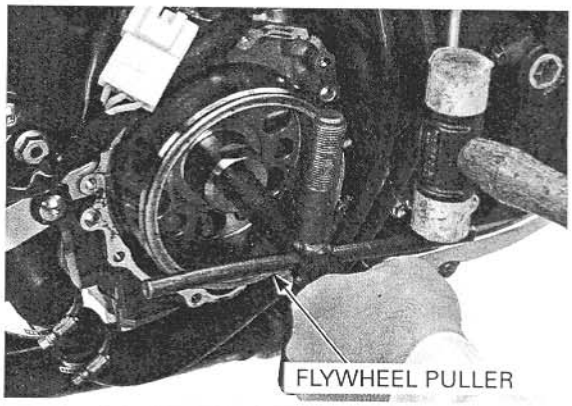
Remove the following:

- Stopper arm pivot bolt
- Stopper arm
- Return spring
- Washer
- Shift drum center socket bolt
- Gearshift cam
- Dowel pin

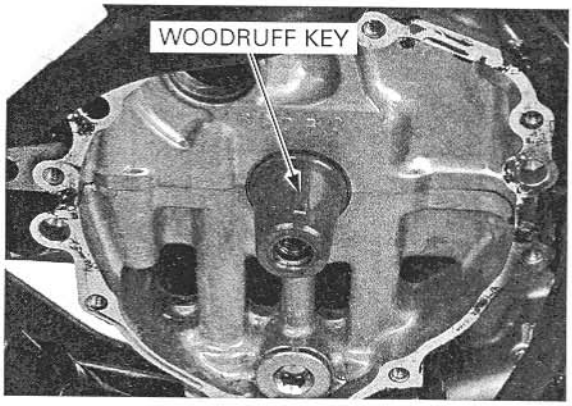


Remove the flywheel using the special tool.

TOOL:
Rotor puller **07733-0020001 or 07933-3950000 (U.S.A. only)**

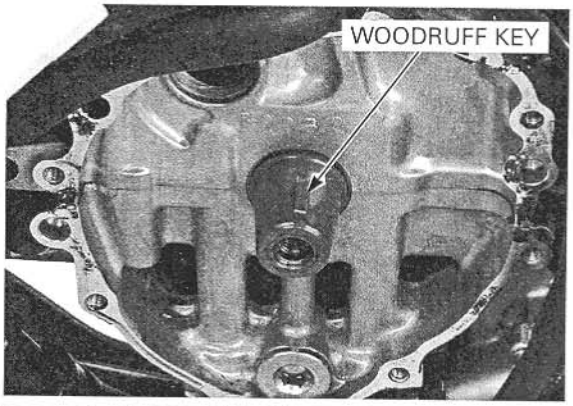


Remove the woodruff key from the crankshaft.

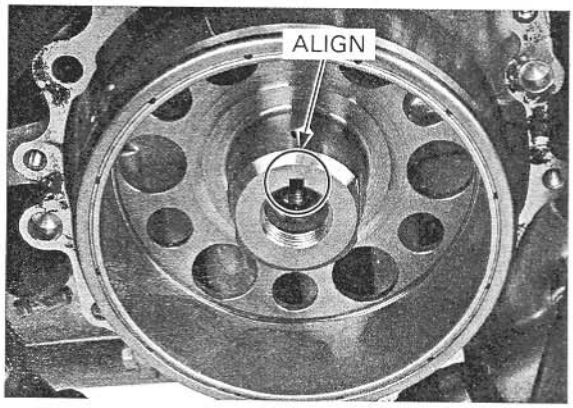


INSTALLATION

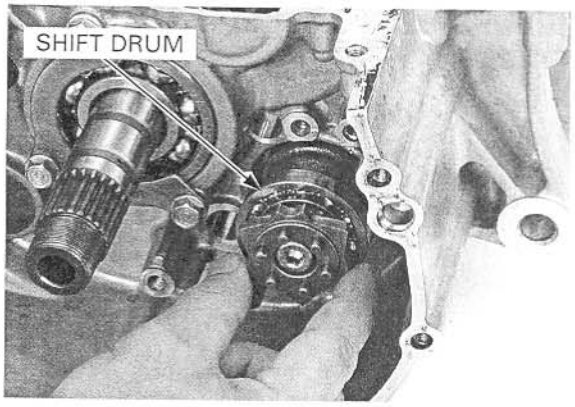
Clean any oil from the crankshaft taper.
Install the woodruff key into the groove of the crankshaft.



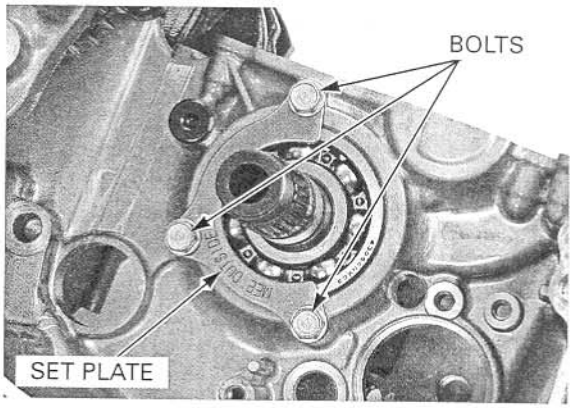
Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.



Remove the shift drum assembly.

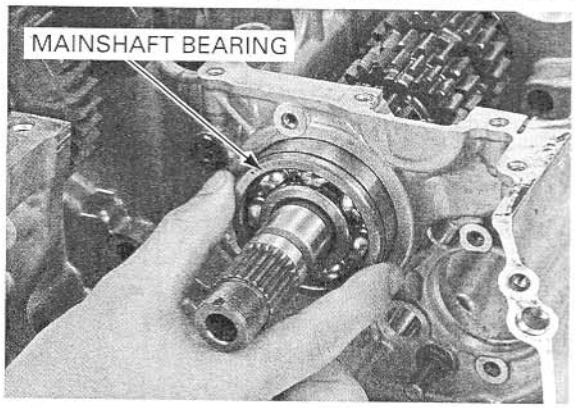


Remove the mainshaft bearing set plate bolts and plate.



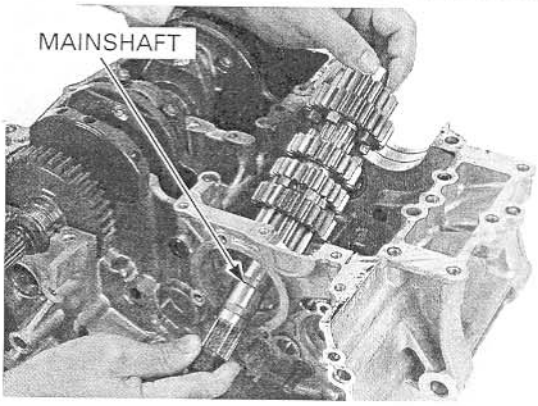
Remove the mainshaft bearing from the crankcase.

Check the mainshaft bearing for smooth rotation, abnormal wear or damage.



Remove the mainshaft assembly.

Disassemble the mainshaft.
Clean all disassembled parts in solvent thoroughly.

