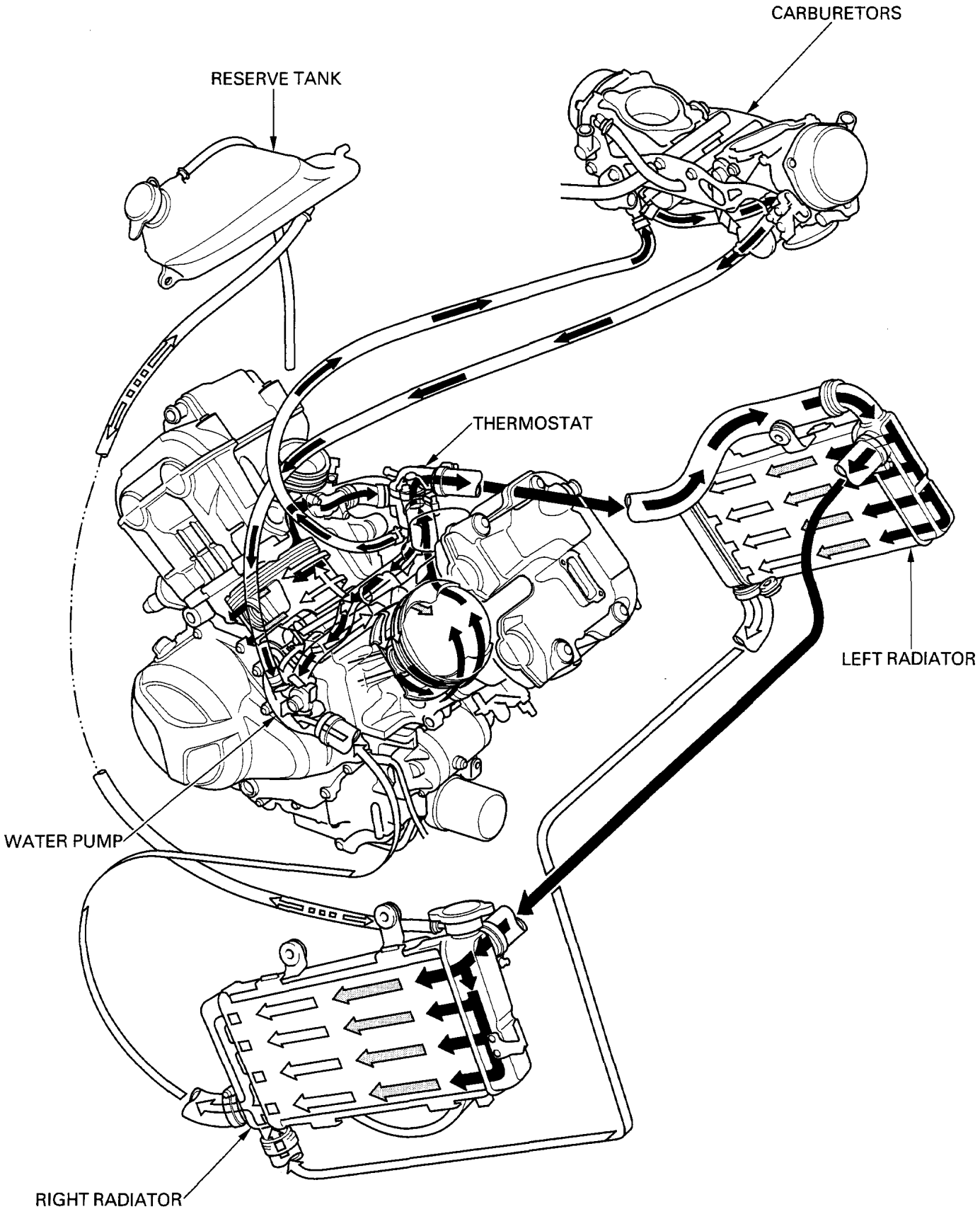

CARBURETORS
RESERVE TANK
THERMOSTAT
LEFT RADIATOR
WATER PUMP
RIGHT RADIATOR

6. COOLING SYSTEM

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Wait until the engine is cool before slowly removing the radiator cap. Removing the cap while the engine is hot and the coolant is under pressure may cause serious scalding.***
- ***Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.***
  - ***If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.***
  - ***If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.***
  - ***If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.***
- ***KEEP OUT OF REACH OF CHILDREN.***

- Use only distilled water and ethylene glycol in the cooling system. A 50−50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze or an antifreeze with self-sealing properties.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for coolant temperature indicator and fan motor switch.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.86 ℓ (0.756 US gal , 0.629 Imp gal)
	Reserve tank	0.71 ℓ (0.188 US gal , 0.156 Imp gal)
Radiator cap relief pressure		108−137 kPa (1.1−1.4 kgf/cm², 16−20 psi)
Thermostat	Begin to open	163−171 °F (73−77 °C)
	Fully open	194 °F (90 °C)
	Valve lift	8 mm (0.3 in) minimum

TOOLS

Bearing remover set, 10 mm	07936-GE00000
−Bearing remover shaft	07936-GE00100
−Bearing remover, 10 mm	07936-GE00200
−Sliding weight	07741-0010201
Driver	07749-0010000
Attachment, 28 × 30 mm	07946-1870100
Pilot, 10 mm	07746-0040100
Mechanical seal driver attachment	07945-4150400

TROUBLESHOOTING

Engine temperature too high
- Faulty temperature gauge or thermosensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan
- Faulty fan motor switch
- Faulty water pump

Engine temperature too low
- Faulty temperature gauge or thermosensor
- Thermostat stuck open
- Faulty fan motor switch

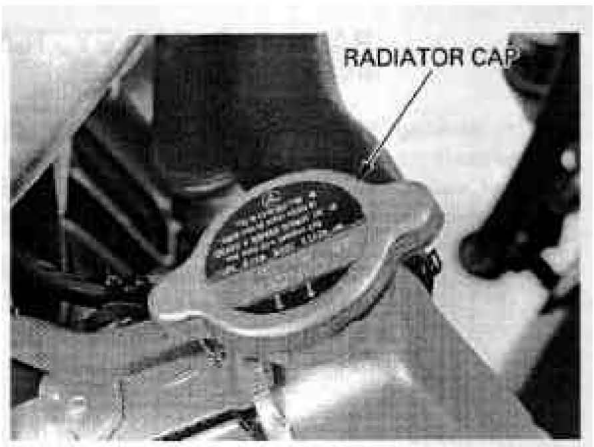
Coolant leaks
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

SYSTEM TESTING

⚠WARNING

The engine must be cool before removing the radiator cap, or severe scalding may result.

Remove the front fairing (page 2-3).
Remove the radiator cap.

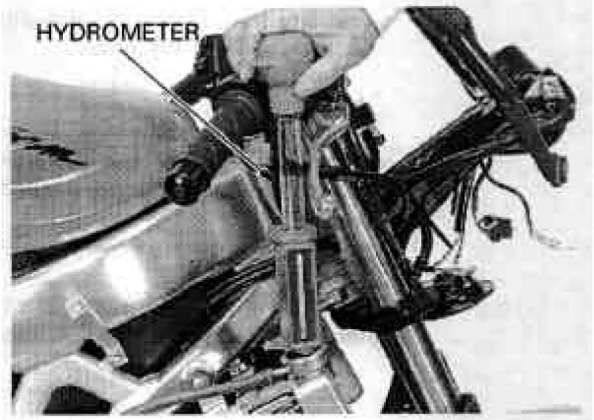


COOLANT (HYDROMETER TEST)

Test the coolant gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION: 50%

Look for contamination and replace the coolant if necessary.



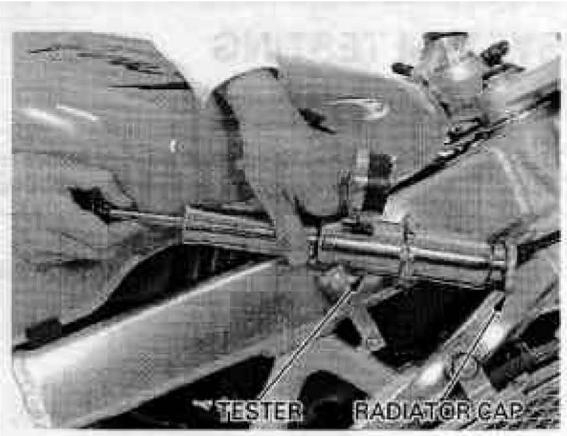
Coolant temperature °F (°C) / Coolant ratio %	32 (0)	41 (5)	50 (10)	59 (15)	68 (20)	77 (25)	86 (30)	95 (35)	104 (40)	113 (45)	122 (50)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Before installing the cap in the tester, wet the sealing surfaces.

Pressure test the radiator cap using the tester. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:
108–137 kPa (1.1–1.4 kgf/cm², 16–20 psi)



Pressure the radiator, engine and hoses using the tester, and check for leaks.

CAUTION:

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

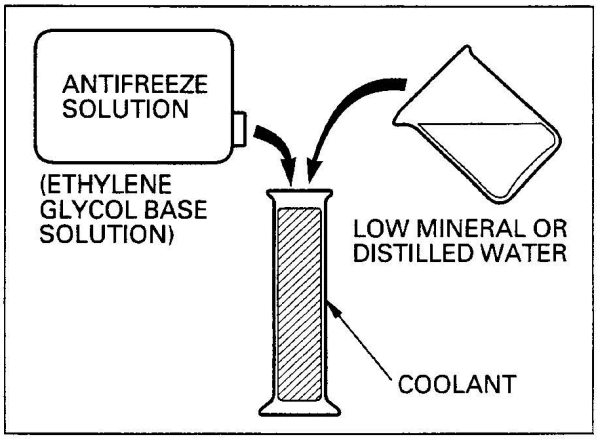
Repair or replace components if the system will not hold specified pressure for at least 6 seconds.

COOLANT REPLACEMENT

PREPARATION

⚠WARNING

- ***Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.***
  - ***If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.***
  - ***If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.***
  - ***If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.***
- ***KEEP OUT OF REACH OF CHILDREN.***



NOTE:

- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

RECOMMENDED MIXTURE:
50–50 (Distilled water and antifreeze)

REPLACEMENT/AIR BLEEDING

⚠WARNING

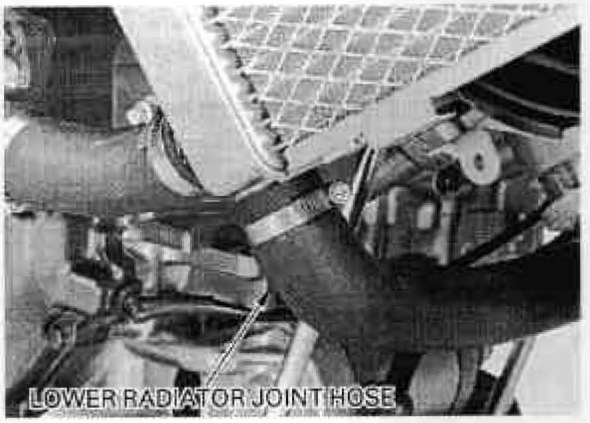
The engine must be cool before servicing the cooling system, or severe scalding may result.

NOTE:

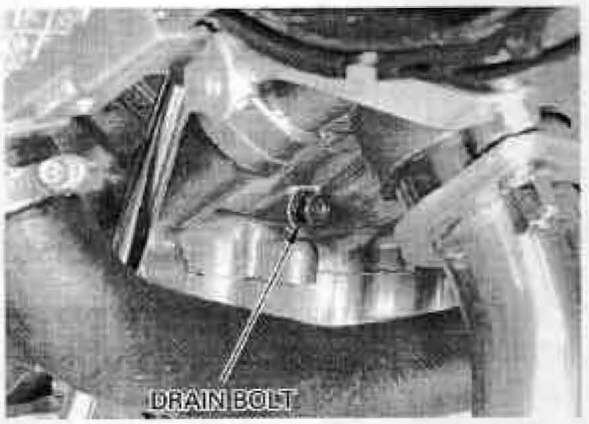
When filling the system, place the motorcycle on its side stand on a flat, level surface.

Remove the front fairing (page 2-3).
Remove the radiator cap.

Disconnect the lower radiator joint hose at the right radiator by loosening the hose band screw and drain the coolant from the system.

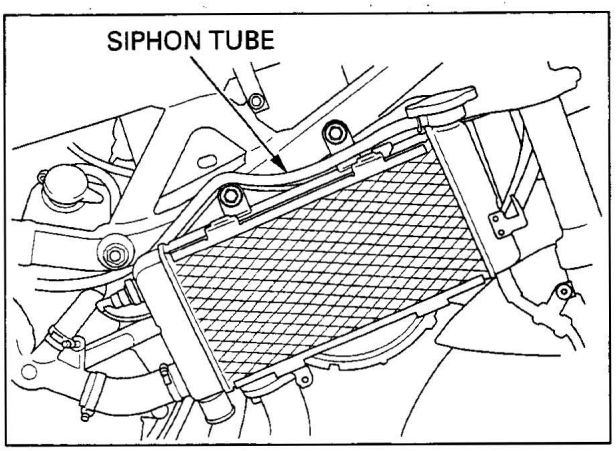


Remove the drain bolt and drain the coolant from the front cylinder.



Disconnect the radiator siphon tube from the filler neck and drain the coolant from the reserve tank.

Connect the radiator lower joint hose and siphon tube, and install the drain bolt with a new sealing washer.



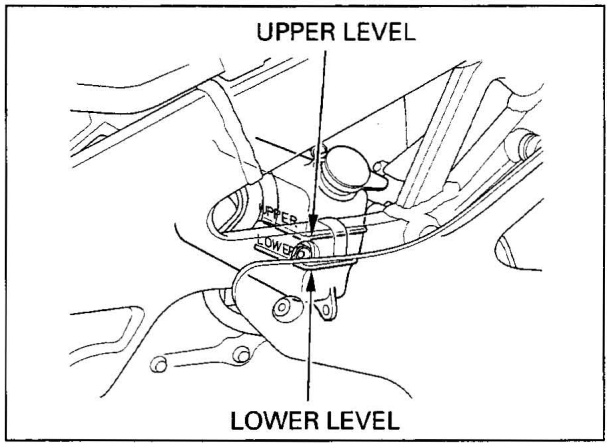
Fill the system with recommended coolant up to the filler neck with the motorcycle on its side stand.

Bleed air from the system as follows:

1. Shift the transmission into neutral.
   Start the engine and let it idle for 2—3 minutes.
2. Snap the throttle 3—4 times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
4. Install the radiator cap.

Fill the reserve tank to the upper level line with the motorcycle upright on a flat, level surface.

Install the front fairing (page 2-3).



RADIATOR/COOLING FAN

CAUTION:

Be careful not to damage the radiator fins while servicing the radiator.

RADIATOR REMOVAL/INSTALLATION

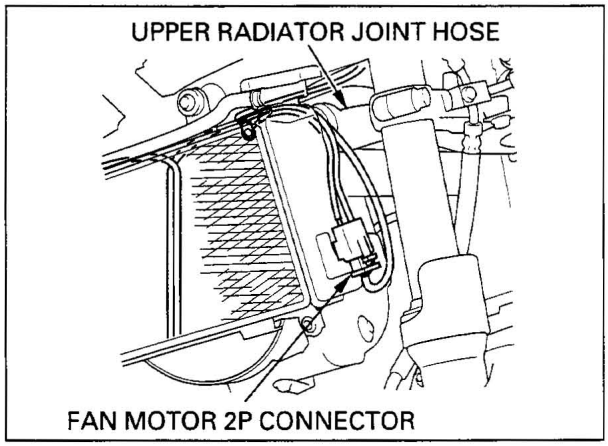
Drain the coolant from the system (page 6-5).

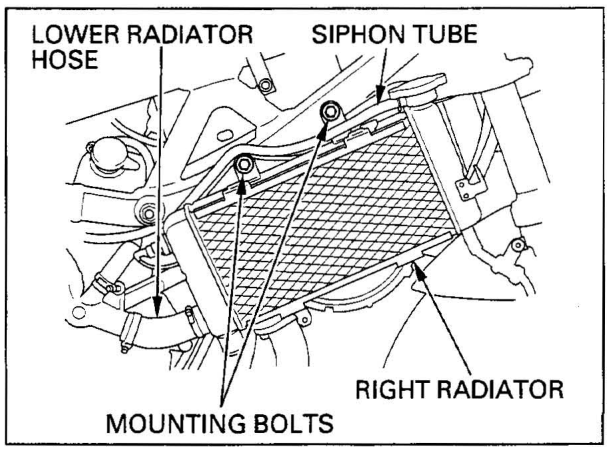
RIGHT RADIATOR

Disconnect the fan motor 2P (black) connector.
Disconnect the radiator siphon tube and upper radiator joint hose.
Remove the two mounting bolts and the radiator from the mounting stay.
Disconnect the lower radiator hose from the radiator.

Install the right radiator in the reverse order of removal.

Fill and bleed the cooling system (page 6-5).



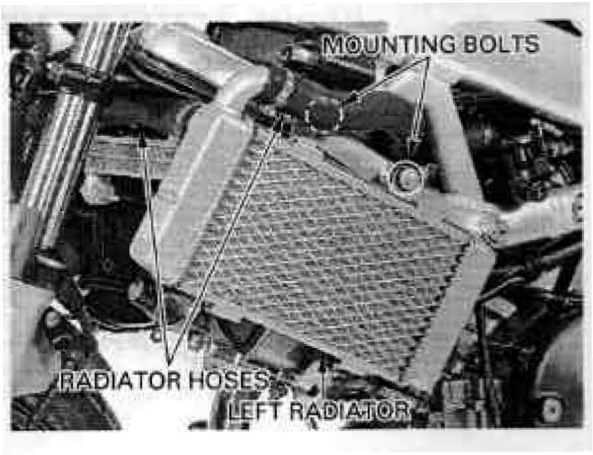


LEFT RADIATOR

Disconnect the upper radiator hose, upper and lower radiator joint hoses.
Remove the two mounting bolts and the radiator from the mounting stay.

Install the left radiator in the reverse order of removal.

Fill and bleed the cooling system (page 6-5).

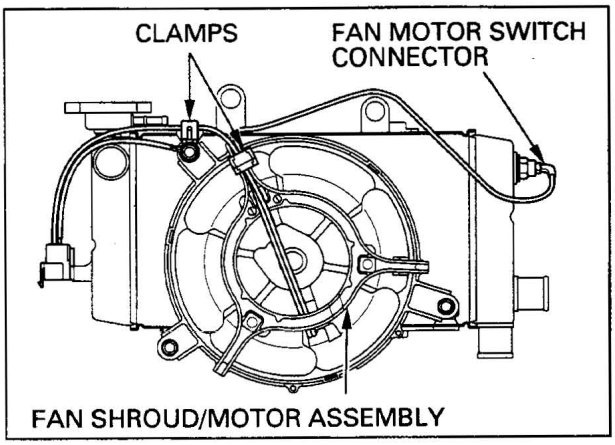


COOLING FAN DISASSEMBLY

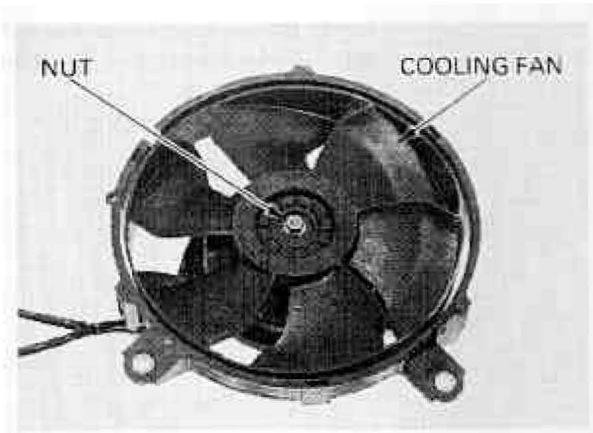
Remove the right radiator (page 6-6).

Disconnect the fan motor switch connector.
Free the fan motor wires from the clamps.

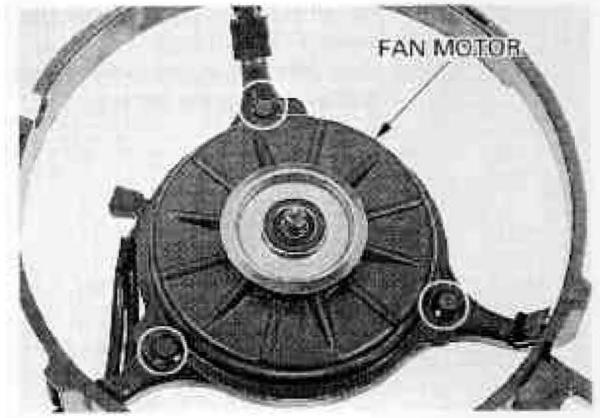
Remove the three bolts, clamp and fan shroud/motor assembly from the radiator.



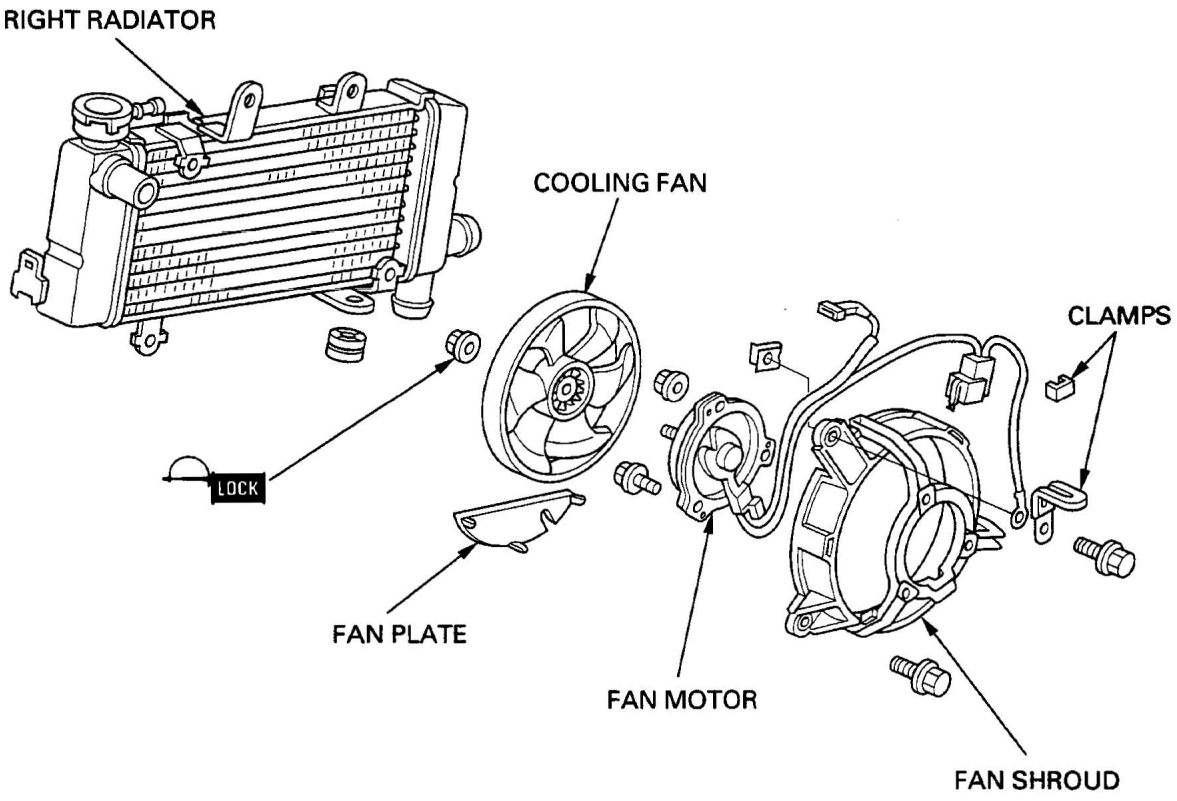
Remove the nut and cooling fan from the motor.



