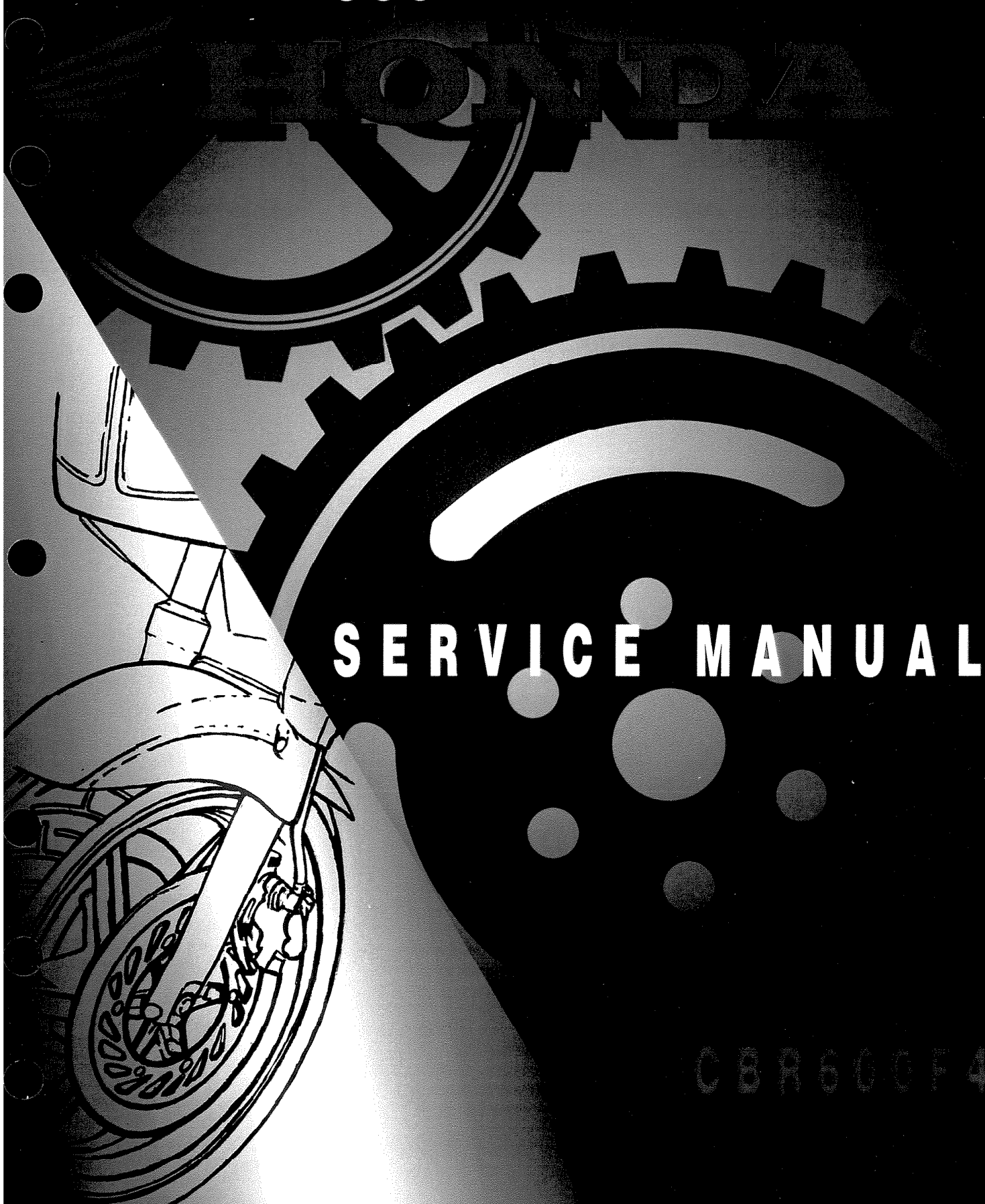


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HONDA

SERVICE MANUAL

CBR600F4







## HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CBR600F4.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Environmental Protection Agency, California Air Resources Board and Transport Canada.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Sections 4 through 19 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

Most sections have an assembly or system illustration, service information and troubleshooting for the section.

The subsequent pages give detailed procedures.

If you don't know the source of the trouble, go to section 22 Troubleshooting.












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## SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	Replace the part(s) with new one(s) before assembly.
	Use recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI # 2 or equivalent).
	Use molybdenum disulfide grease (containing more than 3 % molybdenum disulfide, NLGI # 2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning, U. S. A. Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan
	Use molybdenum disulfide paste (containing more than 40 % molybdenum disulfide, NLGI # 2 or equivalent). Example: Molykote® G-n paste, manufactured by Dow Corning, U. S. A. Honda Moly 60 (U. S. A. only) Rocol ASP manufactured by Rocol Limited, U. K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a middle strength locking agent unless otherwise specified.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use Fork or Suspension Fluid.

# 1. GENERAL INFORMATION

GENERAL SAFETY	1-1	LUBRICATION & SEAL POINTS	1-16
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## GENERAL SAFETY

### CARBON MONOXIDE

If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.

#### ▲WARNING

*The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.*

Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

### GASOLINE

Work in a well ventilated area. Keep cigarettes, flames or sparks away from the work area or where gasoline is stored.

#### ▲WARNING

*Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*

### HOT COMPONENTS

#### ▲WARNING

*Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.*

### USED ENGINE OIL

#### ▲WARNING

*Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.*

### BRAKE DUST

Never use an air hose or dry brush to clean the brake assemblies. Use a vacuum cleaner or alternate method to minimize the hazard caused by air borne asbestos fibers.

#### ▲WARNING

*Inhaled asbestos fibers have been found to cause respiratory disease and cancer.*

### BRAKE FLUID

#### CAUTION:

*Spilling fluid on painted, plastic or rubber parts will damage them. Place a clean shop towel over these parts whenever the system is serviced. KEEP OUT OF REACH OF CHILDREN.*

## GENERAL INFORMATION

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### COOLANT

Under some conditions, the ethylene glycol in engine coolant is combustible and its flame is not visible. If the ethylene glycol does ignite, you will not see any flame, but you can be burned.

#### **▲WARNING**

- *Avoid spilling engine coolant on the exhaust system or engine parts. They may be hot enough to cause the coolant to ignite and burn without a visible flame.*
- *Coolant (ethylene glycol) can cause some skin irritation and is poisonous if swallowed. KEEP OUT OF REACH OF CHILDREN.*
- *Do not remove the radiator cap when the engine is hot. The coolant is under pressure and could scald you.*
- *Keep hands and clothing away from the cooling fan, as it starts automatically.*

#### CAUTION:

*Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.*

### BATTERY HYDROGEN GAS & ELECTROLYTE

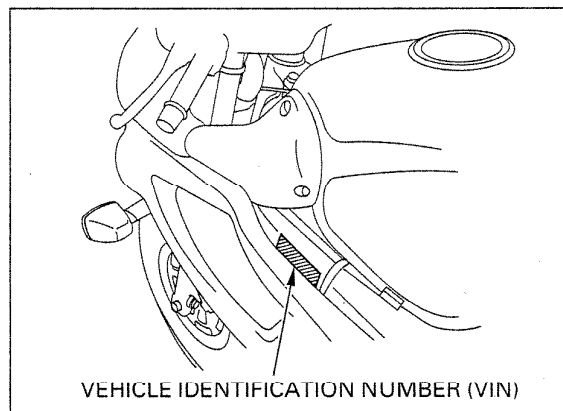
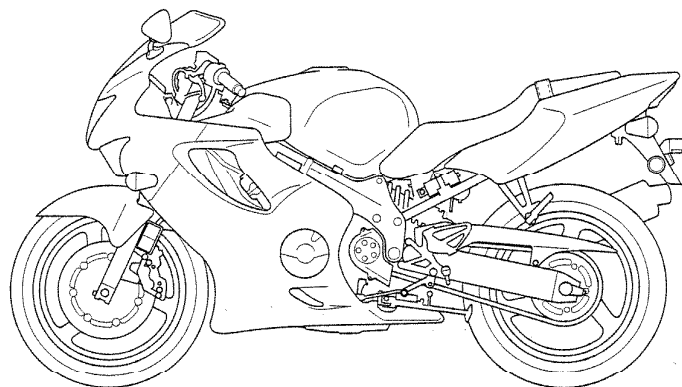
#### **▲WARNING**

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
  - *If electrolyte gets on your skin, flush with water.*
  - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.*
- *Electrolyte is poisonous.*
  - *If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.*

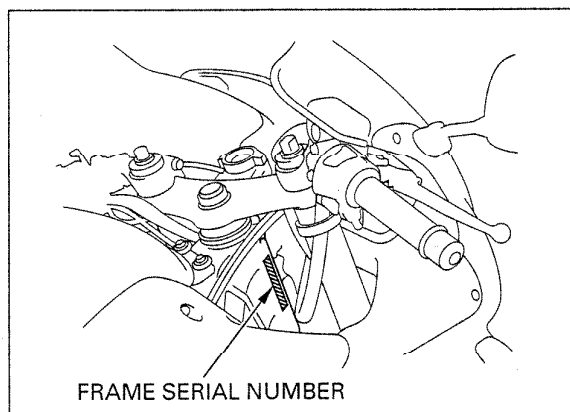
## SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show on pages 1-18 through 1-28, Cable and Harness routing.

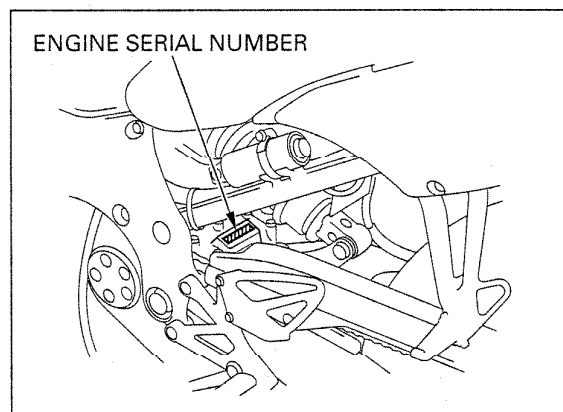
## MODEL IDENTIFICATION



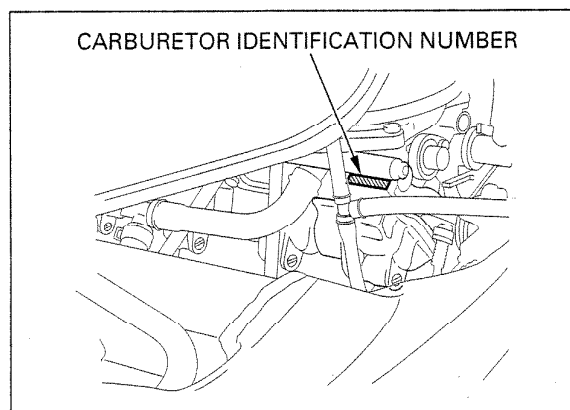
The Vehicle Identification Number (VIN) is located on the left side of the frame.



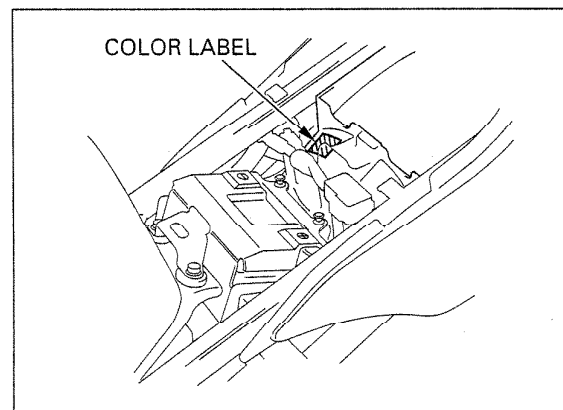
The frame serial number is stamped on the right side of the steering head.



The engine serial number is stamped on the rear side of the upper crankcase.



The carburetor identification number is stamped on the intake side of the carburetor body.



The color label is attached on the rear fender under the seat. When ordering color-coded parts, always specify the designated color code.

## GENERAL INFORMATION

## SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,060 mm (81.1 in)
	Overall width	685 mm (27.0 in)
	Overall height	1,130 mm (44.5 in)
	Wheelbase	1,390 mm (54.7 in)
	Seat height	810 mm (31.9 in)
	Footpeg height	360 mm (14.2 in)
	Ground clearance	135 mm (5.3 in)
	Dry weight 49 state/Canada type	169 kg (373 lbs)
	California type	170 kg (375 lbs)
	Curb weight 49 state/Canada type	197 kg (434 lbs)
	California type	198 kg (437 lbs)
FRAME	Maximum weight capacity 49 state/California type	175 kg (386 lbs)
	Canada type	179 kg (395 lbs)
	Frame type	Diamond
	Front suspension	Telescopic fork
	Front axle travel	120 mm (4.7 in)
	Rear suspension	Swingarm
	Rear axle travel	120 mm (4.7 in)
	Front tire size	120/70 ZR17 (58W)
	Rear tire size	180/55 ZR17 (73W)
	Front tire brand	BRIDGESTONE BT56F RADIAL E , DUNLOP D207FJ , MICHELIN TX15C
	Rear tire brand	BRIDGESTONE BT56R RADIAL G , DUNLOP D207P , MICHELIN TX25
ENGINE	Front brake	Hydraulic double disc
	Rear brake	Hydraulic single disc
	Caster angle	24°
	Trail length	96 mm (3.8 in)
	Fuel tank capacity	17.0 l (4.49 US gal , 3.74 Imp gal)
	Cylinder arrangement	4 cylinders in-line, inclined 31° from vertical
	Bore and stroke	67.0 × 42.5 mm (2.64 × 1.67 in)
	Displacement	599 cm <sup>3</sup> (36.5 cu-in)
	Compression ratio	12.0 : 1
	Valve train	Chain driven, DOHC
	Intake valve opens	22° BTDC (At 1 mm lift)
	Intake valve closes	43° ABDC (At 1 mm lift)
	Exhaust valve opens	38° BBDC (At 1 mm lift)
	Exhaust valve closes	7° ATDC (At 1 mm lift)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Viscous paper element
	Engine dry weight	59 kg (130 lbs)
	Firing order	1-2-4-3

## GENERAL INFORMATION

GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	Constant Velocity 36.5 mm (1.44 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th Gearshift pattern	Multi-plate, wet Cable operating Constant mesh, 6-speeds 1.822 (82/45) 2.812 (45/16) 2.833 (34/12) 2.062 (33/16) 1.647 (28/17) 1.421 (27/19) 1.250 (25/20) 1.130 (26/23) Left foot operated return system, 1-N-2-3-4-5-6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Full transistorized ignition Electric starter motor Triple phase output alternator SCR shorted, triple phase full wave rectification Battery

## GENERAL INFORMATION

Unit: mm (in)

LUBRICATION SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Engine oil capacity	After draining	3.0 l (3.2 US qt, 2.6 Imp qt)	_____
	After draining/filter change	3.3 l (3.5 US qt, 2.9 Imp qt)	_____
	After disassembly	3.7 l (3.9 US qt, 3.3 Imp qt)	_____
Recommended engine oil		Honda GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10 W - 40	_____
Oil pressure (at oil main gallery)		490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 6,000 rpm/(80 °C/176 °F)	_____
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15—0.22 (0.006—0.009)	0.35 (0.014)
	Side clearance	0.02—0.07 (0.001—0.003)	0.10 (0.004)

FUEL SYSTEM		SPECIFICATIONS
ITEM		
Carburetor identification number	49 state/Canada type	VP64C
	California type	VP64B
Main jet	49 state/Canada type	No. 1/4 carburetor: # 132 , No. 2/3 carburetor: # 135
	California type	# 128 (all carburetors)
Slow jet		# 40
Pilot screw	initial/final opening	See page 5-33
	high altitude adjustment	See page 5-34
Float level		13.7 ± 0.5 mm (0.54 ± 0.02 in)
Idle speed	49 state/Canada type	1,300 ± 100 rpm
	California type	1,400 ± 100 rpm
Carburetor vacuum difference (base carburetor: No. 4)		Within 30 mm Hg (1.2 in Hg)
Fuel pump flow capacity (minimum)		700 cm <sup>3</sup> (23.7 US oz, 24.6 Imp oz)/minute
Throttle grip free play		2—6 mm (1/16—1/4 in)

COOLING SYSTEM		SPECIFICATIONS
ITEM		
Coolant capacity	Radiator and engine	2.7 l (2.9 US qt, 2.4 Imp qt)
	Reserve tank	0.31 l (0.33 US qt, 0.27 Imp qt)
Radiator cap relief pressure		108—137 kPa (1.1—1.4 kgf/cm <sup>2</sup> , 16—20 psi)
Thermostat	Begin to open	73—77 °C (163—171 °F)
	Fully open	90 °C (194 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors.



## GENERAL INFORMATION

CYLINDER HEAD/VALVE ITEM				STANDARD		SERVICE LIMIT	
Cylinder compression at 350 rpm				1,226 kPa (12.5 kgf/cm <sup>2</sup> , 178 psi)		_____	
Valve clearance			IN	0.20 ± 0.03 (0.008 ± 0.001)		_____	
			EX	0.28 ± 0.03 (0.011 ± 0.001)		_____	
Camshaft	Cam lobe height	49 state/Canada type	IN	36.600–36.760 (1.4409–1.4472)		36.57 (1.440)	
			EX	35.380–35.540 (1.3929–1.3992)		35.35 (1.392)	
		California type	IN	34.640–34.720 (1.3638–1.3669)		34.61 (1.363)	
			EX	33.920–34.000 (1.3354–1.3386)		33.89 (1.334)	
	Runout			_____		0.05 (0.002)	
	Oil clearance			0.020–0.062 (0.0008–0.0024)		0.10 (0.004)	
Valve lifter	Valve lifter O.D.		25.978–25.993 (1.0228–1.0233)		25.97 (1.022)		
	Valve lifter bore I.D.		26.010–26.026 (1.0240–1.0246)		26.04 (1.025)		
Valve, valve guide	Valve stem O.D.		IN	3.975–3.990 (0.1565–0.1571)		3.965 (0.1561)	
			EX	3.965–3.980 (0.1561–0.1567)		3.955 (0.1557)	
	Valve guide I.D.		IN/EX	4.000–4.012 (0.1575–0.1580)		4.04 (0.159)	
	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		IN	16.1–16.4 (0.63–0.65)		_____	
			EX	14.3–14.6 (0.56–0.57)		_____	
	Valve seat width		IN/EX	0.90–1.10 (0.035–0.043)		1.5 (0.06)	
Valve spring	Free length		IN	39.87 (1.570)		38.27 (1.507)	
			EX	36.23 (1.426)		34.73 (1.367)	
Cylinder head warpage				_____		0.10 (0.004)	

CLUTCH/GEARSHIFT LINKAGE			Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT	
Clutch lever free play		10 – 20 (3/8 – 13/16)		
Clutch	Spring free length	46.5 (1.83)	45.2 (1.78)	
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)	
	Plate warpage		0.30 (0.012)	
Clutch outer guide	I.D.	25.000 – 25.021 (0.9843 – 0.9851)	25.03 (0.985)	
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.97 (1.377)	
Mainshaft O.D. at clutch outer guide		24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)	

ALTERNATOR/STARTER CLUTCH				Unit: mm (in)	
ITEM				STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.				51.699–51.718 (2.0354–2.0361)	51.684 (2.0348)

## GENERAL INFORMATION

Unit: mm (in)

CRANKCASE/TRANSMISSION			Unit: mm (in)
ITEM			
			STANDARD
			SERVICE LIMIT
Shift fork	I.D.		12.000—12.021 (0.4724—0.4733)
	Claw thickness		5.93—6.00 (0.233—0.236)
Shift fork shaft	O.D.		11.957—11.968 (0.4707—0.4712)
Transmission	Gear I.D.	M5, M6	28.000—28.021 (1.1024—1.1032)
		C2, C3, C4	31.000—31.025 (1.2205—1.2215)
	Gear bushing O.D.	M5, M6	27.959—27.980 (1.1007—1.1016)
		C2	30.955—30.980 (1.2187—1.2197)
		C3, C4	30.950—30.975 (1.2185—1.2195)
	Gear-to-bushing clearance	M5, M6	0.020—0.062 (0.0008—0.0024)
		C2	0.020—0.070 (0.0008—0.0028)
		C3, C4	0.025—0.075 (0.0010—0.0030)
	Gear bushing I.D.	M5	24.985—25.006 (0.9837—0.9845)
		C2	27.985—28.006 (1.1018—1.1026)
	Mainshaft O.D.	at M5	24.967—24.980 (0.9830—0.9835)
	Countershaft O.D.	at C2	27.967—27.980 (1.1011—1.1016)
	Bushings-to-shaft clearance	M5	0.005—0.039 (0.0002—0.0015)
		C2	0.005—0.039 (0.0002—0.0015)

Unit: mm (in)

Unit: mm (in)

CRANKSHAFT/PISTON/CYLINDER			
ITEM			
			STANDARD
			SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.10—0.25 (0.004—0.010)
	Crankpin bearing oil clearance		0.028—0.052 (0.0011—0.0020)
	Main journal bearing oil clearance		0.020—0.038 (0.0008—0.0015)
	Runout		0.05 (0.002)
Piston, piston pin, piston ring	Piston O.D. at 15 (0.6) from bottom		66.965—66.985 (2.6364—2.6372)
	Piston pin hole I.D.		17.002—17.008 (0.6694—0.6696)
	Piston pin O.D.		16.994—17.000 (0.6691—0.6693)
	Piston-to-piston pin clearance		0.002—0.014 (0.0001—0.0006)
	Piston ring end gap	Top	0.10—0.20 (0.004—0.008)
		Second	0.18—0.30 (0.007—0.012)
		Oil (side rail)	0.2—0.7 (0.01—0.03)
	Piston ring-to-ring groove clearance	Top	0.020—0.050 (0.0008—0.0020)
		Second	0.015—0.050 (0.0006—0.0020)
Cylinder	I.D.		67.000—67.015 (2.6378—2.6384)
	Out of round		0.10 (0.004)
	Taper		0.10 (0.004)
	Warpage		0.10 (0.004)
Cylinder-to-piston clearance			0.015—0.050 (0.0006—0.0020)
Connecting rod small end I.D.			17.016—17.034 (0.6699—0.6706)
Connecting rod-to-piston pin clearance			0.016—0.040 (0.0006—0.0016)

## GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	336 (13.2)	329.3 (12.96)
	Tube runout	—	0.20 (0.008)
	Recommended fluid	Pro-Honda Suspension Fluid SS-8	—
	Fluid level	118 (4.6)	—
	Fluid capacity	475 ± 2.5 cm <sup>3</sup> (16.1 ± 0.08 US oz, 16.7 ± 0.09 oz)	—
Steering head bearing pre-load		1.0–1.5 kgf (2.2–3.3 lbf)	—

REAR WHEEL/SUSPENSION			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Drive chain slack		25–35 (1–1 3/8)	—

HYDRAULIC BRAKE			Unit: mm (in)
ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.4–4.6 (0.17–0.18)	3.5 (0.14)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)
	Master piston O.D.	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)
	Caliper cylinder I.D.	A	33.96–34.01 (1.337–1.339)
		B	32.030–32.080 (1.2610–1.2630)
	Caliper piston O.D.	A	33.895–33.928 (1.3344–1.3357)
		B	31.965–31.998 (1.2585–1.2598)
Rear	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.8–5.2 (0.19–0.20)	4.0 (0.16)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)
	Master piston O.D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.	38.18–38.23 (1.503–1.505)	38.24 (1.506)
	Caliper piston O.D.	38.098–38.148 (1.4999–1.5019)	38.09 (1.500)

## GENERAL INFORMATION

### BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12V — 8 AH
	Current leakage		0.1 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0 — 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A × 5 — 10 h
		Quick	4.0 A × 1.0 h
Alternator	Capacity		343 W/5,000 min <sup>-1</sup> (rpm)
	Charging coil resistance (20 °C/68 °F)		0.1 — 1.0 Ω

### IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	49 state/Canada type	CR9EH-9 (NGK) U27FER-9 (DENSO)
	California type	CR9EHVX-9 (NGK)
Spark plug gap		0.80 — 0.90 mm (0.031 — 0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		10° BTDC at idle
Throttle sensor	Resistance (20 °C/68 °F)	4 — 6 kΩ
	Input voltage	4.7 — 5.3 V

### ELECTRIC STARTER

Unit: mm (in)

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

### LIGHTS/METERS/SWITCHES

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12V — 60/55W
	Brake/taillight	12V — 21/5W × 2
	License light	12V — 4CP
	Front turn signal/running light	12V — 32/3CP (23/8W) × 2
	Rear turn signal light	12V — 32CP (23W) × 2
	Instrument light	12V — 1.1W × 3
	Turn signal indicator	12V — 1.1W × 2
	High beam indicator	12V — 1.1W
	Neutral indicator	12V — 1.1W
	Oil pressure indicator	12V — 1.1W
	Low fuel indicator	LED
Fuse	Main fuse	30A
	Sub-fuse	10A × 4
Thermosensor resistance	At 80 °C (176 °F)	47 — 57 Ω
	At 120 °C (248 °F)	14 — 18 Ω
Fan motor switch	Starts to close (ON)	98 — 102 °C (208 — 216 °F)
	Stops to open (OFF)	93 — 97 °C (199 — 207 °F)

## TORQUE VALUES

STANDARD			
FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

- Torque specifications listed below are for important fasteners.
- Others should be tightened to standard torque values listed above.

NOTES: 1. Apply sealant to the threads.  
 2. Apply locking agent to the threads.  
 3. Stake.  
 4. Apply oil to the threads and seating surface.  
 5. U-nut.  
 6. ALOC bolt/screw: replace with a new one.  
 7. Apply grease to the threads.  
 8. Apply molybdenum oil solution to the threads and seating surface.