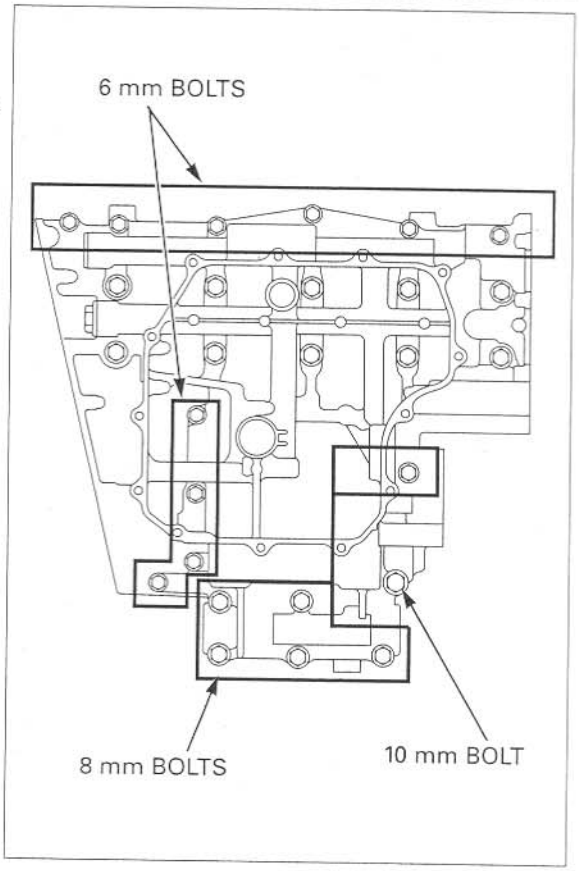


Tighten the 10 mm bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

From the inside to outside, tighten the 6 mm bolts and 8 mm bolts to the specified torque.

TORQUE:
8 mm bolt: 25 N·m (2.5 kgf·m, 18 lbf·ft)
6 mm bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)

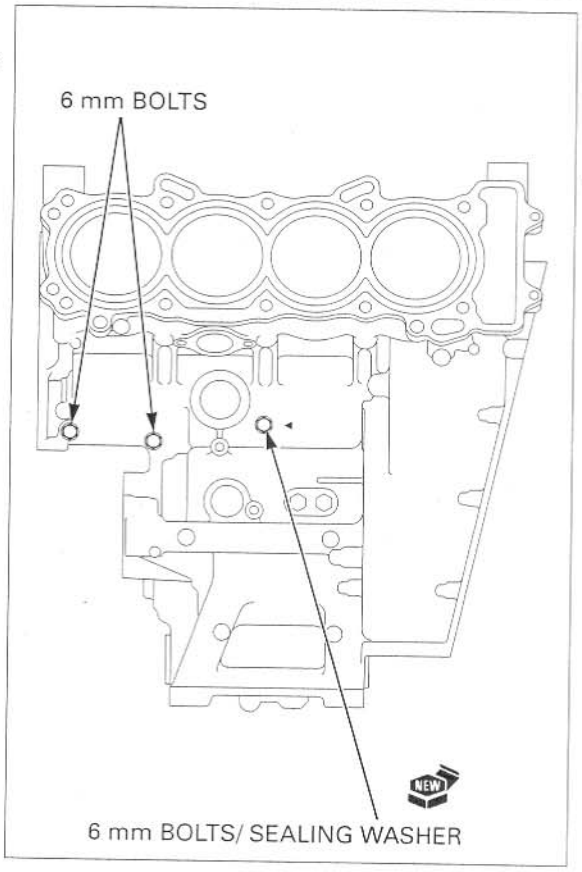


Place the engine with the lower side down.

The sealing washer locations are indicated on the upper crankcase using the '△' mark.

Install the upper crankcase three 6 mm bolts with a new sealing washer.

Tighten the 6 mm bolts securely.



MAIN JOURNAL BEARING

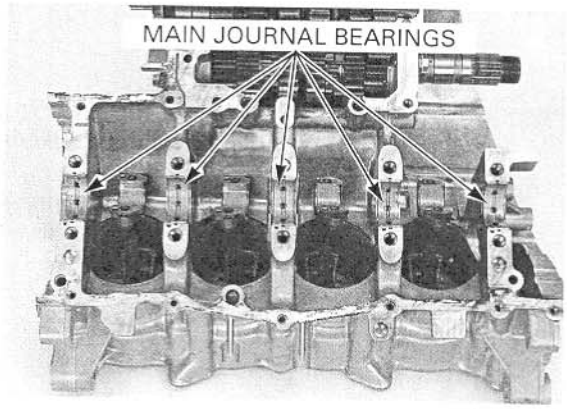
NOTICE

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

Remove the crankshaft (page 13-5).

BEARING INSPECTION

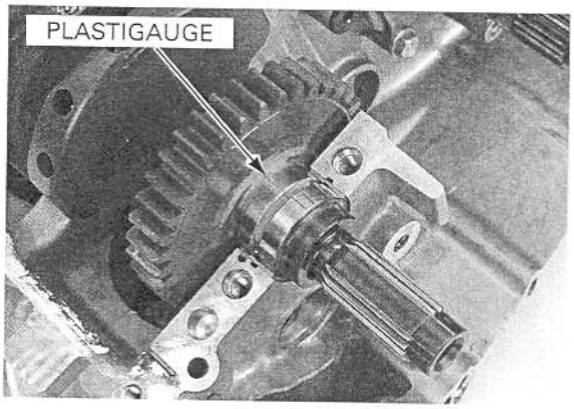
Inspect the main journal bearing inserts on the upper and lower crankcase halves for unusual wear or peeling.
Check the bearing tabs for damage.



OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and main journals.
Install the crankshaft onto the upper crankcase.
Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.

- Do not rotate the crankshaft during inspection.

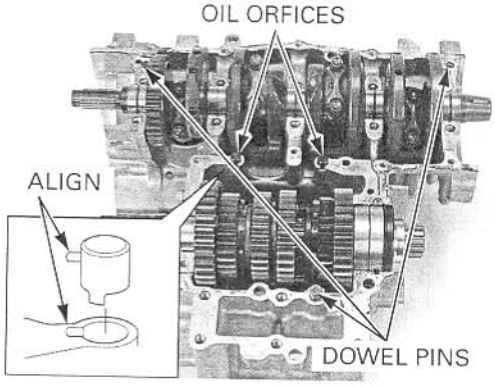


Install the three dowel pins.
Install the oil orifices in the upper crankcase.

NOTE:

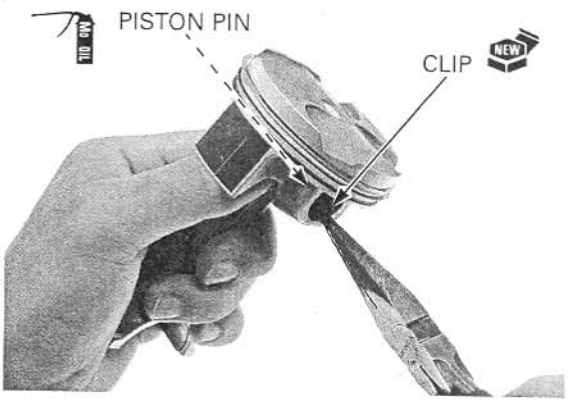
- Right oil orifice: Align its pin with the crankcase groove as shown.
- Left oil orifice: Align its cut-out with the crankcase.

Install the lower crankcase onto the upper crankcase.



Install the piston pin and secure it using new piston pin clips.

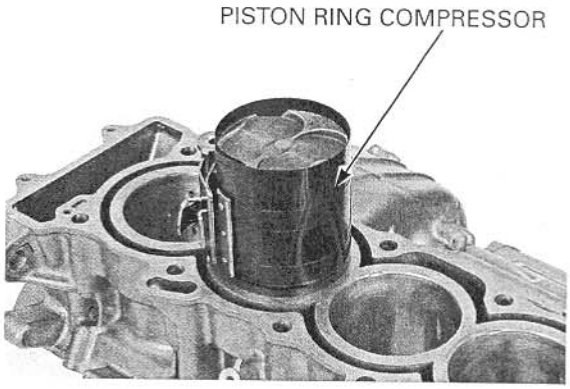
- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.



Coat the cylinder walls, pistons and piston rings with engine oil.

Install the piston/connecting rod assembly with the piston "IN" mark facing the intake side.

Install the piston/connecting rod assemblies into the cylinders using a commercially available piston ring compressor tool.
When reusing the connecting rods, they must be installed in their original locations.