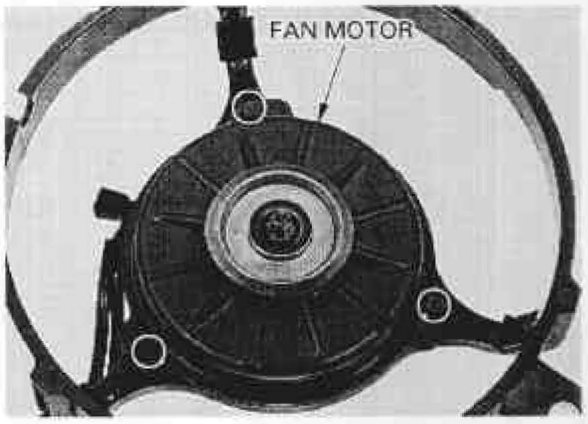
Remove the three bolts and the fan motor from the shroud.



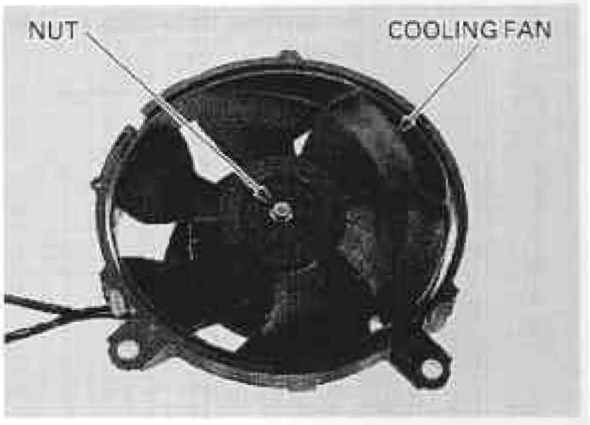
COOLING FAN ASSEMBLY



Install the fan motor onto the shroud with the drain tube facing toward the fan plate, and tighten the three bolts.



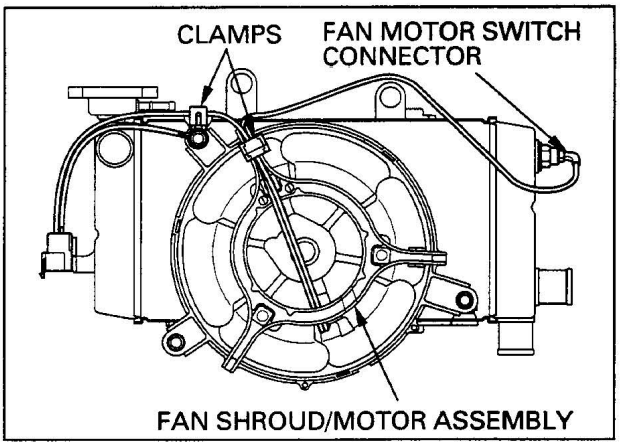
Install the cooling fan onto the motor shaft, aligning the flat surfaces.
Apply locking agent to the motor shaft threads.
Install and tighten the nut.



Install the fan shroud/motor assembly with the clamps and ground terminal onto the right radiator as shown and tighten the bolts.

Route and clamp the fan motor wires properly as shown.

Install the right radiator (page 6-6).

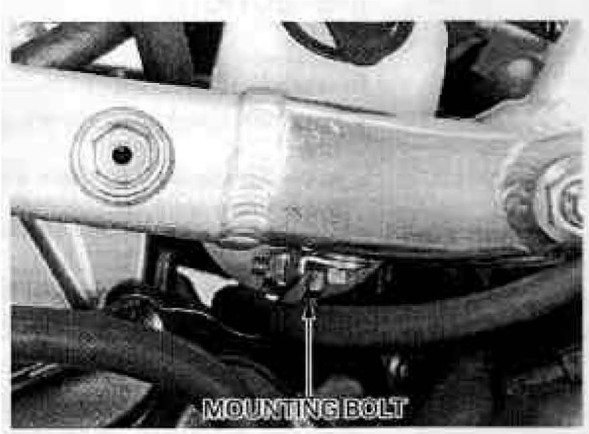


RADIATOR RESERVE TANK

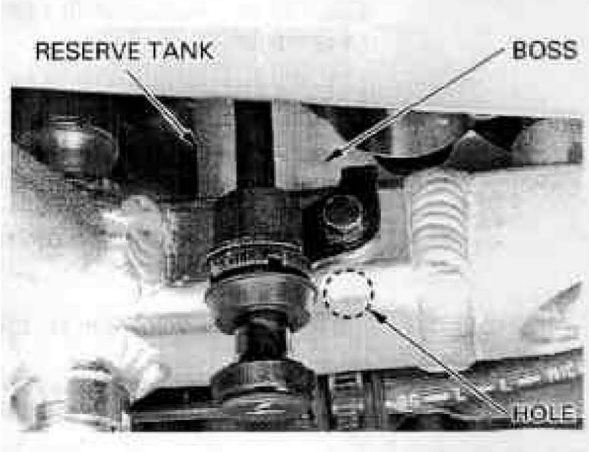
REMOVAL/INSTALLATION

Remove the front fairing (page 2-3).

Disconnect the radiator siphon tube from the radiator filler neck and drain the coolant from the reserve tank.
Remove the mounting bolt and the reserve tank from the frame.



Install the reserve tank in the frame and insert its boss into the hole in the frame.
Install the removed parts in the reverse order of removal.
Fill the reserve tank with recommended coolant to the upper level line.



THERMOSTAT

REMOVAL

Remove the fuel tank (page 2-4).
Drain the coolant from the system (page 6-5).

Loosen the hose band screw and disconnect the upper radiator hose from the thermostat housing cover.
Remove the two bolts, ground terminal and thermostat housing cover.

Remove the thermostat from the housing.

INSPECTION

⚠WARNING

- ***Wear insulated gloves and adequate eye protection.***
- ***Keep flammable materials away from the electric heating element.***

Visually inspect the thermostat for damage.
Replace the thermostat if the valve stays open at room temperature.

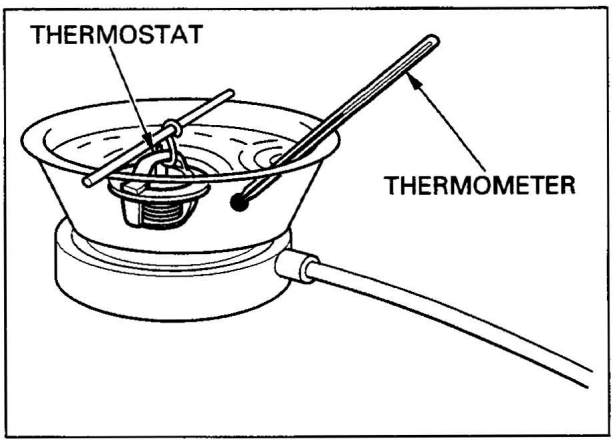
Heat the water with an electric heating element to operating temperature for 5 minutes.
Suspend the thermostat in heated water to check its operation.

NOTE:

Do not let the thermometer or thermostat touch the pan, or you will get false readings.

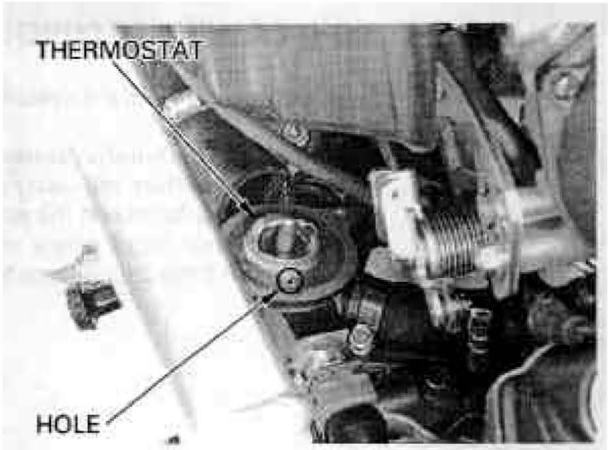
THERMOSTAT BEGINS TO OPEN:
163–171 °F (73–77 °C)
VALVE LIFT:
8 mm (0.3 in) minimum at 194 °F (90 °C)

Replace the thermostat if the valve responds at temperature other than those specified.

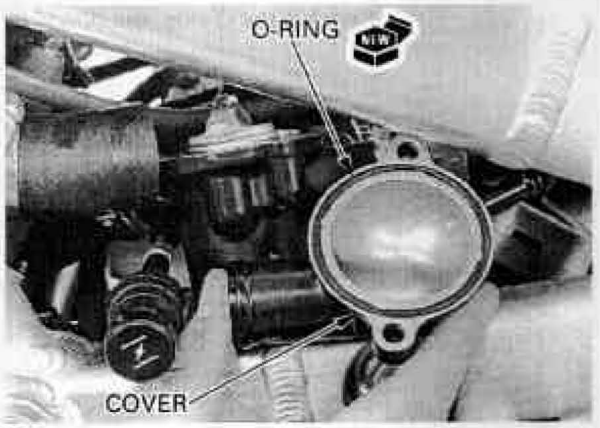


INSTALLATION

Install the thermostat into the housing with its hole facing rearwards.

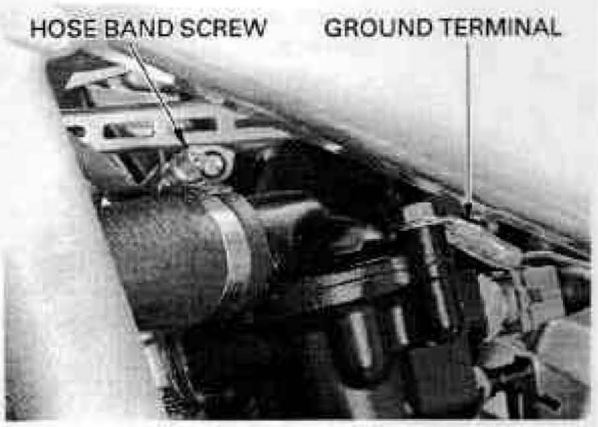


Install a new O-ring into the groove in the housing cover and install the cover onto the housing.



Install the cover bolts with the ground terminal and tighten them.
Connect the upper radiator hose to the thermostat housing cover.

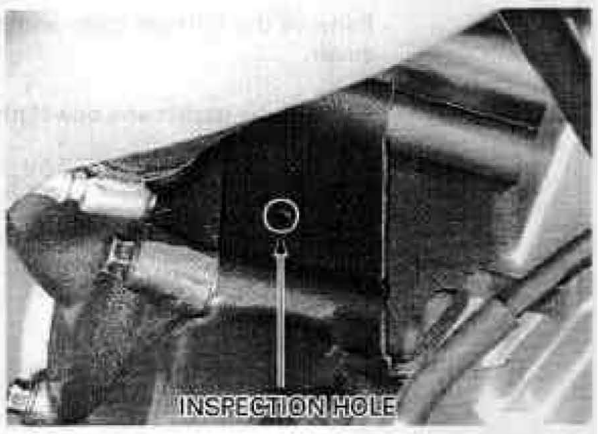
Fill and bleed the cooling system (page 6-5).
Install the fuel tank (page 2-4).



WATER PUMP

MECHANICAL SEAL INSPECTION

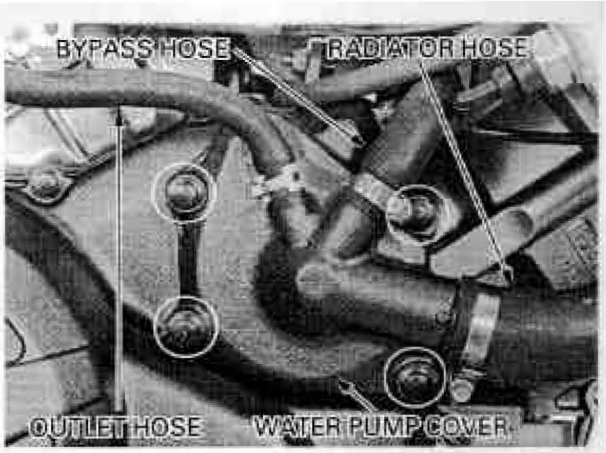
Check the inspection hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective, and it should be replaced (page 6-13).



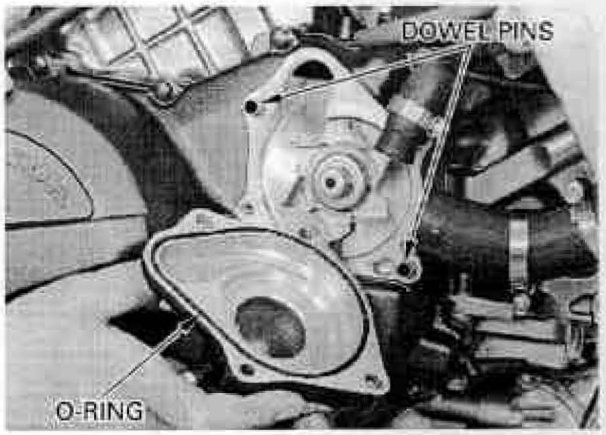
RIGHT CRANKCASE COVER REMOVAL

Drain the coolant from the system (page 6-5).

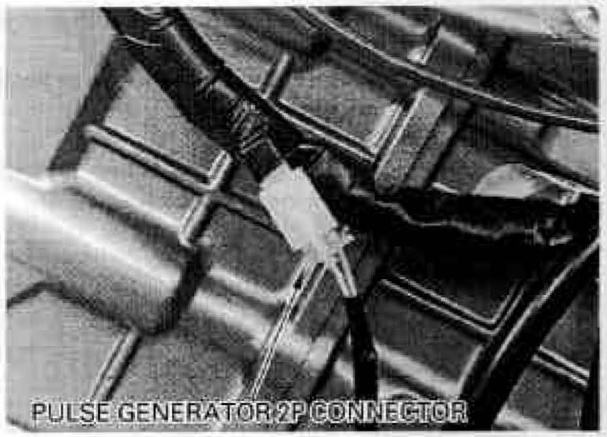
Disconnect the carburetor heater water outlet hose and bypass hose from the water pump cover. Remove the four bolts and the water pump cover. Loosen the hose band screw and disconnect the lower radiator hose from the water pump cover.



Remove the O-ring and dowel pins.



Disconnect the ignition pulse generator 2P (white) connector.

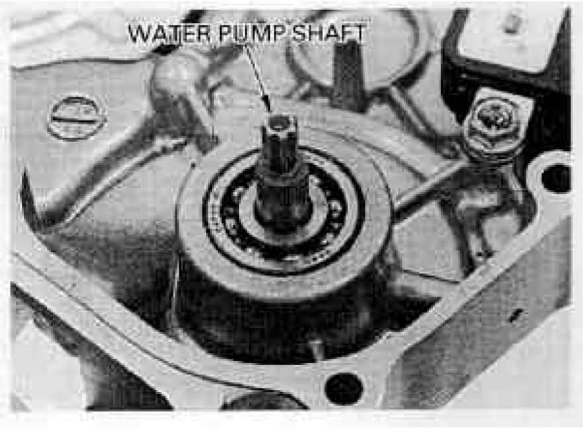


Remove the thirteen bolts and the right crankcase cover.

Remove the gasket and dowel pins.

MECHANICAL SEAL REPLACEMENT

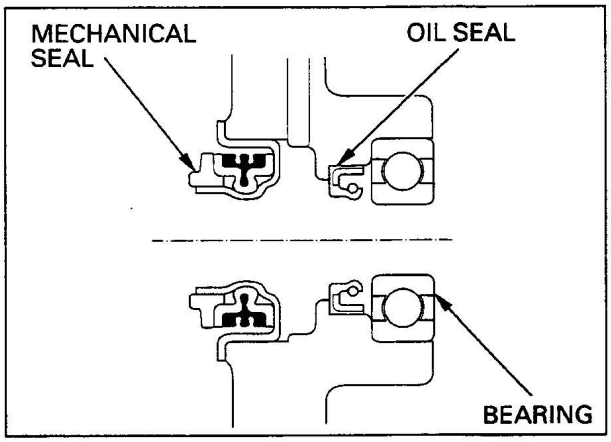
Remove the water pump shaft from the right crankcase cover.



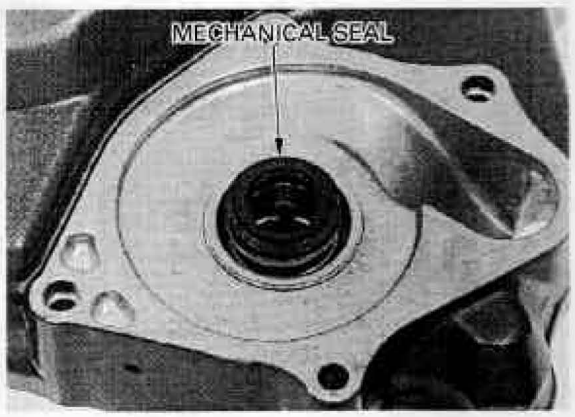
Remove the bearing using the special tools.

TOOLS:

Bearing remover set, 10 mm	07936-GE00000
—Bearing remover shaft	07936-GE00100
—Bearing remover, 10 mm	07936-GE00200
—Sliding weight	07741-0010201



Remove the oil seal and mechanical seal from the right crankcase cover.

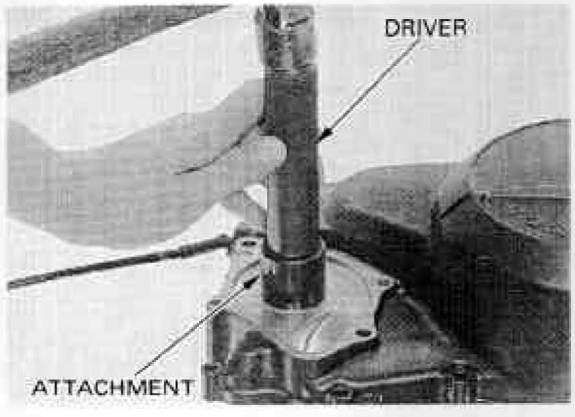


Drive a new mechanical seal using the special tool.

TOOLS:

Driver	07749-0010000
Mechanical seal driver attachment	07945-4150400

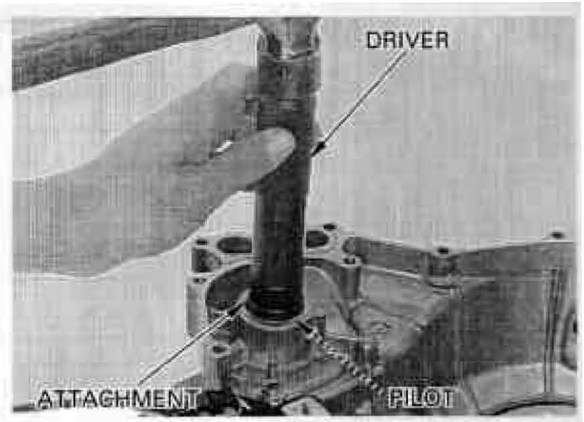
Apply grease to a new oil seal lip and install the oil seal into the right crankcase cover.



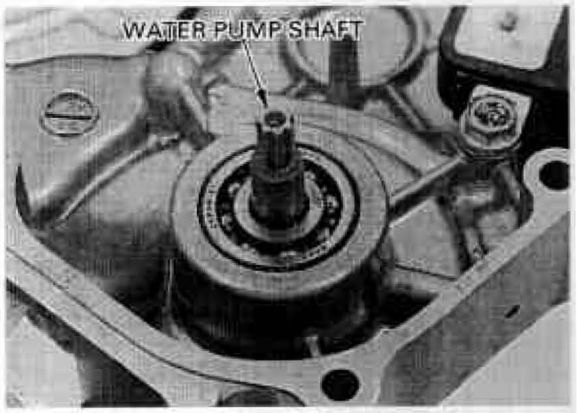
Drive a new bearing with the markings facing out, using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 28 × 30 mm	07946-1870100
Pilot, 10 mm	07746-0040100

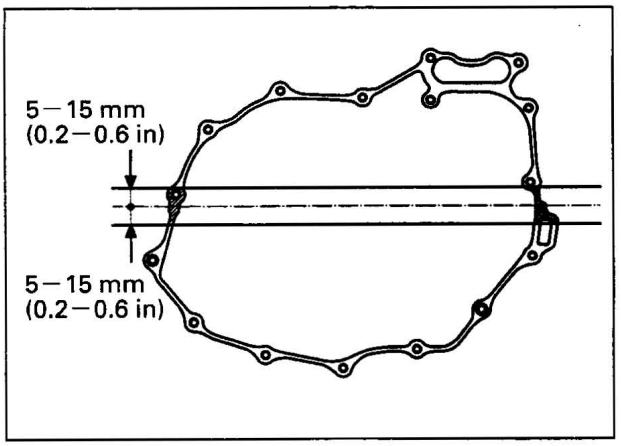


Support the bearing inner race properly and install the water pump shaft until it is seated.

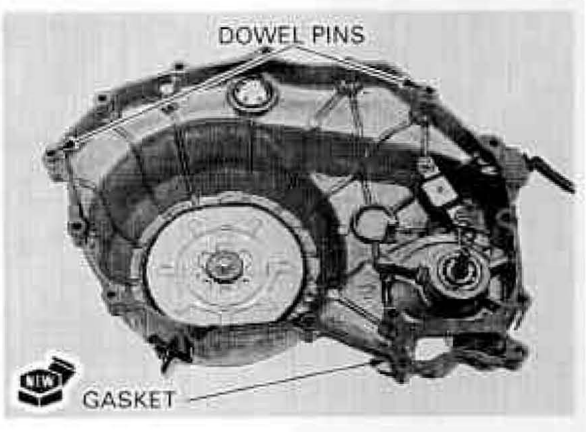


RIGHT CRANKCASE COVER INSTALLATION

Apply sealant to the crankcase mating surfaces as shown.



Install the dowel pins and a new gasket.

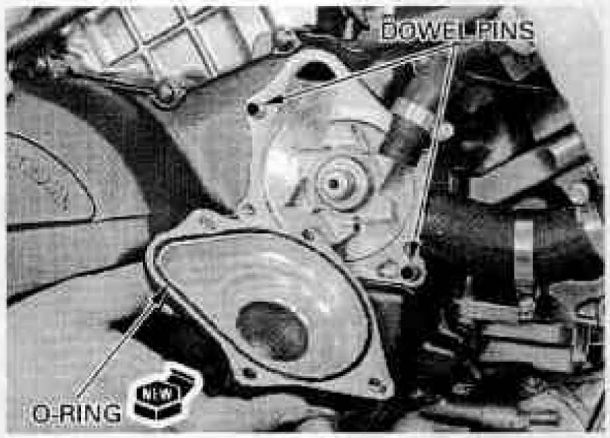


Install the right crankcase cover and tighten the thirteen bolts.