ENGINE				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>MAINTENANCE:</b>				
Spark plug	4	10	12 (1.2, 9)	
Timing hole cap	1	45	18 (1.8, 13)	NOTE 7
Engine oil filter cartridge	1	20	10 (1.0, 7)	NOTE 4
Engine oil drain bolt	1	12	29 (3.0, 22)	
<b>LUBRICATION SYSTEM:</b>				
Oil main gallery sealing bolt	2	20	29 (3.0, 22)	NOTE 2
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
Oil pressure switch terminal screw	1	4	2 (0.2, 1.4)	
Oil pump cover bolt	1	6	8 (0.8, 5.8)	
Oil cooler bolt (filter boss)	1	20	64 (6.5, 47)	NOTE 4
<b>FUEL SYSTEM:</b>				
Starting enrichment (SE) valve nut	4	—	2 (0.2, 1.4)	
Carburetor connecting nut (front)	2	6	9 (0.9, 6.5)	
(rear)	2	5	5 (0.5, 3.6)	
Reed valve cover bolt	4	6	13 (1.3, 9)	
<b>COOLING SYSTEM:</b>				
Water pump assembly bolt	2	6	12 (1.2, 9)	
Thermostat cover bolt	2	6	12 (1.2, 9)	
<b>ENGINE MOUNTING:</b>				
Drive sprocket bolt	1	10	54 (5.5, 40)	
<b>CYLINDER HEAD/VALVE:</b>				
Cylinder head bolt	10	9	47 (4.8, 35)	NOTE 8
Camshaft holder bolt	20	6	12 (1.2, 9)	NOTE 4
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
Cylinder head cover bolt	3	6	10 (1.0, 7)	
Cam chain tensioner lifter mounting bolt	2	6	10 (1.0, 7)	
Intake manifold vacuum port joint	4	5	3 (0.3, 2.2)	

## GENERAL INFORMATION

### ENGINE (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Clutch center lock nut	1	22	127 (13.0 , 94)	NOTE 3, 4
Clutch bolt	5	6	12 (1.2 , 9)	
Oil pump driven sprocket bolt	1	6	15 (1.5 , 11)	NOTE 2
Gearshift cam bolt	1	8	23 (2.3 , 17)	NOTE 2
Gearshift stopper arm bolt	1	6	12 (1.2 , 9)	
Gearshift spindle return spring pin	1	8	23 (2.3 , 17)	
Right crankcase cover bolt	13	6	12 (1.2 , 9)	page 9-14
<b>ALTERNATOR/STARTER CLUTCH:</b>				
Alternator stator bolt	4	6	12 (1.2 , 9)	
Stator wire clamp bolt	1	6	14 (1.4 , 10)	
Starter clutch bolt	6	8	16 (1.6 , 12)	NOTE 2
Flywheel bolt	1	10	103 (10.5 , 76)	NOTE 4
<b>CRANKCASE/TRANSMISSION</b>				
Mainshaft bearing set plate bolt	3	6	12 (1.2 , 9)	NOTE 2
Gearshift drum bearing and fork shaft set bolt	2	6	12 (1.2 , 9)	NOTE 2
Cam chain tensioner pivot bolt	1	6	10 (1.0 , 7)	NOTE 2
Cam chain guide washer bolt	1	6	12 (1.2 , 9)	
Crankcase bolt (Main journal)	10	8	25 (2.6 , 19)	NOTE 4
Crankcase bolt	1	10	39 (4.0 , 29)	
Crankcase bolt (Upper side)	5	8	25 (2.5 , 18)	
Ignition pulse generator rotor bolt	1	10	59 (6.0 , 43)	
<b>CRANKSHAFT/PISTON/CYLINDER</b>				
Connecting rod bearing cap nut	8	7	25 (2.6 , 19)	NOTE 4
<b>ELECTRIC STARTER:</b>				
Starter motor terminal nut	1	6	10 (1.0 , 7)	
<b>LIGHTS/METERS/SWITCHES:</b>				
Thermosensor	1	PT 1/8	10 (1.0 , 7)	NOTE 1
Neutral switch	1	10	12 (1.2 , 9)	

### FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>FRAME/BODY PANELS/EXHAUST SYSTEM:</b>				
Seat cowl screw	2	5	2 (0.2 , 1.4)	
Front inner fairing screw	4	5	2 (0.2 , 1.4)	
Upper fairing-to-side firing bolt	6	5	2 (0.2 , 1.4)	
Exhaust pipe joint nut	8	7	12 (1.2 , 9)	
Muffler band bolt	2	8	23 (2.3 , 17)	
Passenger footpeg bracket bolt	4	8	26 (2.7 , 20)	
Seat rail mounting bolt	4	10	49 (5.0 , 36)	
<b>ENGINE MOUNTING:</b>				
Front engine hanger bolt	2	10	39 (4.0 , 29)	page 7-6
Center engine hanger bolt	2	10	39 (4.0 , 29)	
Center engine hanger adjusting bolt (right side)	1	20	4 (0.4 , 2.9)	
Center engine hanger lock nut (right side)	1	20	54 (5.5 , 40)	
Rear engine hanger nut	1	10	39 (4.0 , 29)	
Rear engine hanger adjusting bolt (right side)	1	22	4 (0.4 , 2.9)	
Rear engine hanger lock nut (right side)	1	22	54 (5.5 , 40)	
Shock link bracket nut	2	10	39 (4.0 , 29)	NOTE 5
<b>FRONT WHEEL/SUSPENSION/STEERING:</b>				
Handlebar weight mounting screw	2	6	10 (1.0 , 7)	NOTE 6
Front brake disc bolt	12	6	20 (2.0 , 14)	NOTE 6
Front axle bolt	1	14	59 (6.0 , 43)	
Front axle holder bolt	4	8	22 (2.2 , 16)	

# GENERAL INFORMATION

FRAME (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf·m, lbf·ft)	REMARKS
FRONT WHEEL/SUSPENSION/STEERING:				
Front fender bolt	4	6	12 (1.2 , 9)	page 13-28
Fork socket bolt	2	10	34 (3.5 , 25)	
Fork cap	2	39	23 (2.3 , 17)	
Fork top bridge pinch bolt	2	8	23 (2.3 , 17)	
Fork bottom bridge pinch bolt	2	10	39 (4.0 , 29)	
Steering bearing adjustment nut	1	26	25 (2.5 , 18)	
Steering bearing adjustment nut lock nut	1	26		
Steering stem nut	1	24	103 (10.5 , 76)	
Front brake hose clamp bolt (steering stem)	1	6	10 (1.0 , 7)	
REAR WHEEL/SUSPENSION:				
Rear brake disc bolt	4	8	42 (4.3 , 31)	NOTE 6
Final driven sprocket nut	5	12	88 (9.0 , 65)	NOTE 5
Rear axle nut	1	18	93 (9.5 , 69)	NOTE 5
Shock absorber mounting nut	2	10	44 (4.5 , 33)	NOTE 5
Shock arm-to-swingarm nut	1	10	44 (4.5 , 33)	NOTE 5
Shock arm-to-shock link nut	1	10	44 (4.5 , 33)	NOTE 5
Shock link-to-bracket nut	1	10	44 (4.5 , 33)	NOTE 5
Drive chain slider bolt	2	6	9 (0.9 , 6.5)	NOTE 6
Swingarm pivot adjusting bolt	2	30	7 (0.7 , 5.1)	page 14-17
Swingarm pivot lock nut	2	30	64 (6.5 , 47)	
Swingarm pivot nut	1	18	93 (9.5 , 69)	NOTE 5
HYDRAULIC BRAKE:				
Brake caliper bleed valve	3	8	6 (0.6 , 4.3)	NOTE 2 NOTE 6
Front master cylinder reservoir cap screw	2	4	2 (0.2 , 1.4)	
Rear brake reservoir mounting bolt	1	6	12 (1.2 , 9)	
Pad pin	5	10	18 (1.8 , 13)	
Pad pin plug	1	10	3 (0.3 , 2.2)	
Brake hose oil bolt	5	10	34 (3.5 , 25)	
Front brake lever pivot bolt	1	6	1 (0.1 , 0.7)	
Front brake lever pivot nut	1	6	6 (0.6 , 4.3)	
Front brake light switch screw	1	4	1 (0.1 , 0.7)	
Front master cylinder mounting bolt	2	6	12 (1.2 , 9)	
Front brake caliper assembly bolt	8	8	23 (2.3 , 17)	
Front brake caliper mounting bolt	4	8	30 (3.1 , 22)	
Rear master cylinder joint nut	1	8	18 (1.8 , 13)	
Rear master cylinder mounting bolt	2	6	9 (0.9 , 6.5)	
Rear brake caliper bolt	1	8	23 (2.3 , 17)	
Rear brake caliper pin bolt	1	12	27 (2.8 , 20)	
LIGHTS/METERS/SWITCHES:				
Side stand switch bolt	1	6	10 (1.0 , 7)	NOTE 6
Ignition switch mounting bolt	2	8	25 (2.5 , 18)	
Fan motor switch	1	16	18 (1.8 , 13)	
Fuel reserve sensor	1	18	23 (2.3 , 17)	
OTHERS:				
Side stand pivot bolt	1	10	10 (1.0 , 7)	NOTE 6
Side stand pivot lock nut	1	10	29 (3.0 , 22)	
Side stand bracket bolt	1	10	44 (4.5 , 33)	
Driver footpeg bracket bolt	4	8	26 (2.7 , 20)	

## GENERAL INFORMATION

### TOOLS

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER
Float level gauge	07401-0010000		
Oil pressure gauge	07506-3000000	Equivalent commercially available in U.S.A.	
Oil pressure gauge attachment	07510-MJ10100		
Universal bearing puller	07631-0010000		
Clutch center holder	07724-0050002		
Flywheel holder	07725-0040000	Equivalent commercially available in U.S.A.	
Rotor puller	07733-0020001	Equivalent commercially available in U.S.A.	
Attachment, 32 × 35 mm	07746-0010100	Rotor puller	07933-3950000
Attachment, 37 × 40 mm	07746-0010200		
Attachment, 42 × 47 mm	07746-0010300		
Attachment, 52 × 55 mm	07746-0010400		
Attachment, 22 × 24 mm	07746-0010800		
Inner driver C	07746-0030100		
Attachment, 25 mm I.D.	07746-0030200		
Attachment, 30 mm I.D.	07746-0030300		
Pilot, 17 mm	07746-0040400		
Pilot, 20 mm	07746-0040500		
Pilot, 35 mm	07746-0040800		
Pilot, 28 mm	07746-0041100		
Bearing remover shaft	07746-0050100	Equivalent commercially available in U.S.A.	
Bearing remover head, 20 mm	07746-0050600		
Driver	07749-0010000		
Valve spring compressor	07757-0010000		
Valve seat cutter, 24.5 mm (EX 45°)	07780-0010100	Equivalent commercially available in U.S.A.	
Valve seat cutter, 27.5 mm (IN 45°)	07780-0010200		
Flat cutter, 24 mm (EX 32°)	07780-0012500		
Flat cutter, 27 mm (IN 32°)	07780-0013300		
Interior cutter, 22 mm (EX 60°)	07780-0014202		
Interior cutter, 26 mm (IN 60°)	07780-0014500		
Cutter holder, 4.0 mm	07781-0010500		
Lock nut wrench	07908-4690003	Lock nut wrench	07908-4690002
Snap ring pliers	07914-SA50001		
Steering stem socket	07916-3710101	Steering stem socket	07916-3710100
Attachment, 28 × 30 mm	07946-1870100		
Ball race remover set	07946-KM90001	Not available in U.S.A. (see psge 13-23)	
— Driver attachment A	07946-KM90100		
— Driver attachment B	07946-KM90200		
— Driver shaft assembly	07946-KM90300		
— Bearing remover A	07946-KM90401		
— Bearing remover B	07946-KM90500		
— Assembly base	07946-KM90600		
Steering stem driver	07946-MB00000		



## GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER
Main bearing driver attachment	07946-ME90200		
Driver shaft	07946-MJ00100		
Driver head	07946-MJ00200		
Fork seal driver attachment, 43 mm I.D.	07947-KA40200		
Fork seal driver weight	07947-KA50100		
Driver attachment handle	07949-3710001		
Valve spring compressor attachment	07959-KM30101		
Oil seal driver	07965-MA60000		
Oil filter wrench	07HAA-PJ70100		
Peak voltage adaptor	07HGG-0020100	Peak voltage tester	(U.S.A. only)
Needle bearing remover	07HMC-MR70100		
Tappet hole protector	07HMG-MR70002		
Drive chain tool set	07HMH-MR10103	Drive chain tool set	07HMH-MR1010B (U.S.A. only)
Valve guide driver	07JMD-KY20100		
Pilot screw wrench	07KMA-MN90100	Pilot screw wrench	07KMA-MS60101
Bearing remover set	07LMC-KV30100		
Valve guide reamer, 4.008 mm	07MMH-MV90100		
Compression gauge attachment	07RMJ-MY50100		
Lock nut wrench	07VMA-MBB0100		
Installer shaft	07VMF-KZ30200		
Installer attachment A	07VMF-MAT0100		
Installer attachment B	07VMF-MAT0200		
Remover attachment A	07VMF-MAT0300		
Remover attachment B	07VMF-MAT0400		

## LUBRICATION & SEAL POINTS

**1-16**

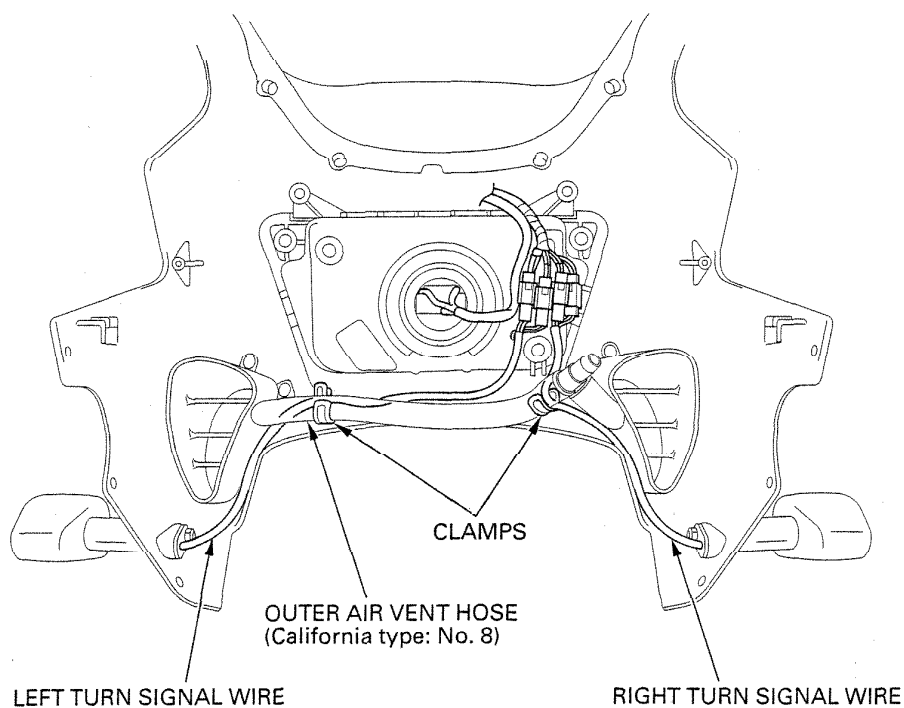
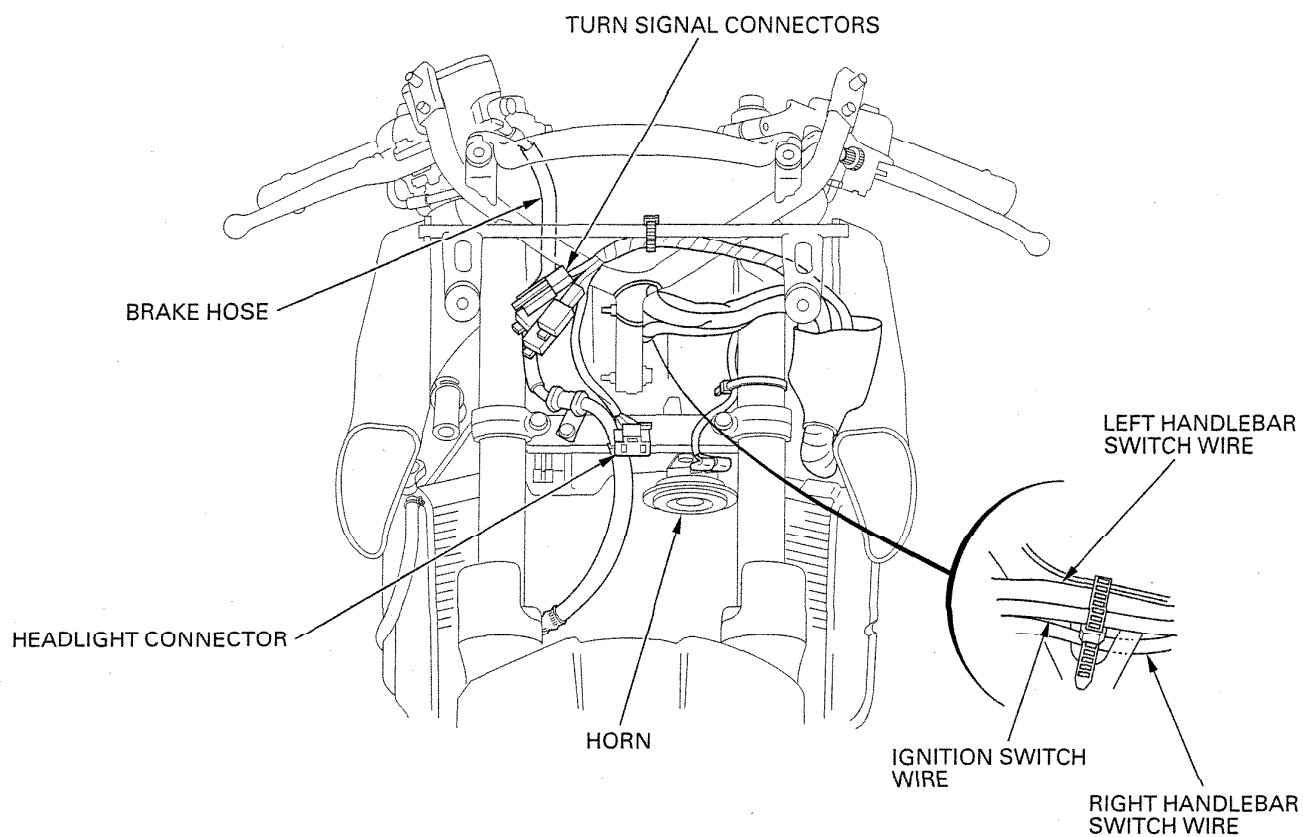
## GENERAL INFORMATION

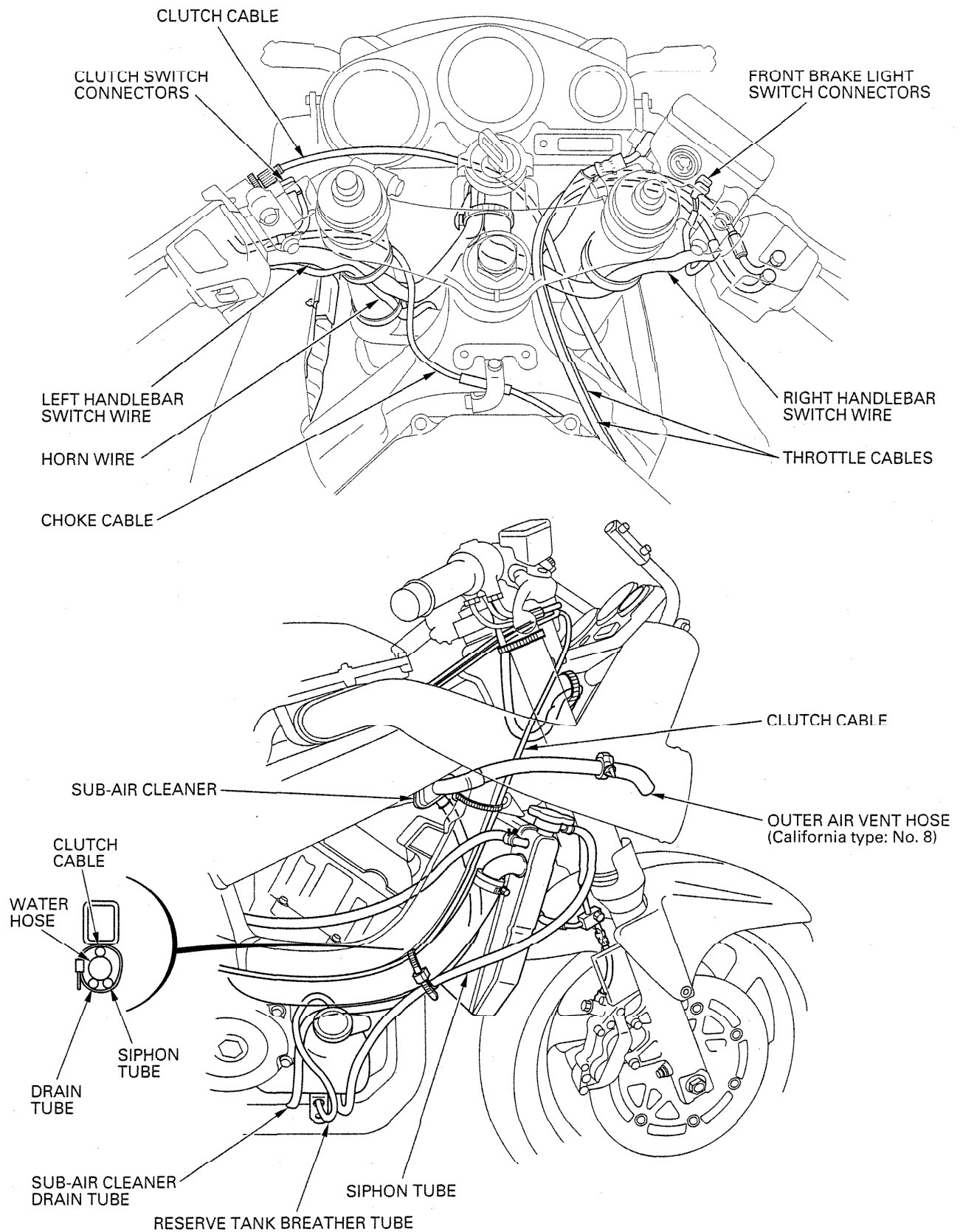
### FRAME

LOCATION	MATERIAL	REMARKS
Seat catch hook sliding area Front wheel dust seal lips Steering head bearings Steering head bearing 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 surfaces Shock absorber needle bearings Shock absorber dust seal lips Shock link and shock arm (swingarm) needle bearings Shock link and shock arm (swingarm) dust seal lips Swingarm pivot bearings Swingarm pivot dust seal lips Throttle grip pipe flange Clutch lever pivot Rear brake pedal pivot Gearshift pedal link tie-rod ball joints Gearshift pedal pivot Driver footpeg sliding area Passenger footpeg sliding area Side stand pivot	Multi-purpose grease	
Throttle cable outer inside Clutch cable outer inside Choke cable outer inside	Cable lubricant	
Handlebar grip rubber inside	Honda bond A or equivalent	
Steering bearing adjustment nut threads	Engine oil	
Front brake lever-to-master piston contacting area Front brake lever pivot Rear brake master piston-to-push rod contacting area and push rod boot groove Rear brake caliper boot inside (collar outer surface) Rear brake caliper pin bolt boot inside	Silicon grease	
Brake master piston and cups Brake caliper piston and piston seals	DOT 4 brake fluid	
Fork dust seal and oil seal lips	Fork fluid	
Rear brake reservoir hose joint screw threads Front brake caliper assembly bolt threads Rear brake caliper pin bolt threads	Locking agent	