NOTICE

- *While installing the piston, be careful not to damage the top surface of the cylinder, especially around the cylinder bore.*
- *Be careful not to damage the cylinder sleeve and crankpin with the connecting rod.*

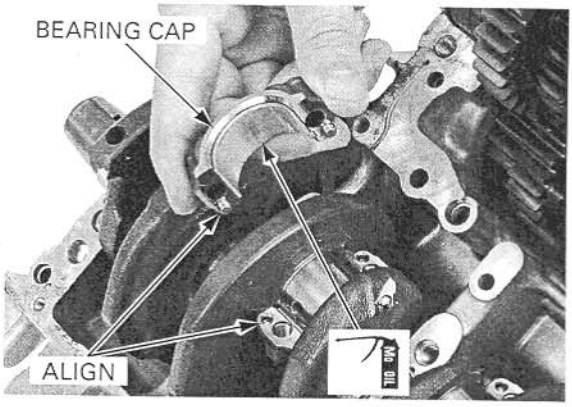
Make sure the piston ring compressor tool sits flush on the top surface of the cylinder.

Use the handle of a plastic hammer or equivalent tool to tap the piston into the cylinder.

Install the crankshaft (page 13-6).

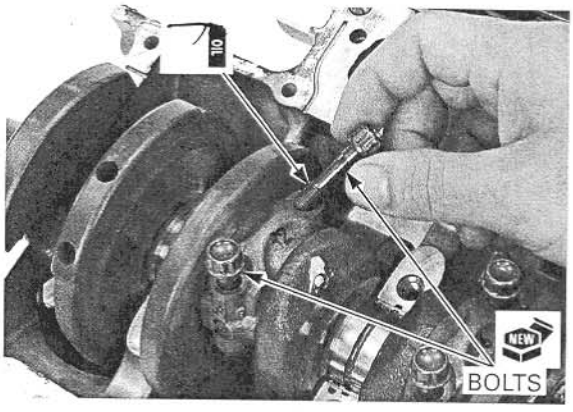
Apply molybdenum oil solution to the crankpin bearing sliding surface on the bearing caps.

Install the connecting rod bearing caps, aligning the dowel pins with the holes in the connecting rods.



The connecting rod bolts cannot be reused. Once the connecting rod bolts have been loosened replace them with new ones.

Apply oil to new connecting rod bearing cap bolt threads and seating surfaces, and install the bolts.

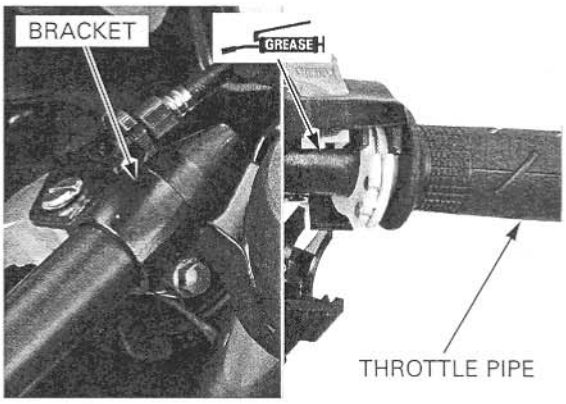


INSTALLATION

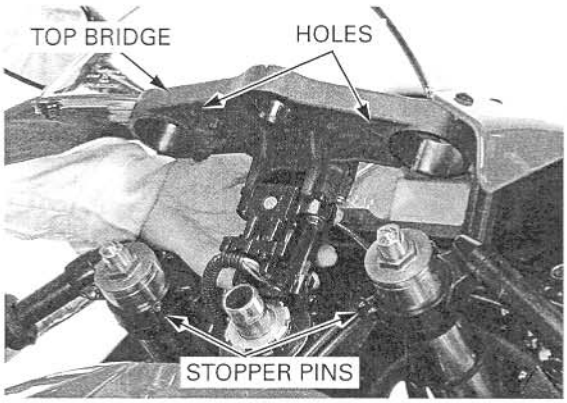
Apply grease to the sliding surface of the throttle pipe.

Install the clutch lever bracket to the left handlebar, and also the throttle pipe to the right handlebar.

Install the handlebars onto the fork tube.



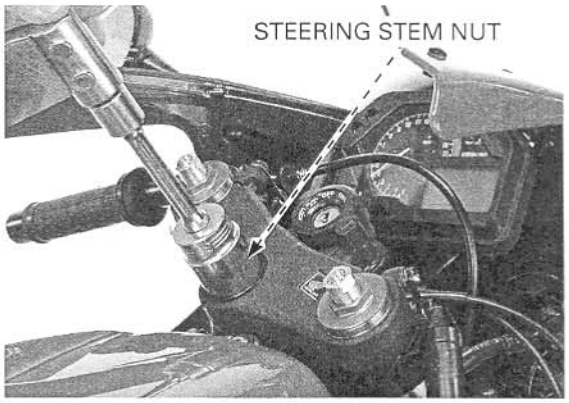
Install the top bridge while aligning its holes with the handlebar stopper pins.



Tighten the steering stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)

Install the steering stem cap.



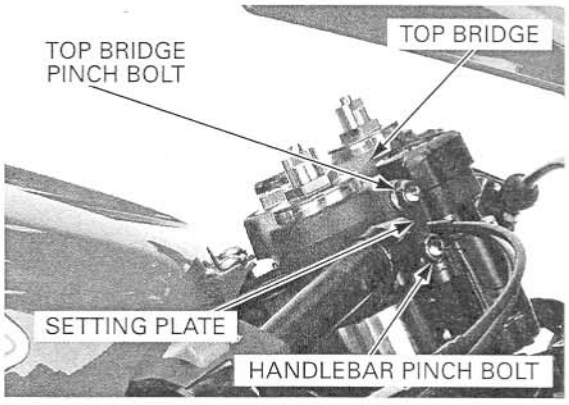
Install the setting plates, top bridge pinch bolts and handlebar pinch bolts.

Tighten the top bridge pinch bolts to the specified torque.

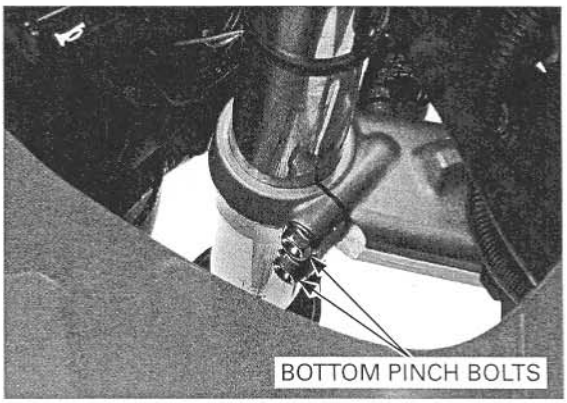
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the handlebar pinch bolts to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)



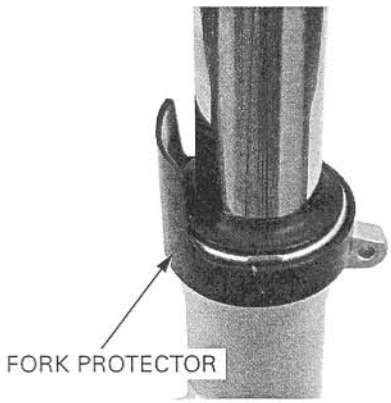
Loosen the fork bottom pinch bolts and remove the fork tube from the fork top bridge and steering stem.



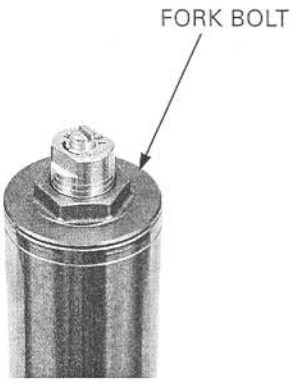
DISASSEMBLY

Be careful not to scratch the fork tube or damage the dust seal.

Remove the fork protector by prying it carefully using a screwdriver.