Route the ignition pulse generator wire properly (page 1-18).

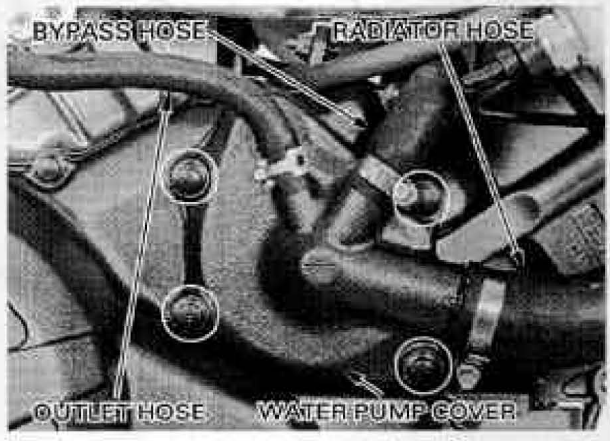
Connect the ignition pulse generator connector.

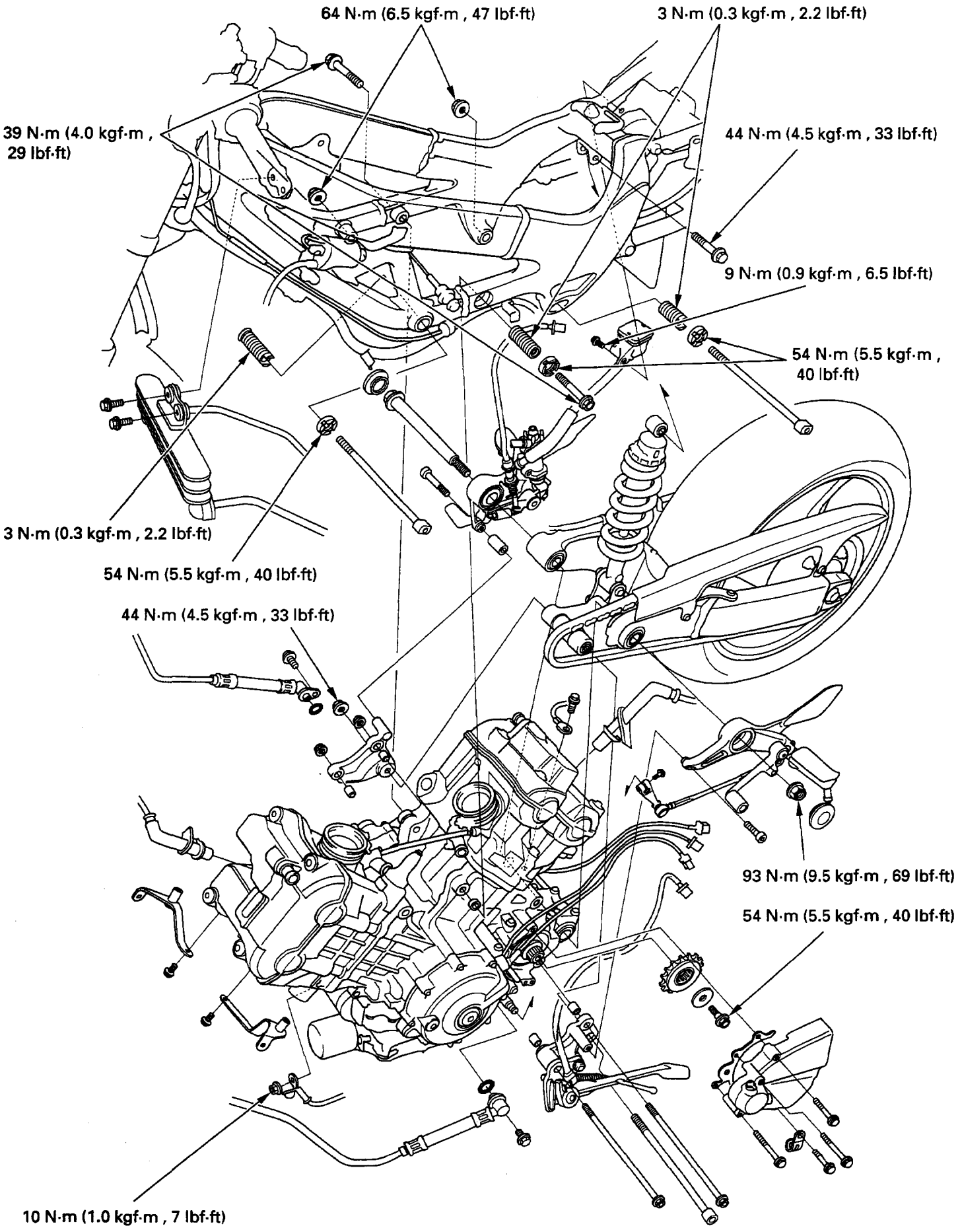
Install the dowel pins and a new O-ring into the water pump cover groove.



Connect the lower radiator hose to the water pump cover.
Install the water pump cover onto the right crankcase cover and tighten the four bolts.
Connect the carburetor heater water outlet hose and bypass hose to the water pump cover.

Fill and bleed the cooling system (page 6-5).




64 N·m (6.5 kgf·m , 47 lbf·ft)
3 N·m (0.3 kgf·m , 2.2 lbf·ft)
39 N·m (4.0 kgf·m , 29 lbf·ft)
44 N·m (4.5 kgf·m , 33 lbf·ft)
9 N·m (0.9 kgf·m , 6.5 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
3 N·m (0.3 kgf·m , 2.2 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
44 N·m (4.5 kgf·m , 33 lbf·ft)
93 N·m (9.5 kgf·m , 69 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
10 N·m (1.0 kgf·m , 7 lbf·ft)

7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

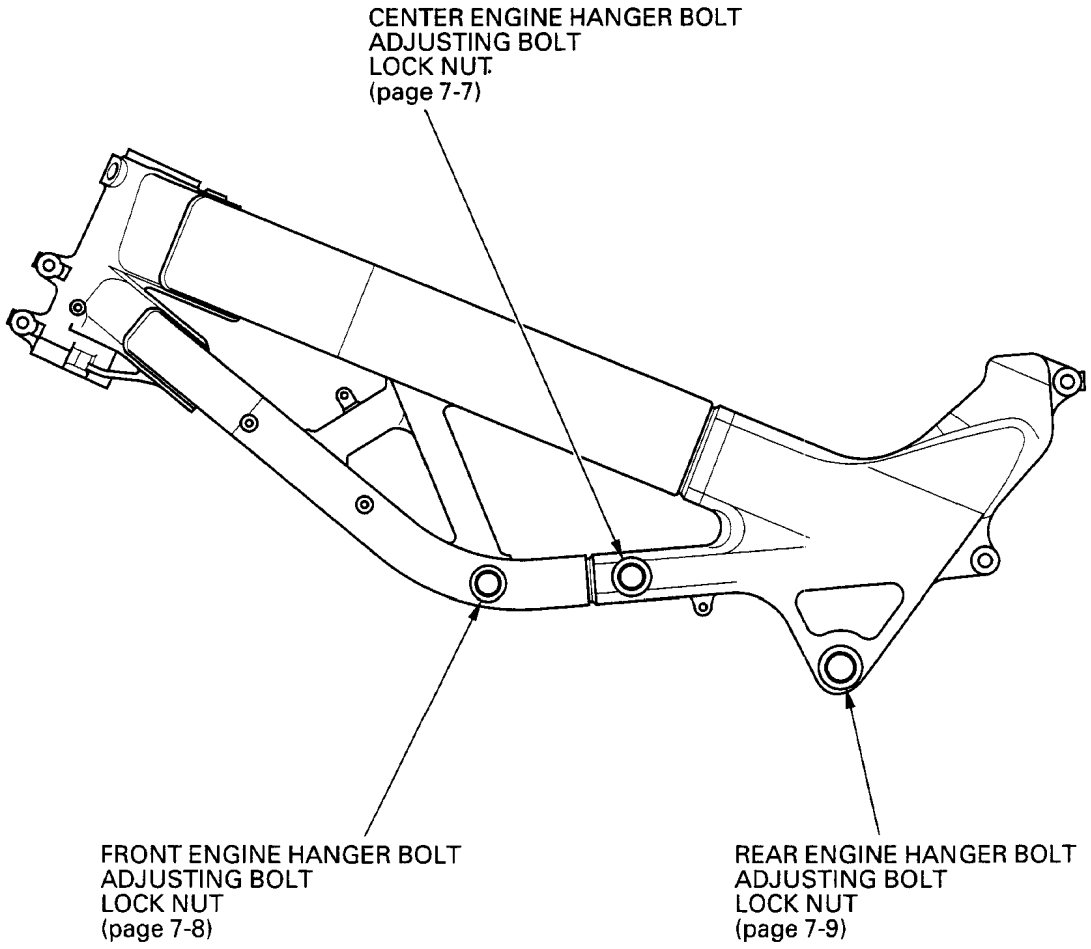
GENERAL

- 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.

CAUTION:

Do not use the oil filter 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 require engine removal for service:
  - transmission (section 11)
  - crankshaft/piston/cylinder (section 12)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.



SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	74.2 kg (163.6 lbs)
Engine oil capacity after disassembly	4.5 ℓ (4.8 US qt , 4.0 Imp qt)
Coolant capacity (radiator and engine)	2.86 ℓ (0.756 US gal , 0.629 Imp gal)

TORQUE VALUES

Center engine hanger bolt	39 N·m (4.0 kgf·m , 29 lbf·ft)
Left center engine hanger adjusting bolt	3 N·m (0.3 kgf·m , 2.2 lbf·ft)
Left center engine hanger lock nut	54 N·m (5.5 kgf·m , 40 lbf·ft)
Rear engine hanger adjusting bolt	3 N·m (0.3 kgf·m , 2.2 lbf·ft)
Rear engine hanger lock nut	54 N·m (5.5 kgf·m , 40 lbf·ft)
Front engine hanger adjusting bolt	3 N·m (0.3 kgf·m , 2.2 lbf·ft)
Front engine hanger lock nut	54 N·m (5.5 kgf·m , 40 lbf·ft)
Rear engine hanger nut	64 N·m (6.5 kgf·m , 47 lbf·ft)
Front engine hanger nut	64 N·m (6.5 kgf·m , 47 lbf·ft)
Shock link bracket nut	44 N·m (4.5 kgf·m , 33 lbf·ft)
Swingarm pivot nut	93 N·m (9.5 kgf·m , 69 lbf·ft)
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m , 33 lbf·ft)
Shock link-to-bracket nut	44 N·m (4.5 kgf·m , 33 lbf·ft)
Rear brake reservoir mounting bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)
Drive sprocket bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)
Starter motor cable terminal nut	10 N·m (1.0 kgf·m , 7 lbf·ft)

TOOLS

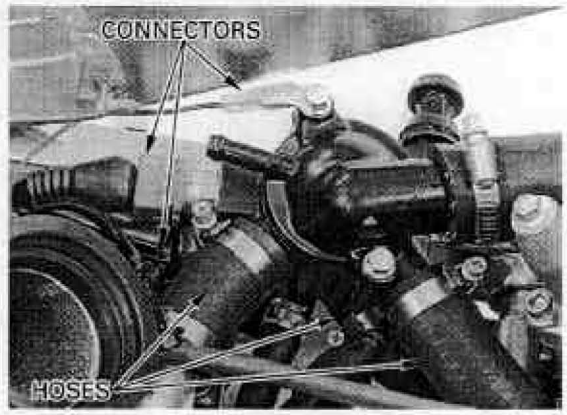
Lock nut wrench	07VMA-MBB0100
Lock nut wrench	07HMA-MR70200

ENGINE REMOVAL

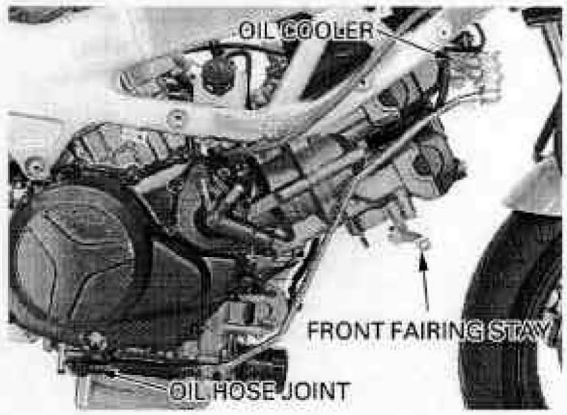
Drain the engine oil (page 3-11).

Remove the following:
- exhaust system (page 2-5).
- left and right radiators (page 6-6).
- carburetor assembly (page 5-5).

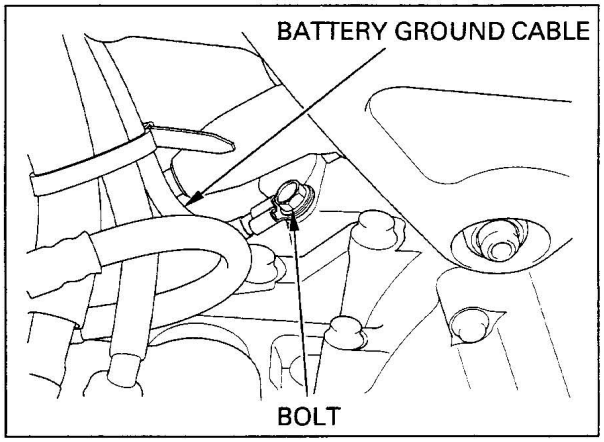
Remove the thermostat housing assembly by disconnecting the following:
- ground wire connector
- engine coolant temperature sensor connector
- thermosensor connector
- bypass hose from the water pump
- water hoses from the cylinder heads



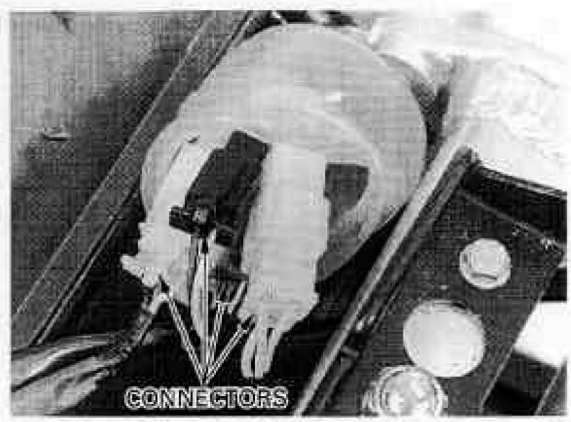
Remove the front fairing stays from the front cylinder head.
Remove the oil hose joints, mounting bolts and the oil cooler assembly.



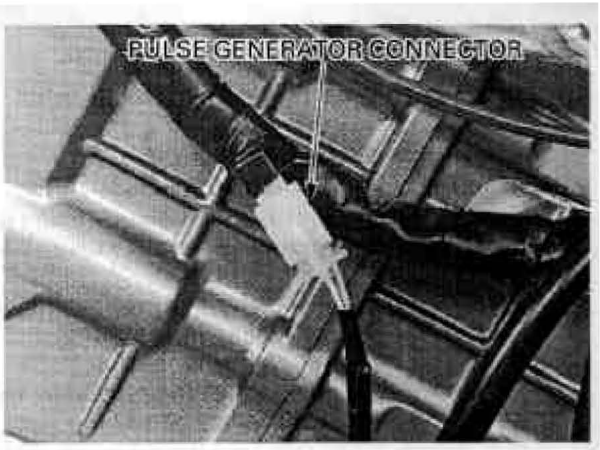
Remove the bolt and the battery ground cable from the engine.



Disconnect the following:
- alternator 3P (white) connector
- oil pressure switch/neutral switch wire 2P (black) connector
- speed sensor 3P (white) connector
- side stand switch 3P (green) connector



—pulse generator 2P (white) connector

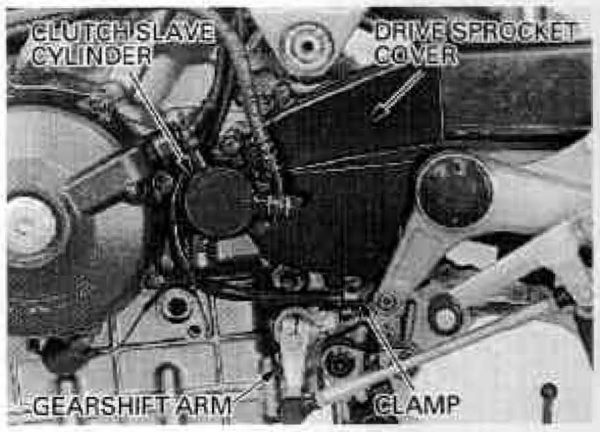


Remove the terminal nut and the starter motor cable from the starter motor.

Remove the following:
—bolt and gearshift arm
—three bolts, clutch slave cylinder, dowel pins and gasket

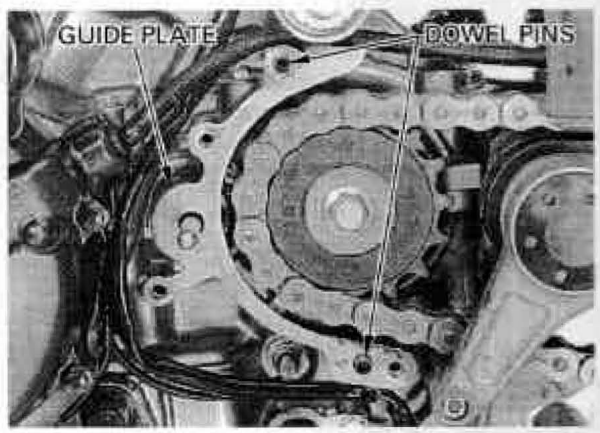
NOTE:

- Do not disconnect the clutch hose.
- To keep slave cylinder piston from being forced out of the cylinder, squeeze the clutch lever and tie it to the handlebar.

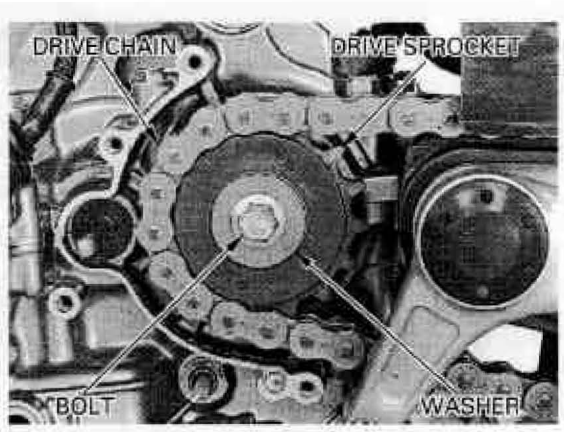


—two bolts, wire clamp and drive sprocket cover

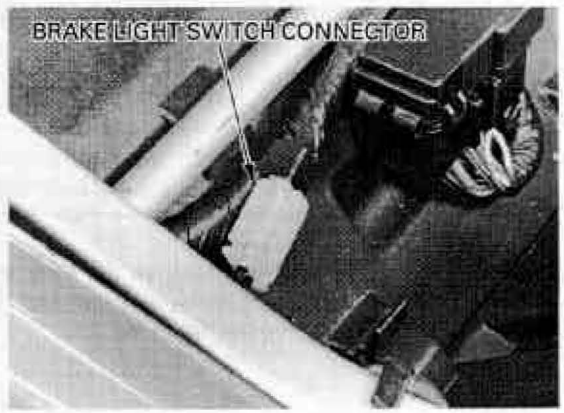
Remove the gasket, guide plate and dowel pins.



Loosen the rear axle nut and drive chain adjusters. Remove the drive sprocket bolt, washer and the drive sprocket with the drive chain from the countershaft.



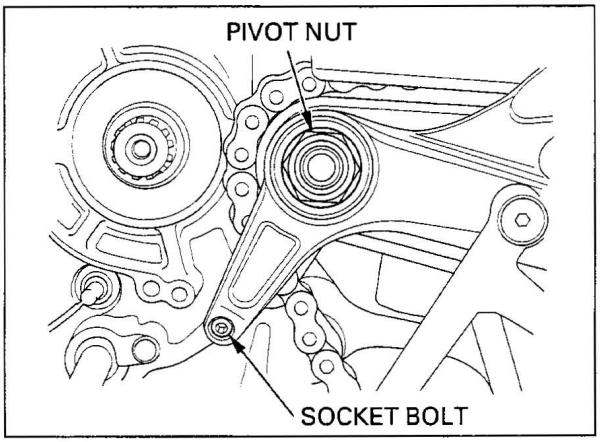
Disconnect the rear brake light switch connector. Remove the rear brake reservoir mounting bolt and the reservoir.

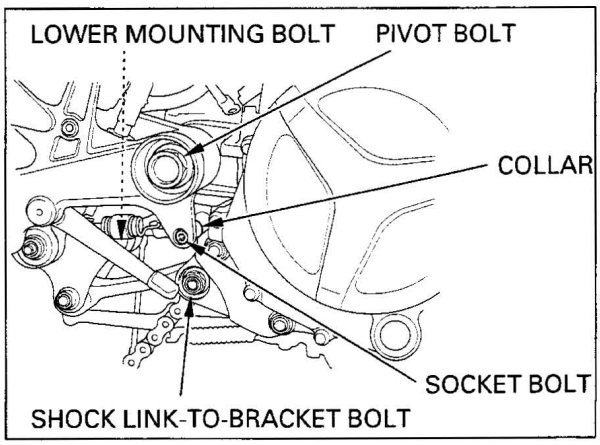


Support the motorcycle securely with a hoist or equivalent.

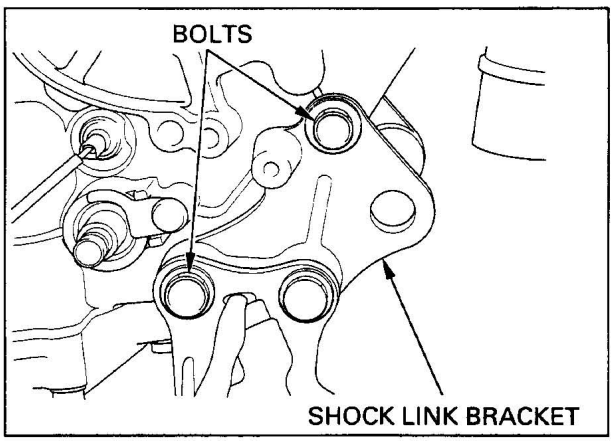
Remove the following:

- swingarm pivot caps
- shock link-to-bracket nut and bolt
- shock absorber lower mounting nut and bolt
- swingarm pivot nut, socket bolt, left driver footpeg bracket
- socket bolt, collar, swingarm pivot bolt, right driver footpeg bracket
- rear wheel, swingarm and rear brake system as an assembly





Remove the shock link bracket mounting nuts, bolts, brackets with the side stand and four dowel pins.