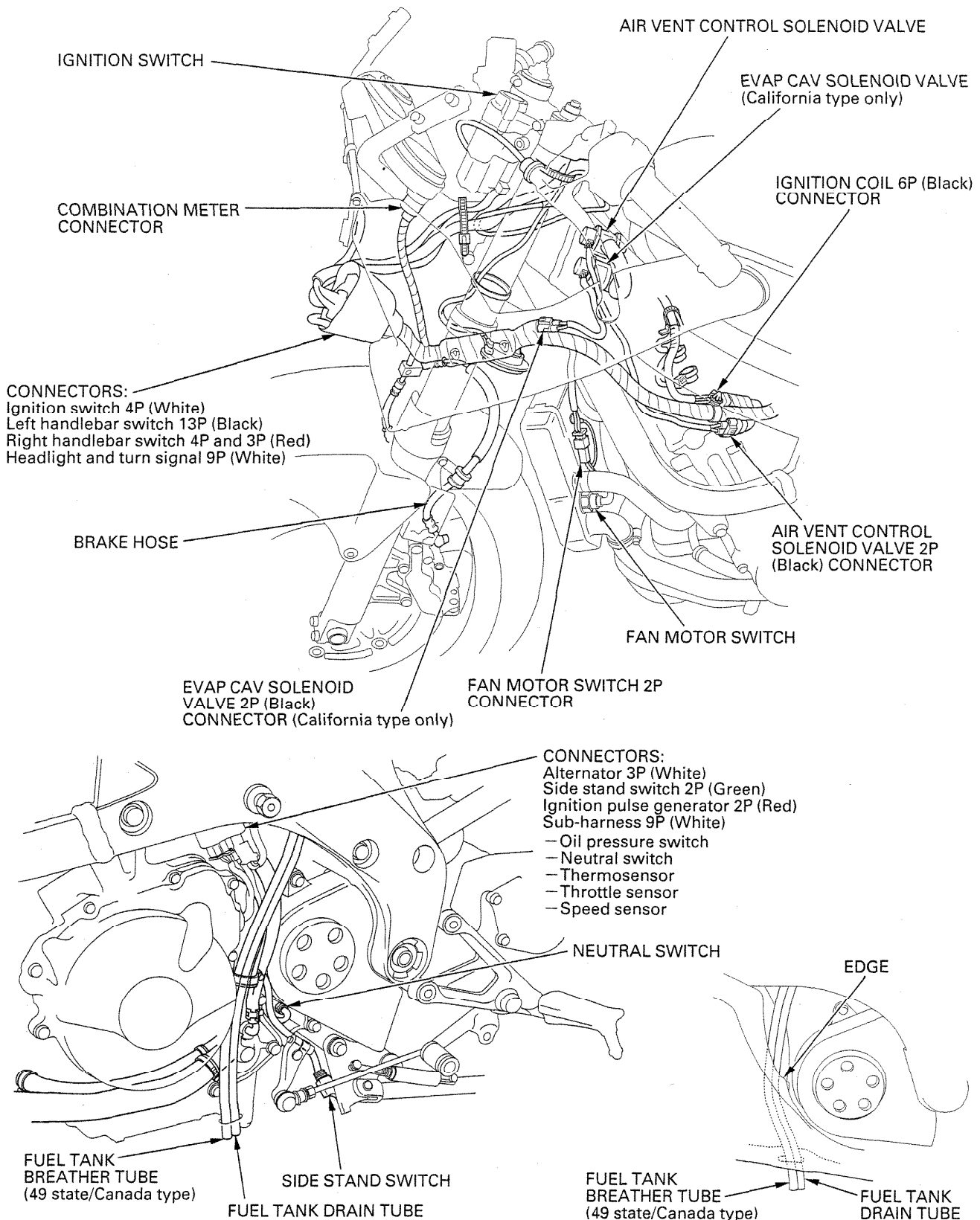
## GENERAL INFORMATION

### CABLE & HARNESS ROUTING

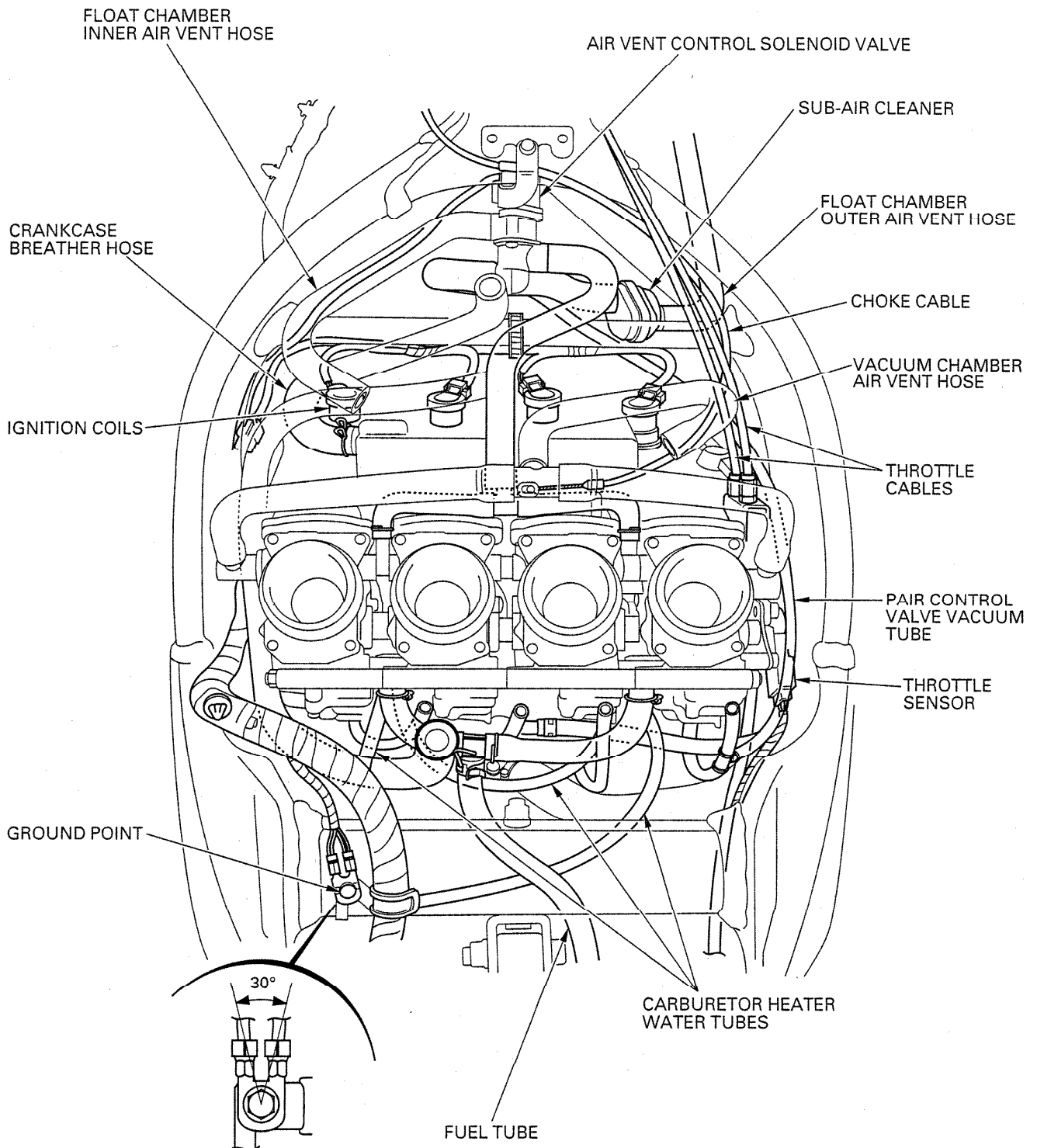




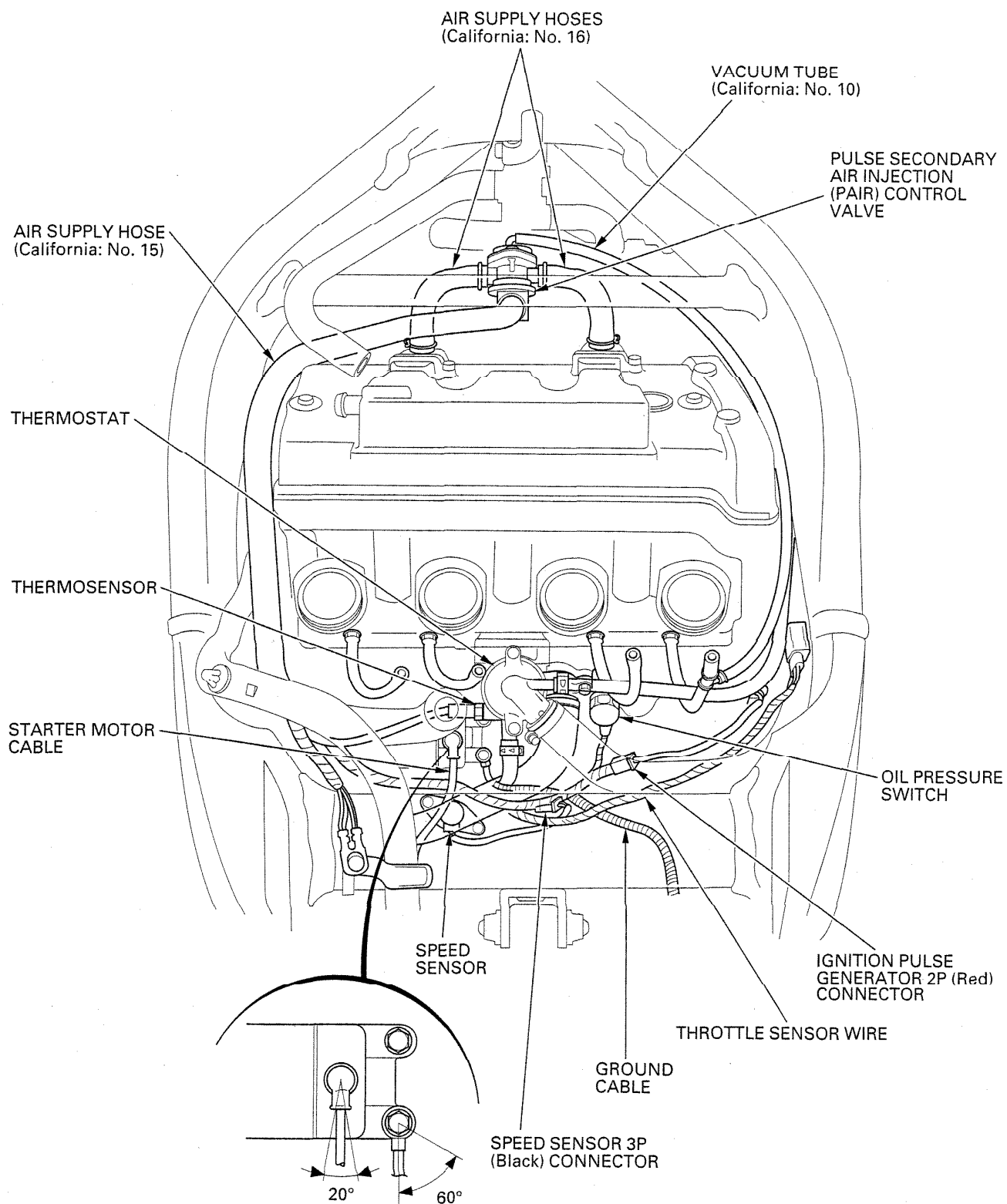
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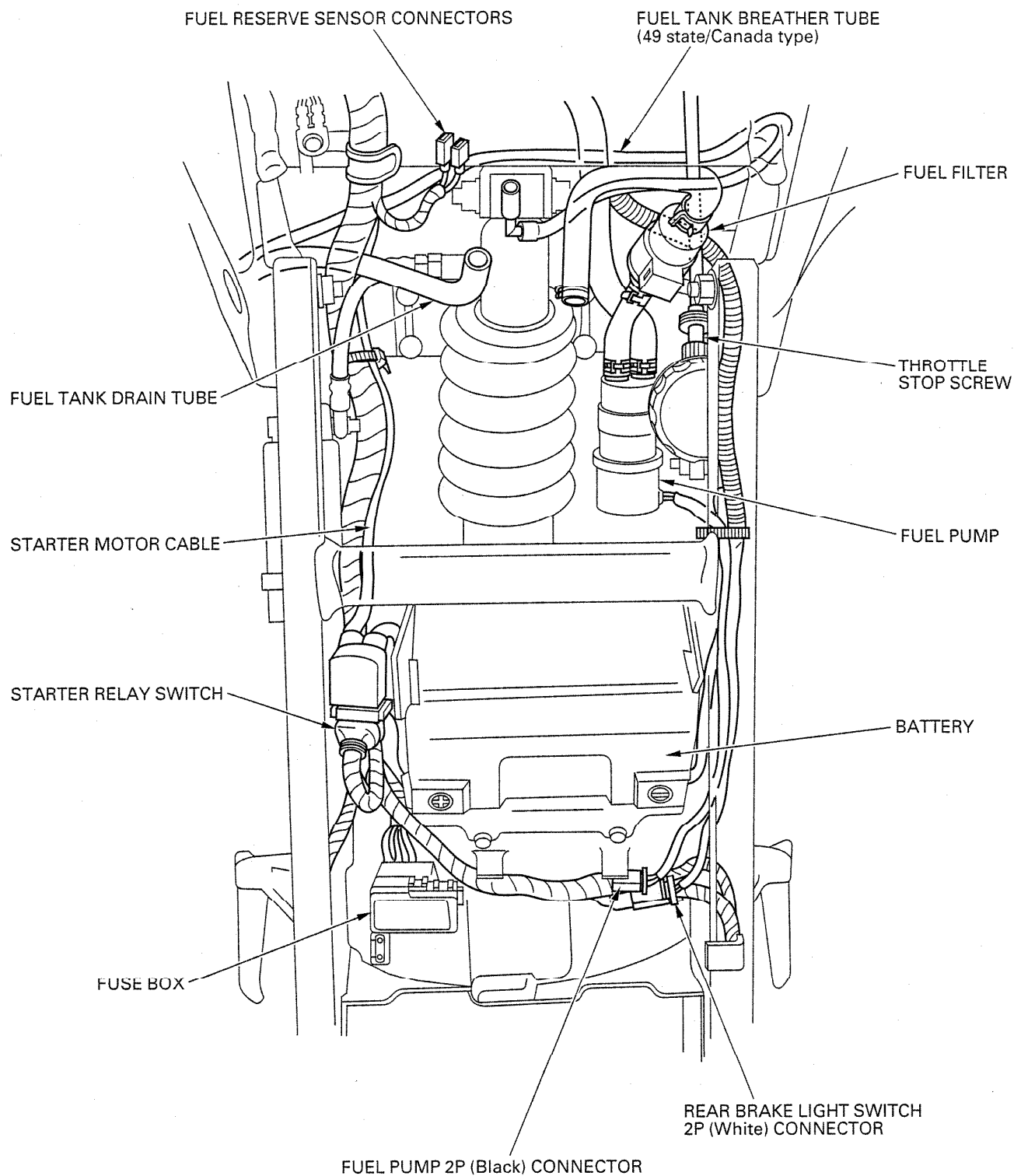
49 state/Canada type shown:



## GENERAL INFORMATION

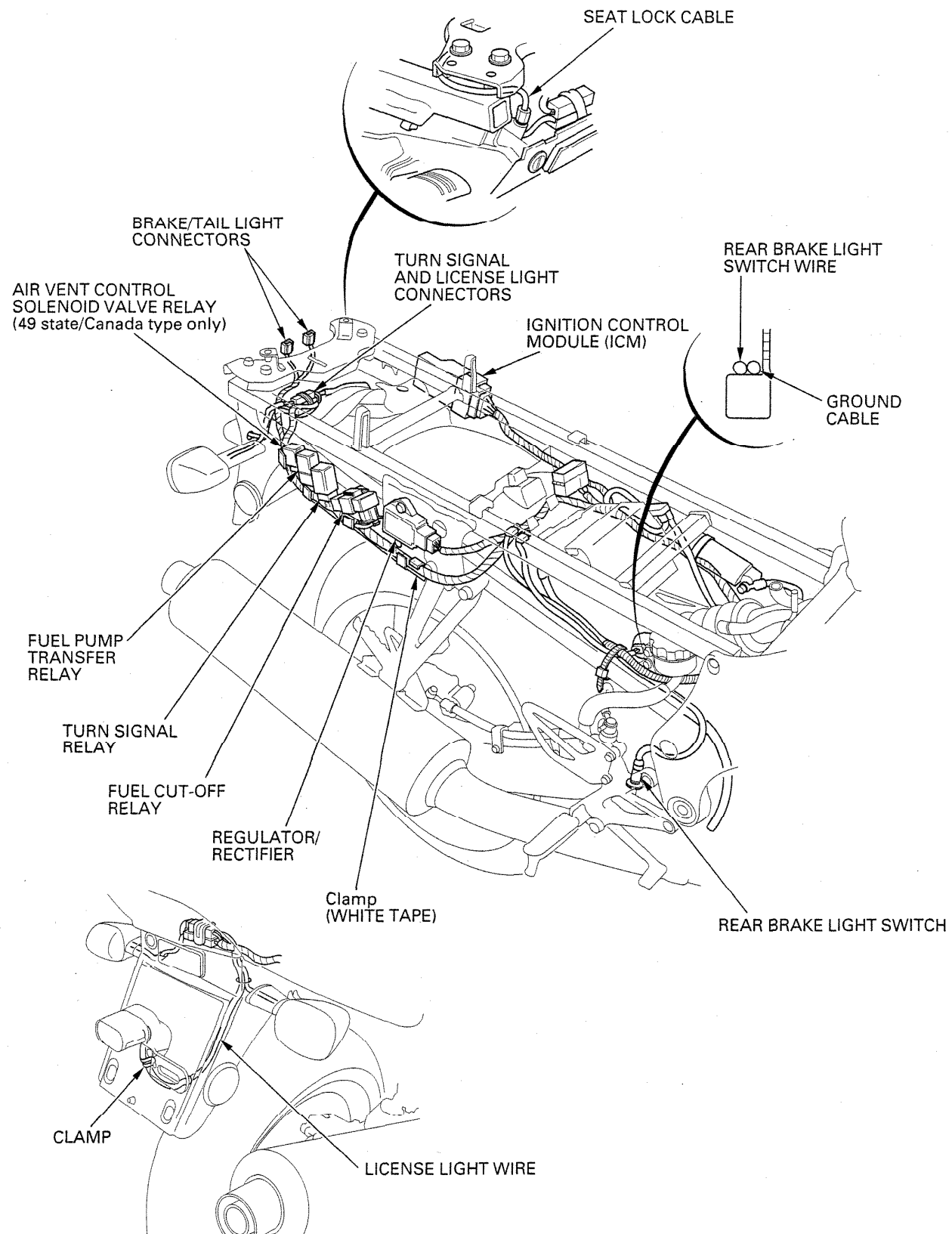




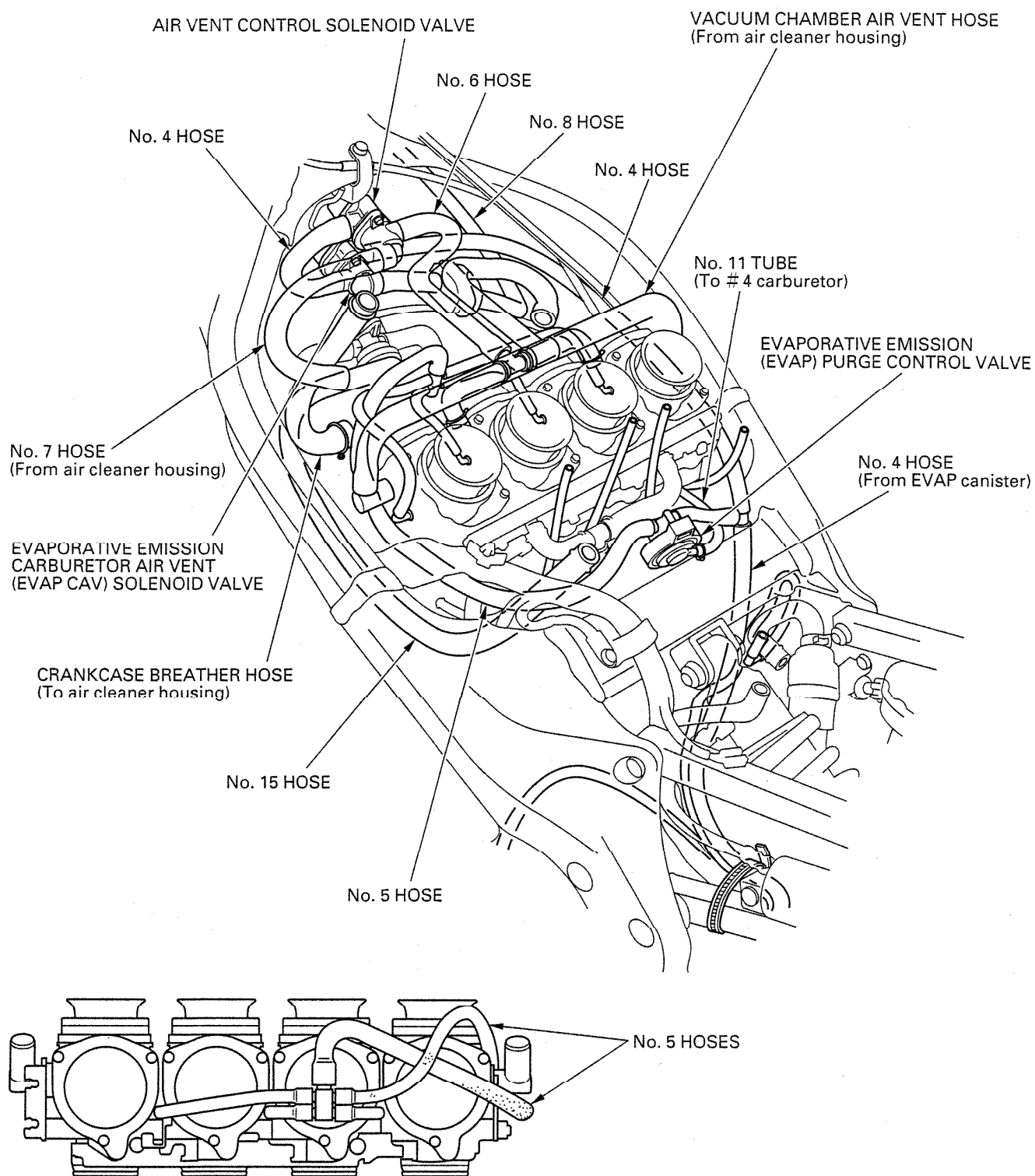


## GENERAL INFORMATION

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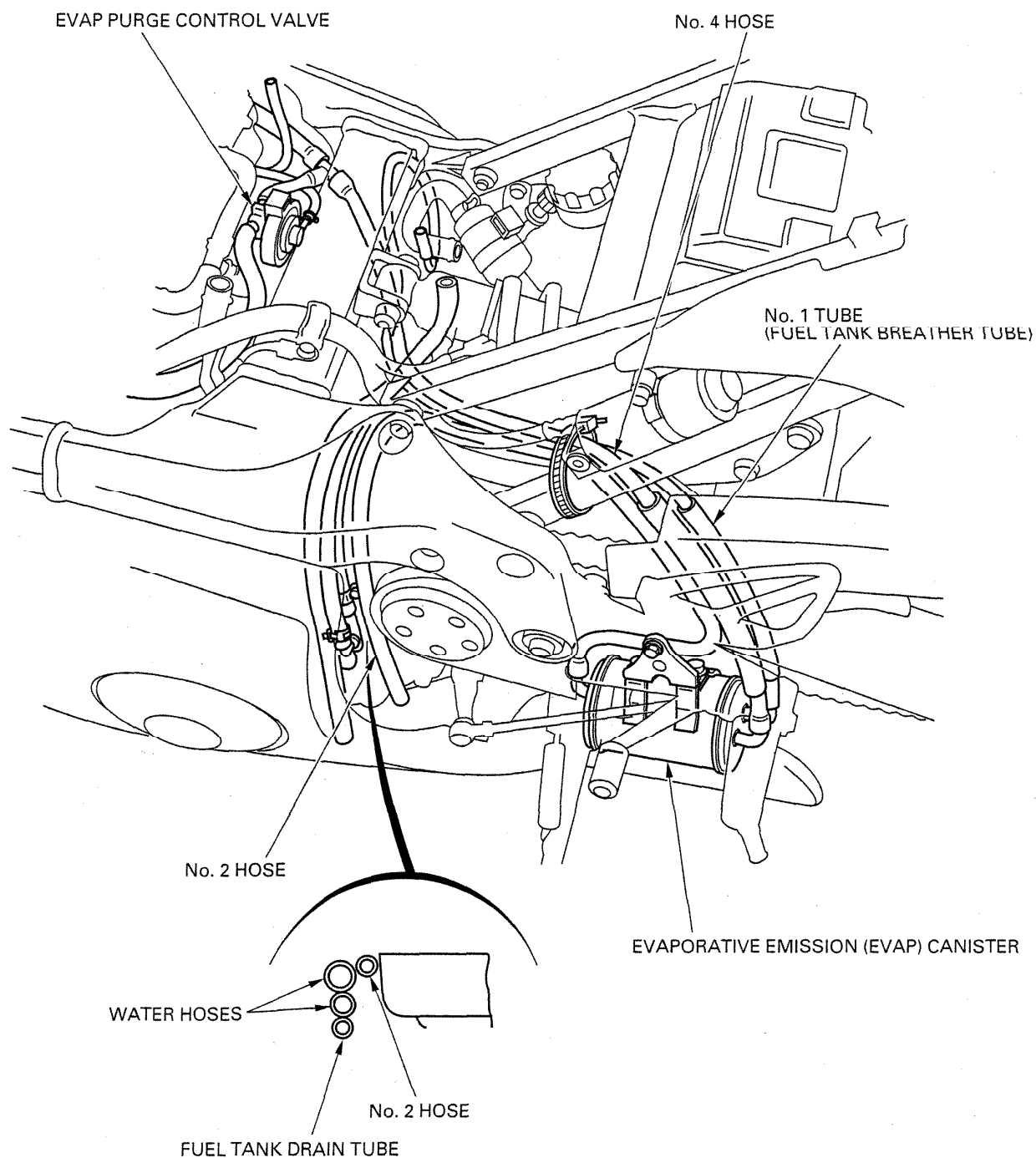
California type only:

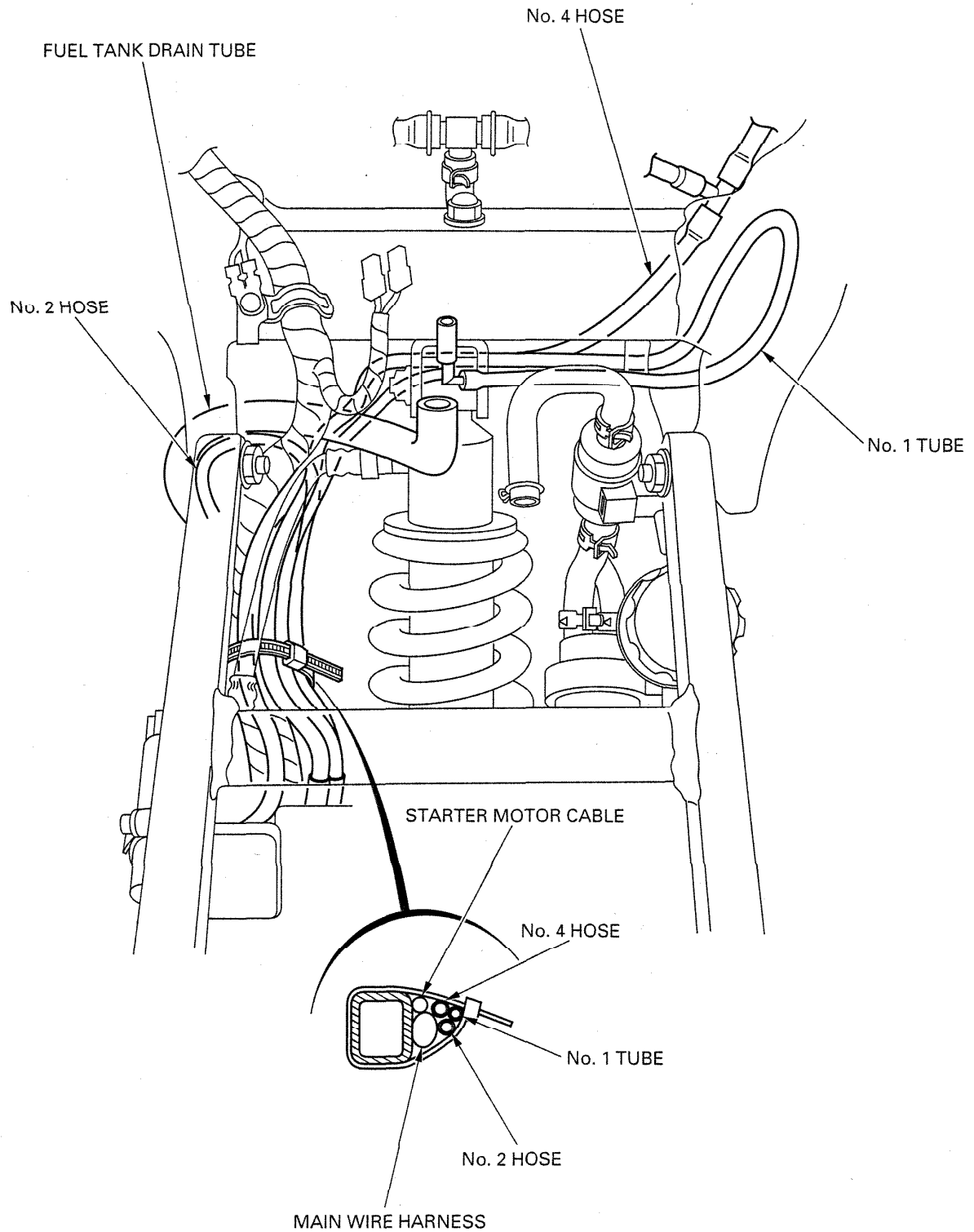


## GENERAL INFORMATION

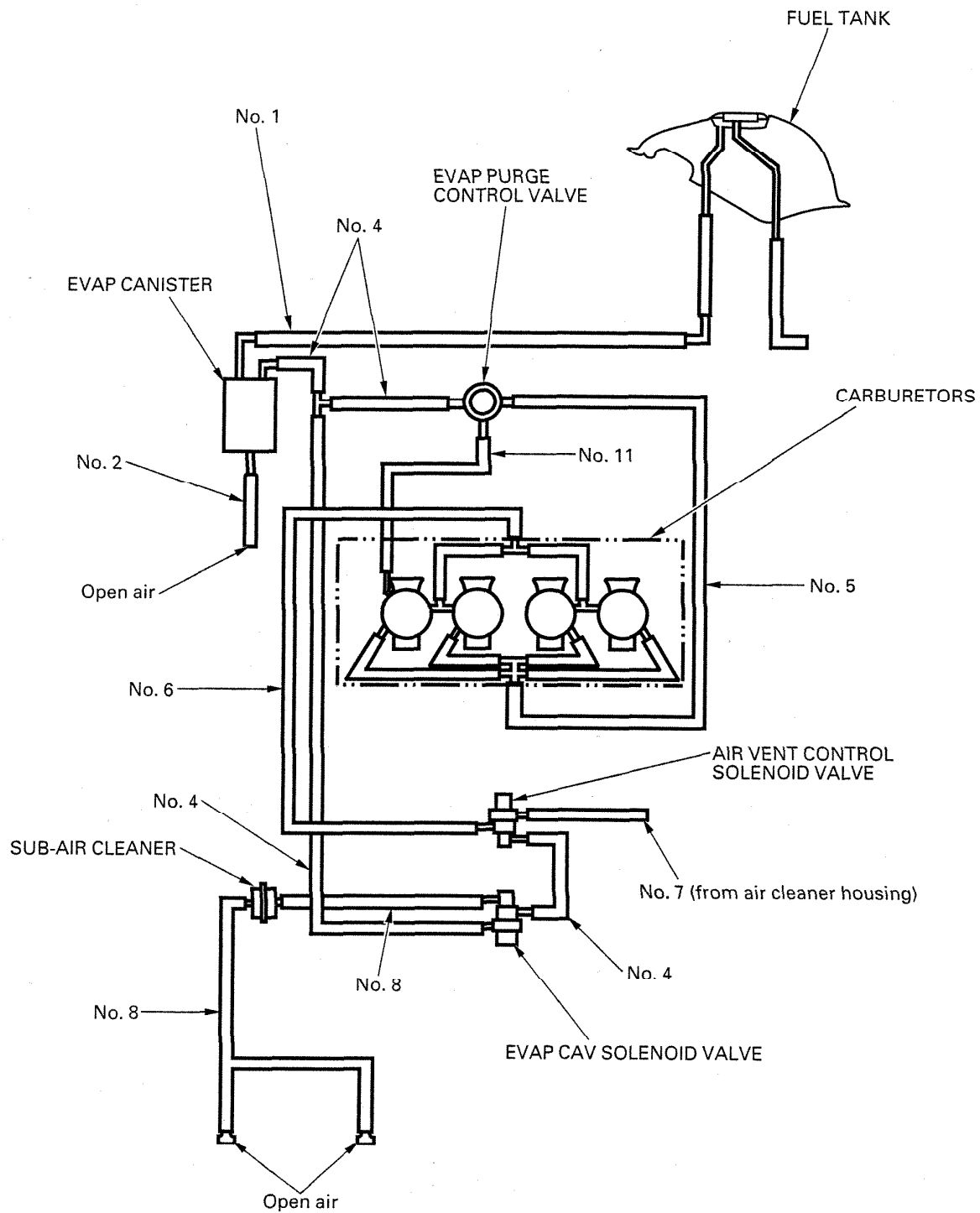
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California type only:





## GENERAL INFORMATION



## **EMISSION CONTROL SYSTEMS**

The U.S. Environmental Protection Agency, Transport Canada and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

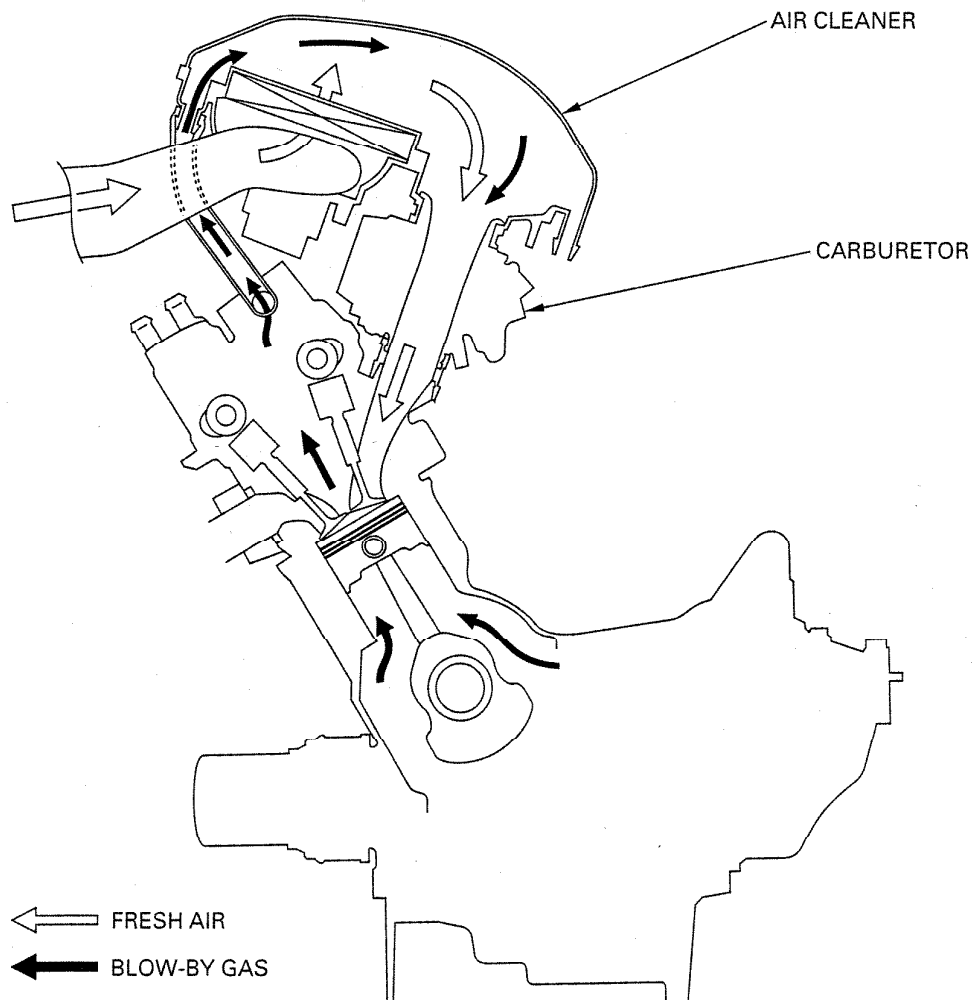
### **SOURCE OF EMISSIONS**

The combustion process produces carbon monoxide and hydrocarbons. Controlling hydrocarbon emissions is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

### **CRANKCASE EMISSION CONTROL SYSTEM**

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and carburetor.