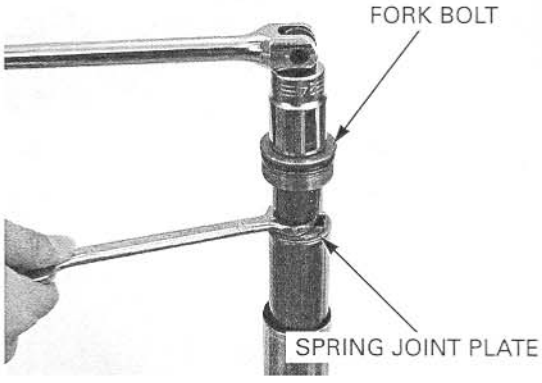
Remove the fork bolt from the fork tube.



Push down the spring joint plate and install the 14 mm wrench onto the rebound adjuster.

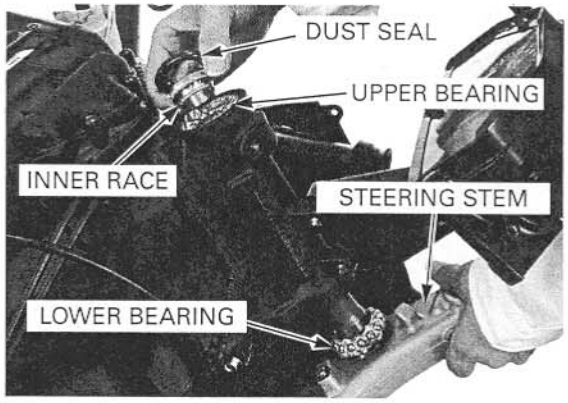
Do not remove the rebound damping adjuster from the damper rod, or fork damping force will be changed.

Hold the rebound adjuster, then loosen and remove the fork bolt from the rebound adjuster.



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



BEARING REPLACEMENT

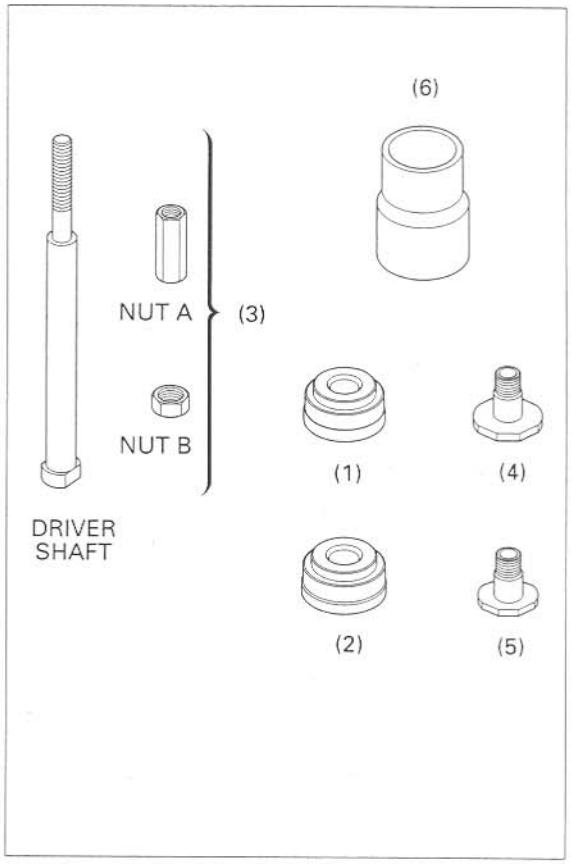
Always replace the bearings and races as a set.

Replace the races using the special tools as described in the following procedure.

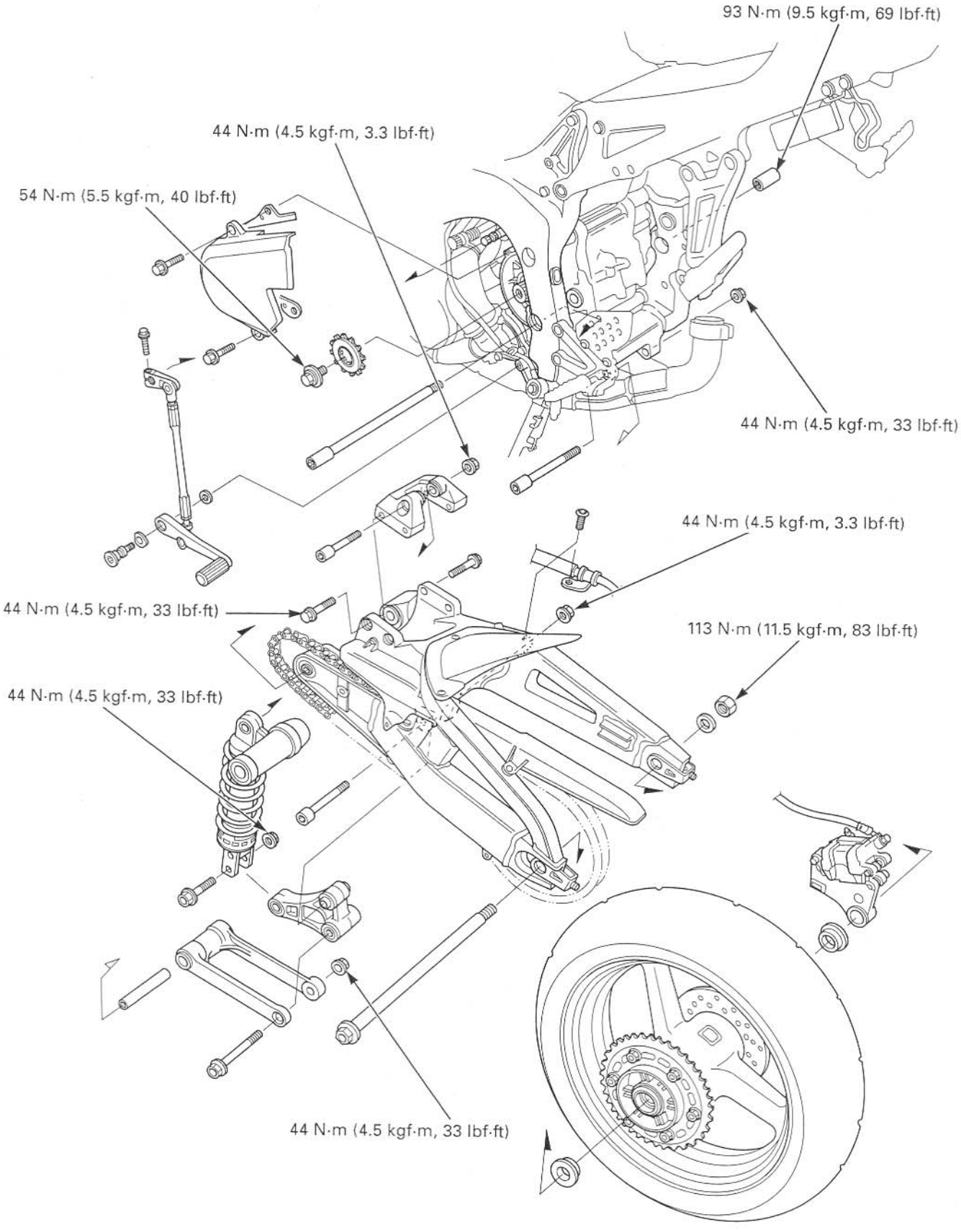
For U.S.A. only outer race replacement, refer to (page 14-32).

TOOLS: (Not available in U.S.A.)