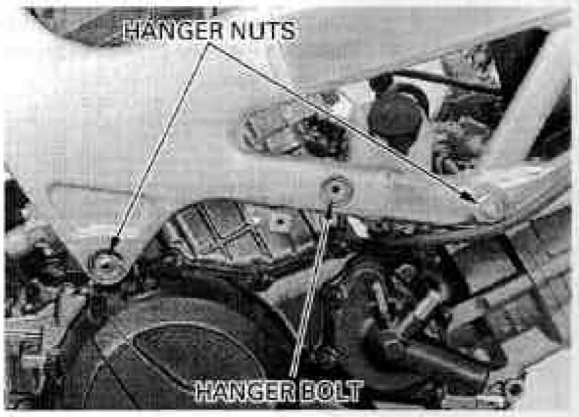


Place a floor jack or other adjustable support under the engine.

NOTE:

The jack height must be continually adjusted to relieve stress for ease of bolt removal.

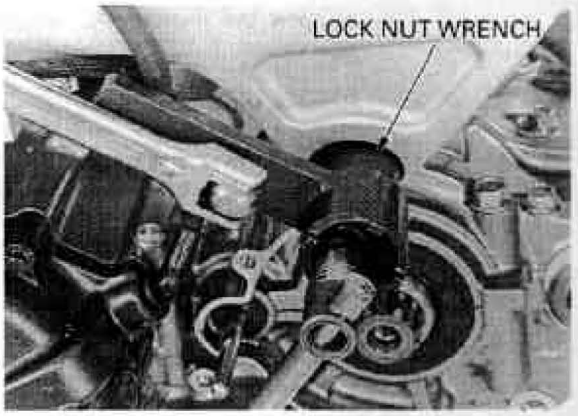
Loosen and remove the front engine hanger nut, center engine hanger bolt and rear engine hanger nut from the right side.



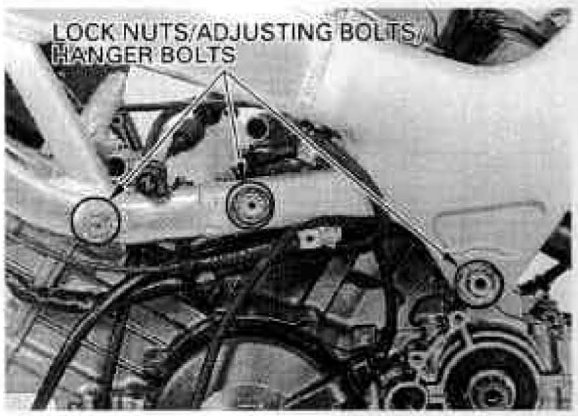
Hold each hanger bolt and loosen each lock nut using the special tool.

TOOLS:

Front and center:	
Lock nut wrench	07VMA-MBB0100
Rear:	
Lock nut wrench	07HMA-MR70200



Remove the lock nuts, adjusting bolts, engine hanger bolts and the engine from the frame.



ENGINE INSTALLATION

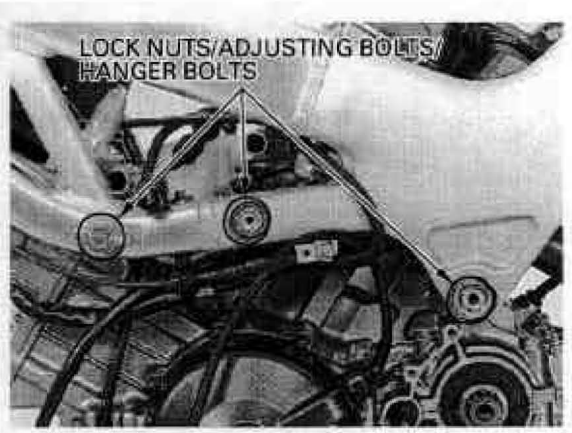
NOTE:

- When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 7-1 "SERVICE INFORMATION".
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.

CAUTION:

Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described below. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.

Install the engine in the frame.
Install the engine hanger bolts, adjusting bolts and lock nuts from the left side.



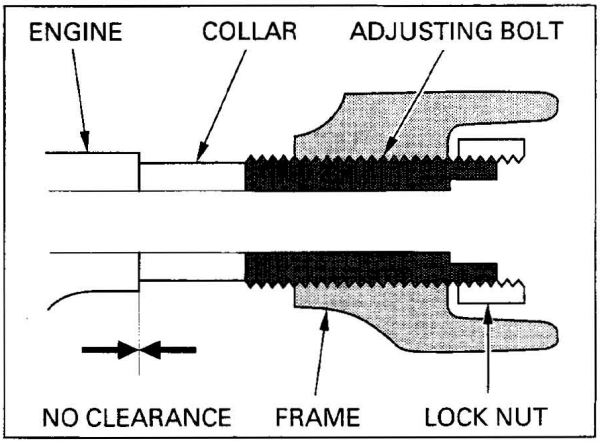
Install the center engine hanger bolt, front and rear engine hanger nut from the right side.

1. Tighten the right center engine hanger bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m , 29 lbf·ft)

2. Install the distance collar between the left center adjusting bolt and engine.
   Tighten the left center adjusting bolt to the specified torque and check that there is no clearance between the distance collar and engine.

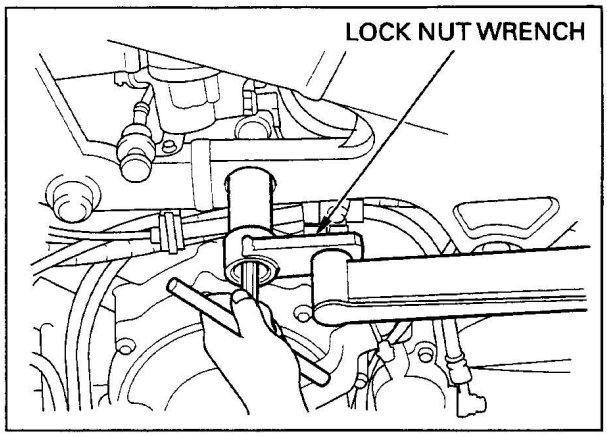
TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)



3. Hold the left center adjusting bolt and tighten the lock nut to the specified torque using the special tool.

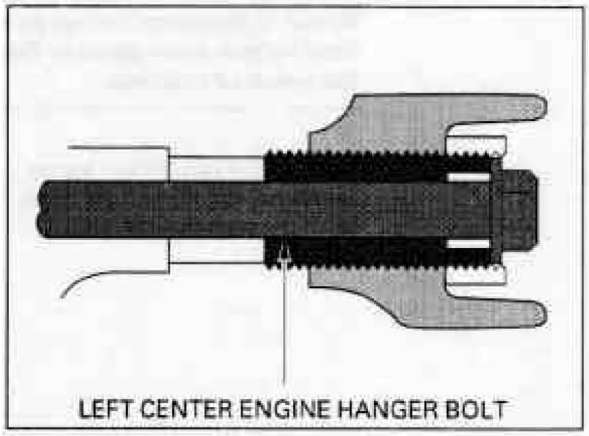
TOOL:
Lock nut wrench 07VMA-MBB0100

TORQUE: Actual: 54 N·m (5.5 kgf·m , 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m , 36 lbf·ft)



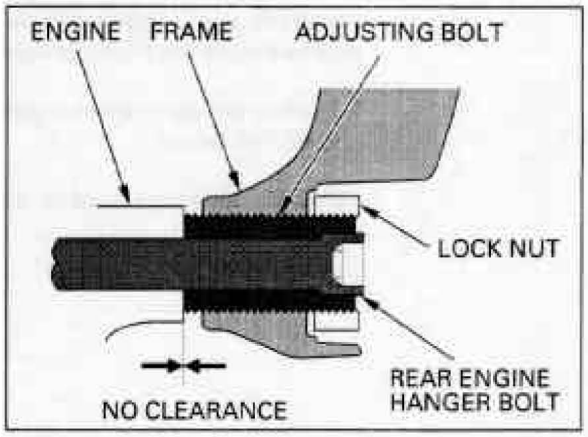
4. Install and tighten the left center engine hanger bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m , 29 lbf·ft)



5. Tighten the rear adjusting bolt with the rear engine hanger bolt to the specified torque and check that there is no clearance between the adjusting bolt and engine.

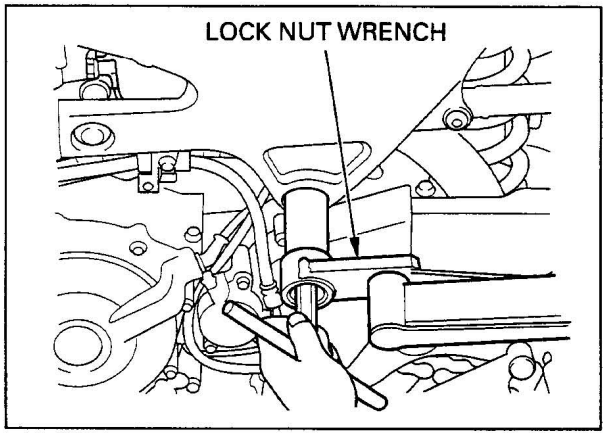
TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)



6. Hold the rear adjusting bolt with the rear engine hanger bolt and tighten the lock nut to the specified torque using the special tool.

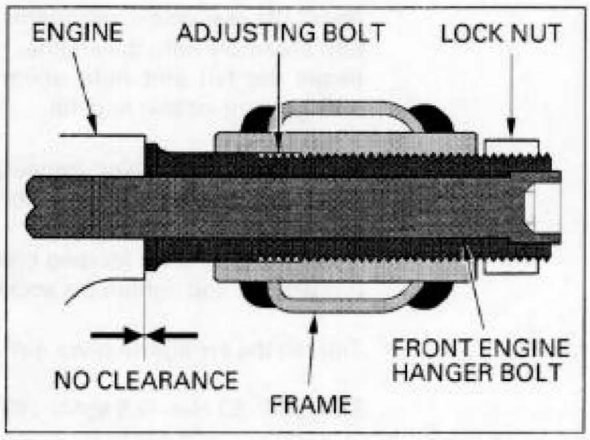
TOOL:
Lock nut wrench 07HMA-MR70200

TORQUE: Actual: 54 N·m (5.5 kgf·m , 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m , 36 lbf·ft)



7. Tighten the front adjusting bolt with the front engine hanger bolt to the specified torque and check that there is no clearance between the adjusting bolt and engine.

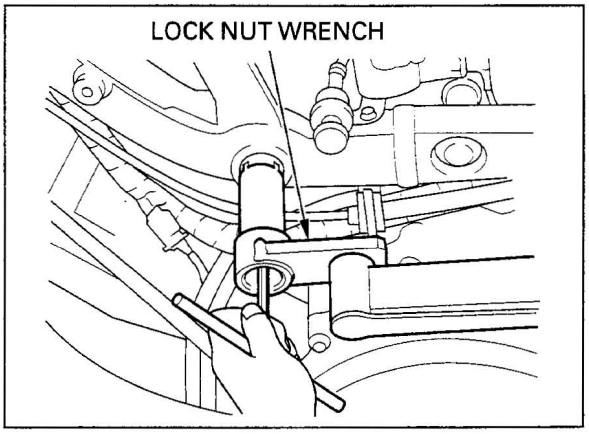
TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)



8. Hold the front adjusting bolt with the front engine hanger bolt and tighten the lock nut to the specified torque using the special tool.

TOOL:
Lock nut wrench 07VMA-MBB0100

TORQUE: Actual: 54 N·m (5.5 kgf·m , 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m , 36 lbf·ft)



9. Tighten the rear engine hanger nut to the specified torque.

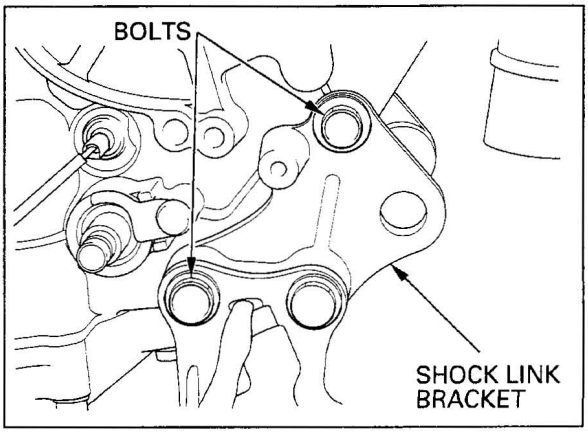
TORQUE: 64 N·m (6.5 kgf·m , 47 lbf·ft)

10. Tighten the front engine hanger nut to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m , 47 lbf·ft)

Install the four dowel pins, shock link brackets and tighten the mounting nuts.

TORQUE: 44 N·m (4.5 kgf·m , 33 lbf·ft)

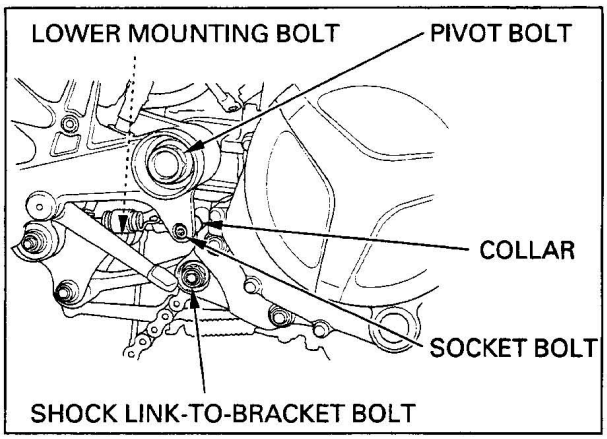


Install the rear wheel, swingarm and rear brake system assembly onto the engine.
Install the left and right driver footpeg brackets, swingarm pivot bolt and nut.

Install the right driver footpeg bracket onto the shock link bracket with the collar and tighten the socket bolt.
Install the left driver footpeg bracket onto the shock link bracket and tighten the socket bolt.

Tighten the swingarm pivot nut.

TORQUE: 93 N·m (9.5 kgf·m , 69 lbf·ft)



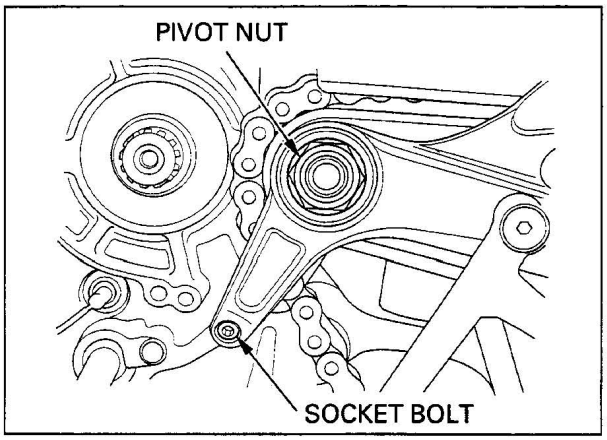
Install the swingarm pivot caps.

Install the shock absorber lower mounting bolt and tighten the nut.

TORQUE: 44 N·m (4.5 kgf·m , 33 lbf·ft)

Install the shock link-to-bracket bolt and tighten the nut.

TORQUE: 44 N·m (4.5 kgf·m , 33 lbf·ft)



Route the rear brake reservoir hose and brake light switch wire properly (page 1-18).

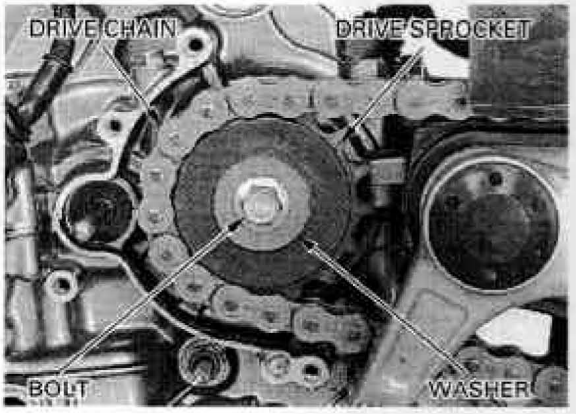
Install the rear brake reservoir and tighten the mounting bolt.

TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)

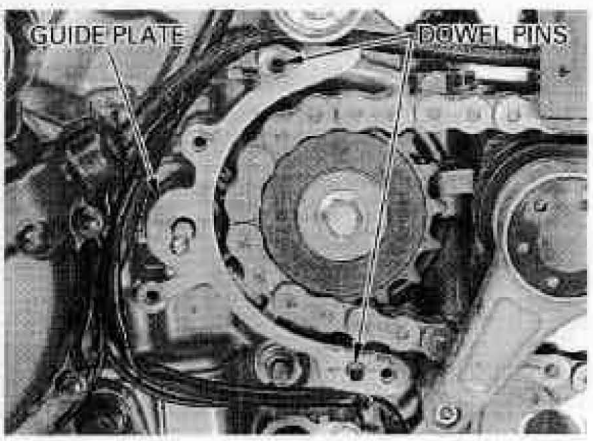
Connect the rear brake light switch connector.

Install the drive sprocket with the drive chain onto the countershaft.
Install the washer and bolt, and tighten the bolt.

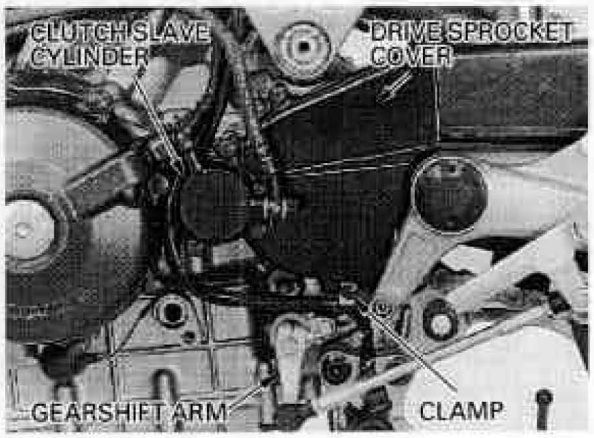
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



Install the dowel pins and guide plate.



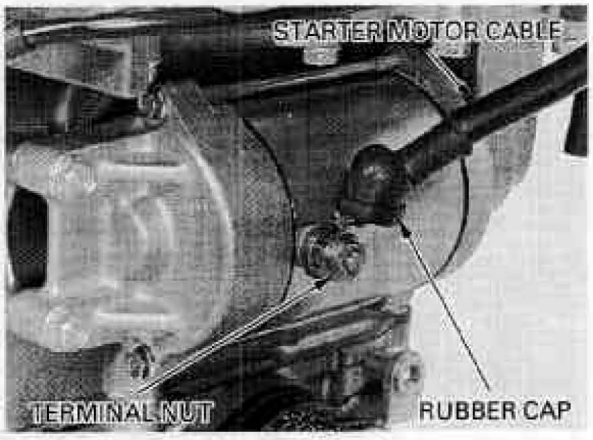
Install a new gasket, drive sprocket cover and clamp, and tighten the two bolts.
Install the dowel pins and a new gasket (page 9-11).
Install the clutch slave cylinder and tighten the bolts.
Release the clutch lever from the handlebar.
Install the gearshift arm (page 9-22).



Connect the starter motor cable.
Install and tighten the terminal nut.

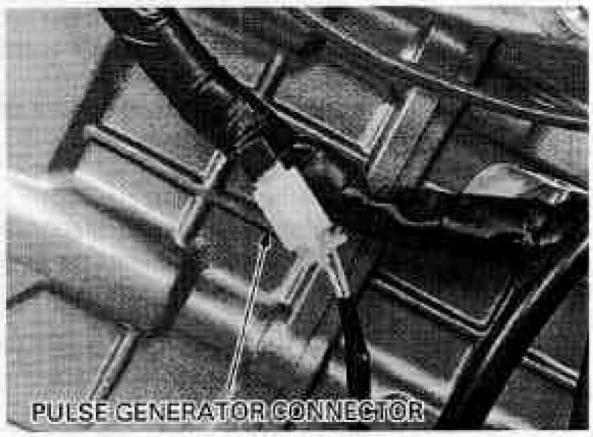
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the rubber cap securely.



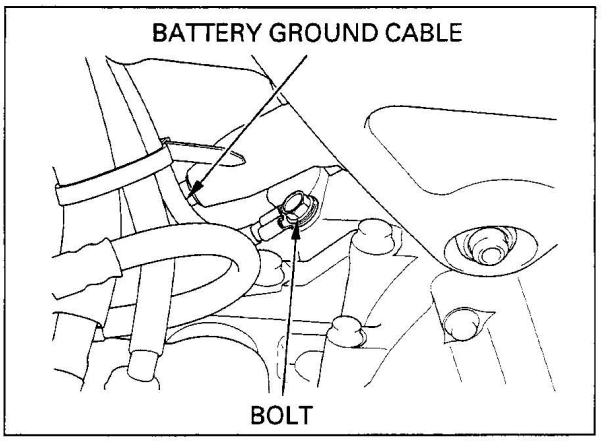
Route the wires properly (page 1-18).

Connect the following:
– pulse generator 2P (white) connector



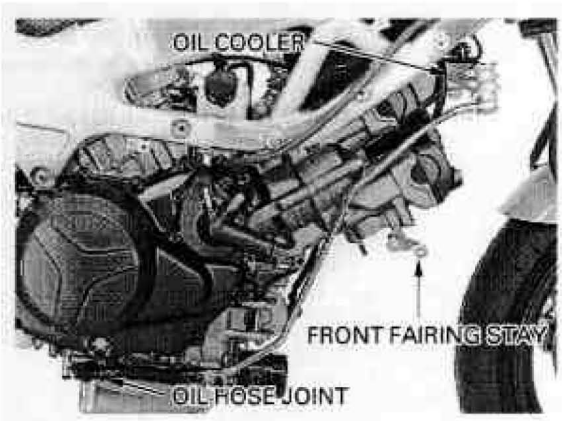
– alternator 3P (white) connector
– oil pressure switch/neutral switch wire 2P (black) connector
– speed sensor 3P (white) connector
– side stand switch 3P (green) connector

Install the battery ground cable and tighten the bolt.



Install the oil cooler assembly onto the stay and tighten the mounting bolts.
Coat new O-rings with oil and install them onto the oil hose joints.
Connect the oil hose joints to the engine and tighten the bolts.

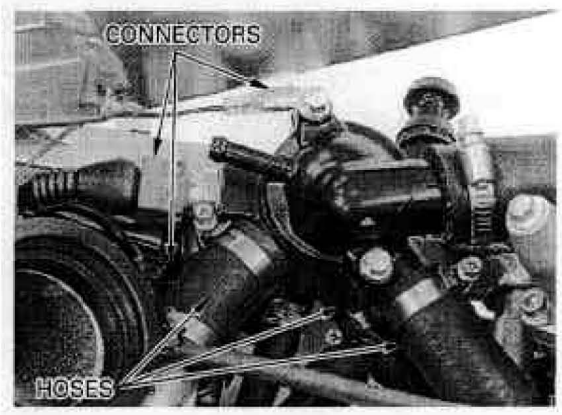
Install the front fairing stays onto the front cylinder head and tighten the bolts.