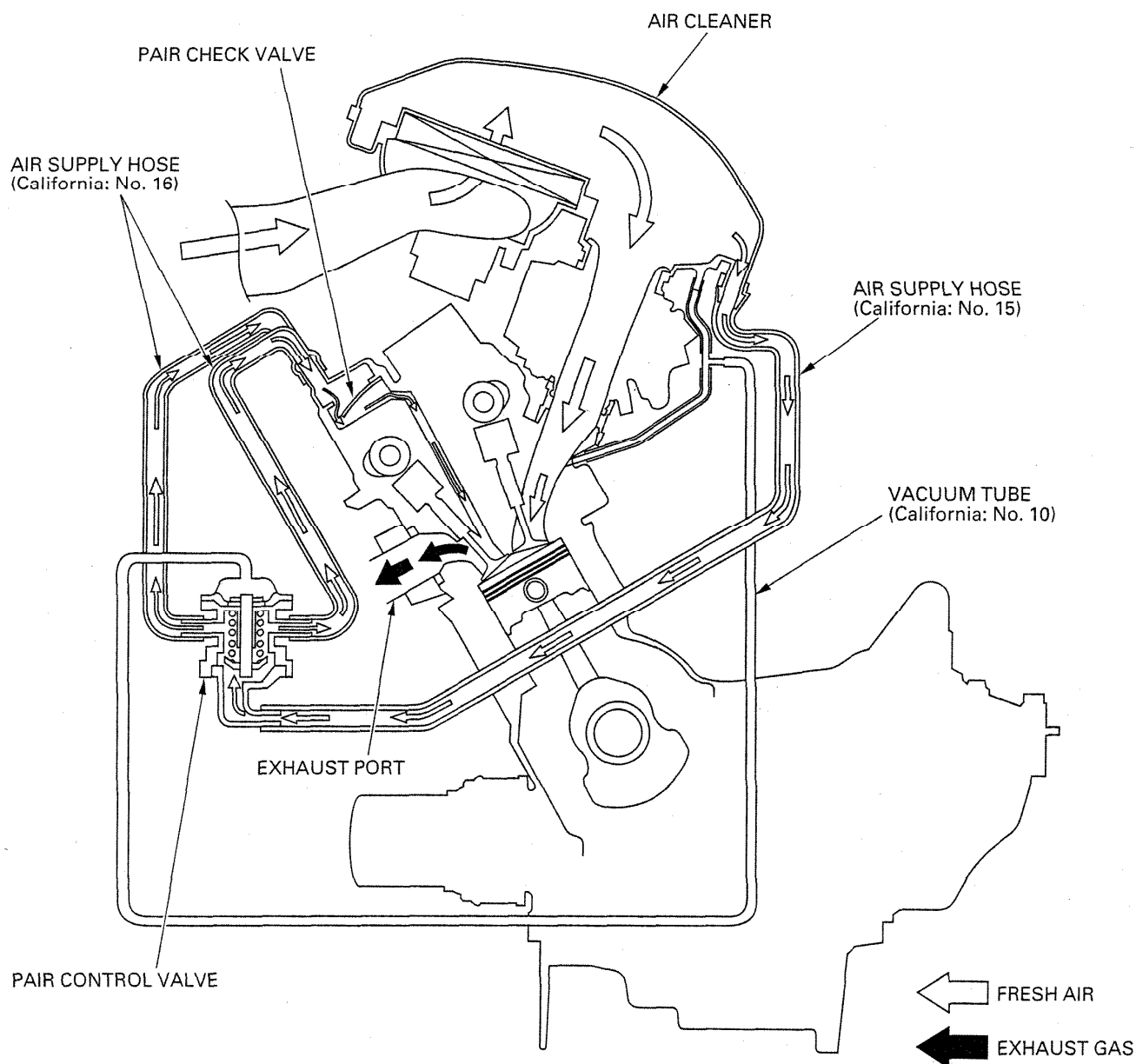
## GENERAL INFORMATION

### EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port whenever there is a negative pressure pulse in the exhaust system. This charge of fresh air promotes burning of the unburned exhaust gases and charges a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

This model has the pulse secondary air injection (PAIR) control valve and PAIR check valves. PAIR check valve prevents reverse air flow through the system. The PAIR control valve reacts to high intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

No adjustment to the pulse secondary air injection system should be made, although periodic inspection of the components is recommended.

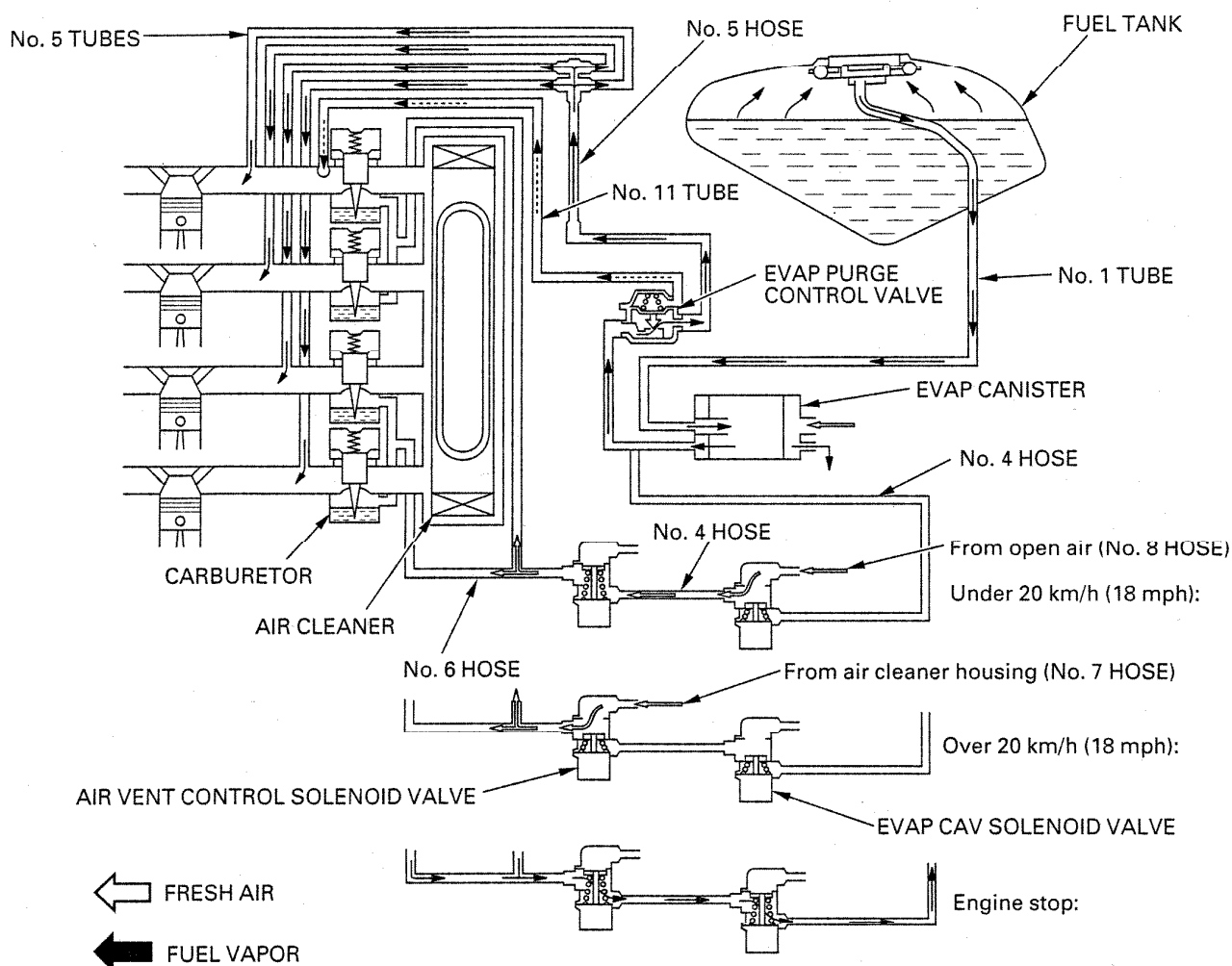




## EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

This model complies with California Air Resources Board evaporative emission requirements.

Fuel vapor from the fuel tank and carburetors is routed into the evaporative emission (EVAP) canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the EVAP purge control valve is open, fuel vapor in the EVAP canister is drawn into the engine through the carburetor. At the same time, the EVAP carburetor air vent (CAV) solenoid valve is open and air is drawn into the carburetor through the valve.



## NOISE EMISSION CONTROL SYSTEM

**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of or puncturing of the muffler, baffles, header pipes or any other component which conduct exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

## GENERAL INFORMATION

### EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the rear fender under the seat as shown. It gives basic tune-up specifications.

#### VEHICLE EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment (page 5-34), attach an update label on the rear fender under the seat as shown.

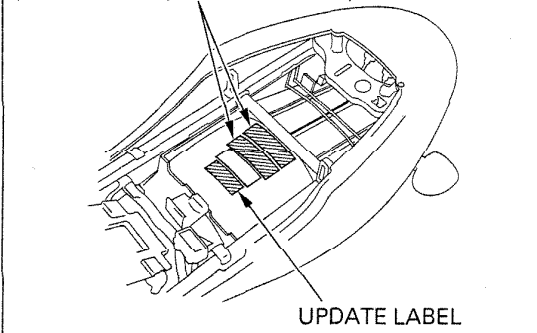
Instructions for obtaining the update label are given in Service Letter No. 132.

When readjusting the carburetors back to the low altitude specifications, be sure to remove this update label.

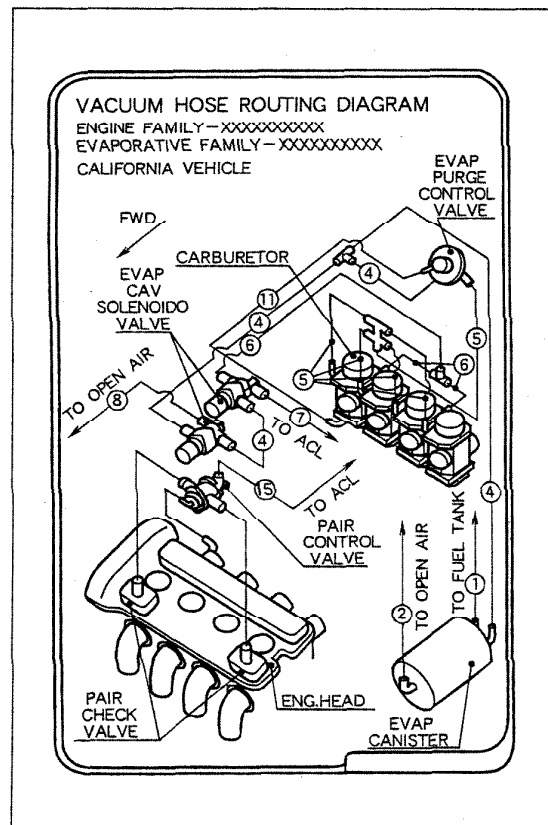
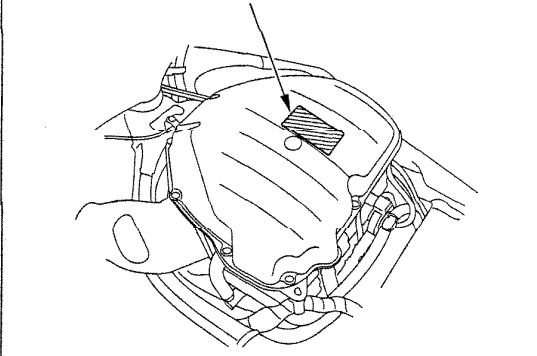
#### VACUUM HOSE ROUTING DIAGRAM LABEL (California type only)

The Vacuum Hose Routing Diagram Label is located on the air cleaner housing cover as shown. The fuel tank must be removed to read it.

EMISSION CONTROL INFORMATION LABEL  
(U.S.A.: 1 label/Canada: 2 labels)



VACUUM HOSE ROUTING DIAGRAM LABEL



## 2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	FRONT INNER FAIRING	2-4
TROUBLESHOOTING	2-1	FRONT FAIRING	2-5
SEAT	2-2	WINDSHIELD	2-6
SEAT COWL	2-2	DIRECT AIR INTAKE DUCT	2-6
FUEL TANK	2-3	EXHAUST SYSTEM	2-7
SIDE FAIRING	2-4	REAR FENDER/SEAT RAIL	2-8

2

### SERVICE INFORMATION

#### GENERAL

##### ▲WARNING

- *Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*
- *Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.*

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- This section covers removal and installation of the body panels, fuel tank and exhaust system.
- Always replace the exhaust pipe gasket when removing the exhaust pipe from the engine.
- Always inspect the exhaust system for leaks after installation.

#### TORQUE VALUES

Exhaust pipe joint nut	12 N·m (1.2 kgf·m , 9 lbf·ft)
Muffler band bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)
Seat cowl screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)
Front inner fairing screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)
Front fairing-to-side fairing bolt	2 N·m (0.2 kgf·m , 1.4 lbf·ft)
Passenger footpeg bracket bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)
Seat rail mounting bolt	49 N·m (5.0 kgf·m , 36 lbf·ft)

### TROUBLESHOOTING

#### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

#### Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

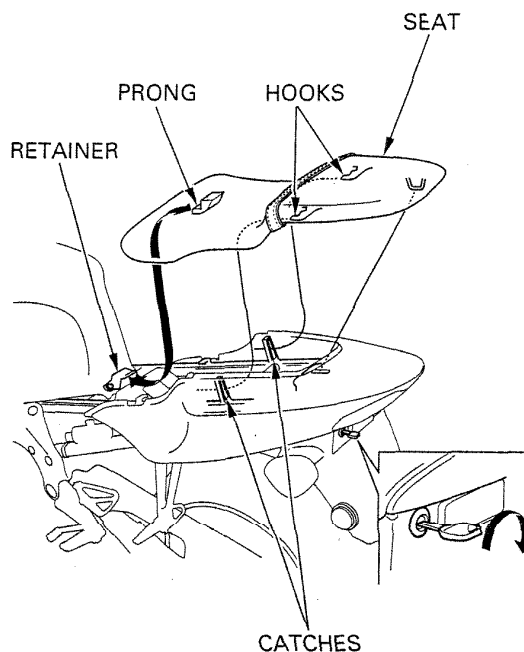
### SEAT

#### REMOVAL

Unlock the seat with the ignition key.  
Pull the seat back and remove it.

#### INSTALLATION

Install the seat by inserting the prong into the retainer on the fuel tank and the hooks into the catches on the frame.  
Push the seat forward, then down to lock it.



### SEAT COWL

Remove the seat.

Remove the two socket bolts.  
Remove the two screws.  
Remove the two trim clips.  
Disconnect the taillight connectors.

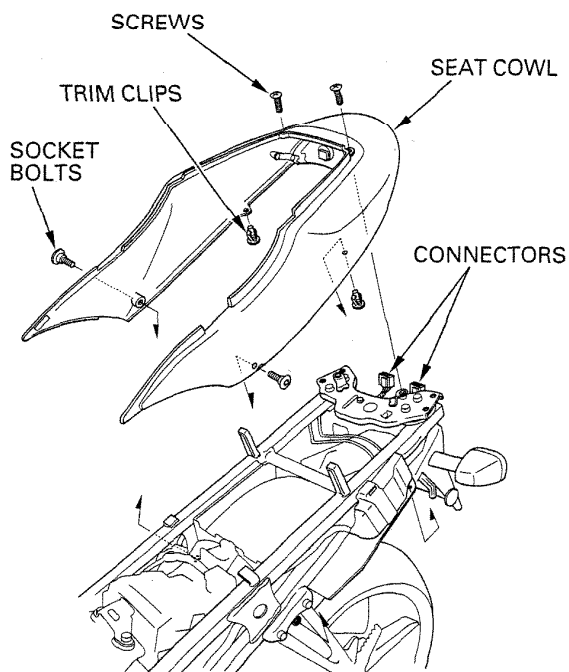
Pull the seat cowl back out of the frame while opening the front portion of it.

Installation is in the reverse order of removal.

#### NOTE:

Make sure that the mating surfaces of the cowl bottom are seated onto the rear fender properly before tightening the fasteners.

**TORQUE: Screw:** 2 N·m (0.2 kgf·m , 1.4 lbf·ft)



## FUEL TANK

### ⚠WARNING

*Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*

Remove the seat (page 2-2).

Remove the duct cover socket bolts.

Remove the air duct covers by releasing the cover tab from the instrument panel and the side fairing boss from the cover grommet.

Remove the two 6 mm tank mounting bolts and washers.

Remove the two collars from the mounting rubbers.

*Do not raise more than necessary to avoid damaging the mounting rubbers and tank.*

Raise the front portion of the fuel tank and support it with the eyelet wrench in the tool kit by setting it between the end of the shock absorber and the recess of the tank bottom properly as shown.

Turn the fuel valve OFF and disconnect the following.

- fuel tube
- drain tube
- breather tube (California: No. 1 tube)
- fuel level sensor connectors.

Remove the eyelet wrench and rest the fuel tank on the frame.

Remove the two 8 mm mounting bolts and seat retainer.

Remove the fuel tank.

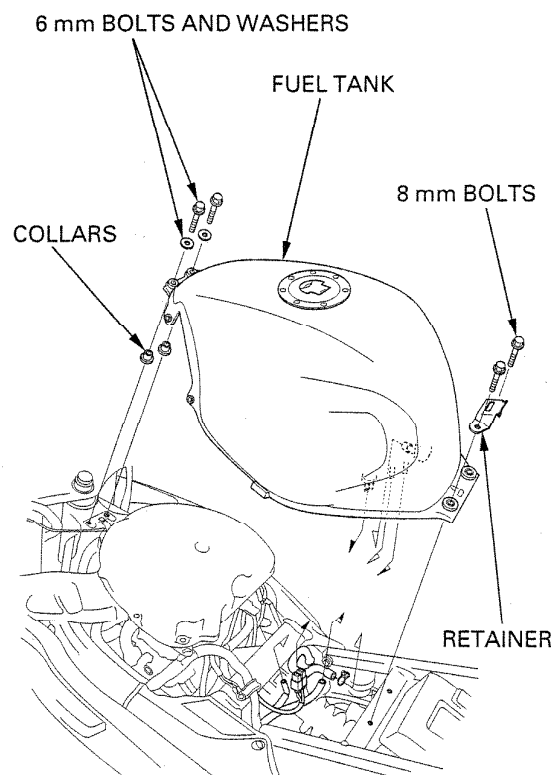
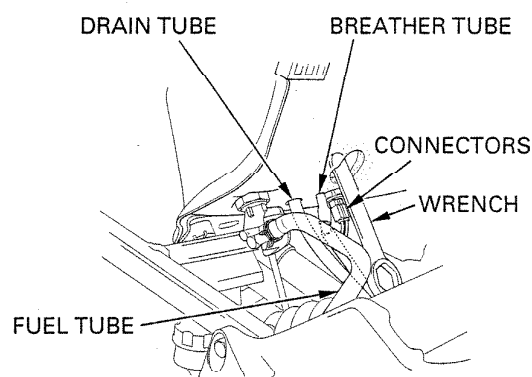
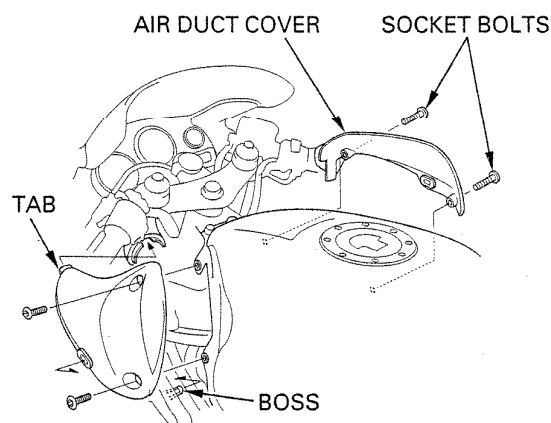
Install the removed parts in the reverse order of removal.

### NOTE:

- When tightening the tank mounting fasteners, loosely install all mounting bolts and tighten the 6 mm bolts first, then the 8 mm bolts securely.
- Be careful not to dislodge the rubber nuts in the fuel tank when tightening the duct cover bolts.

### TORQUE :

Duct cover bolt: 2 N·m (0.2 kgf·m , 1.4 lbf·ft)



### SIDE FAIRING

Remove the following:

- three trim clips
- two screws
- six socket bolts.

Release the boss from the duct cover grommet and remove the side cowl.

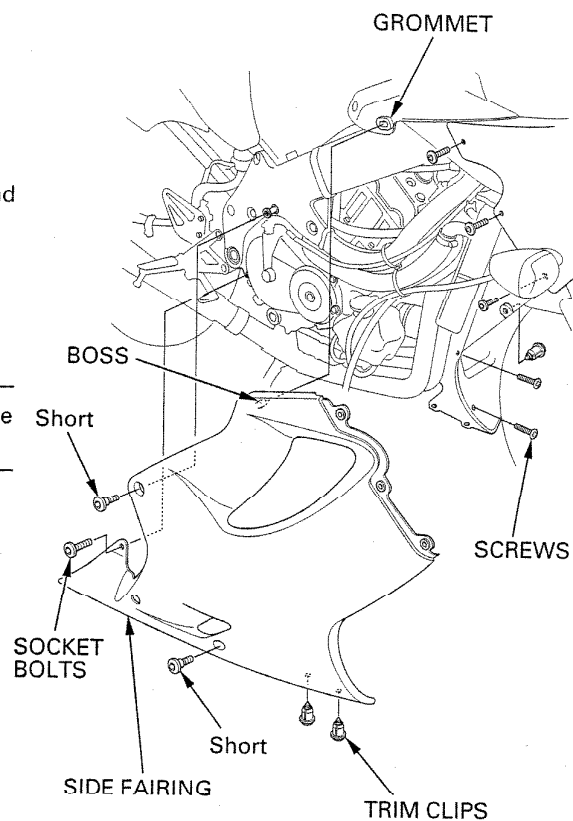
*Left side fairing only:* Remove the fuel tank drain and breather tubes.

Installation is in the reverse order of removal.

#### NOTE:

Be careful not to dislodge the rubber nuts in the side fairing when tightening the front side bolts.

**TORQUE: Socket bolt (Three bolts on front side):**  
2 N·m (0.2 kgf·m, 1.4 lbf·ft)



### FRONT INNER FAIRING

Remove the following:

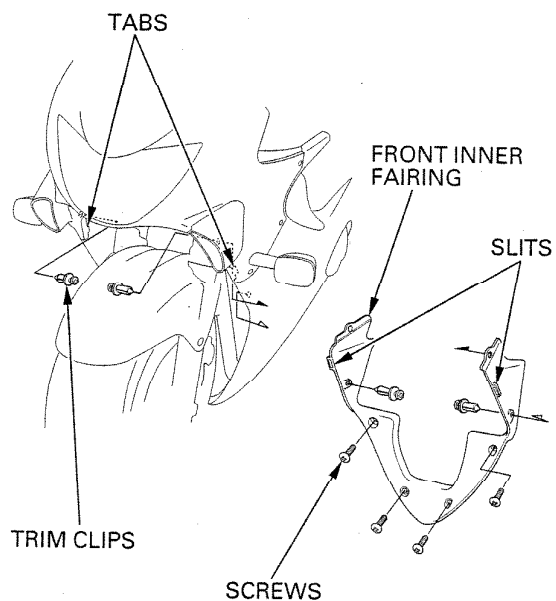
- four trim clips
- four screws
- inner fairing by releasing front fairing tabs from inner fairing slits.

Installation is in the reverse order of removal.

#### NOTE:

Make sure that the mating areas are aligned properly before tightening the fasteners.

**TORQUE: Screw:** 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



## FRONT FAIRING

Remove the socket bolts and the rearview mirrors.

Remove the trim clip from the instrument panel.  
Remove the six screws and two nuts.  
Remove the instrument panels.

Release the air vent hose (California: No. 8) from the hose clip and disconnect it from the 3-way hose joint.

*Be careful not to scratch the front fairing and fender.*

Remove the two trim clips and six socket bolts.  
Remove the front fairing off the rearview mirror bolt hole studs and rest it on the front fender.  
Disconnect the headlight and turn signal connectors.

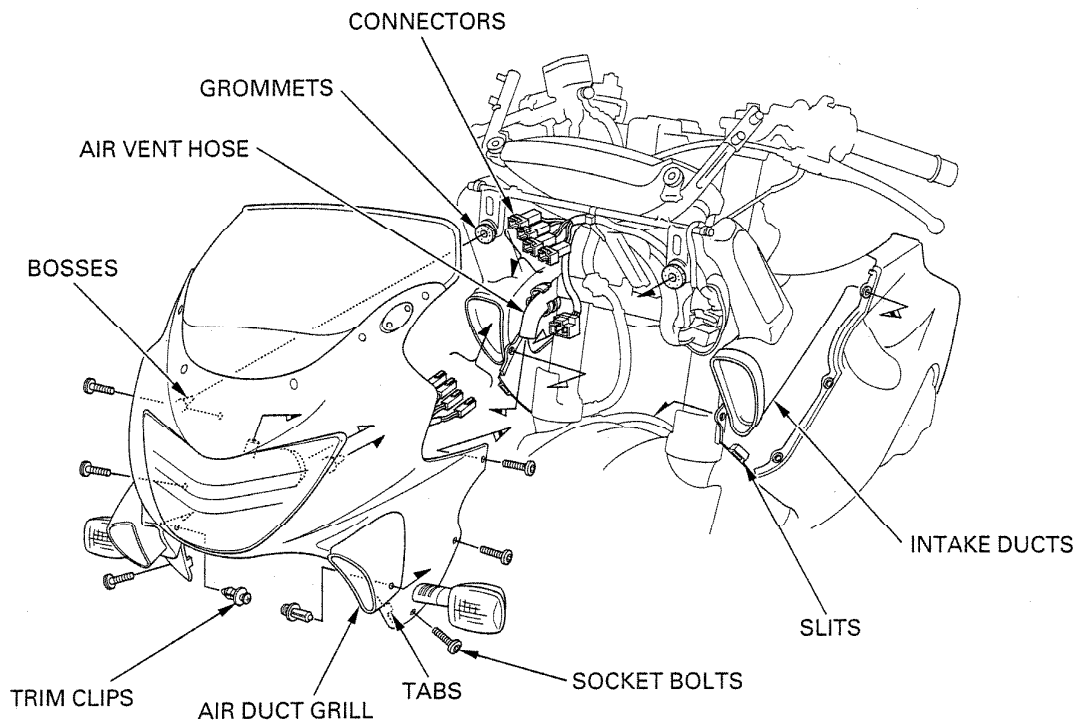
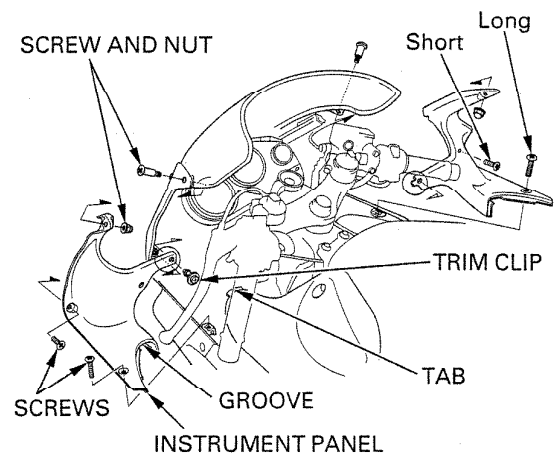
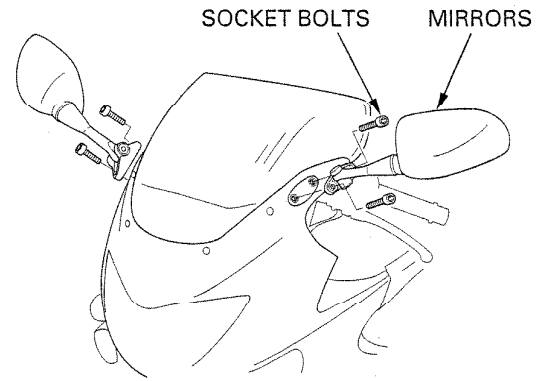
Installation is in the reverse order of removal.