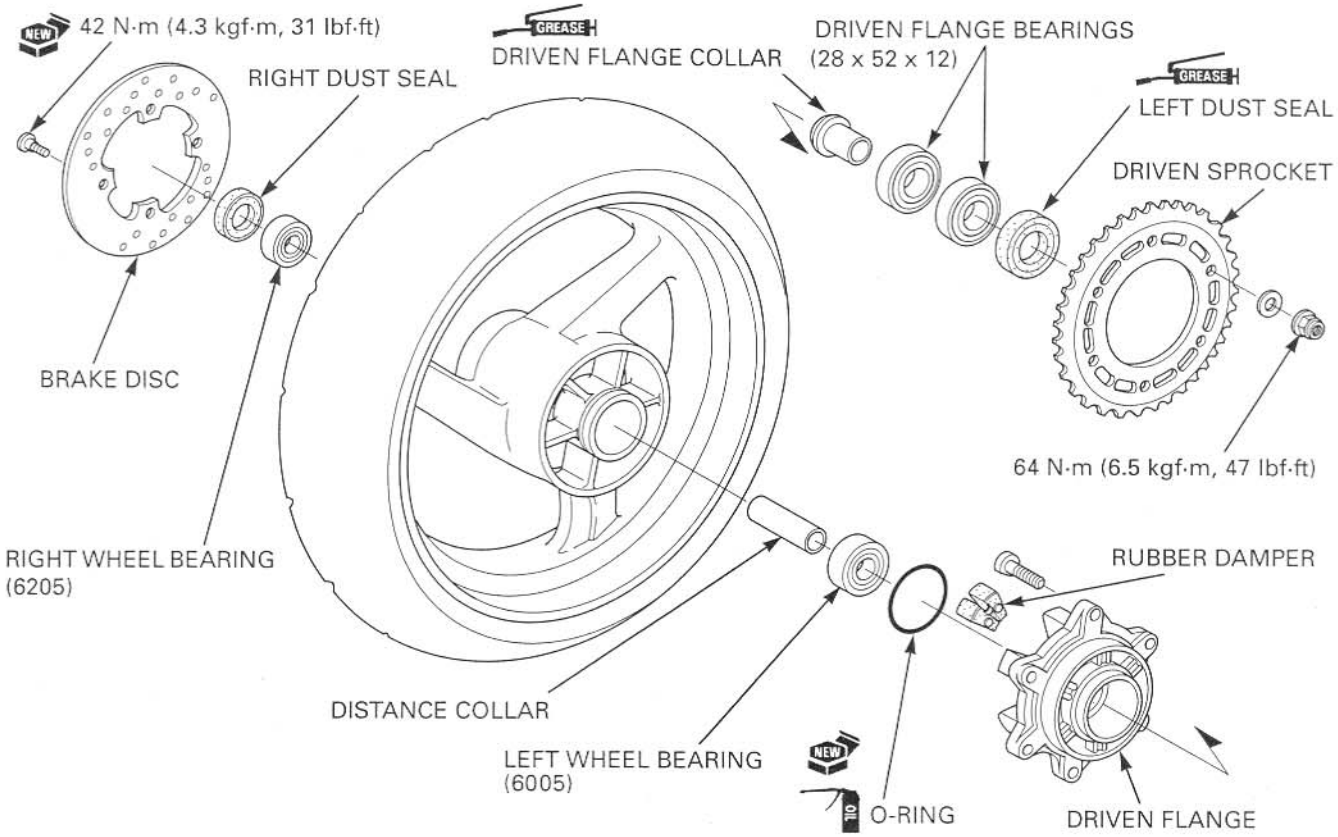
(1) Driver attachment (upper)	**070MF-MCJ0100**
(2) Driver attachment (lower)	**070MF-MCJ0200**
(3) Driver shaft assembly	**07946-KM90301**
(4) Bearing remover, A	**07946-KM90401**
(5) Bearing remover, B	**07NMF-MT70110**
(6) Assembly base	**07946-KM90600**



COMPONENT LOCATION



ASSEMBLY



Never install the old bearings, once the bearings has been removed, the bearings must be replaced with new ones.

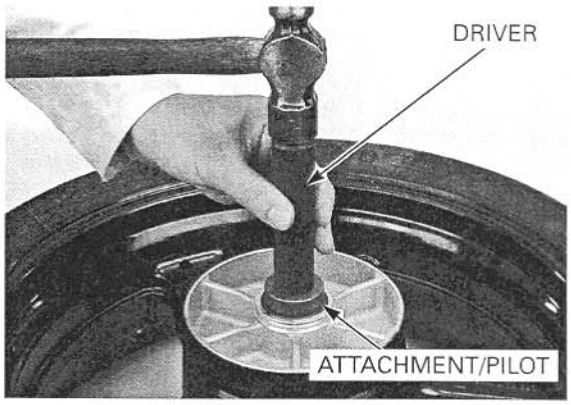
Wheel bearing installation

Drive in a new left bearing squarely.

TOOLS:

Driver	**07749-0010000**
Attachment, 42 X 47 mm	**07746-0010300**
Pilot, 25 mm	**07746-0040600**

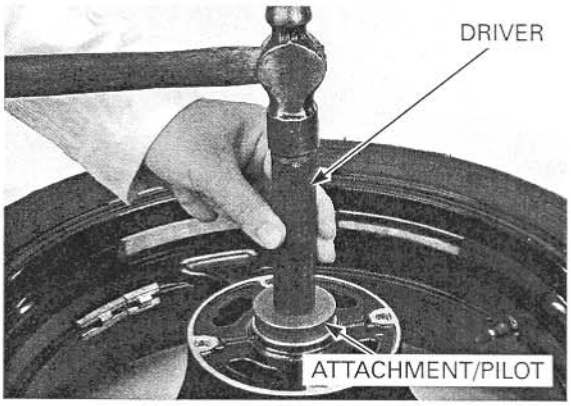
Install the distance collar



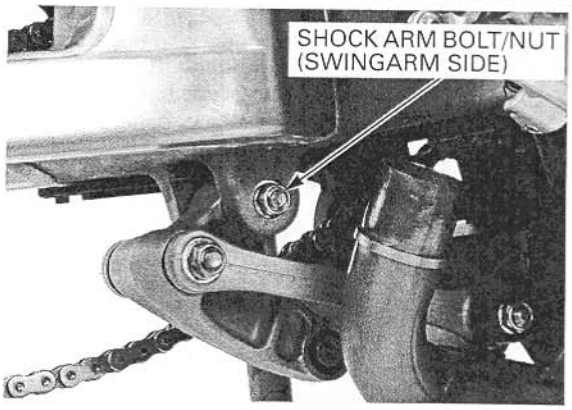
Drive in a new right bearing squarely.

TOOLS:

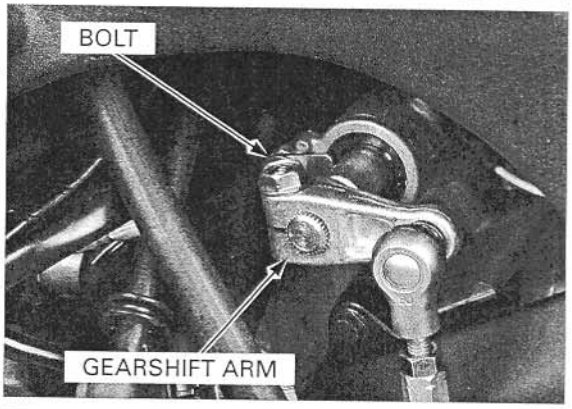
Driver	**07749-0010000**
Attachment, 52 X 55 mm	**07746-0010400**
Pilot, 25 mm	**07746-0040600**



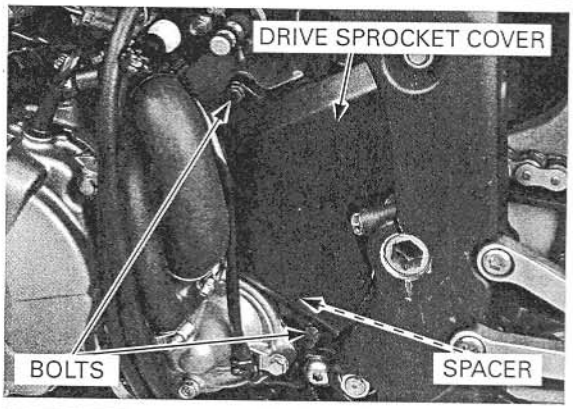
Remove the shock arm bolt/nut (swingarm side).