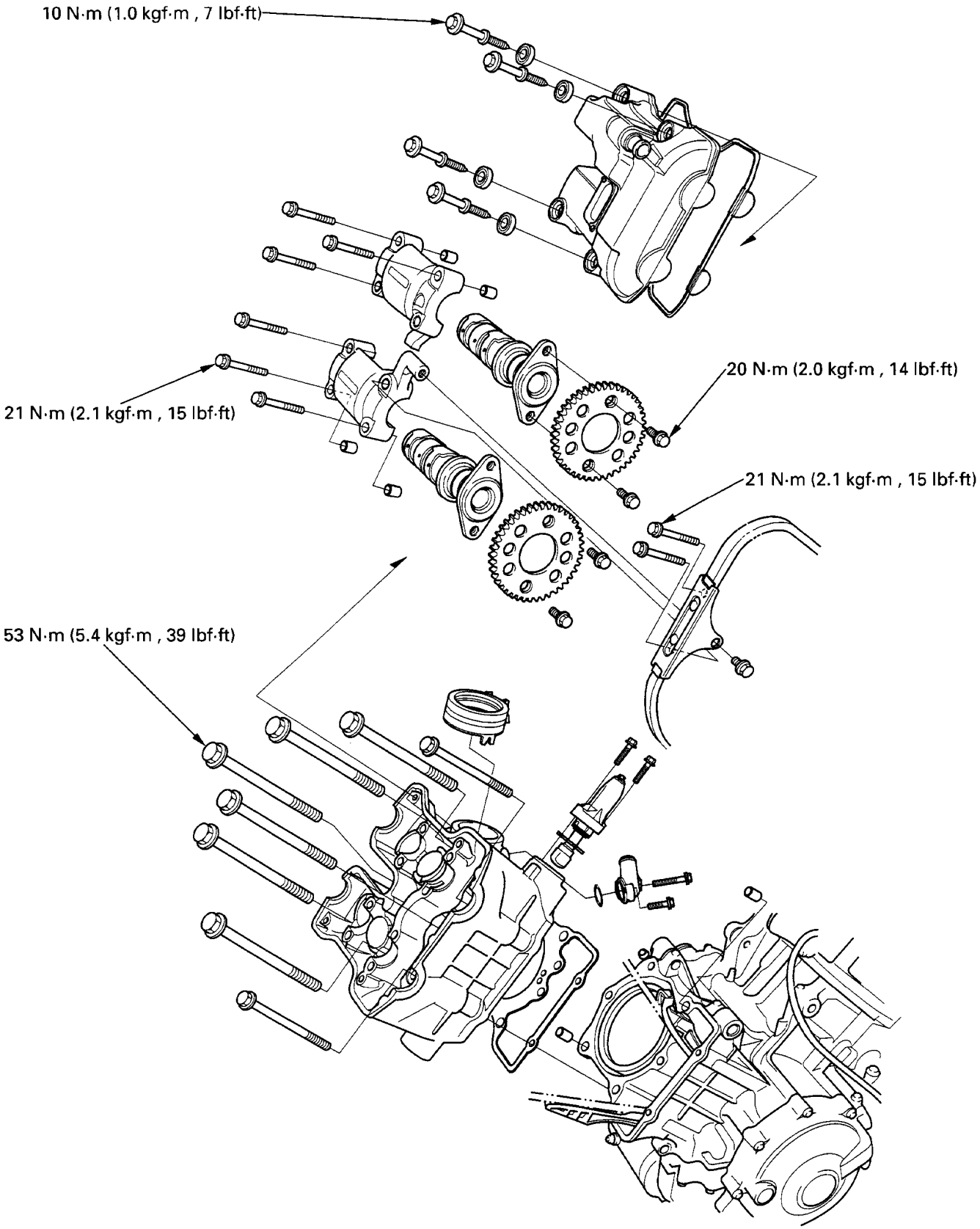


Install the thermostat housing assembly and connect the following:
– water hoses to the cylinder heads
– bypass hose to the water pump
– thermosensor connector
– engine coolant temperature sensor connector
– ground wire connector

Install the following:
– carburetor assembly (page 5-16)
– left and right radiators (page 6-6)
– exhaust system (page 2-6)

Adjust the drive chain (page 3-14).
Fill the crankcase with recommended engine oil (page 3-11).




10 N·m (1.0 kgf·m , 7 lbf·ft)
20 N·m (2.0 kgf·m , 14 lbf·ft)
21 N·m (2.1 kgf·m , 15 lbf·ft)
21 N·m (2.1 kgf·m , 15 lbf·ft)
53 N·m (5.4 kgf·m , 39 lbf·ft)

8. CYLINDER HEAD/VALVE

SERVICE INFORMATION

GENERAL

- This section covers service of the camshafts, cylinder head and valves.
- The camshafts, cylinder head and valves can be serviced with the engine installed in the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression at 350 min^{-1} (rpm)			1,128 kPa (11.5 kgf/cm^2, 164 psi)	———
Valve clearance		IN	0.16 (0.006)	———
		EX	0.31 (0.012)	———
Camshaft	Cam lobe height	IN	40.080−40.240 (1.5779−1.5842)	39.780 (1.5661)
		EX	40.230−40.390 (1.5839−1.5902)	39.930 (1.5720)
	Runout		———	0.05 (0.002)
	Oil clearance		0.020−0.062 (0.0008−0.0024)	0.088 (0.0035)
Valve lifter	Valve lifter O.D.		33.978−33.993 (1.3377−1.3383)	33.97 (1.337)
	Valve lifter bore I.D.		34.010−34.026 (1.3390−1.3396)	34.04 (1.340)
Valve, valve guide	Valve stem O.D.	IN	5.975−5.990 (0.2352−0.2358)	5.965 (0.2348)
		EX	5.965−5.980 (0.2348−0.2354)	5.955 (0.2344)
	Valve guide I.D.	IN/EX	6.000−6.012 (0.2362−0.2367)	6.040 (0.2378)
	Stem-to-guide clearance	IN	0.010−0.037 (0.0004−0.0015)	0.075 (0.0030)
		EX	0.020−0.047 (0.0008−0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head		14.0−14.2 (0.55−0.56)	———
	Valve seat width	IN	1.1−1.3 (0.04−0.05)	1.7 (0.07)
		EX	1.3−1.5 (0.05−0.06)	1.9 (0.07)
Valve spring	Free length	Inner	37.0 (1.46)	36.0 (1.42)
		Outer	41.9 (1.65)	40.9 (1.61)
Cylinder head warpage			———	0.10 (0.004)

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Cam sprocket bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	Apply locking agent to the threads
Camshaft holder bolt	21 N·m (2.1 kgf·m , 15 lbf·ft)	Apply oil to the threads and seating surface
Cylinder head bolt (10 mm)	53 N·m (5.4 kgf·m , 39 lbf·ft)	Apply oil to the threads and seating surface
Cam chain tensioner bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Cam chain guide bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Carburetor insulator band screw	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Spark plug	14 N·m (1.4 kgf·m , 10 lbf·ft)	

TOOLS

Valve spring compressor	07757-0010000
Valve guide remover	07742-0010000
Valve guide driver	07743-0020000
Valve guide reamer	07VMH-MBB0200
Valve seat cutter, 40 mm (IN/EX 45°)	07780-0010500
Flat cutter, 38.5 mm (IN 32°)	07780-0012400
Flat cutter, 35 mm (EX 32°)	07780-0012300
Interior cutter, 37.5 mm (IN/EX 60°)	07780-0014100
Cutter holder, 6 mm	07VMH-MBB0100

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.

Compression too low, hard starting or poor performance at low speed

- Valves
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston (section 12)

Compression too high

- Excessive carbon build-up on piston head or combustion chamber

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (section 12)

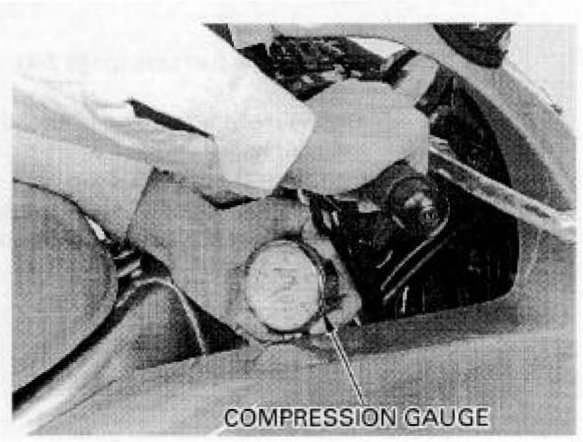
Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn or damaged valve lifter
- Worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Cylinder/piston problem (section 12)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION



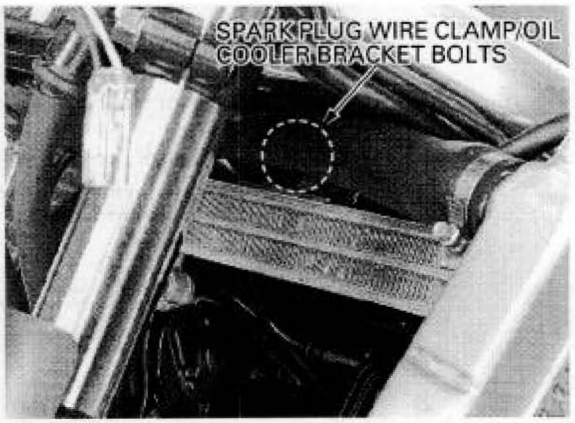
Warm up the engine to normal operating temperature.
Stop the engine and remove the spark plug caps and spark plugs.
Install the compression gauge into the spark plug hole.
Shift the transmission in neutral.
Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4 — 7 seconds.

COMPRESSION PRESSURE:
1,128 kPa (11.5 kgf/cm², 164 psi)
at 350 min⁻¹ (rpm)

Low compression can be caused by:
—blown cylinder head gasket
—improper valve adjustment
—valve leakage
—worn piston ring or cylinder

High compression can be caused by:
—carbon deposits in combustion chamber or on piston head

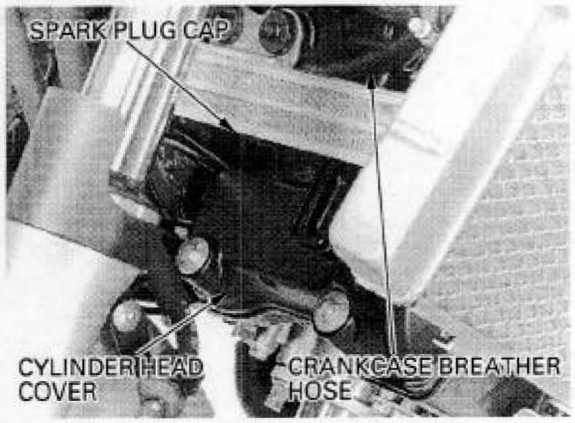
CYLINDER HEAD COVER REMOVAL



FRONT:
Remove the front fairing (page 2-3).

Remove the spark plug wire from the clamp.
Remove the two bolts and the oil cooler with the bracket from the frame.

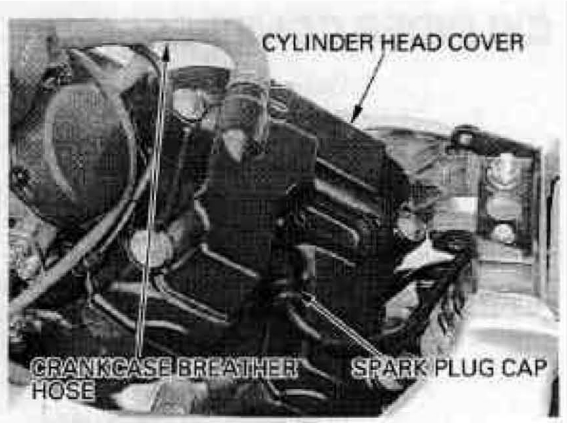
Move the oil cooler forward.



Disconnect the crankcase breather hose from the cylinder head cover.
Remove the spark plug cap.
Remove the four cylinder head cover bolts, special washers and the cylinder head cover.

REAR:
Remove the fuel tank (page 2-4).

Disconnect the crankcase breather hose from the cylinder head cover.
Remove the spark plug cap.
Remove the four cylinder head cover bolts, special washers and the cylinder head cover.

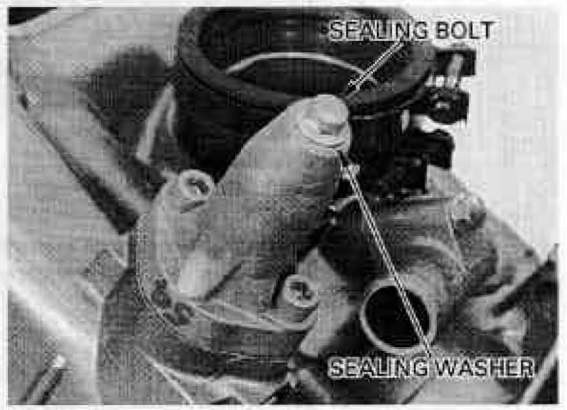


CAMSHAFT REMOVAL

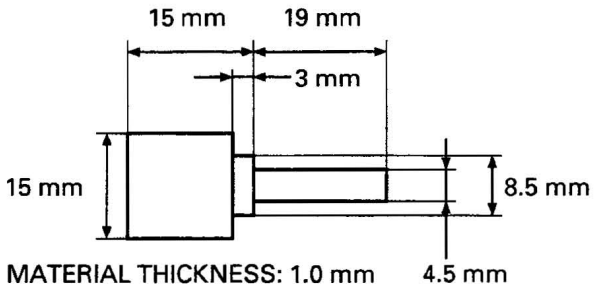
For the front cylinder, remove the following:
— air cleaner housing (page 5-4)
— left radiator (page 6-6)

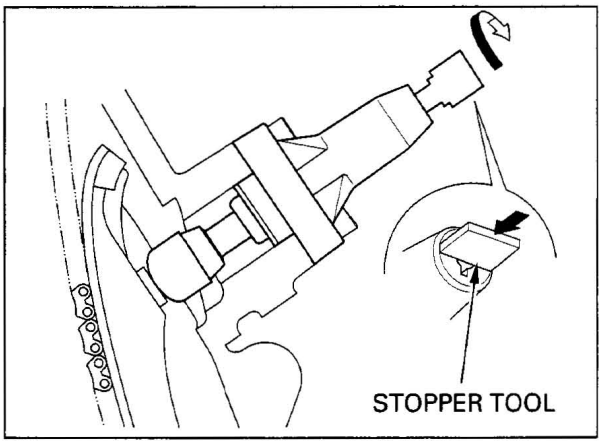
Remove the cylinder head cover (page 8-3).

Remove the cam chain tensioner lifter sealing bolt and sealing washer.

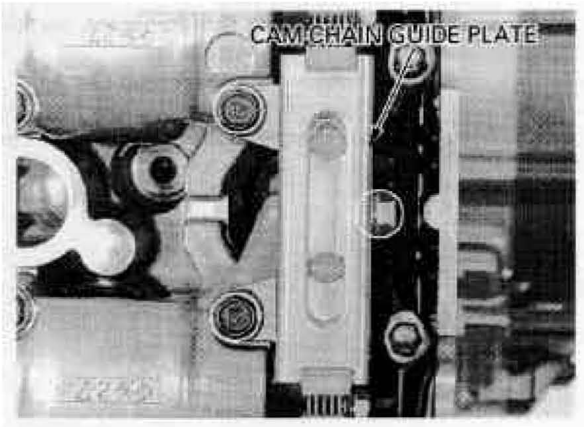


Turn the cam chain tensioner lifter shaft clockwise fully and secure it with a stopper tool.
This tool can easily be made from a thin (1 mm of thickness) piece of steel as shown below.

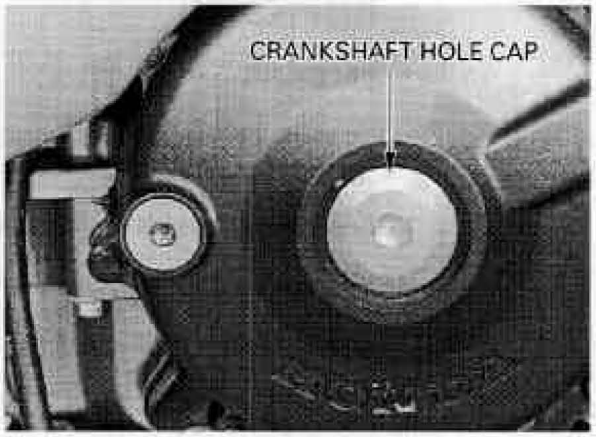




Remove the three bolts and the cam chain guide plate from the camshaft holders.



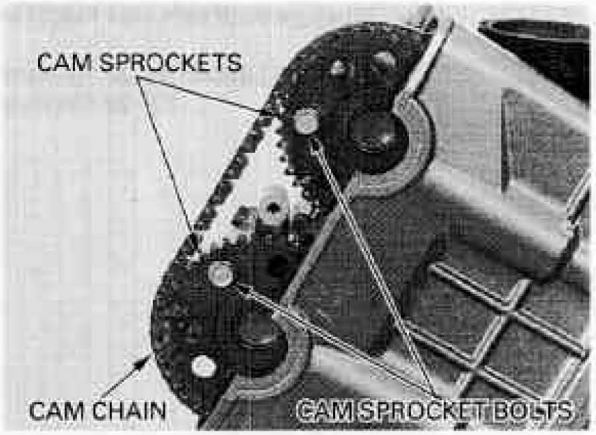
Remove the crankshaft hole cap.



Be careful not to drop the cam sprocket bolts into the crankcase.

Remove the cam sprocket bolts from the intake and exhaust camshafts.
Turn the crankshaft counterclockwise one turn, and remove the other cam sprocket bolts.

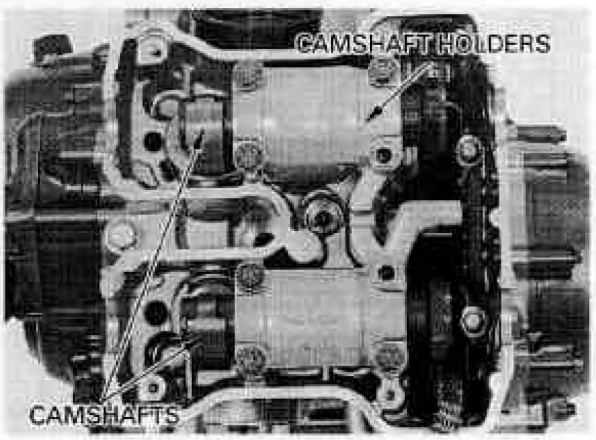
Remove the cam sprockets from the camshafts, and suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.



Remove the camshaft holder bolts, camshaft holders, dowel pins and camshafts.

NOTE:

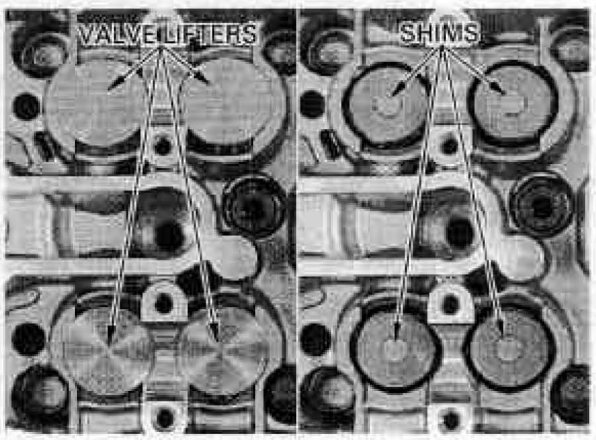
Do not forcibly remove the dowel pins from the camshaft holders.



Remove the valve lifters and shims.

NOTE:

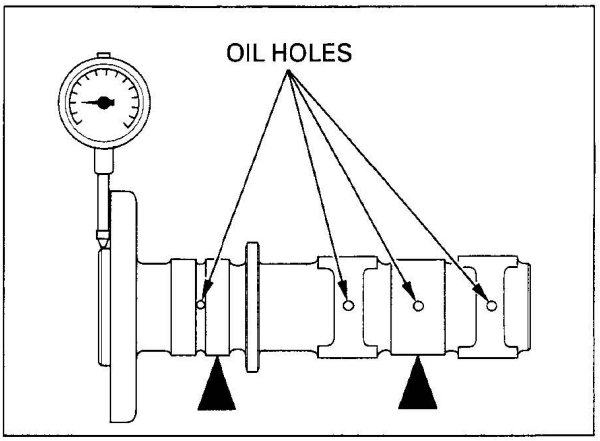
- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.



INSPECTION

CAMSHAFT

Check the cam and journal surfaces of the camshaft for scoring, scratches or evidence of insufficient lubrication.
Check the oil holes in the camshaft for clogging.

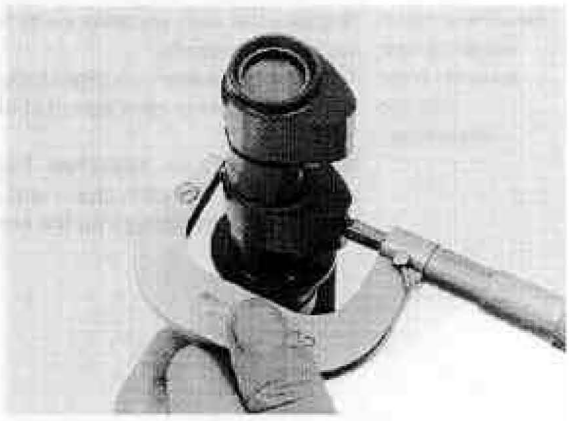


Measure the camshaft runout using a dial indicator.

SERVICE LIMIT: 0.05 mm (0.002 in)

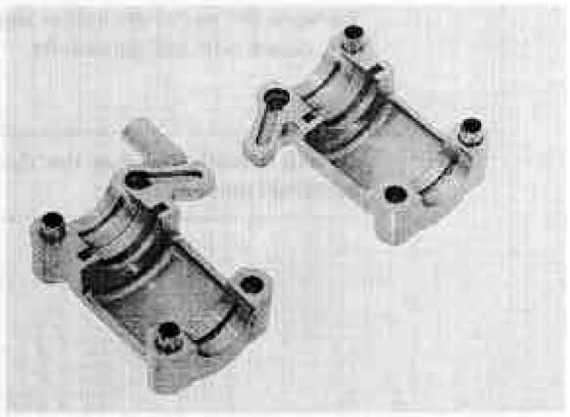
Measure each cam lobe height using a micrometer.

SERVICE LIMITS: IN: 39.780 mm (1.5661 in)
EX: 39.930 mm (1.5720 in)



CAMSHAFT JOURNAL

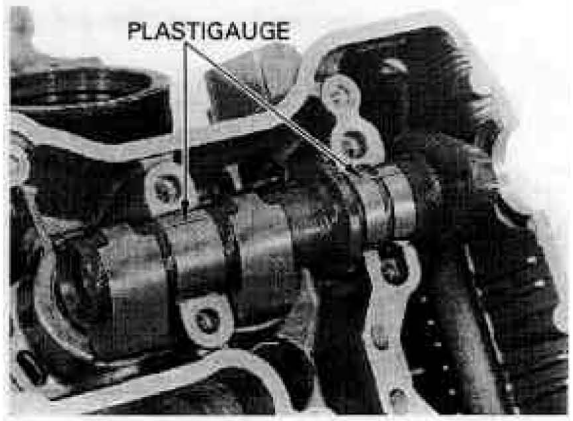
Check the camshaft journal surfaces of the camshaft holders and cylinder head for scoring, scratches or evidence of insufficient lubrication.



Do not rotate the camshaft during inspection.