### NOTE:

- Install the front fairing air duct grill over the air intake ducts and the bosses into the fairing stay grommets and align the front fairing tabs with the inner fairing slits.
- When tightening the fairing socket bolts, be careful not to dislodge the rubber nuts in the side fairing.
- When installing the instrument panel, align the groove with the tab of the duct cover.

### TORQUE :

Fairing socket bolt: 2 N·m (0.2 kgf·m , 1.4 lbf·ft)



## FRAME/BODY PANELS/EXHAUST SYSTEM

### WINDSHIELD

Remove the rearview mirrors (page 2-5).

Remove the following:

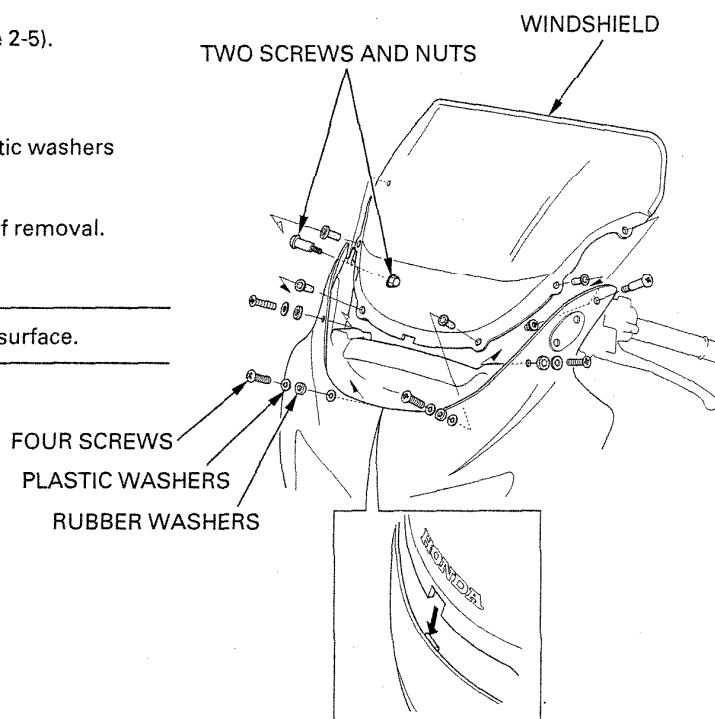
- two screws and nuts
- four screws with rubber and plastic washers
- windshield

*Align the groove in the windshield with the lug on the front fairing.*

Installation is in the reverse order of removal.

**NOTE:**

Be careful not to scratch the shield surface.



### DIRECT AIR INTAKE DUCT

Remove the duct cover (page 2-3).

Remove the instrument panel (page 2-5).

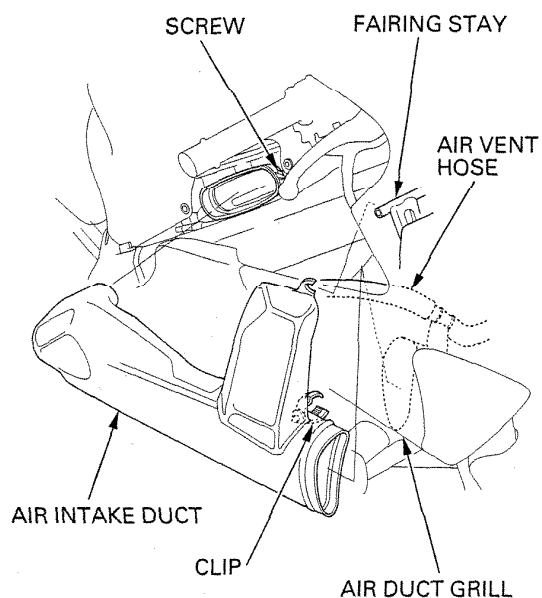
Loosen the connecting tube band screw.

*Right duct:* Remove the outer air vent hose (California: No. 8) from the duct by releasing the hose clip.

*Left duct:* Remove the wire harness from the duct.

Remove the air intake duct from the air duct grill of the front fairing and the front fairing stay.

Installation is in the reverse order of removal.





## EXHAUST SYSTEM

### ▲WARNING

*Do not service the exhaust system while it is hot.*

### CAUTION:

*Be careful not to damage the radiator fins.*

## REMOVAL

### MUFFLER

Loosen the muffler band bolts.  
Remove the mounting bolt, washer and nut.  
Remove the muffler from the exhaust pipe.  
Remove the muffler gasket.

### EXHAUST PIPE

Remove the radiator from the frame without disconnecting the water hoses (as described in spark plug removal procedure, page 3-6).  
Remove the radiator air guide rubber from the cylinder head.

Remove the exhaust pipe joint nuts.  
Remove the mounting bolt, washer and nut, and the exhaust pipe.  
Remove the exhaust pipe joint gaskets.

## INSTALLATION

### EXHAUST PIPE

If the joint stud bolts are loose, tighten them. Be sure to verify the distance from top of stud to the cylinder head surface as shown.

Install new joint gaskets into the exhaust ports.  
Set the exhaust pipe onto the engine by aligning the exhaust flanges with the cylinder head studs, then install the joint nuts and the mounting bolt/washer and nut.  
Tighten the joint nuts.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

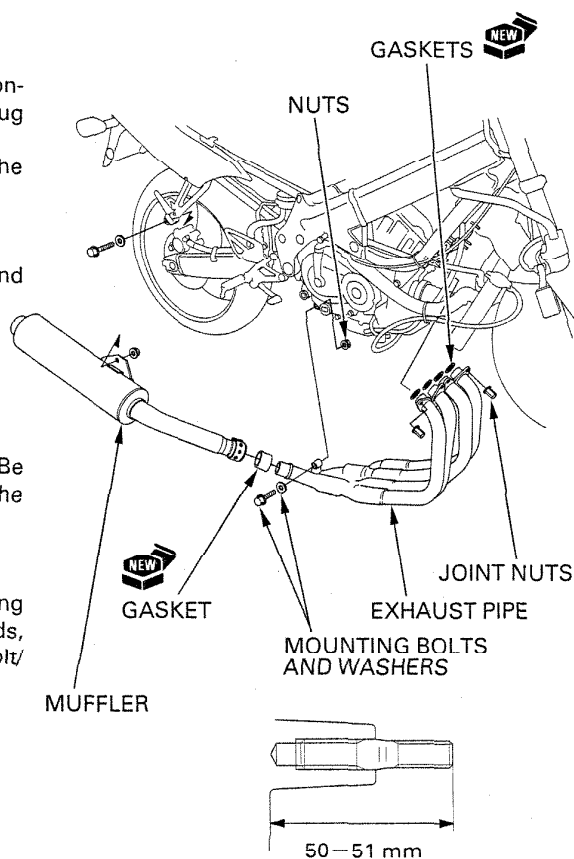
Tighten the mounting bolt.

### MUFFLER

Install a new muffler gasket and the muffler over the exhaust pipe.  
Install the mounting bolt/washer and nut, and tighten it.  
Tighten the muffler band bolts.

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

Install the air guide rubber into the cylinder head and the radiator onto the frame if the exhaust pipe is removed (page 3-6).  
Install the side fairing and front inner fairing (page 2-4).



### REAR FENDER/SEAT RAIL

#### REMOVAL

Remove the seat cowl (page 2-2).

Remove the battery (page 16-4).

Disconnect the following:

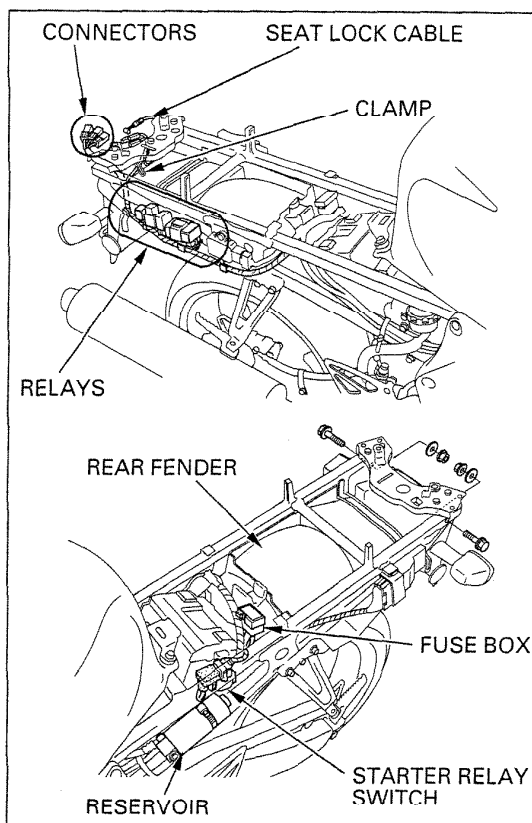
- turn signal and license light connectors (release the clamp).
- seat lock cable from seat catch on cross member

Remove the following:

- fuel cut-off relay
- turn signal relay
- fuel pump transfer relay
- air vent control solenoid valve relay (49 state/Canada only)
- fuse box by releasing the tab on reverse side of fender
- rear shock absorber reservoir by loosening band screw
- starter relay switch

Remove the fender mounting nuts, washers and bolts.

Slide the rear fender rearward, then remove the mounting collars (between the seat rail and fender) and remove the fender from the seat rail.



Remove the fuel tank (page 2-3).

Remove the following:

- wire harness bands
- ignition control module (ICM)
- bolts and regulator/rectifier
- bolts, collars and fuel pump

Secure the reservoir so that it remains upright.

Remove the nuts, bolts, washer and the passenger footpeg brackets.

Remove the four mounting nuts, bolts and seat rail.

#### INSTALLATION

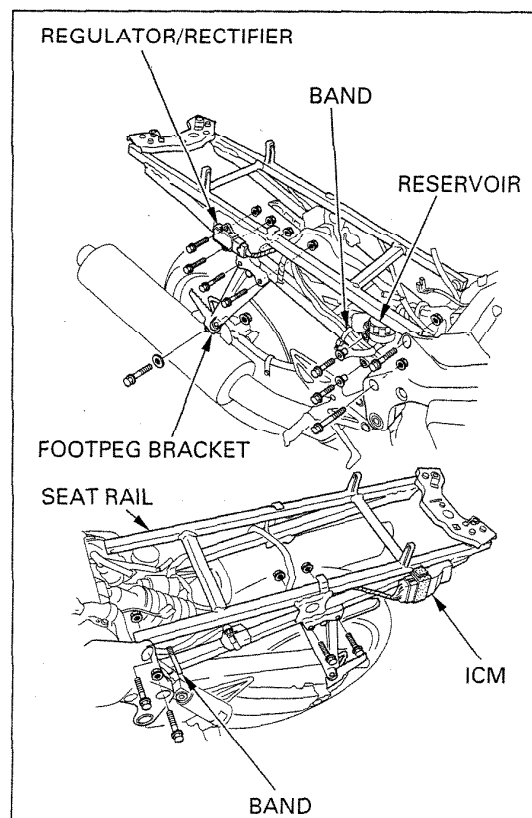
Installation is in the reverse order of removal.

#### TORQUE:

**Seat rail mounting:** 49 N·m (5.0 kgf·m, 36 lbf·ft)

**Footpeg bracket:** 26 N·m (2.7 kgf·m, 20 lbf·ft)

Route the wire harnesses, cable and hose properly (page 1-18).



# 3. MAINTENANCE

SERVICE INFORMATION	3-1	EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	3-16
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN	3-16
FUEL LINE	3-4	BRAKE FLUID	3-20
THROTTLE OPERATION	3-4	BRAKE PADS WEAR	3-21
CARBURETOR CHOKE	3-5	BRAKE SYSTEM	3-22
AIR CLEANER	3-5	BRAKE LIGHT SWITCH	3-22
SPARK PLUG	3-6	HEADLIGHT AIM	3-23
VALVE CLEARANCE	3-8	CLUTCH SYSTEM	3-23
ENGINE OIL	3-11	SIDE STAND	3-24
ENGINE OIL FILTER	3-12	SUSPENSION	3-24
CARBURETOR SYNCHRONIZATION	3-13	NUTS, BOLTS, FASTENERS	3-26
ENGINE IDLE SPEED	3-14	WHEELS/TIRES	3-27
RADIATOR COOLANT	3-14	STEERING HEAD BEARINGS	3-27
COOLING SYSTEM	3-15		
SECONDARY AIR SUPPLY SYSTEM	3-15		

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

*When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle grip free play		2–6 mm (1/16–1/4 in)
Spark plug	49 state/Canada type	CR9EH-9 (NGK), U27FER-9 (DENSO)
	California type	CR9EHVX-9 (NGK)
Spark plug gap		0.80–0.90 mm (0.031–0.035 in)
Valve clearance	Intake	0.20 ± 0.03 mm (0.008 ± 0.001 in)
	Exhaust	0.28 ± 0.03 mm (0.011 ± 0.001 in)
Recommended engine oil		Honda GN4 4-stroke oil or equivalent motor oil API service classification: SF or SG Viscosity: SAE 10W-40
Engine oil capacity	After draining	3.0 ℓ (3.2 US qt, 2.6 Imp qt)
	After draining/filter change	3.3 ℓ (3.5 US qt, 2.9 Imp qt)
	After disassembly	3.7 ℓ (3.9 US qt, 3.3 Imp qt)
Carburetor vacuum difference (base carburetor: No. 4)		Within 30 mm Hg (1.2 in Hg)

## MAINTENANCE

ITEM			SPECIFICATIONS
Engine idle speed	49 state/Canada type		1,300 ± 100 rpm
	California type		1,400 ± 100 rpm
Drive chain slack			25 – 35 mm (1 – 1 3/8 in)
Recommended brake fluid			DOT 4
Clutch lever free play			10 – 20 mm (3/8 – 13/16 in)
Cold tire pressure	Up to 90 kg (200 lbs) load	Front	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
		Rear	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
	Up to maximum weight capacity	Front	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
		Rear	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
Tire size		Front	120/70 ZR17 (58W)
		Rear	180/55 ZR17 (73W)
Tire brand		Front	BRIDGESTONE BT56F RADIAL E, DUNLOP D207FJ MICHELIN TX15C
		Rear	BRIDGESTONE BT56R RADIAL G, DUNLOP D207P MICHELIN TX25
Minimum tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

## TORQUE VALUES

Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads
Oil filter cartridge	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply oil to the threads and seating surface
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Rear brake reservoir mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

## TOOL

Oil filter wrench	07HAA-PJ70100
Drive chain tool set	07HMH-MR10103 or 07HMH-MR1010B (U.S.A. only)

# MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary.

C: Clean R: Replace A: Adjust L: Lubricate

The following items require some mechanical knowledge. Certain items (particularly those marked \* and \*\*) may require more technical information and tools. Consult your Honda dealer.

ITEM	FREQUENCY	WHICHEVER COMES → FIRST ↓ NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
			× 1,000 mi	0.6	4	8	12	16	20	24	
			× 100 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	* FUEL LINE					I		I		I	3-4
	* THROTTLE OPERATION					I		I		I	3-4
	* CARBURETOR CHOKE					I		I		I	3-5
	AIR CLEANER	NOTE 2					R			R	3-5
	SPARK PLUG			I	R	I	R	I	R		3-6
	* VALVE CLEARANCE							I			3-8
	ENGINE OIL		R			R		R		R	3-11
	ENGINE OIL FILTER		R			R		R		R	3-12
	* CARBURETOR SYNCHRONIZATION					I		I		I	3-13
	* ENGINE IDLE SPEED		I	I	I	I	I	I	I	I	3-14
	RADIATOR COOLANT	NOTE 3				I		I		R	3-14
	* COOLING SYSTEM					I		I		I	3-15
	* SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-15
	* EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	3-16
NON-EMISSION RELATED ITEMS	DRIVE CHAIN		Every 500 mi (800 km) I, L								3-16
	BRAKE FLUID	NOTE 3		I	I	I	R	I	I	R	3-20
	BRAKE PAD WEAR			I	I	I	I	I	I	I	3-21
	BRAKE SYSTEM		I		I		I		I		3-22
	* BRAKE LIGHT SWITCH				I		I		I		3-22
	* HEADLIGHT AIM				I		I		I		3-23
	CLUTCH SYSTEM		I	I	I	I	I	I	I	I	3-23
	SIDE STAND				I		I		I		3-24
	* SUSPENSION				I		I		I		3-24
	* NUTS, BOLTS, FASTENERS		I		I		I		I		3-26
	** WHEELS/TIRES				I		I		I		3-27
	** STEERING HEAD BEARINGS		I		I		I		I		3-27

\* Should be serviced by your dealer, unless the owner has proper tools and service data and is mechanically qualified.

\*\* In the interest of safety, we recommend these items be serviced only by your Honda dealer.

- NOTES:
- At higher odometer readings, repeat at the frequency interval established here.
  - Service more frequently if the motorcycle is ridden in unusually wet or dusty areas.
  - Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
  - California type only.

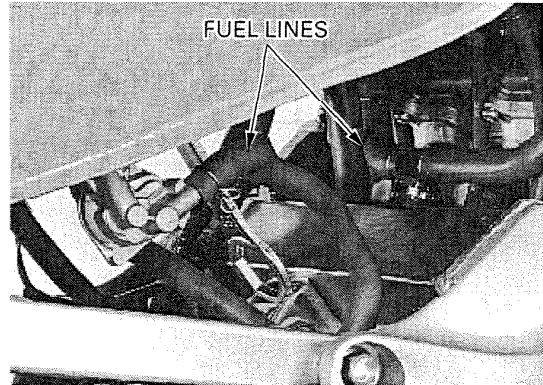
## MAINTENANCE

### FUEL LINE

Raise the fuel tank (page 2-3).

Check the fuel lines for deterioration, damage or leakage.

Replace the fuel lines if necessary.



### THROTTLE OPERATION

Check for any deterioration or damage to the throttle cables. Check that the throttle grip for smooth operation. Check that the throttle opens and automatically closes in all steering positions.

If the throttle grip does not return properly, lubricate the throttle cables and overhaul and lubricate the throttle grip housing.

For cable lubrication: Disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

If the throttle grip still does not return properly, replace the throttle cables.

#### **▲WARNING**

*Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle slide operation and may lead to a loss of throttle control while riding.*

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip free play and the throttle cable connection.

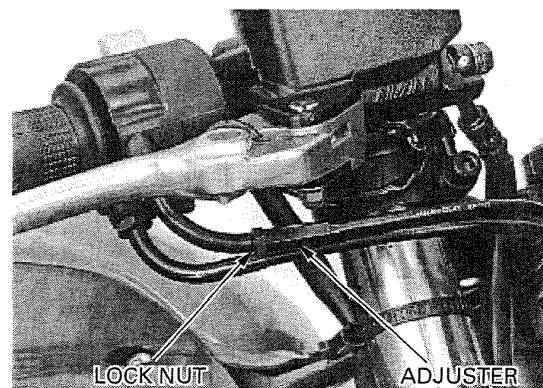
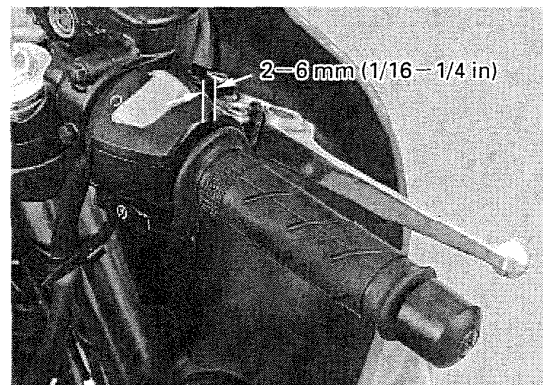
Measure the throttle grip free play at the throttle grip flange.

#### **THROTTLE GRIP FREE PLAY:**

2–6 mm (1/16–1/4 in)

Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.

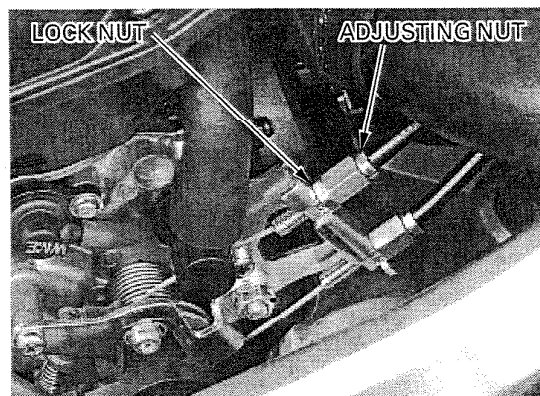
Loosen the lock nut, turn the adjuster as required and tighten the lock nut.



Major adjustments are made with the lower adjuster.

Raise the fuel tank and support it (page 2-3).  
Loosen the lock nut, turn the adjusting nut as required and tighten the lock nut.

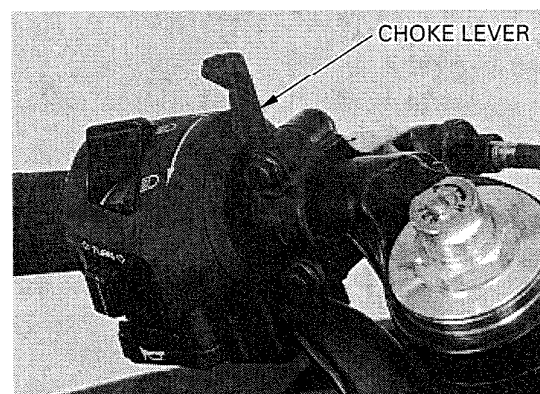
Recheck the throttle operation and install the fuel tank (page 2-3).



## CARBURETOR CHOKE

This model's choke system uses a fuel enriching circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enriching circuit via a cable when the choke lever on the left handlebar is turned this side.

Check for smooth choke lever operation and lubricate the choke if required.  
Check the choke cable for frayed, kinked or other damage.



## AIR CLEANER

### NOTE:

- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in wet or dusty areas, more frequent inspections are required.

Raise the fuel tank and support it (page 2-3).

Remove the ten cover screws and the air cleaner housing cover.  
Replace the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.

Install the air cleaner element and cover, and tighten the screws.

Install the fuel tank (page 2-3).



## MAINTENANCE

### SPARK PLUG

#### ⚠ WARNING

*Wear insulated gloves to avoid burns while the engine is hot.*

Remove the side fairings and the front inner fairing (page 2-4).

Disconnect the fan motor switch 2P (Black) connector.

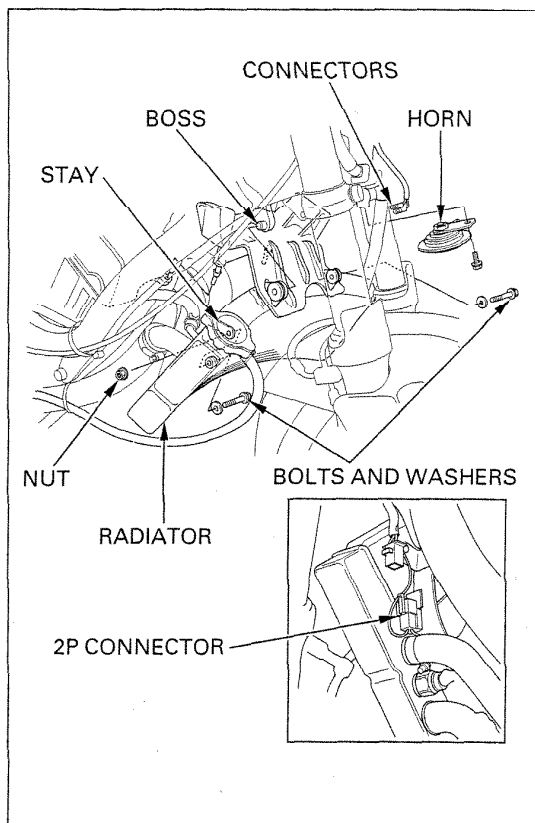
Disconnect the horn connectors. Remove the horn bolt and horn.

Remove the radiator mounting bolts, washers and nut.

Cover the radiator with a shop towel to avoid damaging the radiator fins.

Swing the radiator forward so that the lower mounting stay is not interfered with the radiator. Slide the radiator to the right to remove it off the boss of the frame.

Move the radiator down without disconnecting the water hoses and secure it to the fork legs.

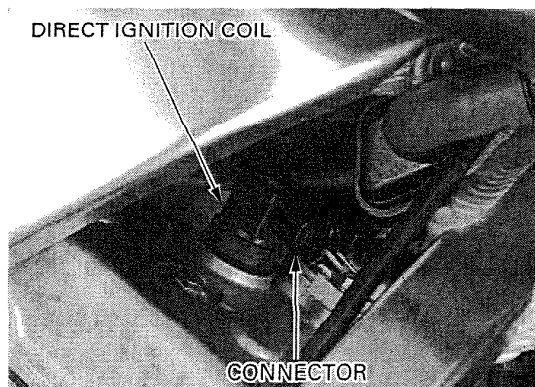


Disconnect the ignition coil 2P connectors and remove the direct ignition coils.

Clean around the spark plug bases.

#### NOTE:

- This motorcycle adopted the direct type ignition coil that the spark plug cap and ignition coil are integrated.
- Clean around the spark plug bases with compressed air before removing the plugs, and be sure that no debris is allowed to enter the combustion chamber.

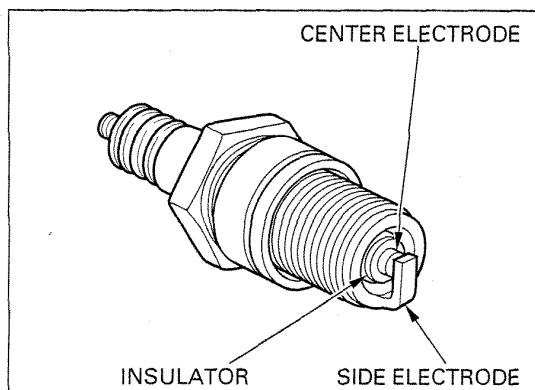


Remove the spark plugs.

49 state/Canada  
type:

Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary.

**RECOMMENDED SPARK PLUG:** CR9EH-9 (NGK)  
U27FER-9 (DENSO)





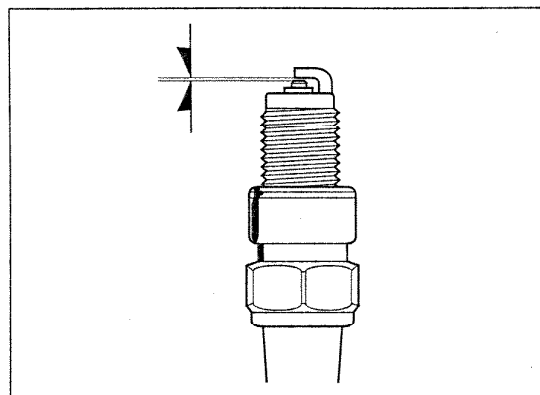
If the electrode is contaminated with carbon deposits, clean the spark plug electrodes using a wire type brush or spark plug cleaner.

Measure the gap between the center and side electrodes with a wire-type feeler gauge. If necessary, adjust the gap by bending the side electrode carefully.

## SPARK PLUG GAP:

0.80–0.90 mm (0.031–0.035 in)

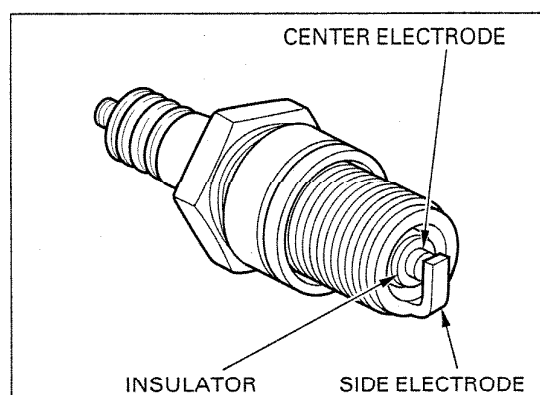
Install the spark plug (page 3-8).



*California type:* Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary. If the electrode is contaminated with carbon deposits, clean the electrode using the spark plug cleaner.