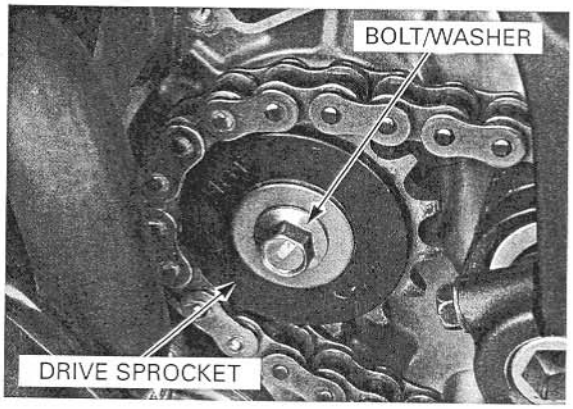
Remove the bolt and disconnect the gearshift arm from the gearshift spindle.



Remove the bolts, spacer and drive sprocket cover.



Remove the bolt, washer and drive sprocket.

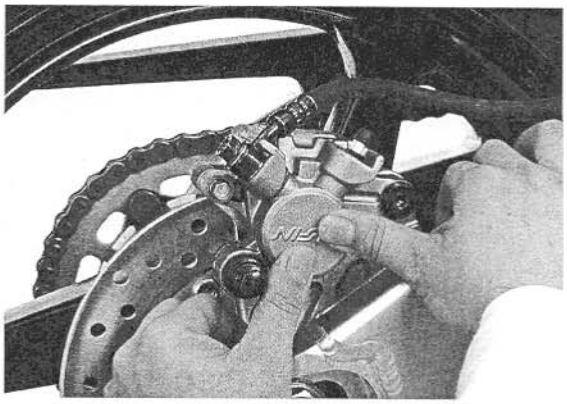


16. HYDRAULIC BRAKE

REAR BRAKE PAD REPLACEMENT

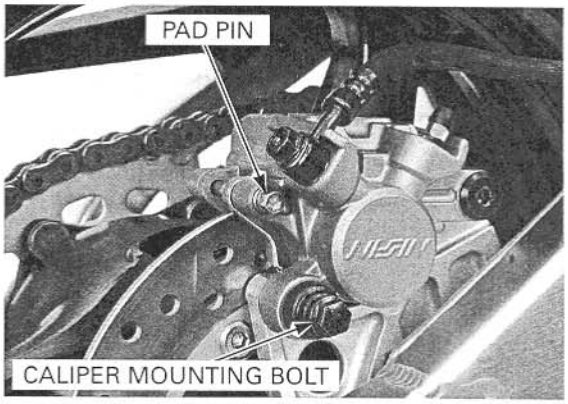
Always replace the brake pads in pars to assure even disc pressure.
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Push the caliper piston all the way in by pushing the caliper body inward to allow installation of new brake pads.



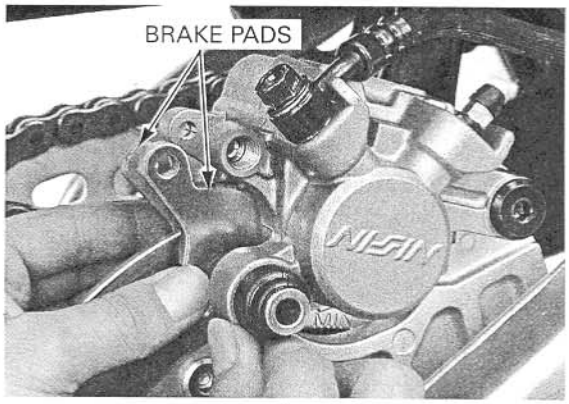
Loosen the pad pin.

Remove the caliper mounting bolt.



Pivot the caliper up.
Remove the pad pin and brake pads.

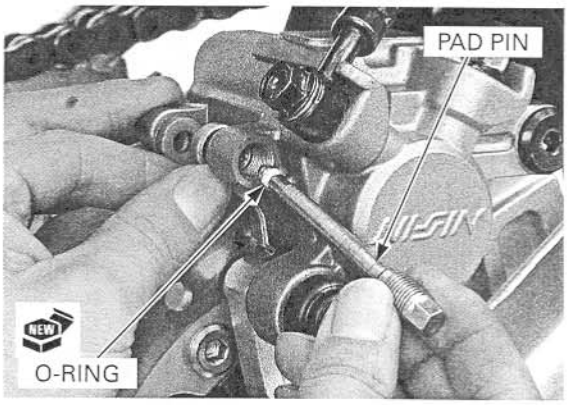
Clean the inside of the caliper especially around the caliper pistons.



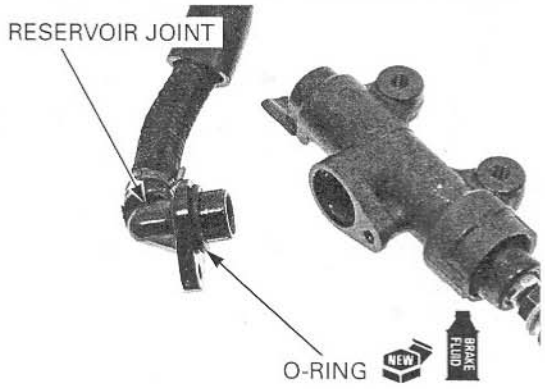
Make sure the brake pad spring is in place.
Install new brake pads.

Lower the caliper while pushing the pads against the pad spring so that the pad ends are positioned onto the retainer on the caliper bracket.

Install a new O-ring into the pad pin groove.
Install the pad pin.

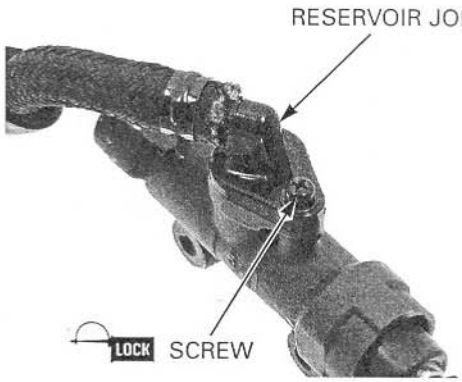


Apply brake fluid to a new O-ring and install it onto the reservoir joint.
Install the reservoir joint into the master cylinder.



Apply a locking agent to the reservoir joint screw threads.
Tighten the screw to the specified torque.

TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)

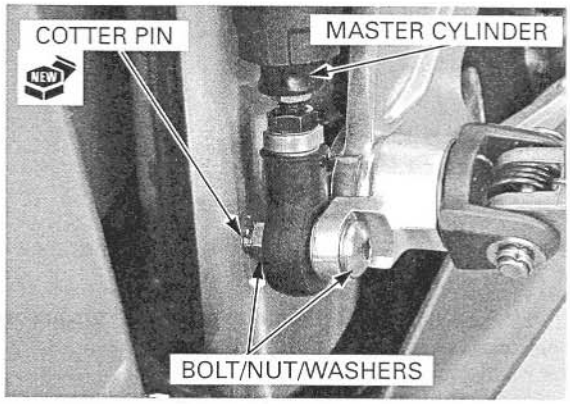


INSTALLATION

Connect the brake pedal to the push rod lower joint.

Install the bolt, washers, nut and tighten the nut securely.

Install a new cotter pin.

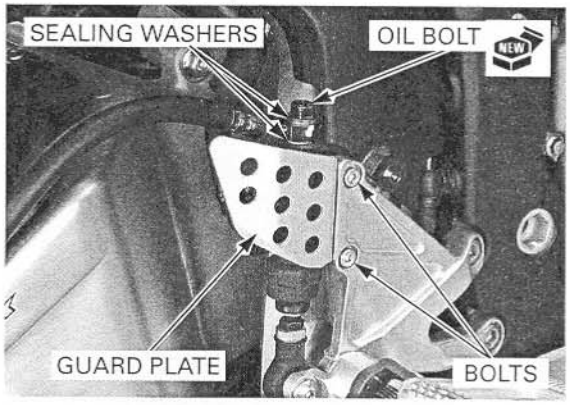


Install the master cylinder and guard plate, tighten the bolts to the specified torque.

TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)

Install the brake hose with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

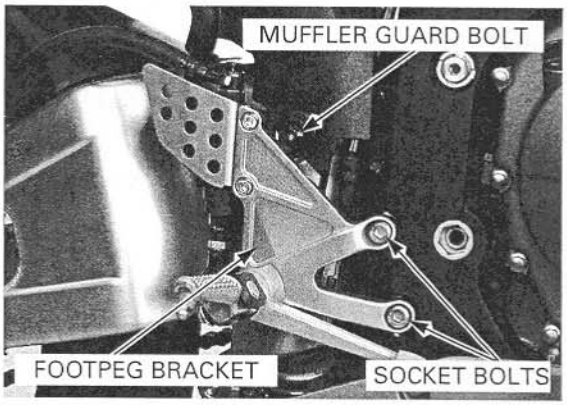
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Install the footpeg bracket assembly onto the frame. Install and tighten the footpeg bracket socket bolts to the specified torque.

TORQUE: 37 N·m (3.8 kgf·m, 28 lbf·ft)

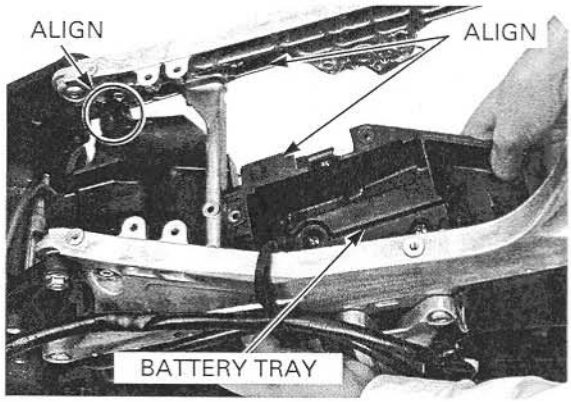
Tighten the muffler guard bolt.
Adjust the rear brake light switch operation (page 4-27).

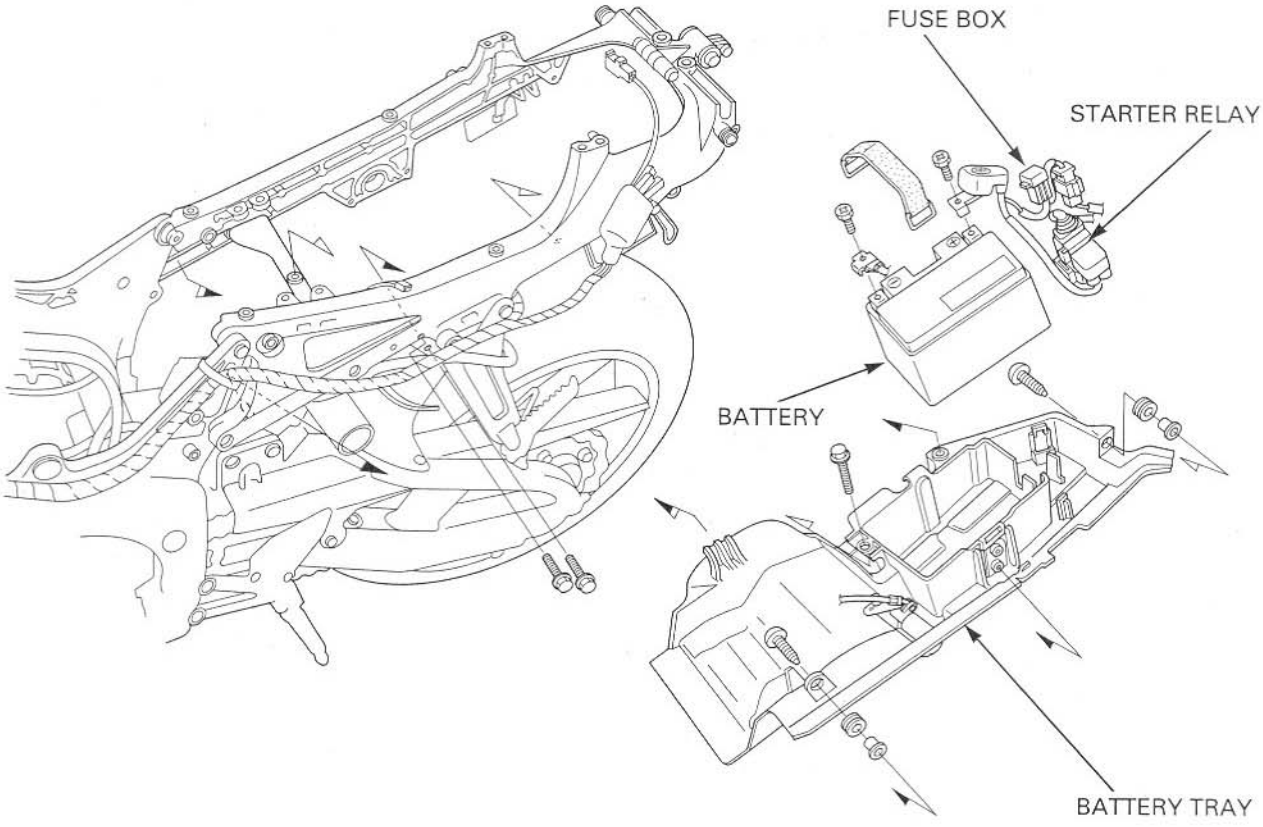


Remove the battery tray from the seat rail by pulling it backward.

Installation is in the reverse order of removal.

NOTE:
When installing the battery tray, align the battery tray bosses with the seat rail grooves.

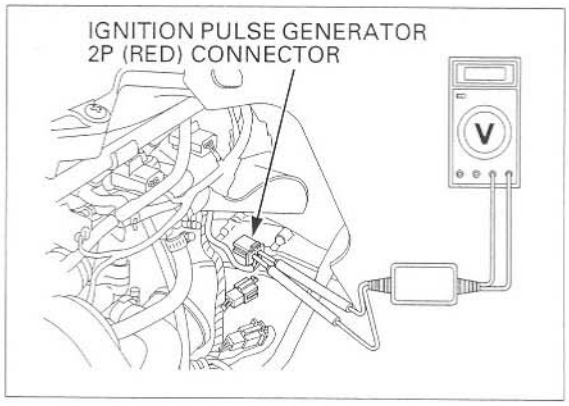




Lift and support the fuel tank (page 6-61)

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and Yellow/white).
In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, check the 2P (Red) connector for loose connection and the wire harness for an open circuit or loose connection.
- If both peak voltage measured are abnormal, check each item in the troubleshooting chart (page 18-4). If all items are normal, the ignition pulse generator is faulty. See following steps for ignition pulse generator replacement.



IGNITION PULSE GENERATOR

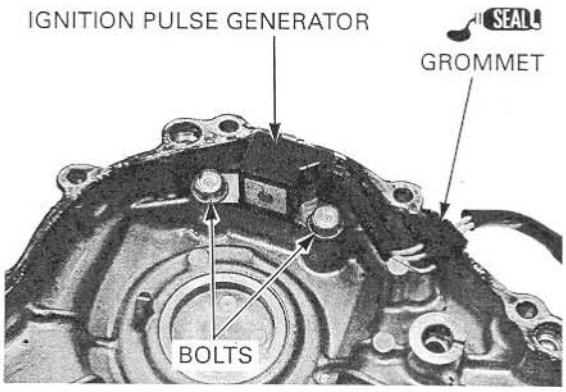
REPLACEMENT

Remove the right crankcase cover (page 10-5).

Remove the wire grommet from the cover.
Remove the bolts and ignition pulse generator.

Apply sealant to the grommet seating surface.
Install a new ignition pulse generator and the grommet into the cover groove properly.
Apply locking agent to the threads of the bolts.
Tighten the bolts securely.

Install the right crankcase cover (page 10-24).