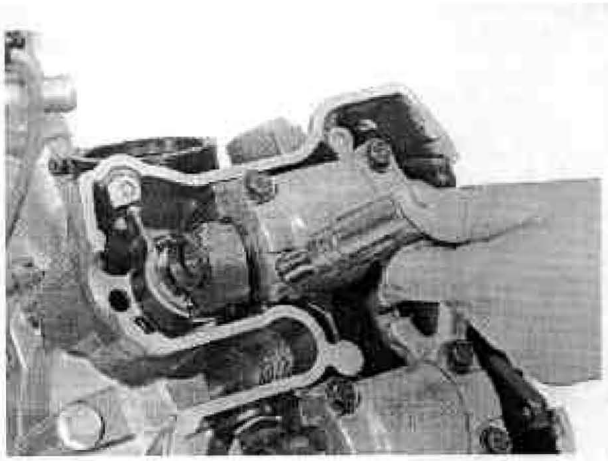
CAMSHAFT OIL CLEARANCE

Wipe any oil from the journals of the cylinder head, camshaft and camshaft holder.
Put the camshaft onto the cylinder head and lay a strip of plastigauge lengthwise on each camshaft journal.



Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the camshaft holder and tighten the bolts in a crisscross pattern in 2 or 3 steps.

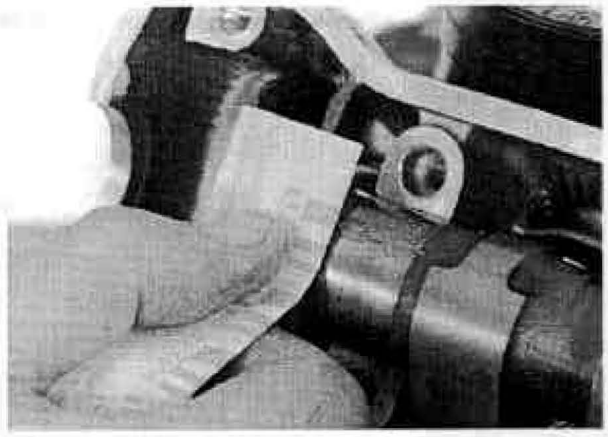
TORQUE: 21 N·m (2.1 kgf·m , 15 lbf·ft)



Remove the camshaft holder and measure the compressed plastigauge at its widest point on the camshaft to determine the oil clearance.

SERVICE LIMIT: 0.088 mm (0.0035 in)

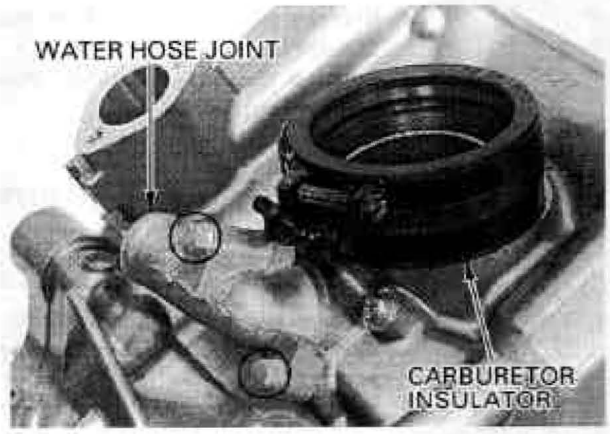
If the oil clearance exceeds the service limit, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the oil clearance still exceeds the service limit.



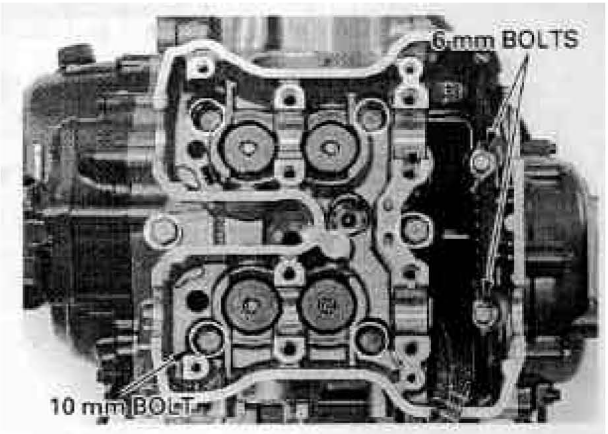
CYLINDER HEAD REMOVAL

Remove the following:
—carburetor assembly (page 5-5)
—camshafts (page 8-4)
—two bolts and cam chain tensioner lifter

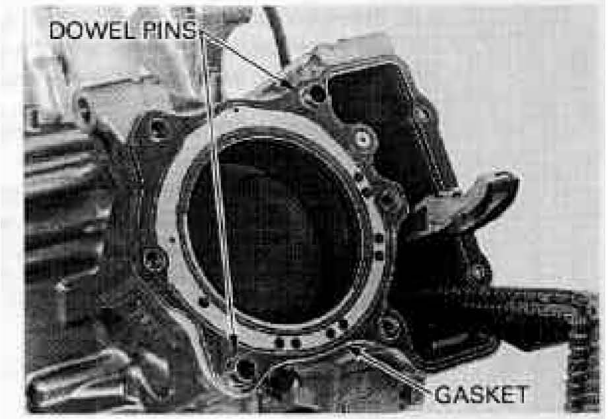
—carburetor insulator
—two bolts and water hose joint



Remove the two 6 mm cylinder head bolts.
Loosen the six 10 mm cylinder head bolts in a crisscross pattern in 2 or 3 steps, and remove them.
Remove the cylinder head.



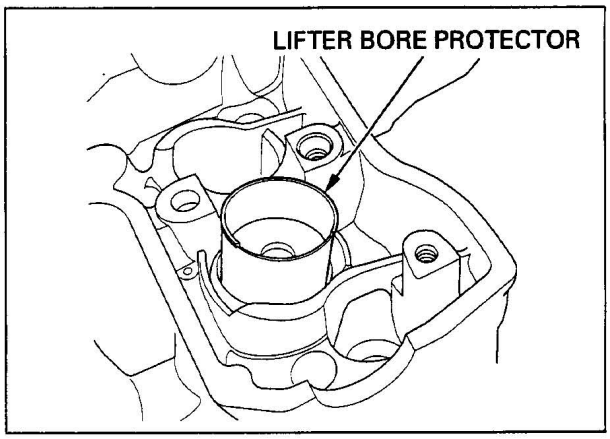
Remove the gasket and dowel pins.



CYLINDER HEAD DISASSEMBLY

Remove the spark plug from the cylinder head.

Make a lifter bore protector from a plastic 35 mm film container by cutting the bottom of the container.
Install the protector into the valve lifter bore.

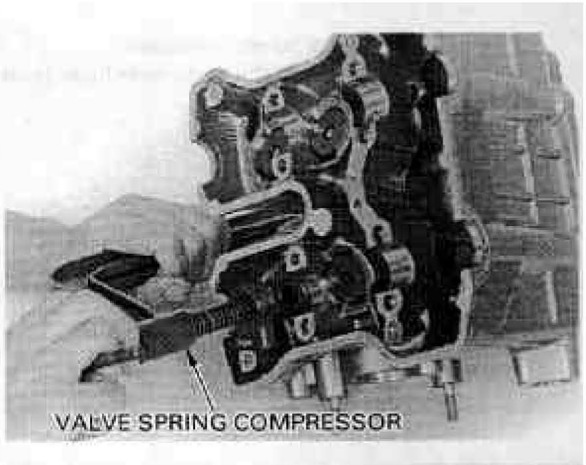


Remove the attachment from the valve spring compressor.
Remove the valve spring cotters using the valve spring compressor.

TOOL:
Valve spring compressor 07757-0010000

CAUTION:

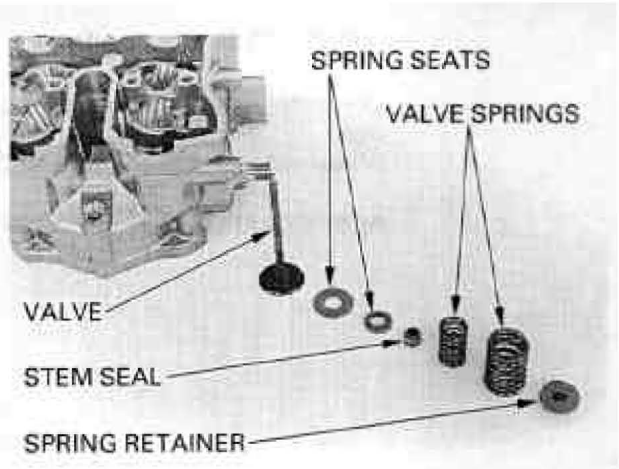
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.



Remove the following:
- spring retainer
- inner and outer valve springs
- valve
- stem seal
- inner and outer valve spring seats

NOTE:

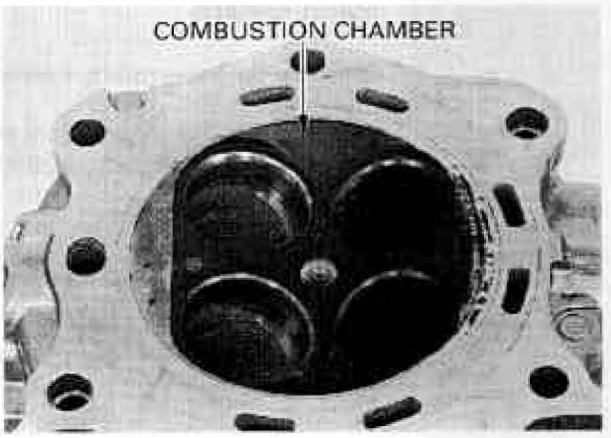
Mark all parts during disassembly so they can be placed back in their original locations.



INSPECTION

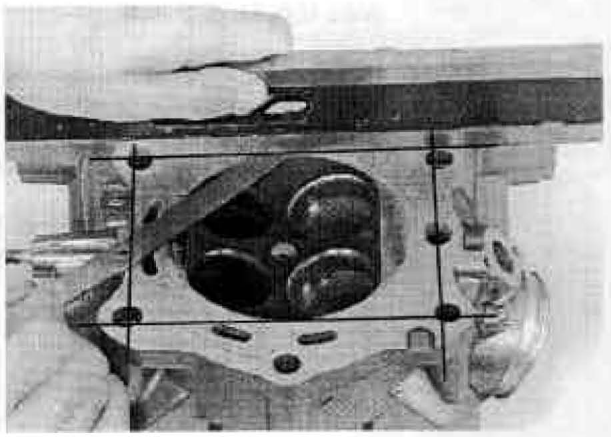
CYLINDER HEAD

Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface.
Check the spark plug hole and valve areas for cracks.



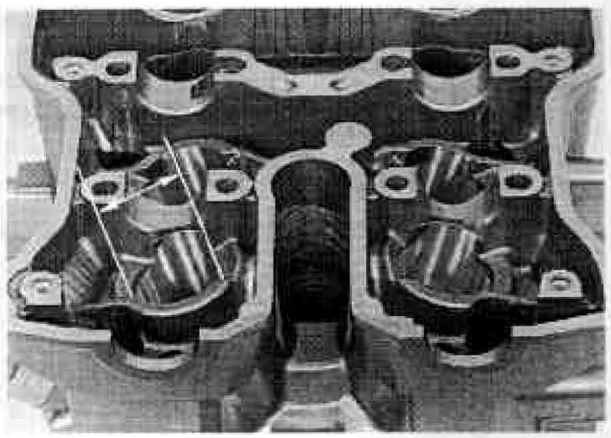
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)



Check the valve lifter bore for scoring, scratches or damage.
Measure the each valve lifter bore I.D.

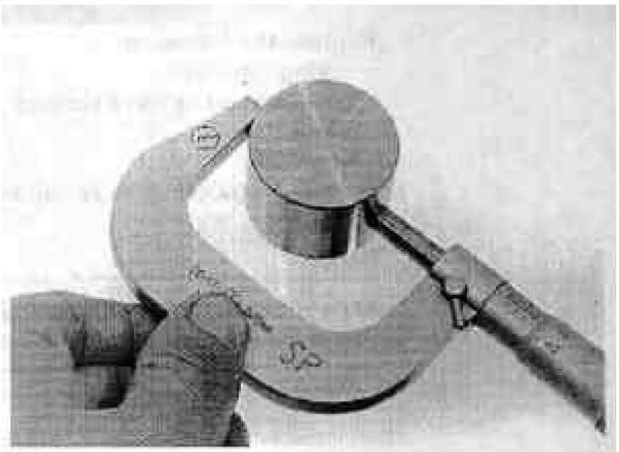
SERVICE LIMIT: 34.04 mm (1.340 in)



VALVE LIFTER

Check the valve lifter for scoring, scratches or damage.
Measure the each valve lifter O.D.

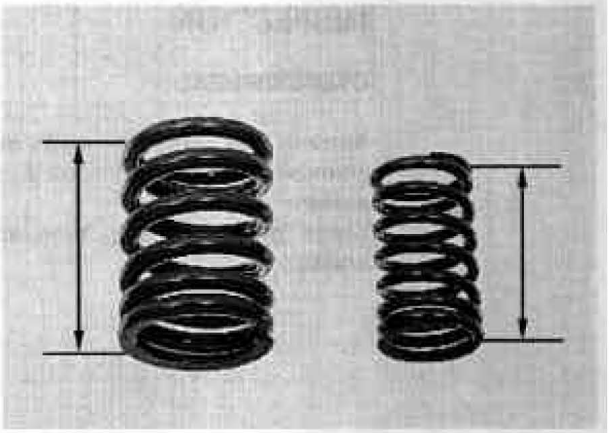
SERVICE LIMIT: 33.97 mm (1.337 in)



VALVE SPRING

Measure the valve spring free length.

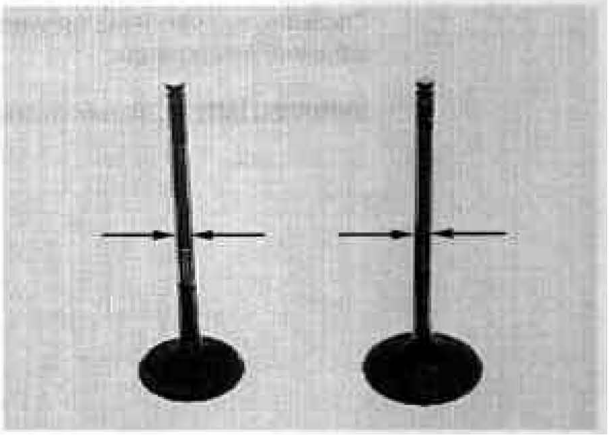
SERVICE LIMITS: Inner: 36.0 mm (1.42 in)
Outer: 40.9 mm (1.61 in)



VALVE/VALVE GUIDE

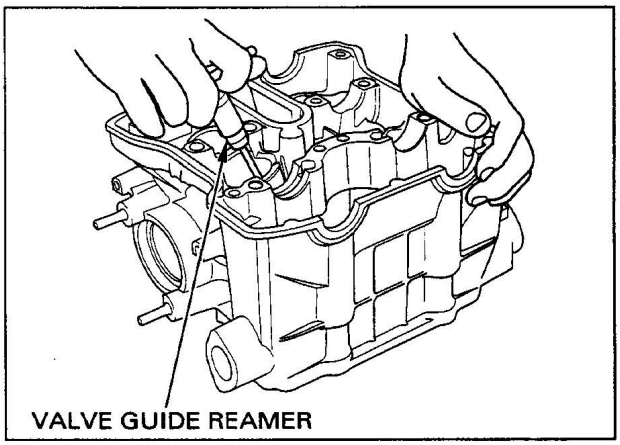
Check that the valve moves smoothly in the guide.
Check the valve for bending, burning or abnormal wear.
Measure each valve stem O.D. and record it.

SERVICE LIMITS: IN: 5.965 mm (0.2348 in)
EX: 5.955 mm (0.2344 in)



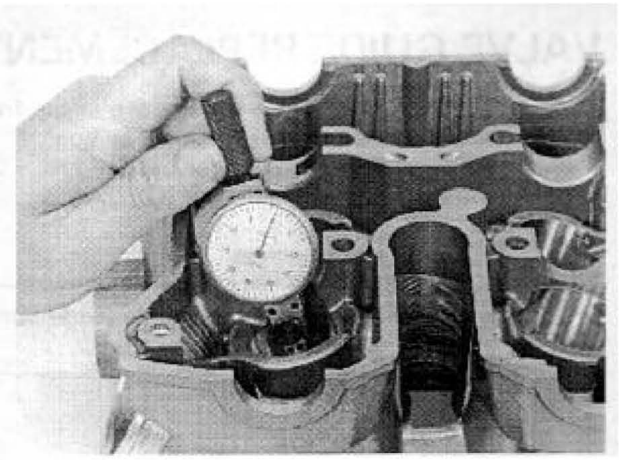
Ream the valve guide to remove any carbon build-up before measuring the guide.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:
Valve guide reamer 07VMH-MBB0200



VALVE GUIDE REAMER

Measure each valve guide I.D. and record it.



SERVICE LIMIT: 6.040 mm (0.2378 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS: IN: 0.075 mm (0.0030 in)
EX: 0.085 mm (0.0033 in)

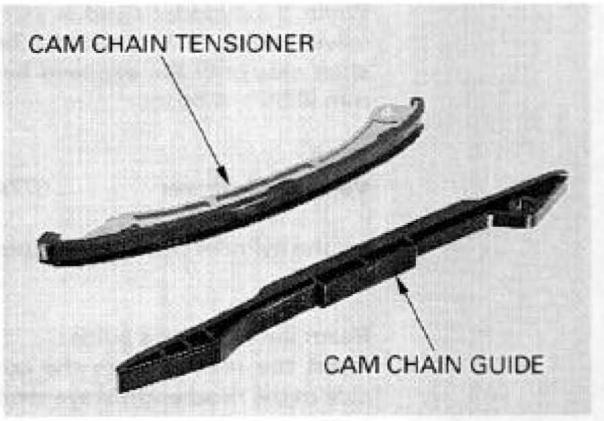
If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance.
If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance exceeds the service limit with a new guide, also replace the valve.

NOTE:

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-12).

CAM CHAIN TENSIONER/GUIDE

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



To remove the cam chain tensioner and guide:
Front cylinder: Remove the flywheel (page 10-4).
Rear cylinder: Remove the primary drive gear (page 9-22).

Remove the bolts, cam chain tensioner and guide.

Apply locking agent to the bolt threads.
Install the cam chain tensioner and guide, and tighten the bolts.

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

Install the primary drive gear (page 9-23).
Install the flywheel (page 10-7).

VALVE GUIDE REPLACEMENT

Chill new valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 275 — 290 °F (130 — 140 °C) with a hot plate or oven.

⚠WARNING

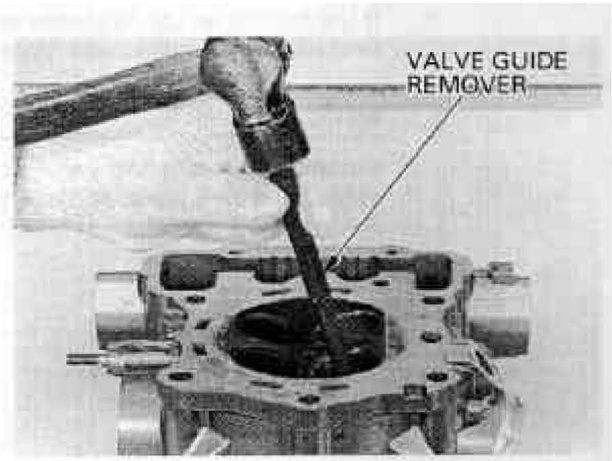
Wear heavy gloves to avoid burns when handling the heated cylinder head.

CAUTION:

Using a torch to heat the cylinder head may cause warpage.

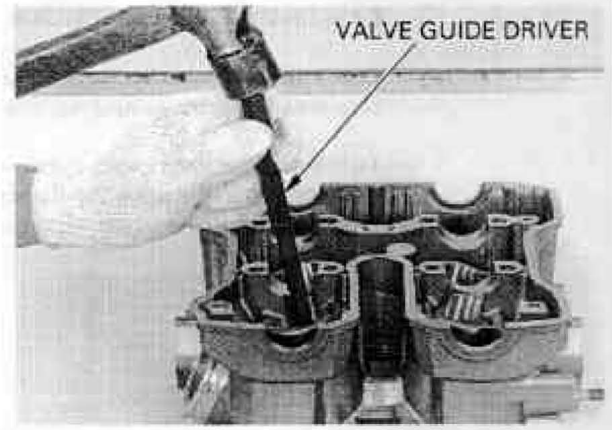
Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

TOOL:
Valve guide remover 07742-0010000



While the cylinder head is still heated, drive new valve guides in the cylinder head from the camshaft side until the exposed height is 14.0 — 14.2 mm (0.55 — 0.56 in).

TOOL:
Valve guide driver 07743-0020000



Let the cylinder head cool to room temperature.

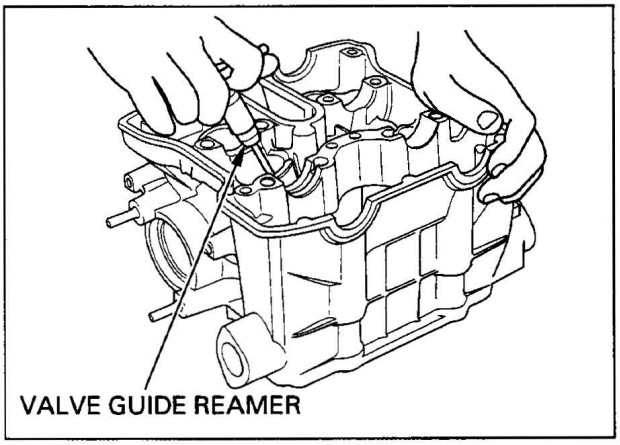
Ream the new valve guides.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:
Valve guide reamer 07VMH-MBB0200

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming.
- Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat (page 8-14).

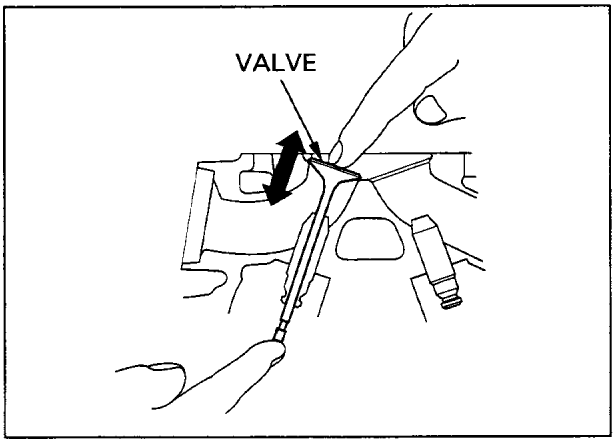


VALVE SEAT INSPECTION/REFACING

INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

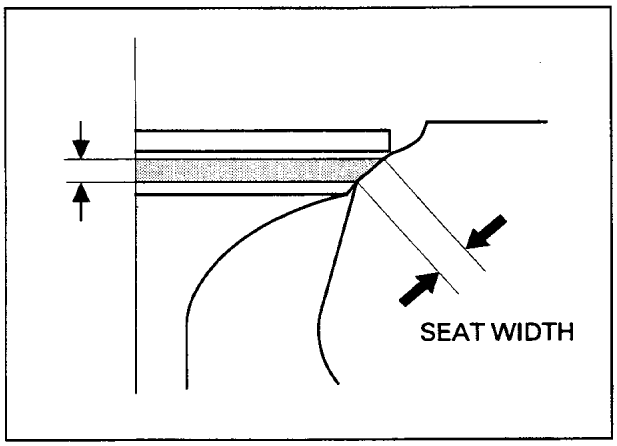
Apply a light coating of Prussian Blue to each valve seat.
Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.



Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: IN: 1.1—1.3 mm (0.04—0.05 in)
EX: 1.3—1.5 mm (0.05—0.06 in)
SERVICE LIMIT: IN: 1.7 mm (0.07 in)
EX: 1.9 mm (0.07 in)

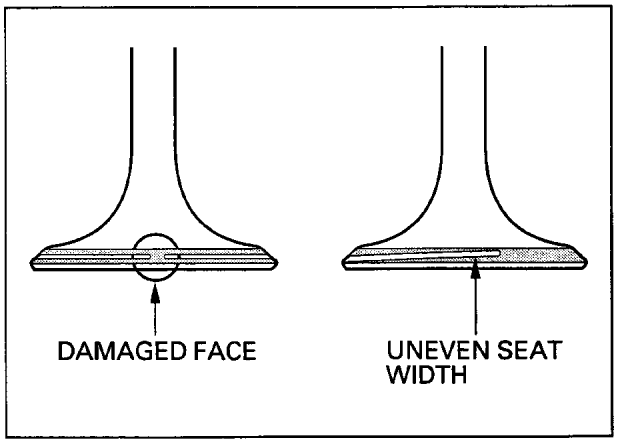
If the valve seat width is not within specification, reface the valve seat (page 9-14).

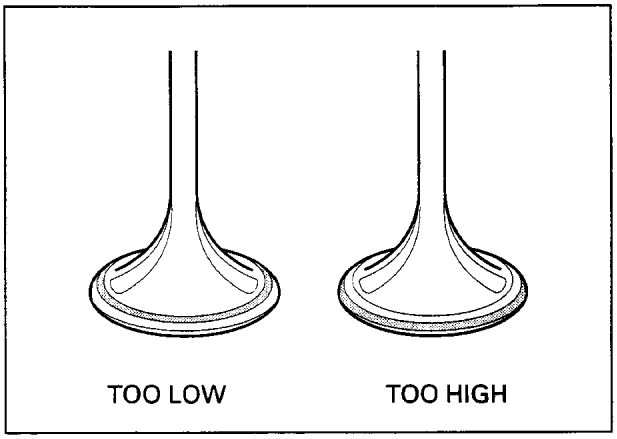


Inspect the valve seat face for:
- Uneven seat width:
  —Replace the valve and reface the valve seat.
- Damaged face:
  —Replace the valve and reface the valve seat.
- Contact area (too high or too low)
  —Reface the valve seat.

NOTE:

The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

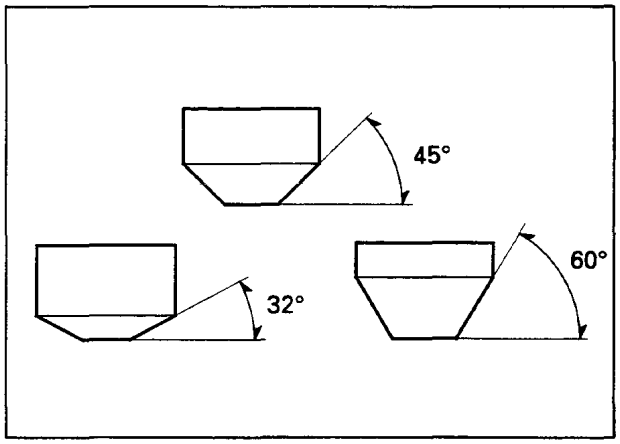




REFACING

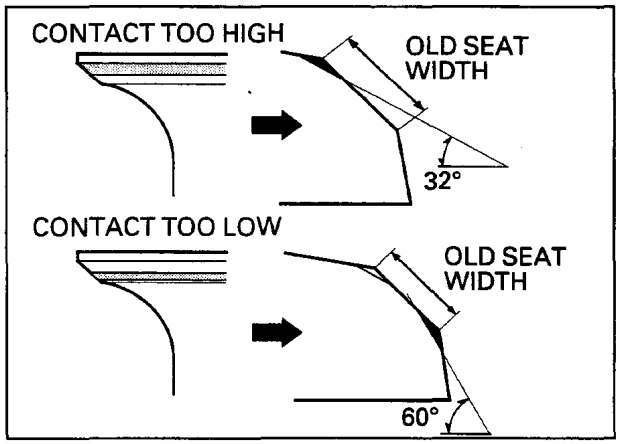
NOTE:

- Follow the refacing manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.



If the contact area is too high on the valve, the seat must be lowered using a 32 ° flat cutter.

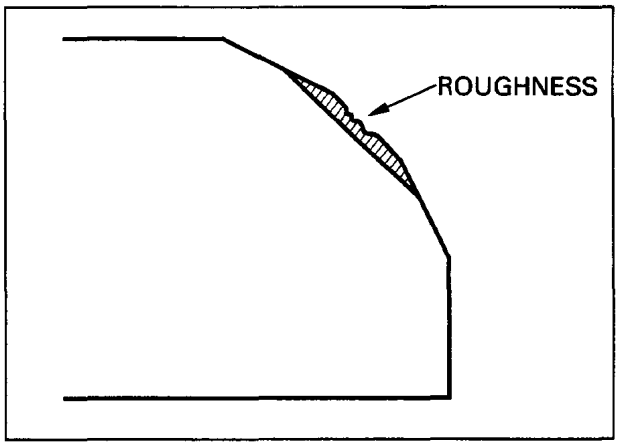
If the contact area is too low on the valve, the seat must be raised using a 60 ° interior cutter.



Using a 45 ° seat cutter, remove any roughness or irregularities from the seat.

TOOLS:

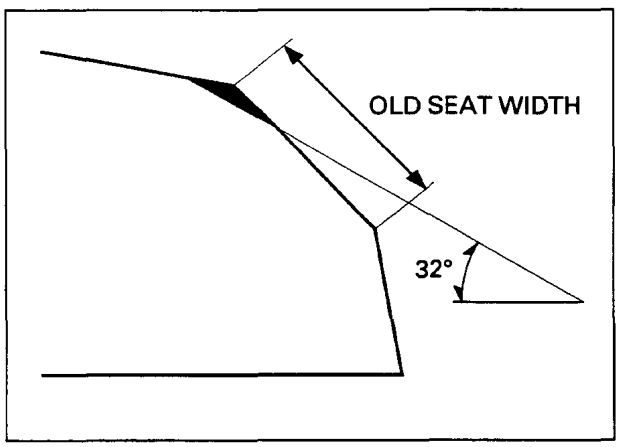
Seat cutter, 40 mm	07780-0010500
Cutter holder, 6 mm	07VMH-MBB0100



Using a 32 ° flat cutter, remove 1/4 of the existing valve seat material.

TOOLS:

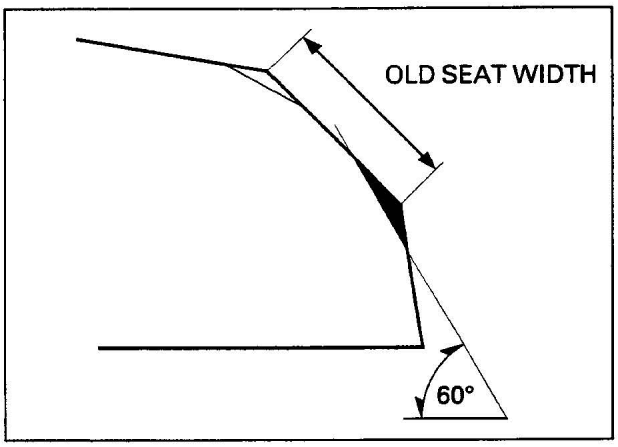
Flat cutter, 38.5 mm (IN)	07780-0012400
Flat cutter, 35 mm (EX)	07780-0012300
Cutter holder, 6 mm	07VMH-MBB0100



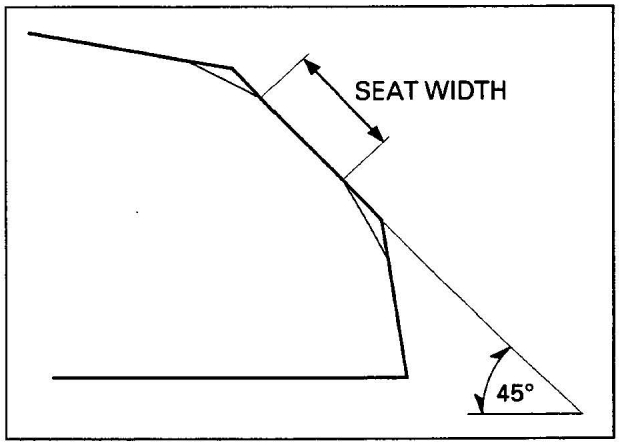
Using a 60 ° interior cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Interior cutter, 37.5 mm	07780-0014100
Cutter holder, 6 mm	07VMH-MBB0100



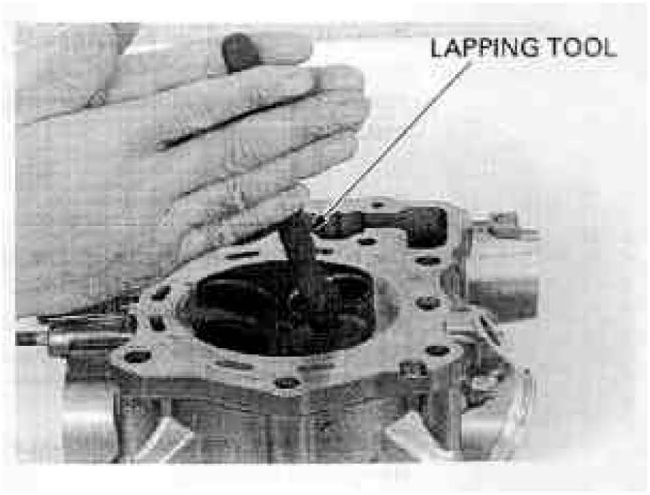
Using a 45 ° seat cutter, cut the seat to the proper width.



After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

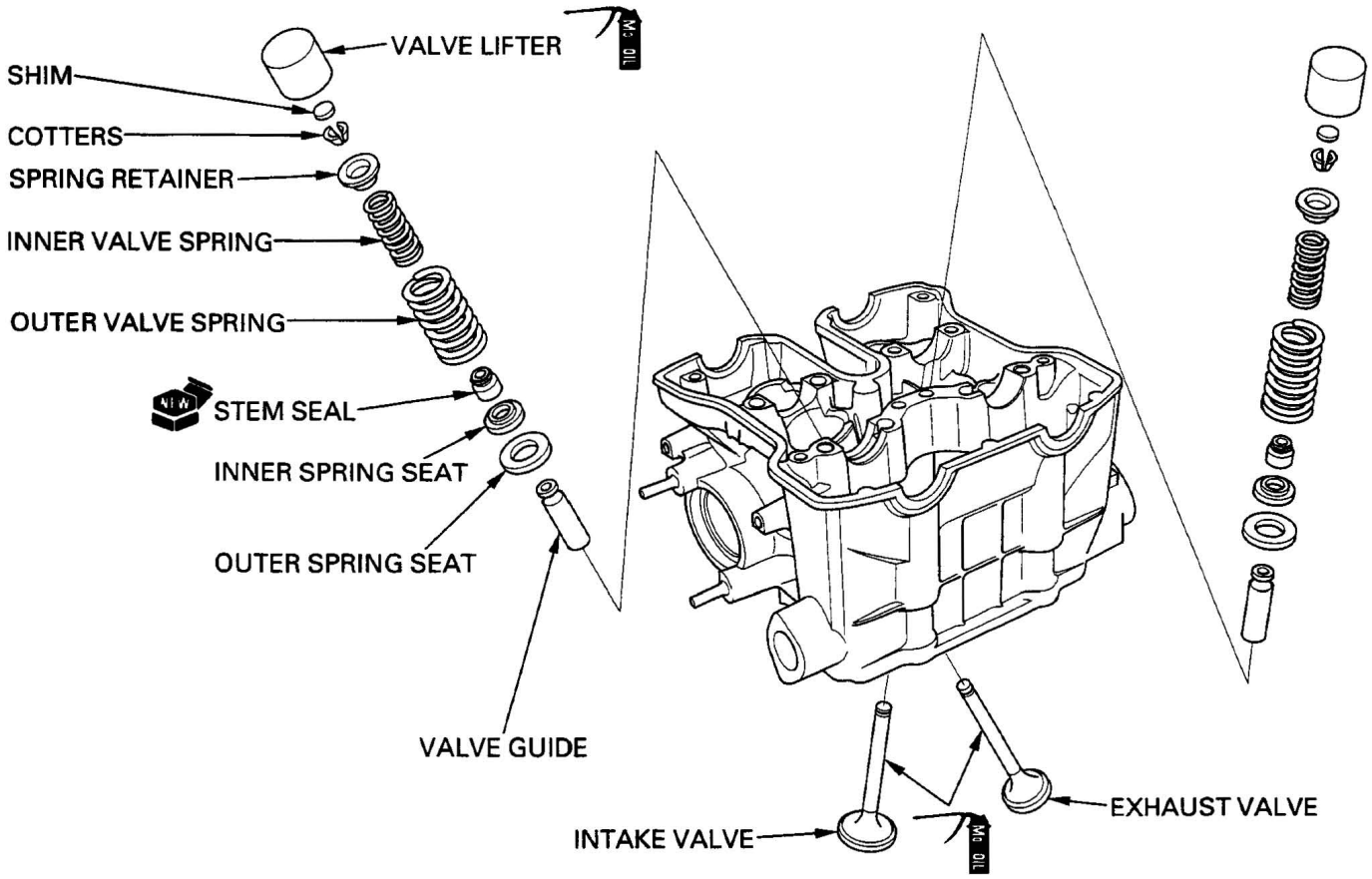
CAUTION:

- ***Excessive lapping pressure may deform or damage the seat.***
- ***Change the angle of lapping tool frequently to prevent uneven seat wear.***
- ***Do not allow lapping compound to enter the guides.***



After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.

CYLINDER HEAD ASSEMBLY



Blow through all oil passages in the cylinder head with compressed air.
Install the inner and outer valve spring seats.
Install new stem seals.

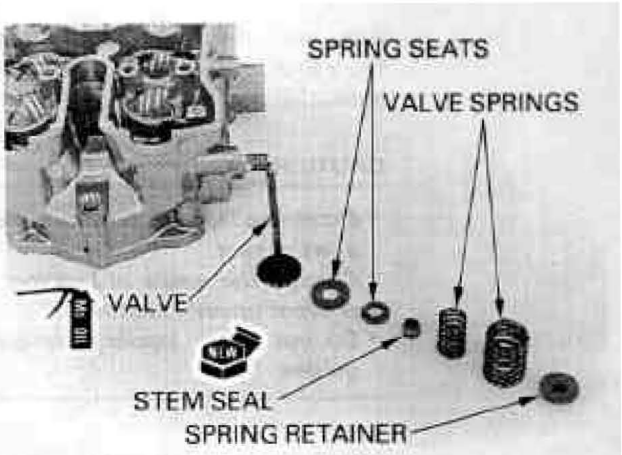
NOTE:

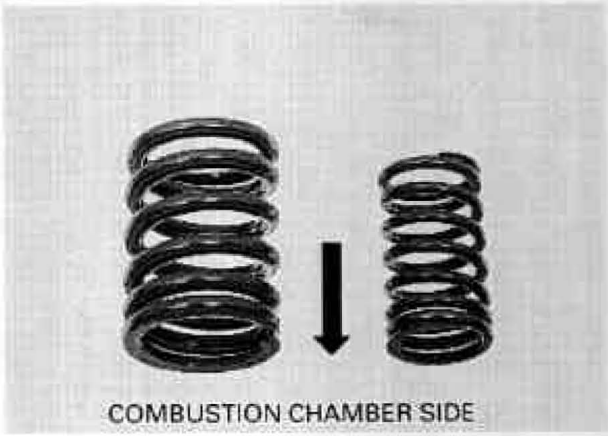
Do not interchange the intake and exhaust stem seals.
The intake stem seal has sliver spring and the exhaust stem seal has black spring.

Lubricate the valve stem sliding surface with molybdenum oil solution.
Insert the valve into the guide while turning it slowly to avoid damage to the stem seal.

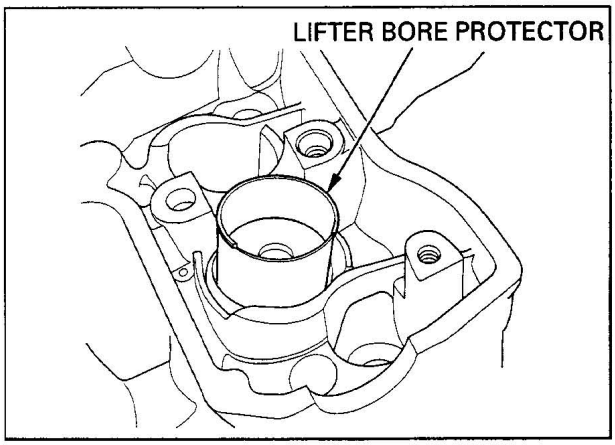
Install the inner and outer valve springs with the tightly wound coils facing the combustion chamber.

Install the spring retainer.





Install the lifter bore protector made from the film container into the valve lifter bore.



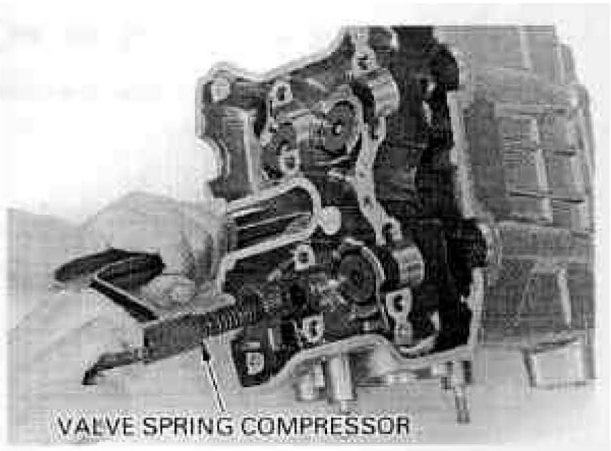
Grease the cotters to ease installation.

Remove the attachment from the valve spring compressor.
Install the valve spring cotters using the valve spring compressor.

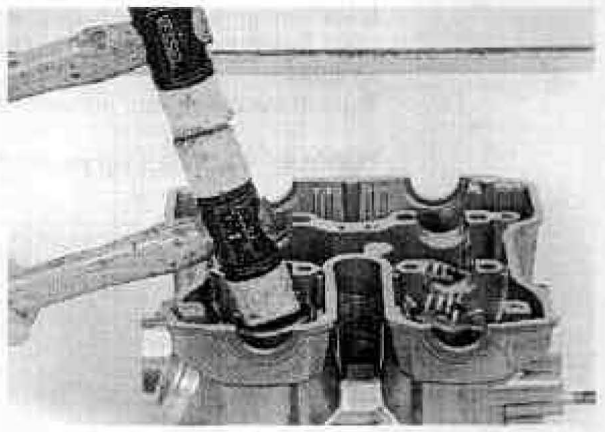
TOOL:
Valve spring compressor 07757-0010000

CAUTION:

To prevent loss of tension, do not compress the valve springs more than necessary to install the cotters.



Support the cylinder head so that the valve heads will not contact anything that cause damage.
Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

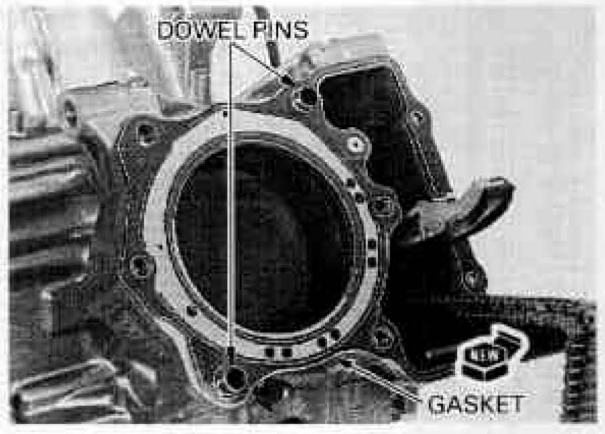


Install and tighten the spark plug.

TORQUE: 14 N·m (1.4 kgf·m , 10 lbf·ft)

CYLINDER HEAD INSTALLATION

Install the dowel pins and a new gasket.

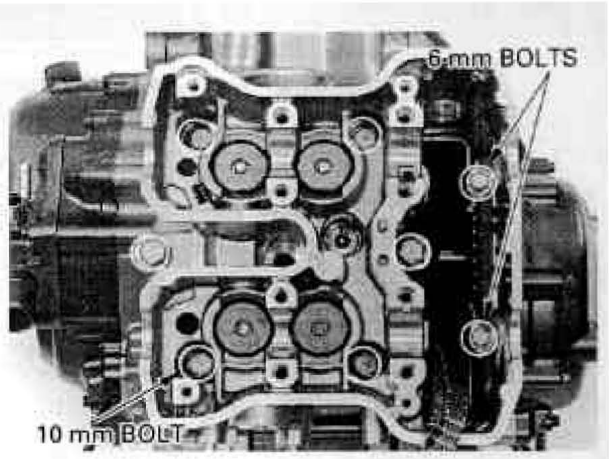


Install the cylinder head onto the cylinder.

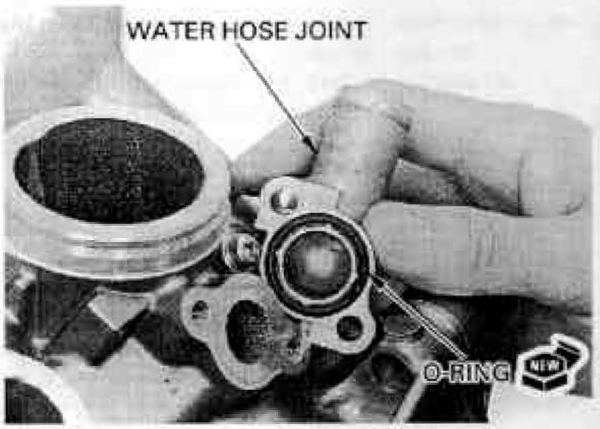
Apply oil to the threads and seating surfaces of the 10 mm cylinder head bolts and install them.
Tighten the 10 mm bolts in a crisscross pattern in 2 or 3 steps.

TORQUE: 53 N·m (5.4 kgf·m , 39 lbf·ft)

Install and tighten the two 6 mm bolts.

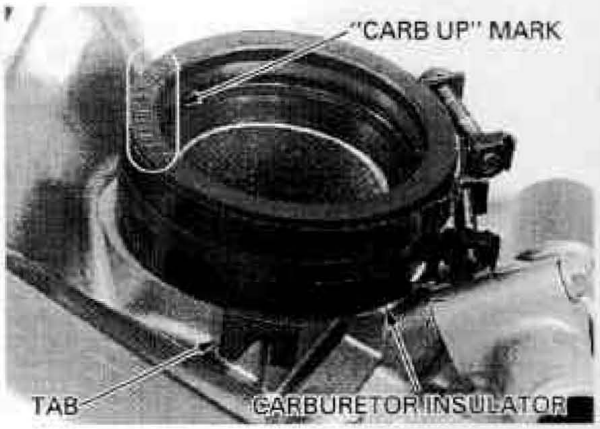


Install a new O-ring into the water hose joint groove.
Install the water hose joint and tighten the two bolts.