## CAUTION:

- *This motorcycle's (california type) spark plug is equipped with platinum type electrodes. Do not use wire brush to clean the electrodes.*
- *The plug cleaner should be used with the air pressure of less than 6 kgf/cm<sup>2</sup> (85 psi) and for less than 20 seconds.*



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

*Always use specified spark plugs on this motorcycle.*

## SPECIFIED SPARK PLUG: CR9EHVX-9 (NGK)

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

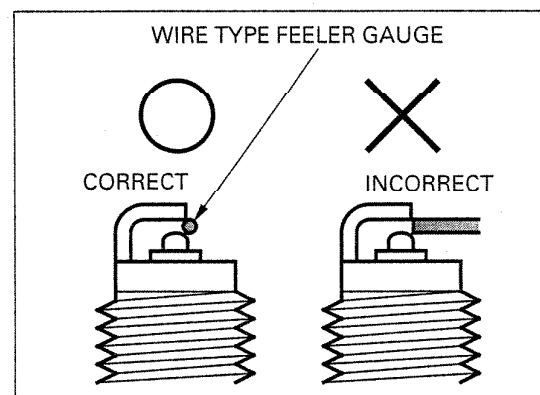
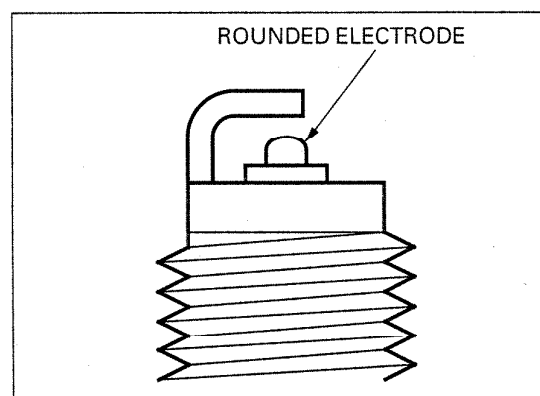
## CAUTION:

*To prevent damaging the platinum coating of the center electrode, use a wire type feeler gauge to check the spark plug gap.*

Make sure that the 1.0 mm (0.04 in) wire type feeler gauge cannot be inserted into the gap. If the gauge can be inserted into the gap, replace the plug with a new one.

## CAUTION:

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



## MAINTENANCE

### CAUTION:

*To prevent damage to the cylinder head, hand-tighten the spark plug before using a wrench to tighten to the specified torque.*

With the plug washer attached, screw the spark plug in by hand to prevent cross-threading. Tighten the spark plug.

**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the removed parts in the reverse order of removal.

### NOTE:

When installing the radiator, set the air guide rubber properly. Do not pinch the air guide rubber between the frame and radiator.



## VALVE CLEARANCE

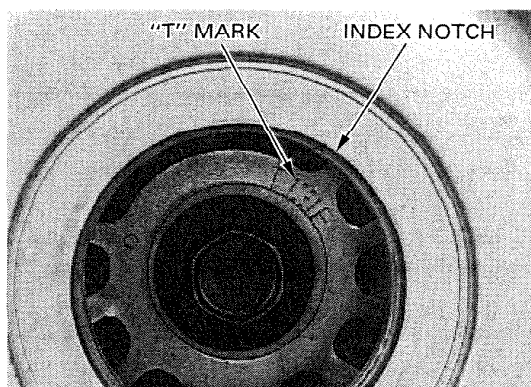
### INSPECTION

#### NOTE:

Inspect and adjust the valve clearance while the engine is cold (below 35 °C, 95 °F).

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

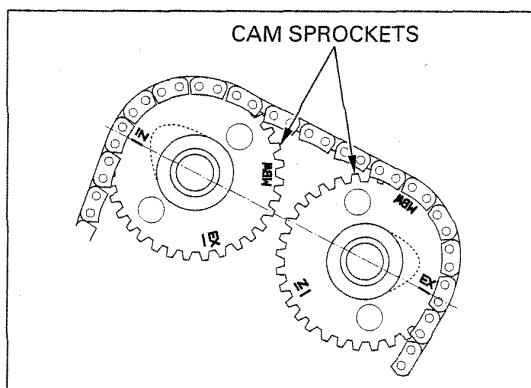
Remove the timing hole cap.



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

The timing marks ("IN" for intake and "EX" for exhaust) on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks are facing inward, rotate the crankshaft clockwise 360° (1 full turn) and align the "T" mark with the index notch.

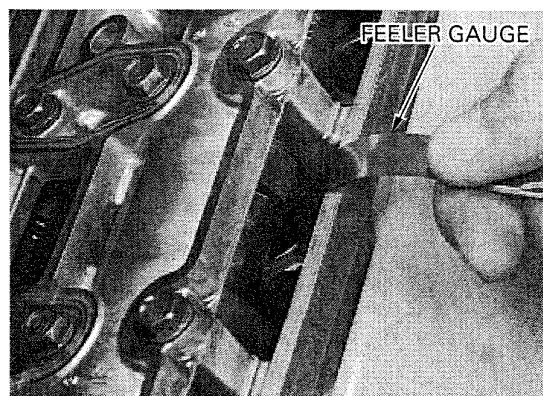


Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner and hold it in the fully retracted position (page 8-4).

Measure the No. 1 and No. 3 cylinder intake valve clearance by inserting a feeler gauge between the valve lifter and cam lobe.

## VALVE CLEARANCE:

**IN** :  $0.20 \pm 0.03$  mm ( $0.008 \pm 0.001$  in)

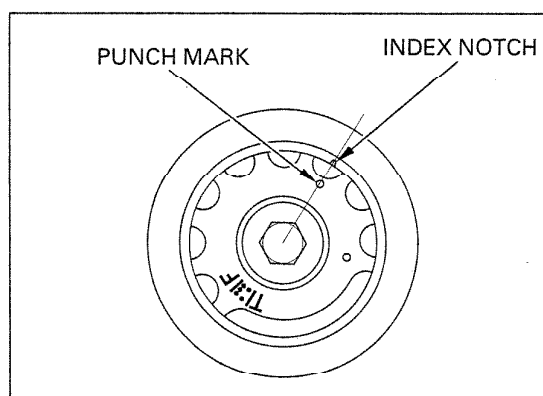


Rotate the crankshaft clockwise  $1/2$  ( $180^\circ$ ) turn from previous position and align the punch mark with the index notch.

Measure the No. 2 and No. 4 cylinder exhaust valve clearance.

## VALVE CLEARANCE:

**EX** :  $0.28 \pm 0.03$  mm ( $0.011 \pm 0.001$  in)

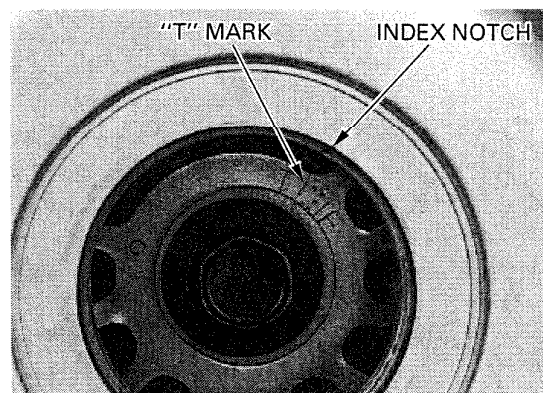


Rotate the crankshaft clockwise  $1/2$  ( $180^\circ$ ) turn from previous position and align the "T" mark with the index notch.

Measure the No. 2 and No. 4 cylinder intake valve clearance.

## VALVE CLEARANCE:

**IN** :  $0.20 \pm 0.03$  mm ( $0.008 \pm 0.001$  in)

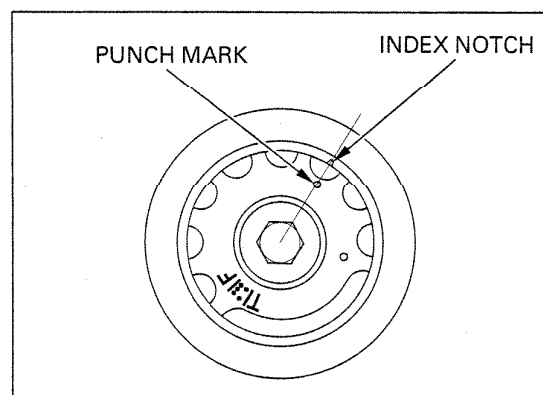


Rotate the crankshaft clockwise  $1/2$  ( $180^\circ$ ) turn from previous position and align the punch mark with the index notch.

Measure the No. 1 and No. 3 cylinder exhaust valve clearance.

## VALVE CLEARANCE:

**EX** :  $0.28 \pm 0.03$  mm ( $0.011 \pm 0.001$  in)

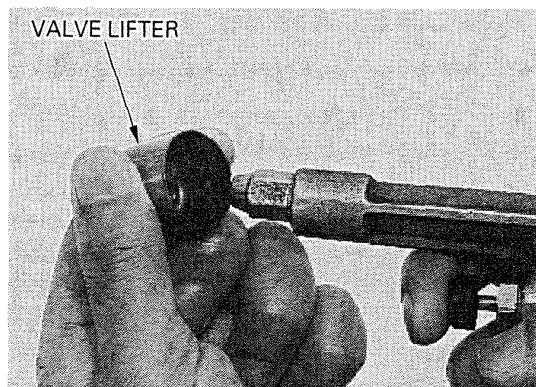


## MAINTENANCE

### ADJUSTMENT

Remove the valve lifters and shims (page 8-4).

Clean the valve shim contact area in the valve lifter with compressed air.



Measure the shim thickness and record it.

#### NOTE:

Sixty-nine different thickness shims are available from the thinnest (1.200 mm thickness) shim to the thickest (2.900 mm thickness) in intervals of 0.025 mm.

Calculate the new shim thickness using the equation below.

$$A = (B - C) + D$$

A: New shim thickness

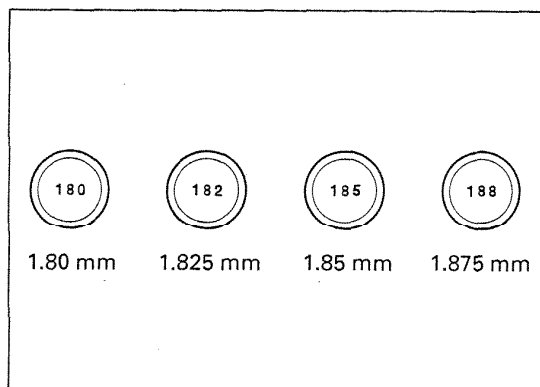
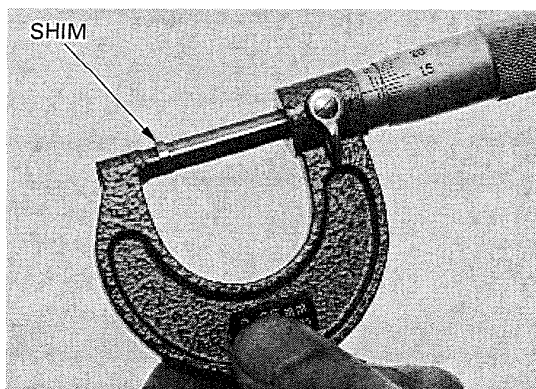
B: Recorded valve clearance

C: Specified valve clearance

D: Old shim thickness

#### NOTE:

- Make sure of the correct shim thickness by measuring the shim with the micrometer.
- Reface the valve seat if carbon deposits result in a calculated dimension of over 2.900 mm.



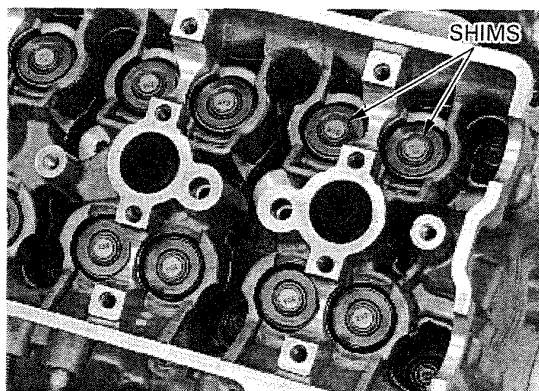
Install the newly selected shims on the valve retainers.

Install the valve lifters and camshafts (page 8-19).

Rotate the camshafts by rotating the crankshaft clockwise several times.

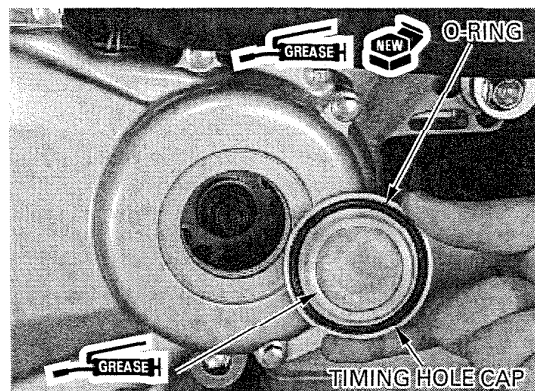
Recheck the valve clearances.

Install the cylinder head cover (page 8-21).



Coat a new O-ring with grease and install it onto the timing hole cap.  
Apply grease to the timing hole cap threads.  
Install and tighten the timing hole cap.

**TORQUE** : 18 N·m (1.8 kgf·m , 13 lbf·ft)

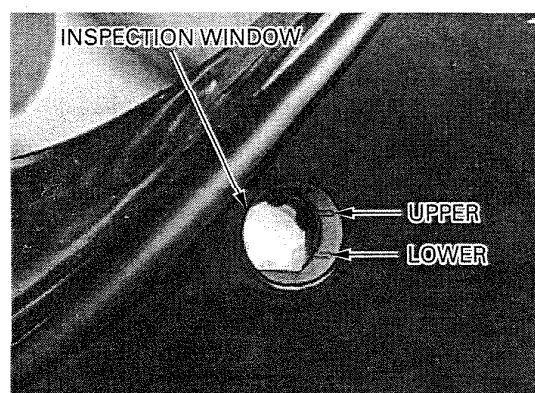


## ENGINE OIL

Start the engine and let it idle for a few minutes.

Stop the engine, support the motorcycle upright on a level surface.

Wait for a few minutes and check that the oil level is between the upper and lower level marks in the inspection window.



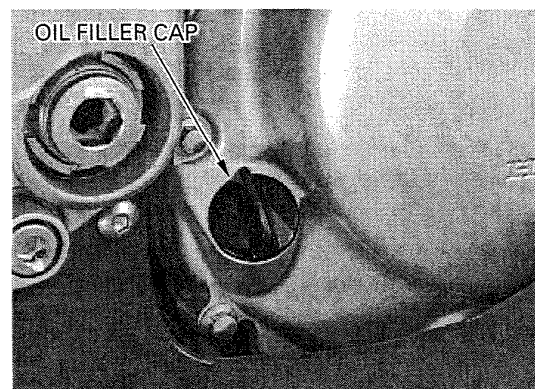
If the oil level is below or near the lower level mark, remove the oil filler cap and add the recommended engine oil up to the upper level mark.

### RECOMMENDED ENGINE OIL:

Honda GN4 4-stroke oil or equivalent motor oil

API service classification: SF or SG

Viscosity: SAE 10W-40

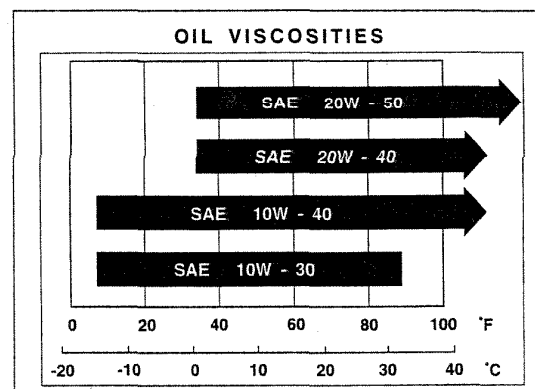


### NOTE:

Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

Reinstall the filler cap.

For engine oil change, see next page.



## MAINTENANCE

### ENGINE OIL FILTER

#### NOTE:

Change the oil with engine warm and the motorcycle on its side stand to assure complete and rapid draining.

#### ▲WARNING

*Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves.*

Warm up the engine.

Stop the engine and remove the side and inner fairings (page 2-4).

Remove oil filler cap and drain bolt, and drain the oil.

Remove the oil filter cartridge and let the remaining oil drain out. Discard the filter cartridge.

#### TOOL:

Oil filter wrench 07HAA-PJ70100

#### CAUTION:

*Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.*

Apply oil to the O-ring and threads of a new oil filter cartridge and install the filter cartridge.

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

After draining the oil completely check that the sealing washer on the drain bolt is in good condition and replace it if necessary.

Install and tighten the drain bolt.

**TORQUE** : 29 N·m (3.0 kgf·m , 22 lbf·ft)

Fill the crankcase with the recommended oil (page 3-10).

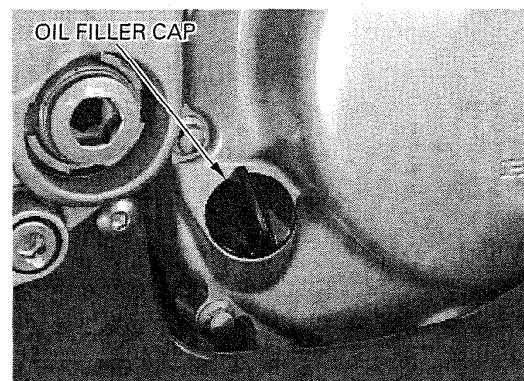
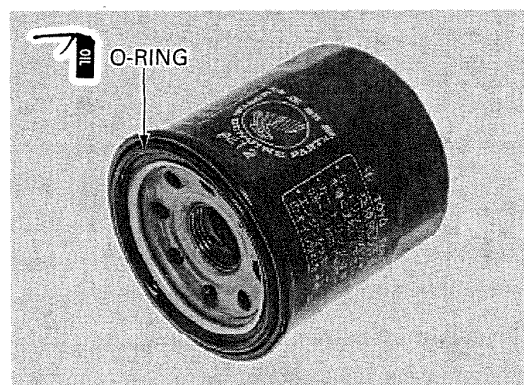
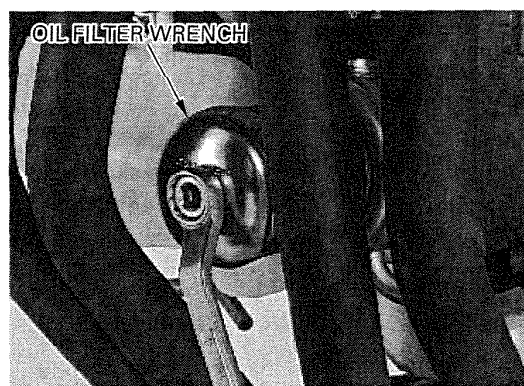
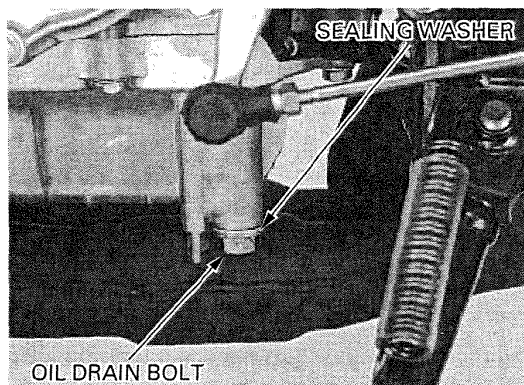
**OIL CAPACITY:** 3.3 ℓ (3.5 US qt , 2.9 Imp qt)  
after draining/filter change  
3.7 ℓ (3.9 US qt , 3.3 Imp qt)  
at disassembly

Reinstall the oil filler cap.

Check the engine oil level (page 3-11).

Make sure there are no oil leaks.

Install the side and inner fairings (page 2-4).



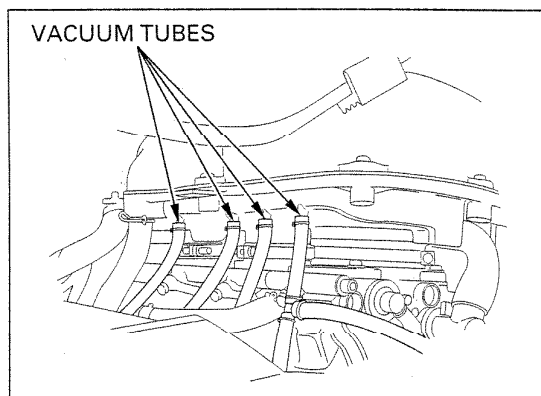
# CARBURETOR SYNCHRONIZATION

## NOTE:

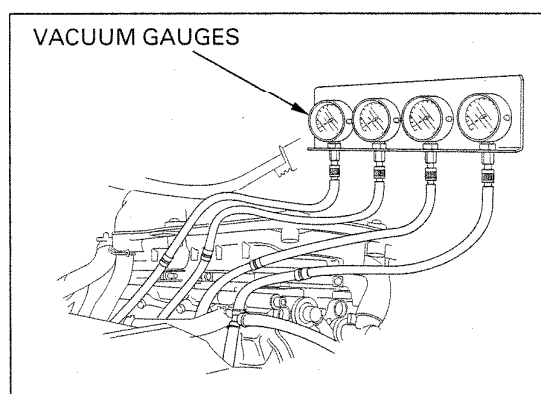
Perform this maintenance with the engine at normal operating temperature and transmission in neutral. Place the motorcycle on a level surface.

Raise the fuel tank and support it (page 2-3).

Disconnect the vacuum tubes from the air cleaner housing.



Connect the vacuum gauges to the vacuum tubes.



Start the engine and adjust the idle speed with the throttle stop screw.

## IDLE SPEED:

**49 state/Canada type :**  $1,300 \pm 100$  rpm

**California type :**  $1,400 \pm 100$  rpm

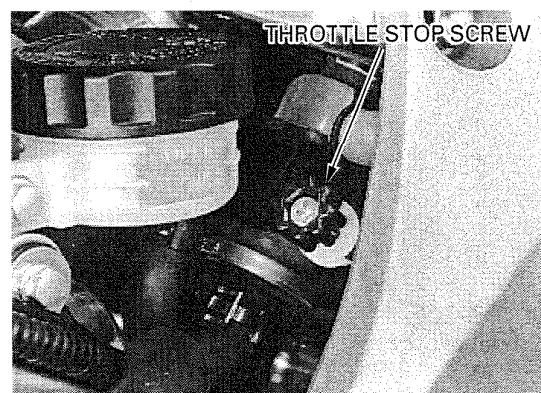
Check the difference between the each carburetor.

## CARBURETOR VACUUM DIFFERENCE:

Within 30 mm Hg (1.2 in Hg)

## NOTE:

The base carburetor is the No. 4 carburetor.



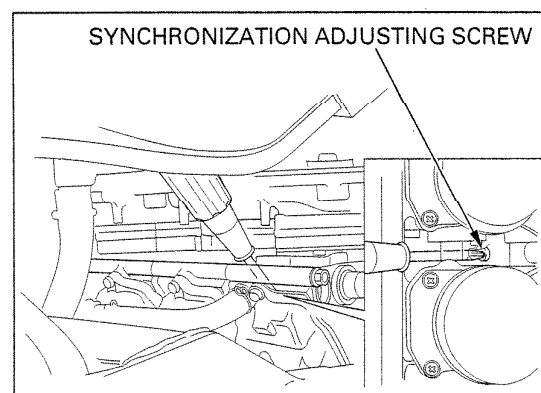
Synchronize to specification by turning the synchronization adjusting screws.

Rev the engine up several times.  
Recheck the idle speed and synchronization.

Disconnect the vacuum gauges.  
Connect the vacuum tubes to the joints of the air cleaner housing.

Install the fuel tank (page 2-3).

Route the tubes properly (page 1-18)





## MAINTENANCE

### ENGINE IDLE SPEED

#### NOTE:

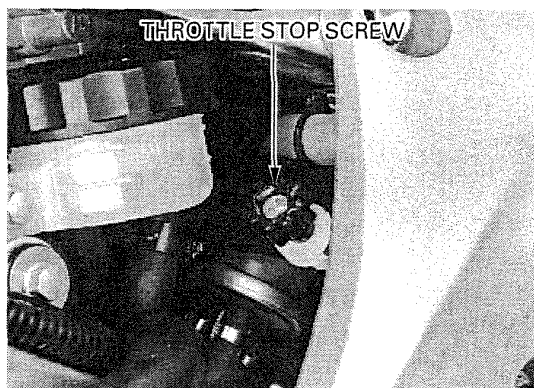
- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine, shift the transmission into neutral and place the motorcycle on a level surface. Check the idle speed and adjust by turning the throttle stop screw as required.

#### IDLE SPEED:

**49 state/Canada:**  $1,300 \pm 100$  rpm

**California type:**  $1,400 \pm 100$  rpm



### RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines with the motorcycle upright on a level surface.

If the level is low, remove the right side fairing (page 2-4) and the reserve tank cap, and fill the tank to the "UPPER" level line with a 50/50 mixture of distilled water and antifreeze (coolant preparation: page 6-4).

#### RECOMMENDED ANTIFREEZE:

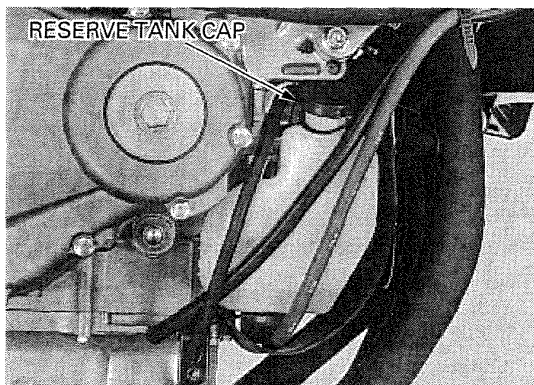
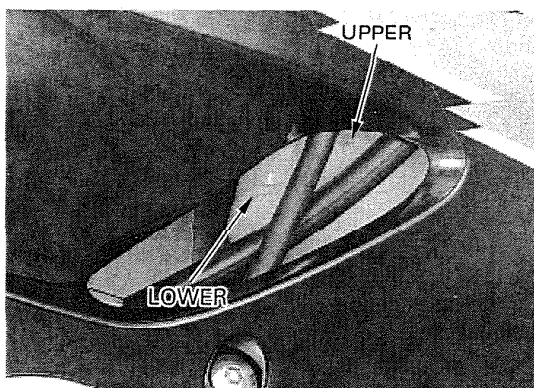
Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors

#### CAUTION:

*Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.*

Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

If reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove all air from the cooling system (page 6-4).





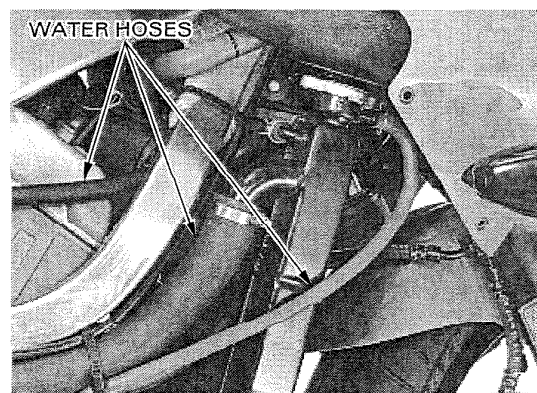
## COOLING SYSTEM

Remove the side fairings (page 2-4).

Check for any coolant leakage from the water pump, water hoses and hose joints.

Check the water hoses for cracks or deterioration and replace if necessary.

Check that all hose clamps are tight.

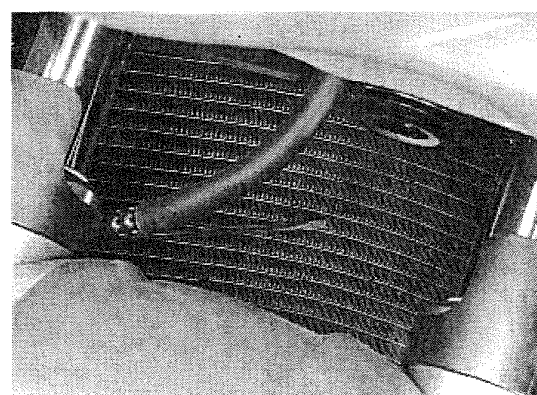


Check the radiator air passage for clogging or damage.

Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air or low pressure water.

Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

Install the side fairings (page 2-4).



## SECONDARY AIR SUPPLY SYSTEM

Check the air supply hoses between the pulse secondary air injection (PAIR) control valve and PAIR check valves for damage or loose connections.

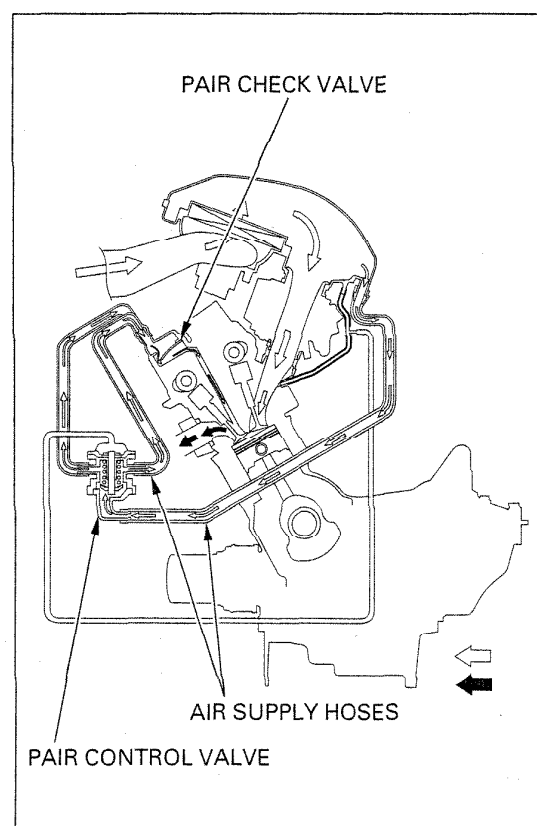
Check the air supply hoses for cracks or deterioration.