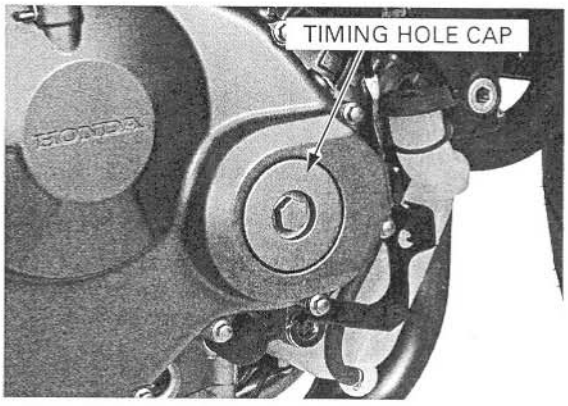


IGNITION TIMING

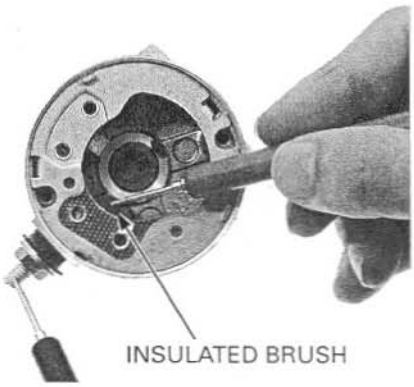
Remove the following:
- Lower cowls (page 3-6)
- Middle cowls (page 3-7)

Warm up the engine.

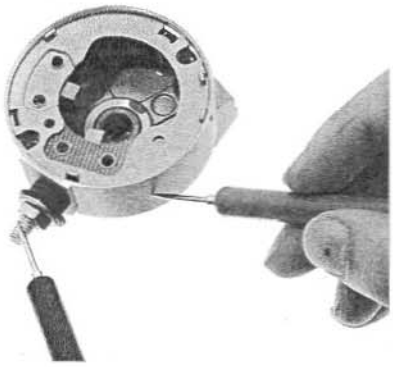
Stop the engine and remove the timing hole cap.



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



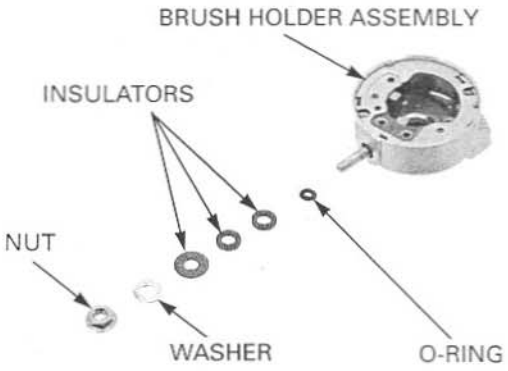
Check for continuity between the cable terminal and the rear cover.
There should be no continuity.



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)

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 is 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)	

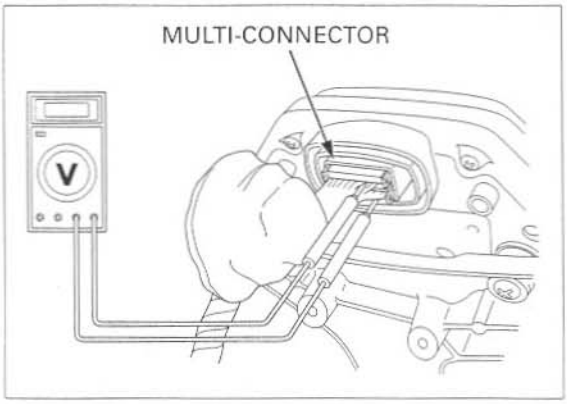
SPEEDOMETER/VEHICLE SPEED SENSOR (VSS)

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

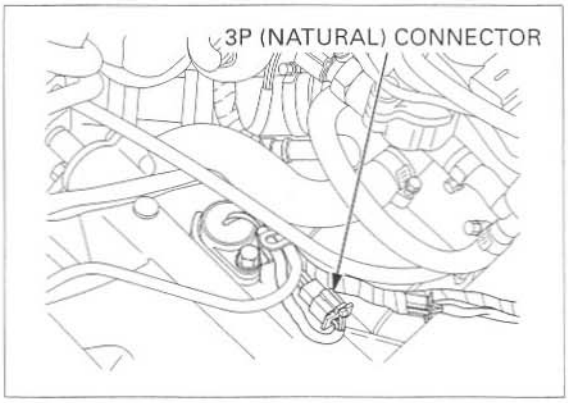
Lift and support the fuel tank (page 6-61).

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.

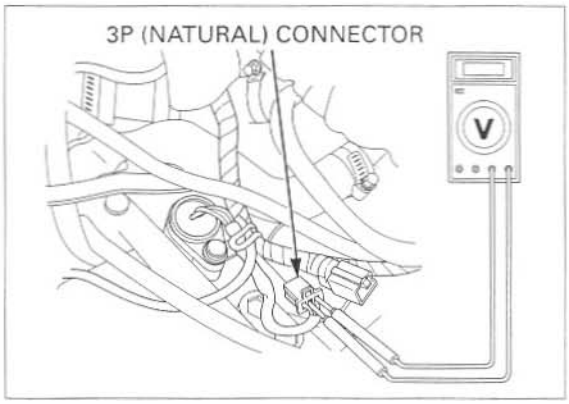


Disconnect the VSS 3P (Natural) connector.
Support the motorcycle securely and place the rear wheel off the ground.
Shift the transmission into neutral.

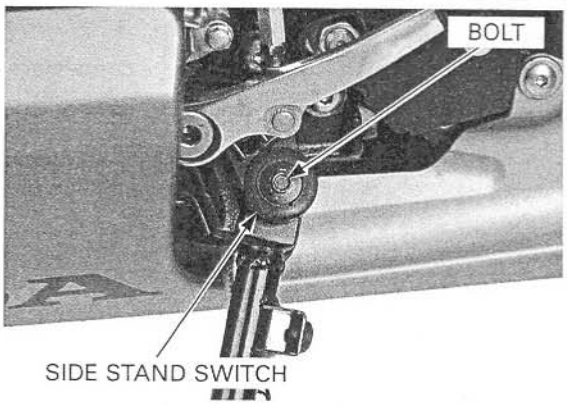
Measure the voltage at the sensor connector terminals with the ignition switch ON while slowly turning the rear wheel by hand.

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

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

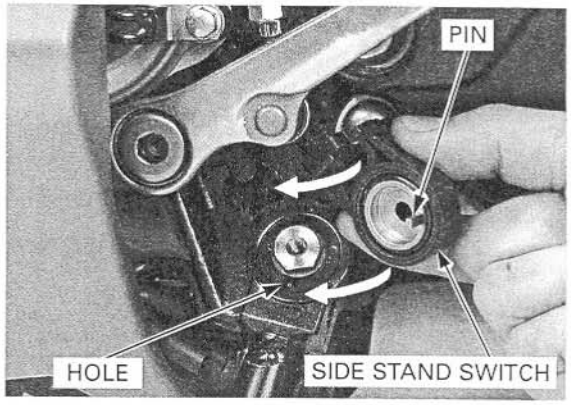


Remove the bolt and side stand switch.



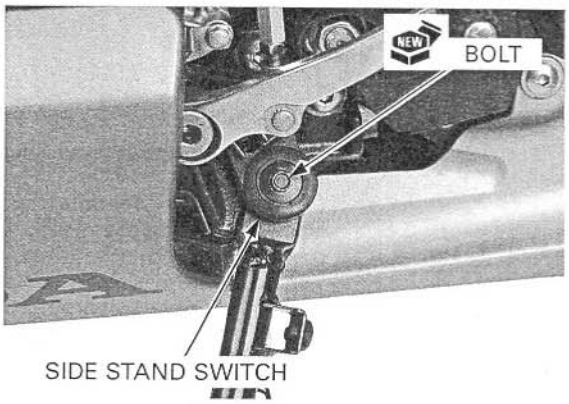
INSTALLATION

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.