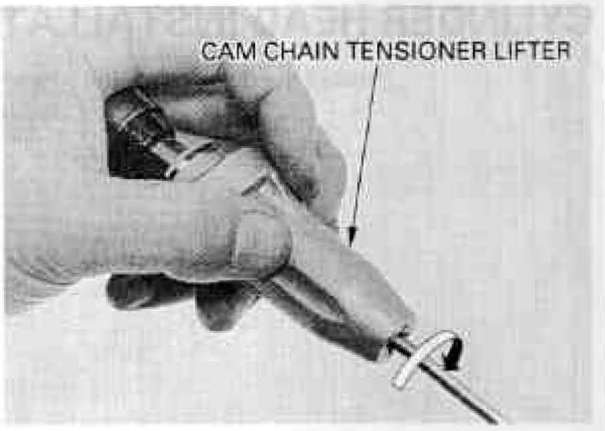


Install the carburetor insulator with the "CARB UP" mark facing out and up so that the tab is positioned as shown.
Tighten the carburetor insulator band screw.

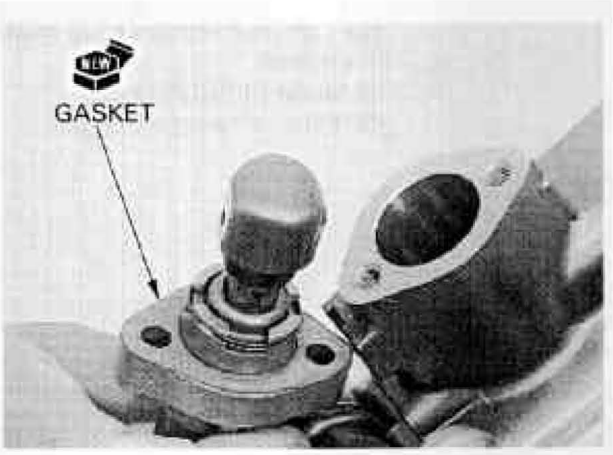
TORQUE: 1 N·m (0.1 kgf·m , 0.7 lbf·ft)



Turn the cam chain tensioner lifter shaft clockwise fully to retract the tensioner lifter and secure it with a stopper tool.

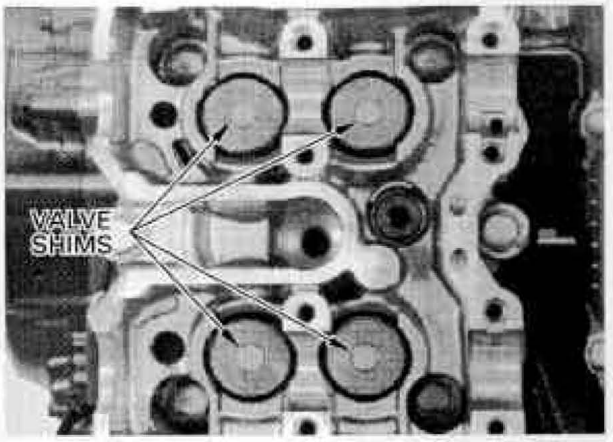


Install a new gasket onto the tensioner lifter.
Install the tensioner lifter onto the cylinder head and tighten the two bolts.

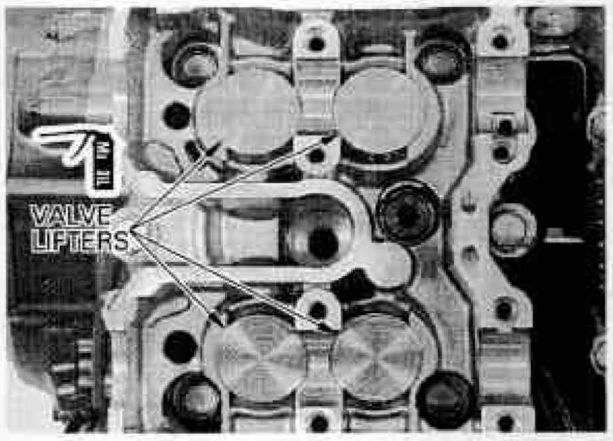


CAMSHAFT INSTALLATION

Install the valve shims in their original locations.



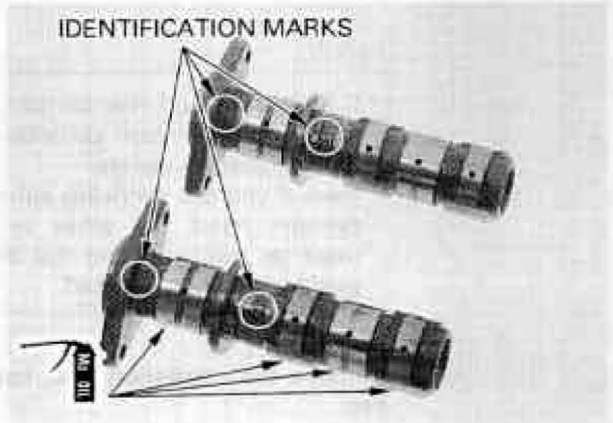
Coat the outer surfaces of the valve lifters with molybdenum oil solution.
Install the valve lifters in their original lifter bores, being careful not to damage the sliding surfaces of the lifters and bores.



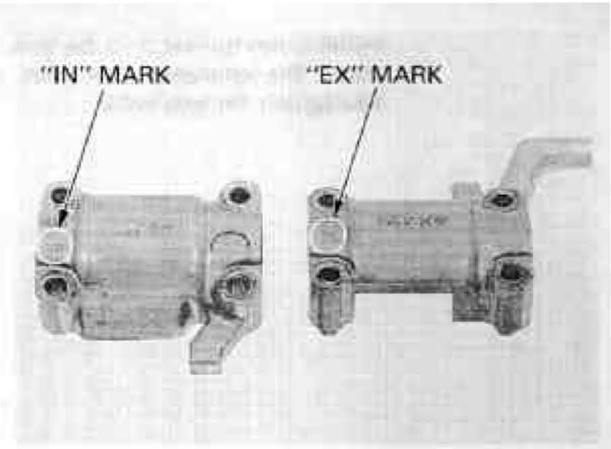
Apply molybdenum oil solution to the camshaft journals and cam lobes.

The camshafts have the following identification marks:
FR IN: Front cylinder intake camshaft
FR EX: Front cylinder exhaust camshaft
RR IN: Rear cylinder intake camshaft
RR EX: Rear cylinder exhaust camshaft

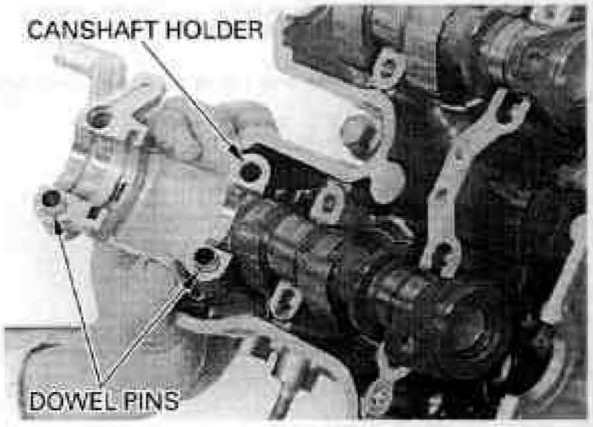
Install the camshafts in their proper locations.



The camshaft holders have the following identification marks:
IN: Intake camshaft holder
EX: Exhaust camshaft holder

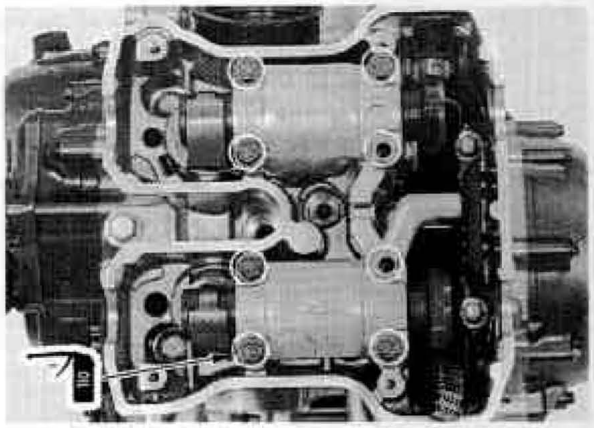


Install the dowel pins.
Install the camshaft holders in their proper locations.



Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the bolts and tighten them in a crisscross pattern in 2 or 3 steps.

TORQUE: 21 N·m (2.1 kgf·m , 15 lbf·ft)

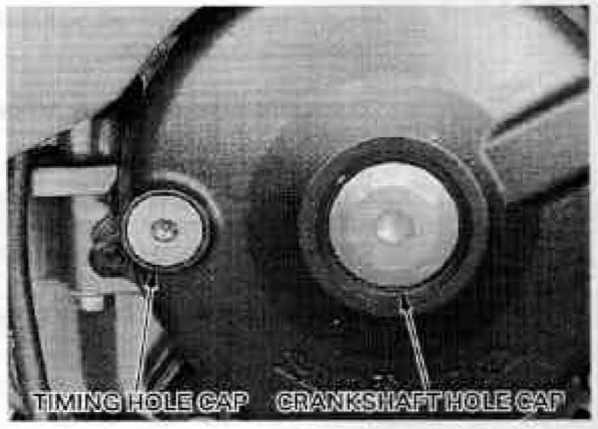


CAM SPROCKET INSTALLATION

NOTE:

- If both front and rear camshafts were serviced, install the front cam sprockets first, then install the rear cam sprockets.
- Even if you are servicing either the front or rear cylinder head, the other cylinder head cover must be removed and the other cam sprocket position must be checked.

Remove the crankshaft hole cap and timing hole cap.

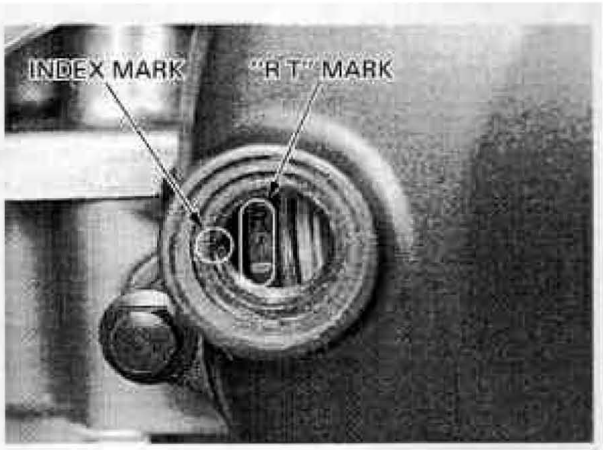


FRONT CAM SPROCKETS:

If the rear cylinder has not been serviced, remove the rear cylinder head cover and check the rear cam sprocket position as follows:

Be careful not to jam the cam chain at the crankshaft when turning the crankshaft.

Turn the crankshaft counterclockwise and align "RT" mark on the flywheel with the index mark on the left crankcase cover.



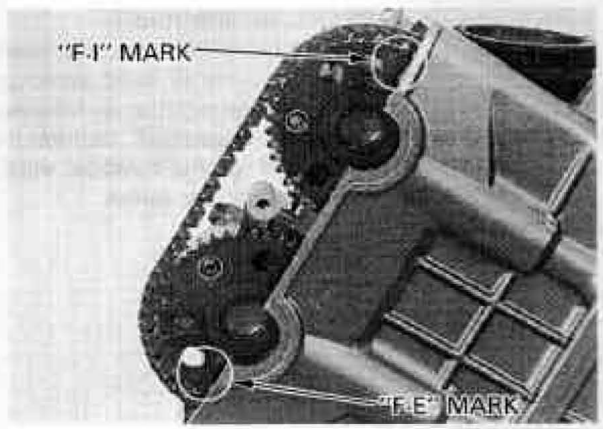
Check the timing marks ("R·I" for intake and "R·E" for exhaust) on the rear cylinder cam sprockets.

If the timing marks are facing outward, turn the crankshaft counterclockwise 1-1/4 turn (450 °) and align the "FT" mark with the index mark.

If the timing marks are facing inward, turn the crankshaft counterclockwise 1/4 turn (90 °) and align the "FT" mark with the index mark.

Install the cam sprockets onto the cam chain and cam sprocket flanges so that the timing marks ("F·I" for intake and "F·E" for exhaust) on the sprockets are flush with the cylinder head surface and facing outward as shown.

Make sure that both intake and exhaust cam lobes are facing up, align the bolt holes in the cam sprockets and camshafts.

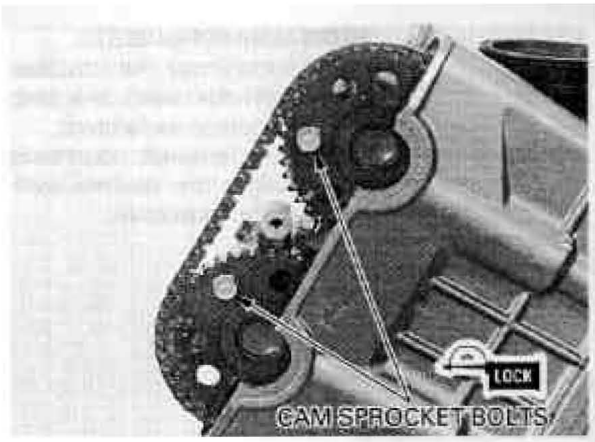


Apply locking agent to the cam sprocket bolt threads.
Install the cam sprocket bolts.

Turn the crankshaft counterclockwise one turn and install the remaining cam sprocket bolts.
Tighten the cam sprocket bolts.

TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)

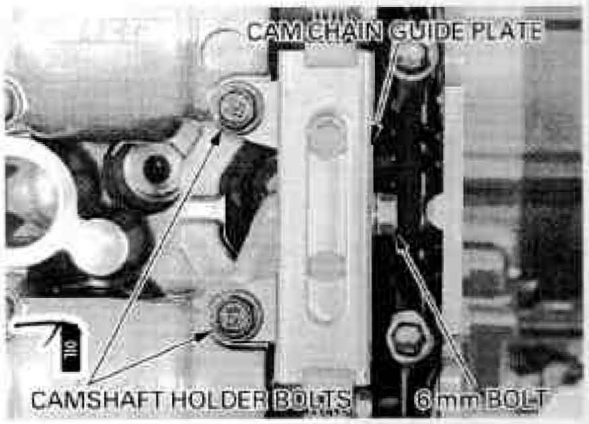
Turn the crankshaft counterclockwise one turn and tighten the other sprocket bolts to the same torque.



Remove the two camshaft holder bolts to attach the cam chain guide plate.
Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the cam chain guide plate.
Tighten the camshaft holder bolts.

TORQUE: 21 N·m (2.1 kgf·m , 15 lbf·ft)

Tighten the 6 mm bolt.



Remove the stopper tool from the cam chain tensioner lifter and install the sealing bolt with a new sealing washer.

If the rear cylinder head has been serviced, install the rear cylinder cam sprockets (see below).

Install the crankshaft hole cap and timing hole cap (page 3-9).

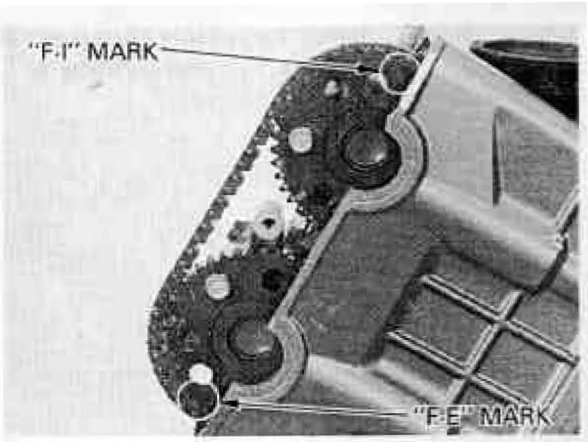
Install the following:
- cylinder head cover (page 8-23)
- left radiator (page 6-6)
- air cleaner housing (page 5-4)

REAR CAM SPROCKET:
If the front cylinder has not been serviced, remove the front cylinder head cover and check the front cam sprocket position as follows:

Be careful not to jam the cam chain at the crankshaft when turning the crankshaft.

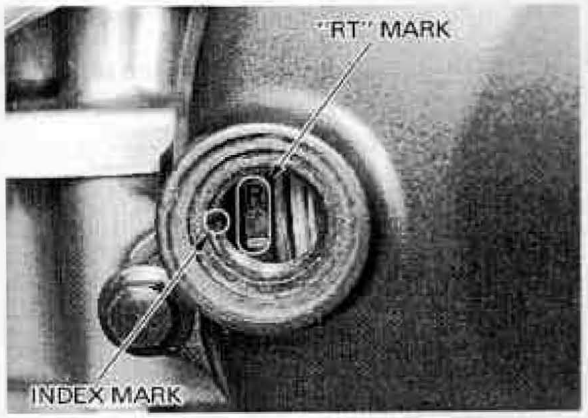
Turn the crankshaft counterclockwise and align "FT" mark on the flywheel with the index mark on the left crankcase cover.

Check the timing marks ("F·I" for intake and "F·E" for exhaust) on the front cylinder cam sprockets.



If the timing marks are facing outward, turn the crankshaft counterclockwise 3/4 turn (270°) and align the "RT" mark with the index mark.

If the timing marks are facing inward, turn the crankshaft counterclockwise 1-3/4 turn (630°) and align the "RT" mark with the index mark.



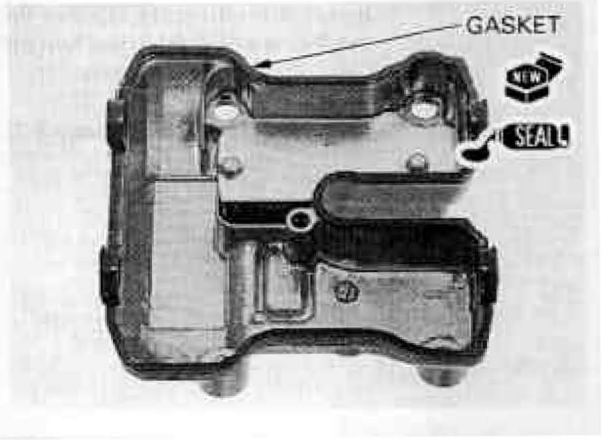
Install the cam sprockets onto the cam chain and cam sprocket flanges so that the timing marks ("R·I" for intake and "R·E" for exhaust) on the sprockets are flush with the cylinder head surface and facing outward as shown.

Install the cam sprocket bolts and cam chain guide plate in the same procedures as for the front cylinder.

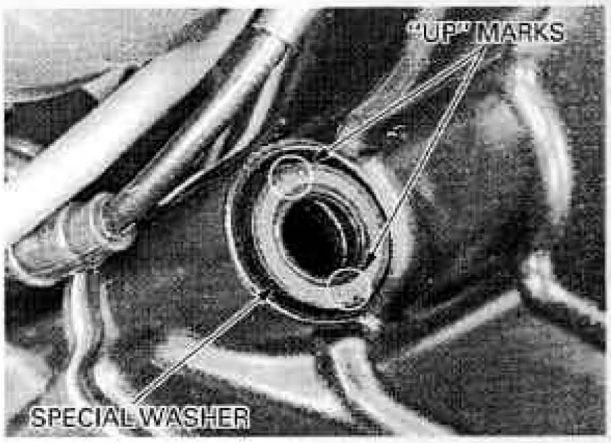
CYLINDER HEAD COVER INSTALLATION

Apply sealant to the cylinder head cover side of a new gasket.
Install the gasket into the groove in the head cover.

Apply sealant to the cylinder head semi-circular areas.

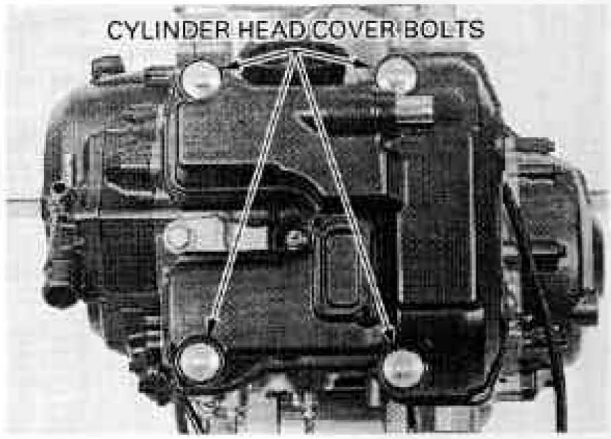


Install the cylinder head cover and special washers with the "UP" marks facing up.

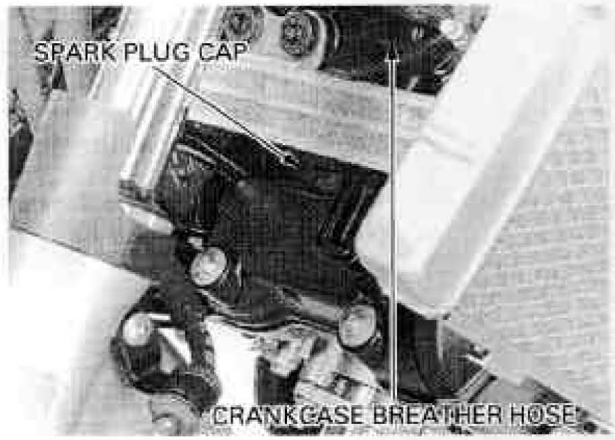


Install and tighten the cylinder head cover bolts.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

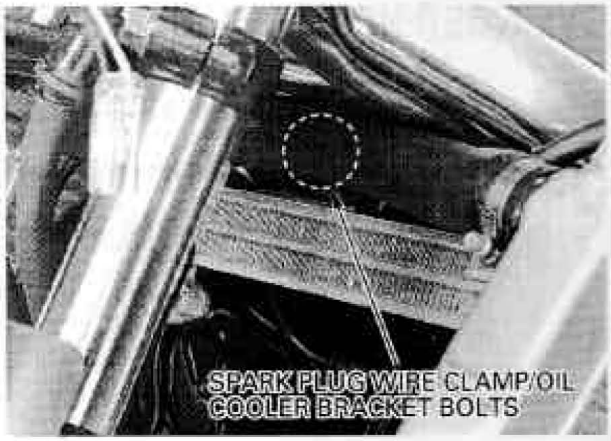


FRONT:
Install the spark plug cap onto the plug.
Connect the breather hose to the cylinder head cover.
Connect the air supply hose to the pulse secondary air injection (PAIR) check valve (SW, AR, IIG type only).



Install the oil cooler bracket with the cooler onto the frame and tighten the two bolts.
Clamp the spark plug wire.

Install the front fairing (page 2-2).



REAR:
Install the spark plug cap onto the plug.
Connect the breather hose to the cylinder head cover.
Connect the air supply hose to the PAIR check valve (SW, AR, IIG type only).

Install the fuel tank (page 2-4).