### NOTE:

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 5-38).

Check the vacuum tube between the No. 4 cylinder head vacuum joint and PAIR control valve for deterioration, damage or loose connections. Also check that the tube is not kinked or pinched.

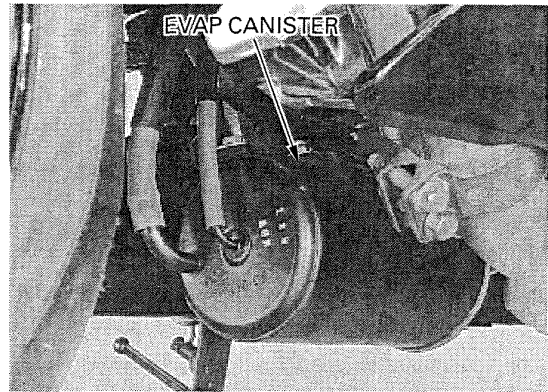
For PAIR control valve inspection, see page 5-37.



## MAINTENANCE

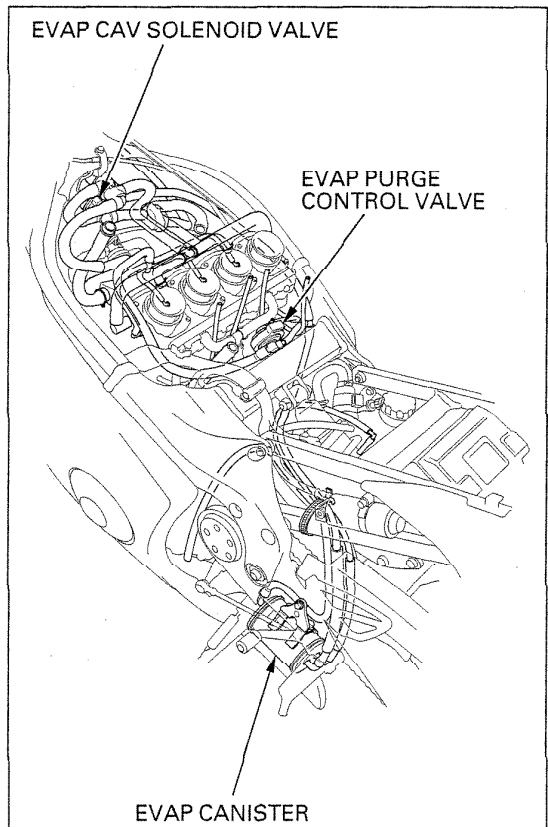
### EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

Check the evaporative emission (EVAP) canister for cracks or damage.



Check the tubes between the fuel tank, EVAP canister, EVAP purge control valve, EVAP carburetor air vent (CAV) solenoid valve and carburetors for deterioration, damage or loose connections. Also check that the tubes are not kinked or pinched.

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-18) for tube connections and routing.



## DRIVE CHAIN

### CHAIN SLACK INSPECTION

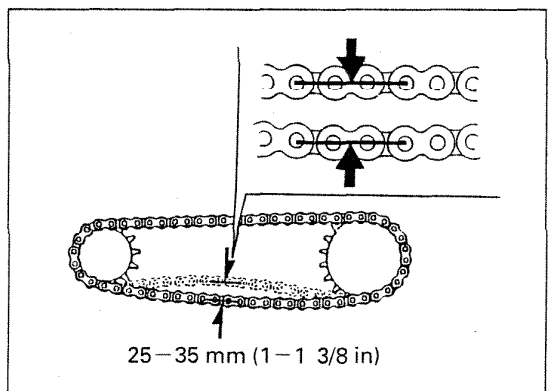
#### ▲WARNING

*Never inspect and adjust the drive chain while the engine is running.*

Turn the ignition switch OFF, place the motorcycle on its side stand and shift the transmission into neutral.

Check the slack in the drive chain lower run midway between the sprockets.

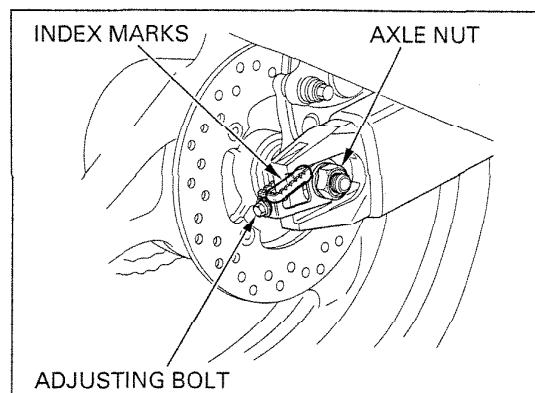
**CHAIN SLACK:** 25–35 mm (1–1 3/8 in)



## ADJUSTMENT

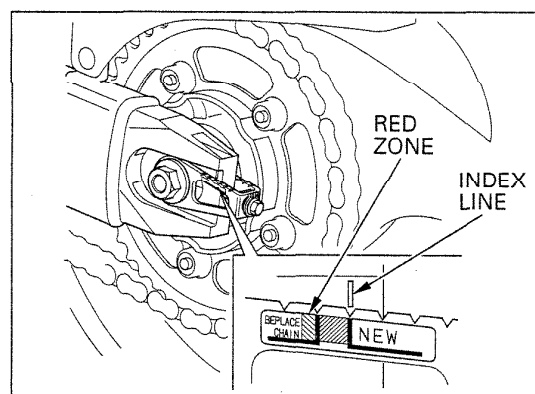
Loosen the rear axle nut.  
Turn both adjusting bolts an equal number of turn until the correct drive chain slack is obtained.  
Make sure the index marks on both adjusters are aligned with the index lines on the swingarm.  
Tighten the rear axle nut.

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



Recheck the drive chain slack and free wheel rotation.

Check the drive chain wear indicator label attached on the left drive chain adjuster.  
If the red zone of the indicator label reaches the index line on the swingarm, replace the drive chain with a new one (page 3-18).

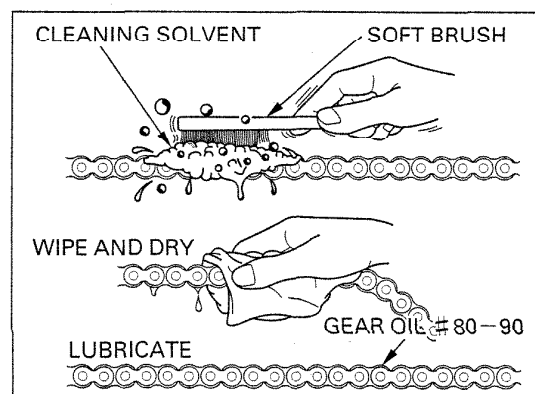


## CLEANING AND INSPECTION

Clean the chain with a soft brush using a non-flammable or high flash point solvent and wipe it dry.  
Be sure the chain has dried completely before lubricating.

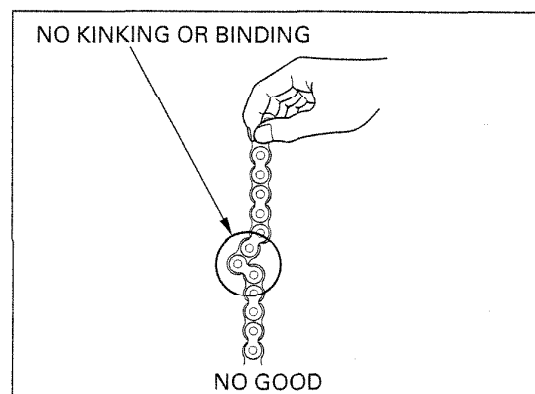
Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly. Inspect and replace the sprockets as necessary.



## LUBRICATION

Lubricate the drive chain with #80-90 gear oil or equivalent chain lubricant designed for specifically for use on O-ring chains.  
Some commercially available chain lubricants may contain solvents which could damage the O-rings.  
Wipe off the excess chain lube.

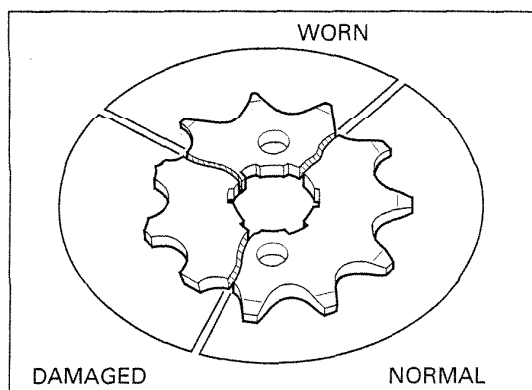


## MAINTENANCE

### SPROCKET INSPECTION

Inspect the drive and driven sprocket teeth for damage or wear. Replace if necessary. Never use a worn chain on new sprockets. Both chain and sprockets must be in good condition, or the new replacement parts will wear rapidly.

Check the attachment bolt and nuts on the drive and driven sprockets. If any are loose, torque them.



### REPLACEMENT

This motorcycle uses a drive chain with a staked master link.

Loosen the drive chain.  
Assemble the special tool.

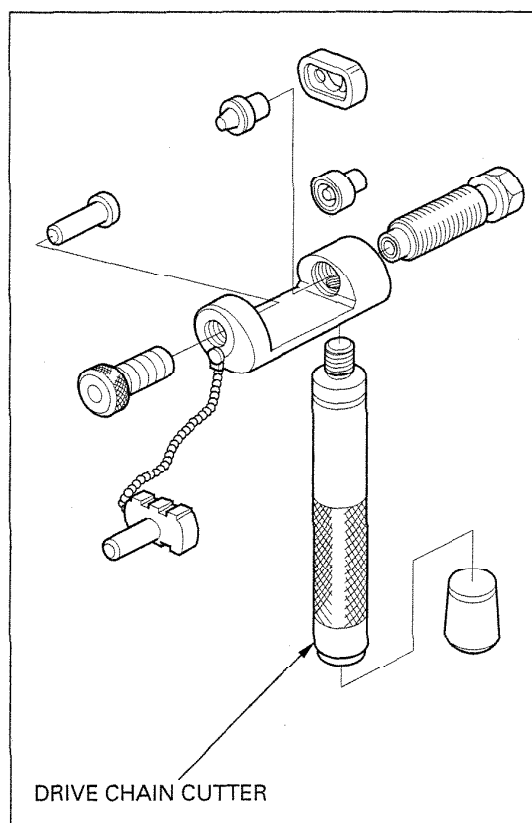
#### TOOL:

Drive chain tool set

07HMH-MR10103 or  
07HMH-MR1010B  
(U.S.A. only)

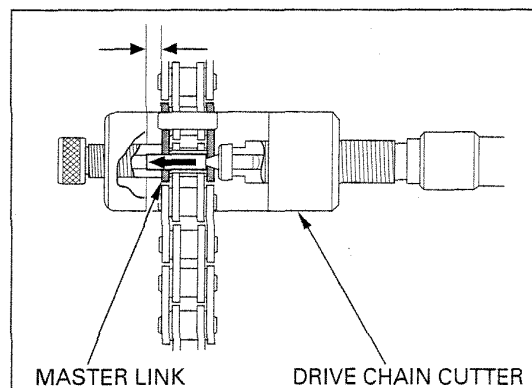
#### NOTE:

When using the special tool, follow the manufacturer's instruction.



Locate the crimped pin ends of the master link from the outside of the chain and remove the link with the drive chain tool set.

Remove the drive chain.



Remove the excess drive chain links from the new drive chain with the drive chain tool set.

## NOTE:

Include the master link when you count the drive chain links.

**SPECIFIED LINKS:** 110 links

**REPLACEMENT CHAIN:** DID 525HV  
RK 525ROZ1

Remove the drive sprocket cover (page 7-4).  
Install the new drive chain on the sprockets over the drive and driven sprockets.

Assemble the new master link, O-rings and master link plate with the drive chain tool set.

## NOTE:

Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing the outside.

Measure the master link pin length projected from the plate.

## SPECIFIED LENGTH:

**DID:** 1.15–1.55 mm (0.045–0.061 in)

**RK:** 1.20–1.40 mm (0.047–0.055 in)

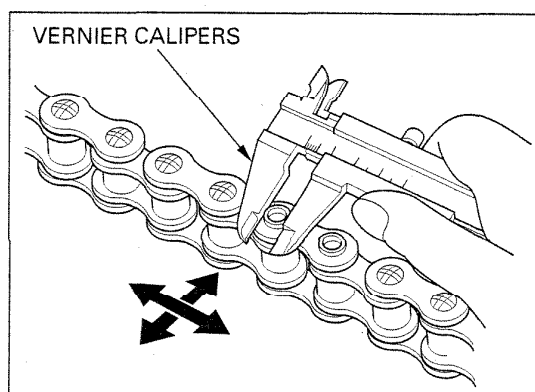
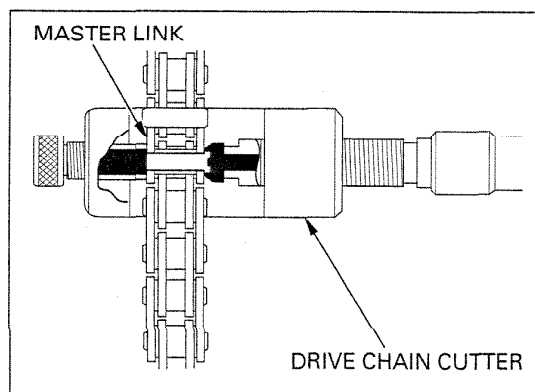
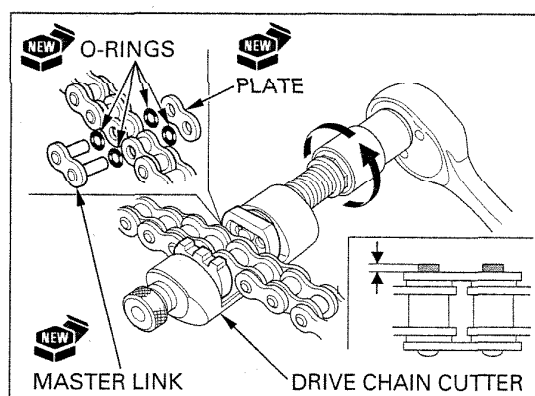
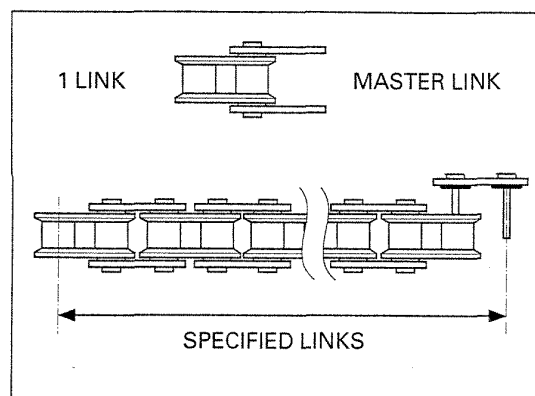
Stake the master link pins with the drive chain tool set.

Make sure that the master link pins are staked properly by measuring the diameter of the staked area.

## DIAMETER OF THE STAKED AREA:

**DID:** 5.50–5.80 mm (0.217–0.228 in)

**RK:** 5.55–5.85 mm (0.219–0.230 in)



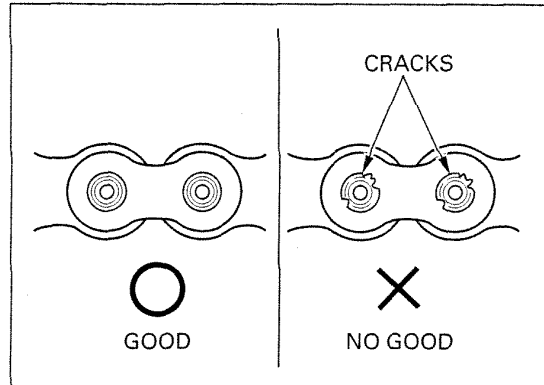
## MAINTENANCE

After staking, check the staked area of the master link for cracks.  
If there is any cracking, replace the master link, O-rings and plate.

### CAUTION:

***A drive chain with a clip-type master link must not be used.***

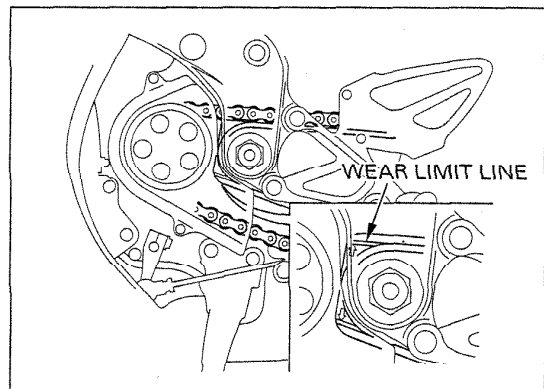
Install the drive sprocket cover (page 7-8).



## DRIVE CHAIN SLIDER INSPECTION

Check the drive chain slider for wear.  
Replace the chain slider if it is worn to the wear limit line.

Refer to section 14 for drive chain slider replacement.



## BRAKE FLUID

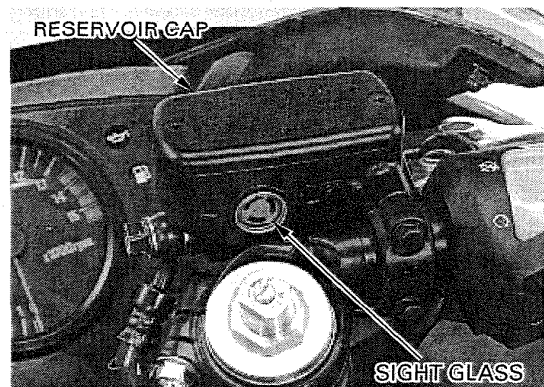
### CAUTION:

- ***Do not mix different types of fluid, as they are not compatible with each other.***
- ***Do not allow foreign material to enter the system when filling the reservoir.***
- ***Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***

### NOTE:

When the fluid level is low, check the brake pads for wear (page 3-21). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper pistons are pushed out, and this accounts for a low reservoir level.

If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-21).



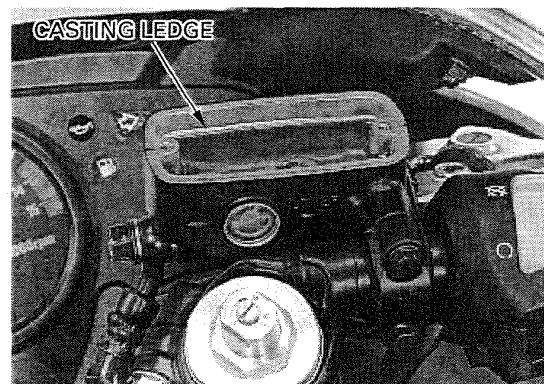
## FRONT BRAKE

Turn the handlebar to the left side so that the reservoir is level and check the fluid level through the sight glass.

If the level is near the lower level mark, remove the reservoir cap, set plate and diaphragm, and fill the reservoir with DOT 4 brake fluid from a sealed container to the casting ledge.

Install the diaphragm, set plate and reservoir cap and tighten the cap screws.

**TORQUE : 2 N·m (0.2 kgf·m , 1.4 lbf·ft)**



## REAR BRAKE

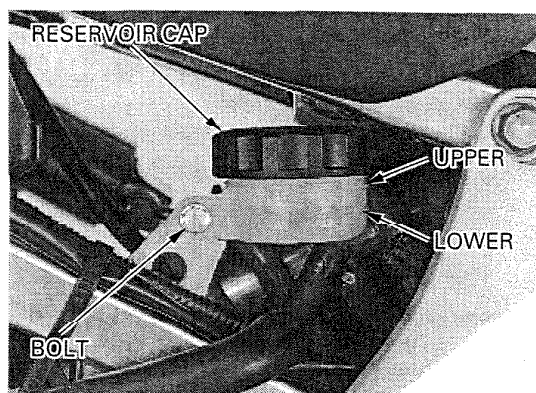
Place the motorcycle on a level surface and support it upright.

Check the fluid level in the rear brake reservoir.

If the level is near the lower level line, remove the reservoir mounting bolt and the reservoir cap, and fill the reservoir with DOT 4 brake fluid from a sealed container to the upper level line. Install the reservoir cap.

Install the reservoir onto the stay with the mounting bolt.

**TORQUE** : 12 N·m (1.2 kgf·m, 9 lbf·ft)

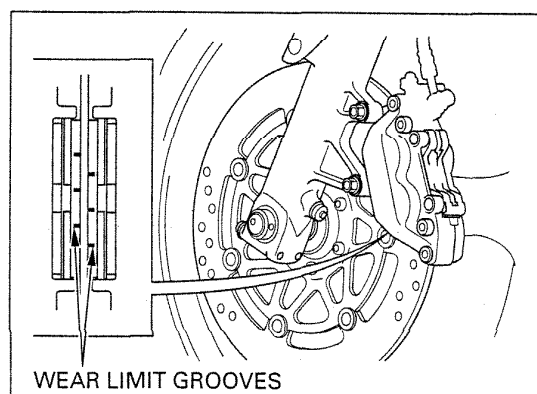


## BRAKE PAD WEAR

### FRONT BRAKE PAD

Check the brake pad for wear.

Replace the brake pads if the wear limit groove of either pad is worn out.

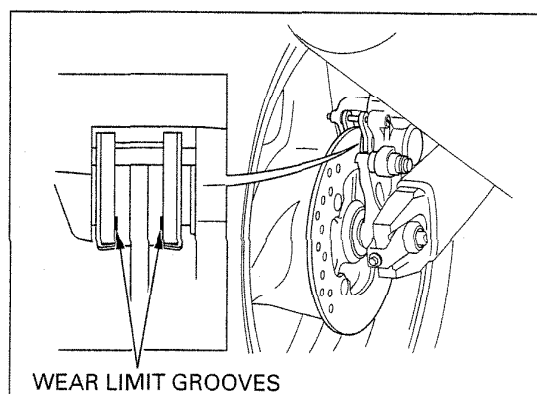


### REAR BRAKE PAD

Check the brake pad for wear by looking from the rear side of the caliper.

Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Refer to page 15-5 for brake pad replacement.



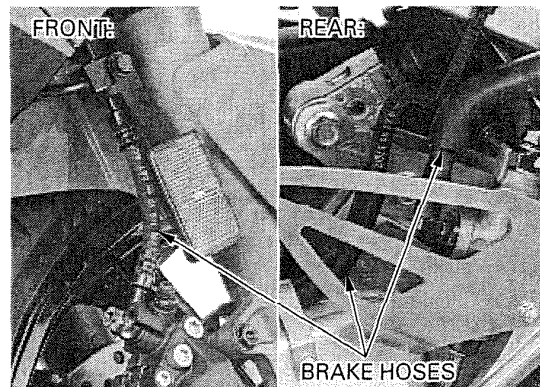
## MAINTENANCE

### BRAKE SYSTEM

Firmly apply the brake lever or pedal, and check that no air has entered the system. If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

Refer to page 15-3 for air bleeding procedures.

Inspect the brake hoses, pipes and fittings for deterioration, cracks, damage or signs of leakage. Tighten any loose fittings. Replace hoses, pipes and fittings as required.

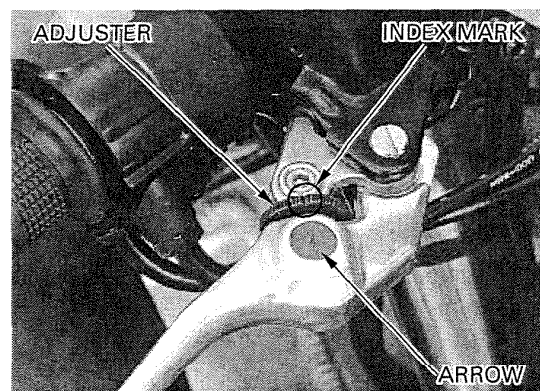


### BRAKE LEVER ADJUSTMENT

The distance between the tip of the brake lever and the grip can be adjusted by turning the adjuster.

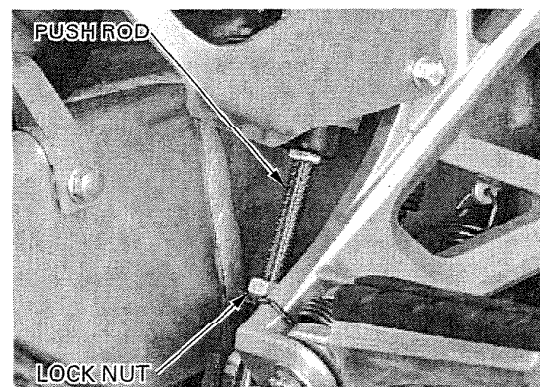
#### CAUTION:

*Align the arrow on the brake lever with the index mark on the adjuster.*



### BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod until the correct pedal height is obtained.

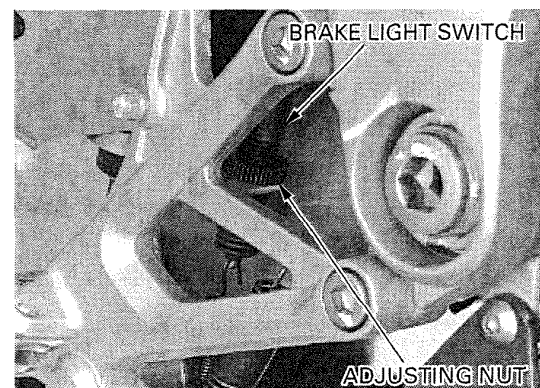


### BRAKE LIGHT SWITCH

#### NOTE:

The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are off, either replace the switch unit or the malfunctioning parts of the system.

Check that the brake light comes on just prior to the brake actually being engaged. If the light fails to come on, adjust the switch so that the light comes on at proper time. Hold the switch body and turn the adjusting nut. Do not turn the switch body.





# HEADLIGHT AIM

## ⚠ WARNING

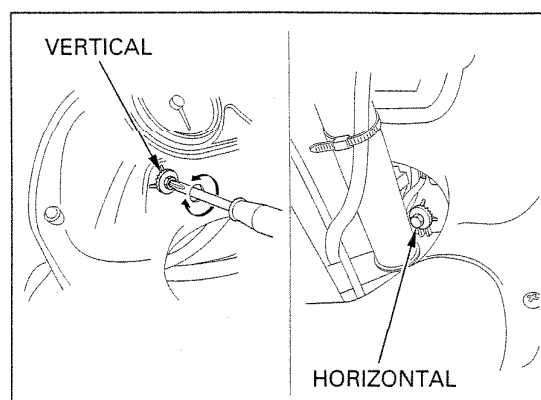
*An improperly adjusted headlight may blind on-coming drivers, or it may fail to light the road for a safe distance.*

## NOTE:

Adjust headlight beam as specified by local laws and regulations.

Adjust vertically by turning the vertical adjusting screw.

Adjust horizontally by turning the horizontal adjusting bolt.



# CLUTCH SYSTEM

Inspect the clutch cable for kinks or damage, and lubricate the cable if necessary.

Measure the clutch lever free play at the end of the lever.

**FREE PLAY:** 10–20 mm (3/8–13/16 in)



Minor adjustments are made with the upper adjuster at the clutch lever.

Loosen the lock nut and turn the adjuster.

Tighten the lock nut securely.

## CAUTION:

*The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.*

If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn.

Tighten the lock nut and make a major adjustment as described below.

Major adjustments are made with the lower adjusting nut at the engine.

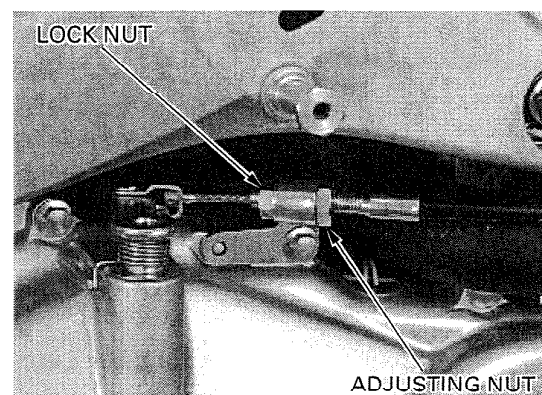
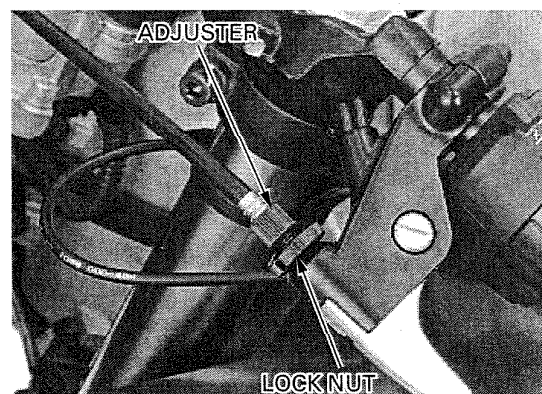
Remove the right side fairing (page 2-4).

Loosen the lock nut and turn the adjusting nut.

After adjustment is complete, tighten the lock nut securely while holding the adjusting nut.

Check the clutch operation.

If the free play cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch (section 9).



## MAINTENANCE

### SIDE STAND

Support the motorcycle on a level surface.

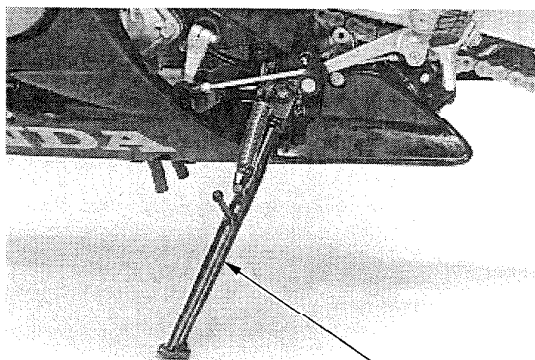
Check the side stand spring for damage or loss of tension.

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, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 19-15).



SIDE STAND

### SUSPENSION

#### ⚠ WARNING

*Loose, worn or damaged suspension parts impair motorcycle stability and control. Repair or replace any damaged components before riding. Riding a motorcycle with faulty suspension increases your risk of an accident and possible injury.*

#### 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.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

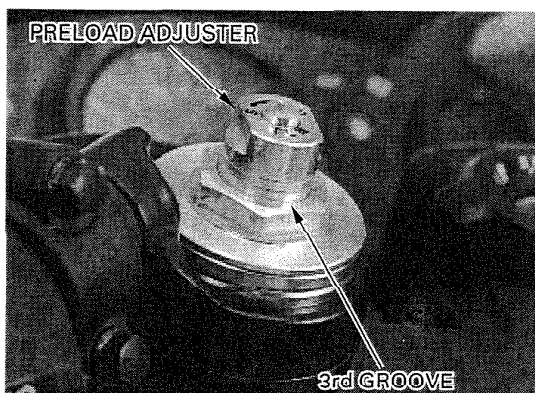
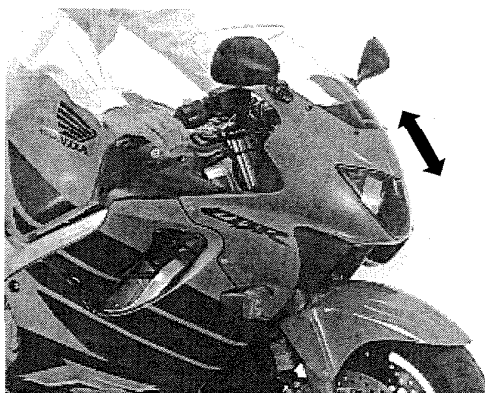
Refer to section 13 for fork service.

#### FRONT SUSPENSION ADJUSTMENT

##### SPRING PRELOAD

Turn the preload adjuster counterclockwise to reduce the spring preload, and turn it clockwise to increase the preload.

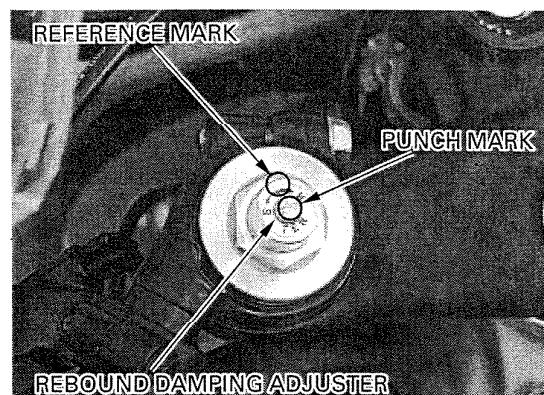
To set the standard position, align the 3rd groove on the adjuster with the top surface of the fork cap.



## REBOUND DAMPING

Turn the rebound damping adjuster counterclockwise to reduce the rebound damping force, and turn it clockwise to increase the rebound damping force.

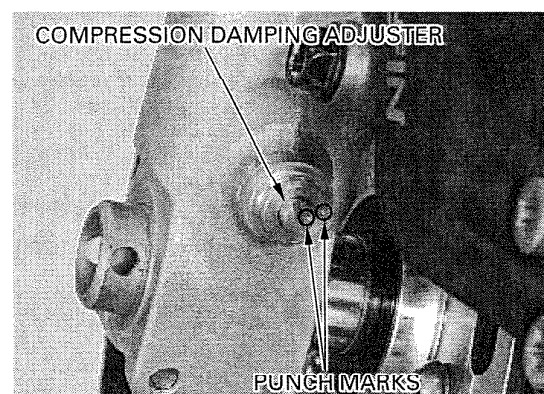
To set the standard position, turn the adjuster clockwise until it stops, then turn it counterclockwise approx. 1 turn. Align the punch mark on the adjuster with the reference mark.



## COMPRESSION DAMPING

Turn the compression damping adjuster counterclockwise to reduce the compression damping force, and turn it clockwise to increase the compression damping force.

To set the standard position, turn the adjuster clockwise until it stops, then turn it counterclockwise approx. 1-1/2 turn. Align the punch marks.



## REAR SUSPENSION INSPECTION

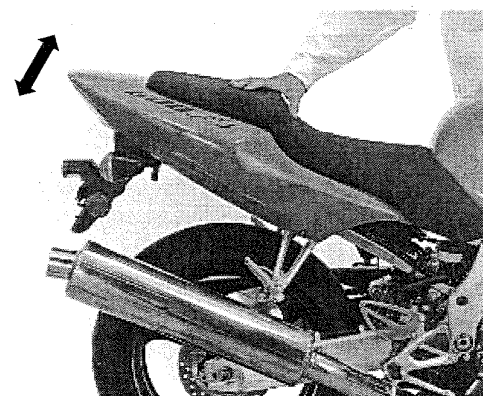
Check the action of the shock absorber by compressing it several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

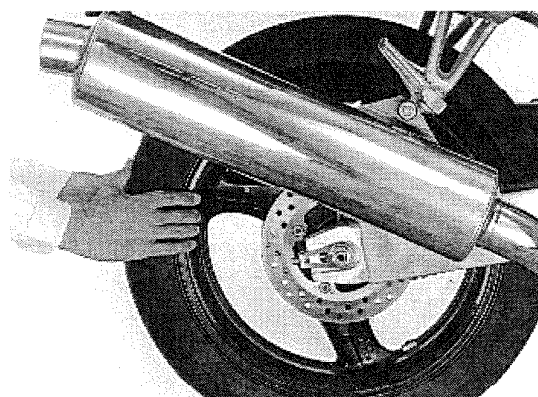
Refer to section 14 for shock absorber service.



Raise the rear wheel off the ground and support the motorcycle securely.

Check for worn swingarm bearings by grabbing the rear wheel and attempting to move the wheel side to side.

Replace the bearings if any looseness is noted (section 14).



## MAINTENANCE

### REAR SUSPENSION ADJUSTMENT

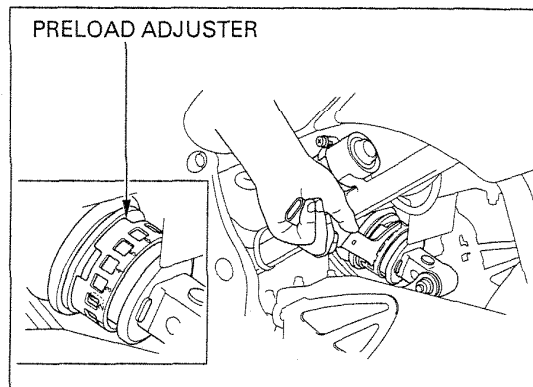
#### SPRING PRELOAD

The spring preload adjuster has 7 positions. To change the spring preload, turn the adjuster with the pin spanner.

Position 2 is the standard position.

Position 1 is for soft spring preload.

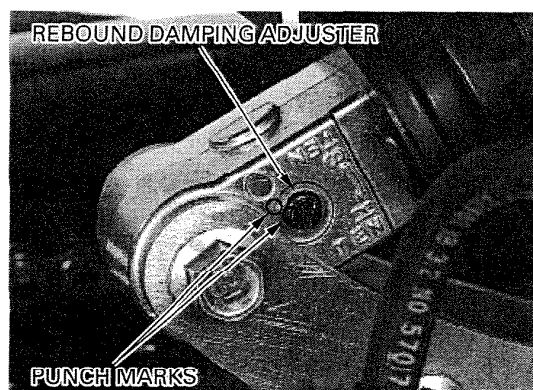
Positions 3 to 7 are for hard spring preload.



#### REBOUND DAMPING

Turn the rebound damping adjuster counterclockwise to reduce the rebound damping force, and turn it clockwise to increase the rebound damping force.

To set the standard position, turn the adjuster clockwise until it stops, then turn it counterclockwise approx. 1 turn. Align the punch marks.



#### COMPRESSION DAMPING

Turn the compression damping adjuster counterclockwise to reduce the compression damping force, and turn it clockwise to increase the compression damping force.

To set the standard position, turn the adjuster clockwise until it stops, then turn it counterclockwise approx. 1 turn. Align the punch marks.



## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-11).

Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

## WHEELS/TIRES

### NOTE:

Tire pressure should be checked when the tires are COLD.

Check the tire pressure with the tire pressure gauge.

### RECOMMENDED TIRE PRESSURE:

**Up to 90 kg (200 lbs) load:**

**Front:** 250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

**Rear:** 290 kPa (2.90 kgf/cm<sup>2</sup>, 42 psi)

**Up to maximum weight capacity:**

**Front:** 250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

**Rear:** 290 kPa (2.90 kgf/cm<sup>2</sup>, 42 psi)

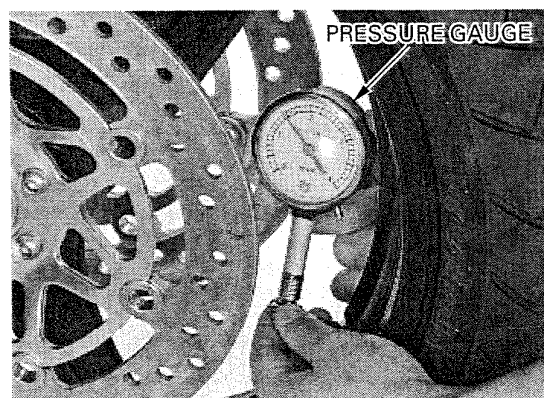
Check the tires for cuts, embedded nails, or other damage.

Check the front and rear wheels for trueness (refer to section 13 and 14).

Measure the tread depth at the center of the tires.  
Replace the tires when the tread depth reaches the following limits.

**MINIMUM TREAD DEPTH:** **Front:** 1.5 mm (0.06 in)

**Rear:** 2.0 mm (0.08 in)



## STEERING HEAD BEARINGS

### NOTE:

Check that the control cables do not interfere with handlebar rotation.

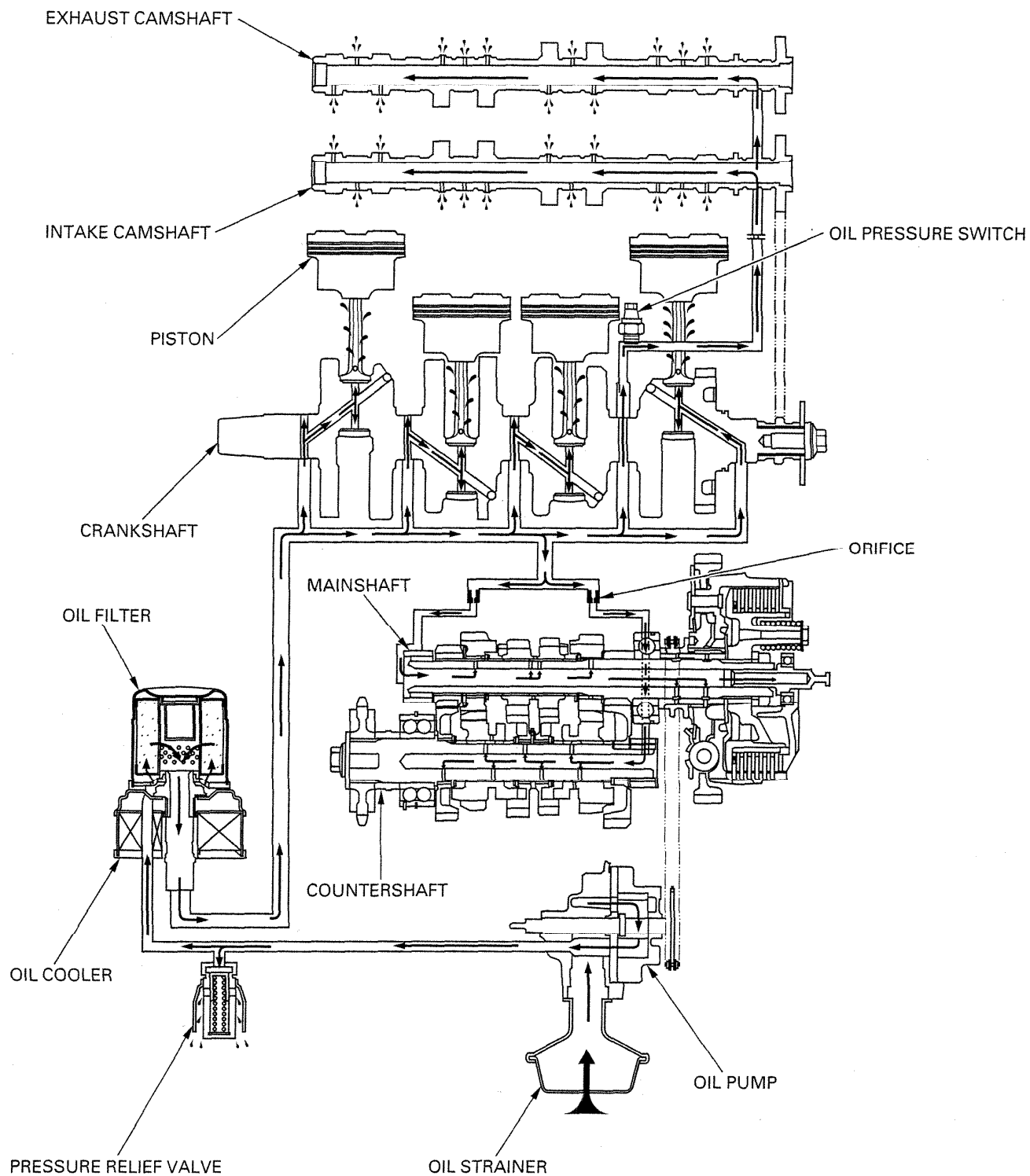
Raise the front wheel off the ground and support the motorcycle securely.

Check that the handlebar moves freely from side to side.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (section 13).



## LUBRICATION SYSTEM



# 4. LUBRICATION SYSTEM

SERVICE INFORMATION	4-1	OIL STRAINER/PRESSURE RELIEF VALVE	4-4
TROUBLESHOOTING	4-2	OIL PUMP	4-6
OIL PRESSURE CHECK	4-3	OIL COOLER	4-8

## SERVICE INFORMATION

### GENERAL

4

#### ▲WARNING

- When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.
- Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.

- The service procedures in this section can be performed with the engine installed in the frame.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- For engine oil level check, see page 3-11.
- For engine oil and filter change, see page 3-12.
- For oil pressure indicator inspection, see page 19-12.

## SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.0 ℓ (3.2 US qt, 2.6 Imp qt)	_____
	After draining/filter change	3.3 ℓ (3.5 US qt, 2.9 Imp qt)	_____
	After disassembly	3.7 ℓ (3.9 US qt, 3.3 Imp qt)	_____
Recommended engine oil		Honda GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40	_____
Oil pressure (at oil main gallery)		490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 6,000 rpm/80 °C (176 °F)	_____
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

## TORQUE VALUES

Oil main gallery sealing bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply locking agent to the threads
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads (page 4-4)
Oil pressure switch terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil pump cover bolt	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	
Oil cooler bolt (filter boss)	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply oil to the threads and seating surface

## TOOLS:

Oil pressure gauge	07506-3000000	or equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07510-MJ10100	

## LUBRICATION SYSTEM

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### TROUBLESHOOTING

#### Oil level too low

- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn stem seals
- Worn valve guide

#### Low oil pressure

- Oil level low
- Clogged oil strainer
- Faulty oil pump
- Internal oil leak
- Incorrect oil being used

#### No oil pressure

- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

#### High oil pressure

- Oil pressure relief valve stuck closed
- Clogged oil gallery or metering orifice
- Incorrect oil being used

#### Oil contamination

- Oil or filter not changed often enough
- Worn piston rings

#### Oil emulsification

- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water



## OIL PRESSURE CHECK

Remove the right side fairing (page 2-4).

Start the engine and warm it up to normal operating temperature.

Stop the engine, remove the oil main gallery sealing bolt.

Connect an oil pressure gauge attachment and gauge to the bolt hole, use care not to allow any locking agent material to enter the engine.

### TOOLS:

**Oil pressure gauge** 07506-3000000 or equivalent commercially available in U.S.A.

**Pressure gauge attachment** 07510-MJ10100 or equivalent commercially available in U.S.A.

Check the oil level and add the recommended oil if necessary (page 3-11).

Start the engine and check the oil pressure at 6,000 rpm/80 °C (176 °F).

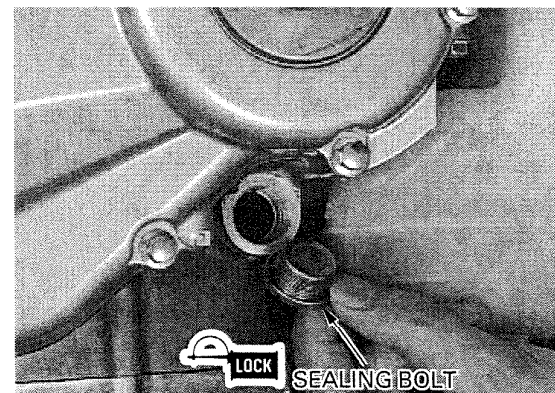
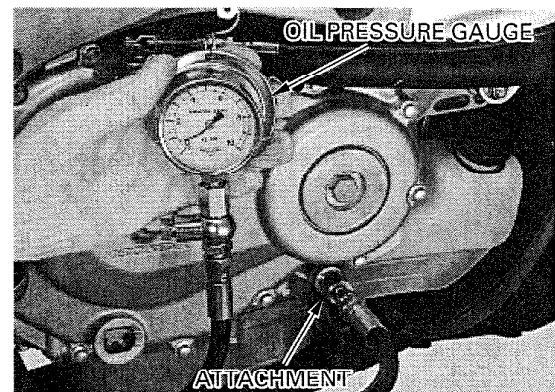
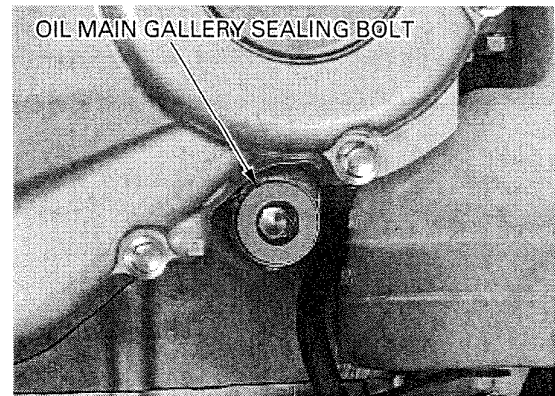
**OIL PRESSURE:** 490 kPa (5.0 kgf/cm<sup>2</sup>, 71 psi)

Stop the engine.

Clean the sealing bolt threads thoroughly. Apply locking agent to the sealing bolt threads and install it.

**TORQUE :** 29 N·m (3.0 kgf·m, 22 lbf·ft)

Install the right side fairing (page 2-4).



## OIL PRESSURE SWITCH REPLACEMENT

Remove the fuel tank (page 2-3).

Remove the rubber cap and disconnect the switch wire by removing the terminal screw. Remove the oil pressure switch.



## LUBRICATION SYSTEM

Apply sealant to the oil pressure switch threads as shown and install it.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

### CAUTION:

*To prevent crankcase damage, do not overtighten the switch.*

Connect the oil pressure switch wire and tighten the terminal screw.

**TORQUE** : 2 N·m (0.2 kgf·m , 1.4 lbf·ft)

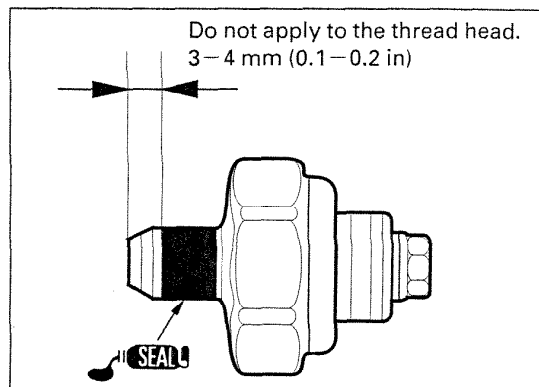
Install the rubber cap properly.

Install the fuel tank (page 2-3).

Start the engine.

Check that the oil pressure indicator goes out after one or two seconds.

If the oil pressure indicator stays on, stop the engine and check the indicator system (page 19-12).



## OIL STRAINER/PRESSURE RELIEF VALVE

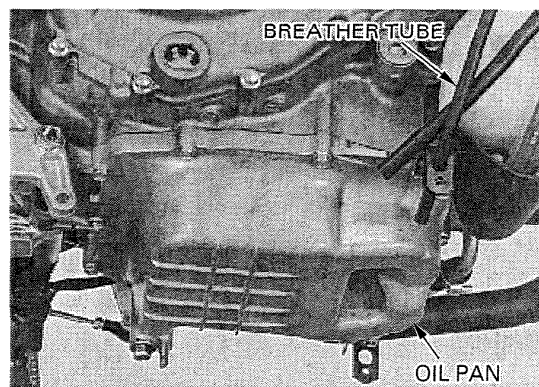
### OIL PAN REMOVAL

Drain the engine oil (page 3-12).

Remove the exhaust pipe (page 2-7).

Remove the reserve tank breather tube from the stay.

Remove the eleven bolts and the oil pan.



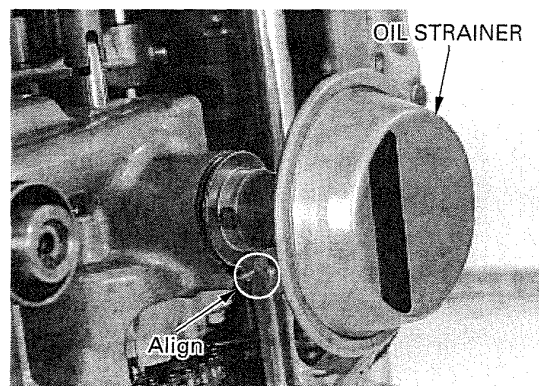
### OIL STRAINER

Remove the oil strainer and seal rubber from the oil pump.

Clean the oil strainer screen thoroughly.

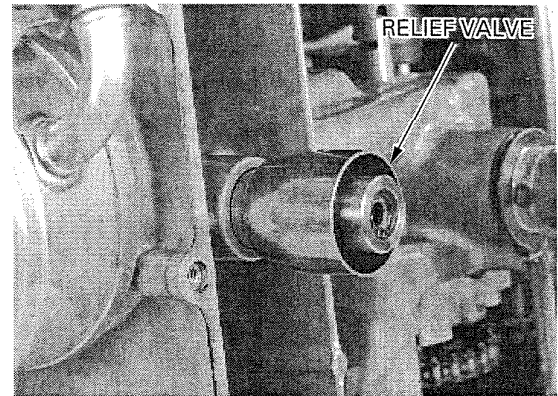
Coat a new seal rubber with oil and install it onto the strainer.

Install the oil strainer by aligning its tab with the groove in the crankcase.



### OIL PRESSURE RELIEF VALVE

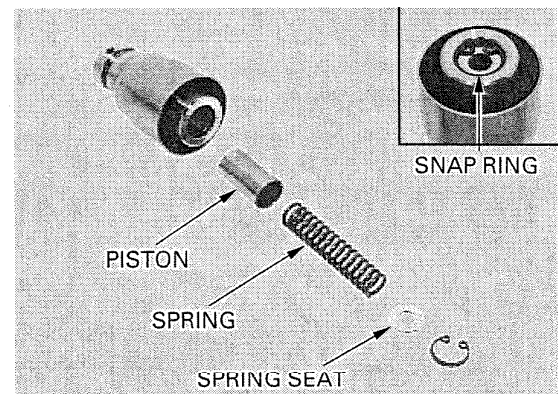
Remove the oil pressure relief valve from the crankcase.  
Remove the O-ring from the relief valve body.



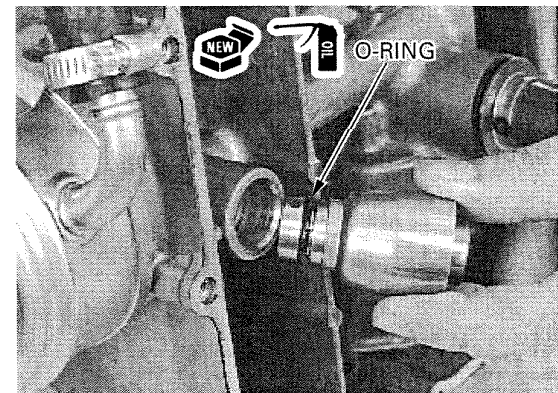
Remove the snap ring.  
Remove the spring seat, spring and piston from the valve body.

Check the piston for wear, sticking or other damage.  
Check the spring for fatigue or damage.

Install the piston, spring and spring seat and secure them with the snap ring.

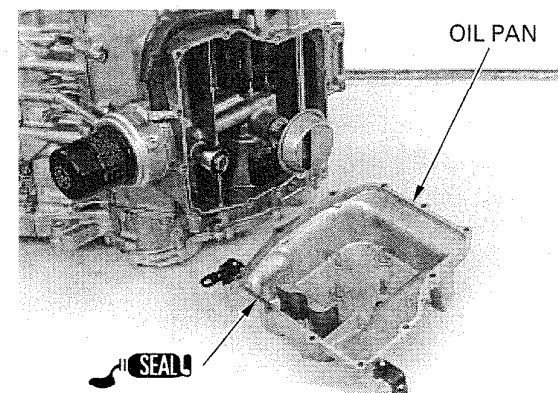


Coat a new O-ring with oil and install it into the relief valve body groove.  
Install the relief valve into the crankcase.



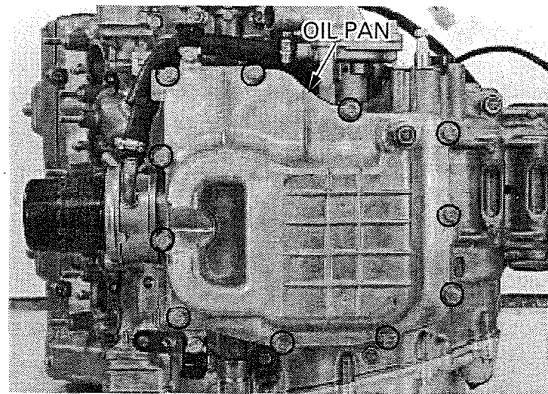
### OIL PAN INSTALLATION

Clean the oil pan mating surfaces thoroughly, being careful not to damage them.  
Apply sealant to the oil pan mating surface.



## LUBRICATION SYSTEM

Install the oil pan and tighten the eleven bolts in a crisscross pattern in 2 or 3 steps.  
Install the breather tube into the stay.  
Route the tube properly (page 1-18).  
Install the exhaust pipe and muffler (page 2-7).  
Fill the crankcase with recommended engine oil (page 3-12).

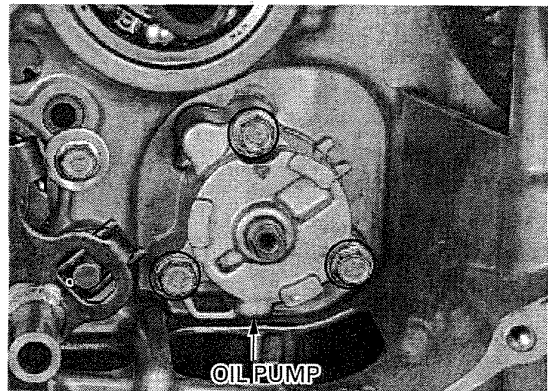


## OIL PUMP

### REMOVAL

Remove the clutch and oil pump driven sprocket (page 9-3).

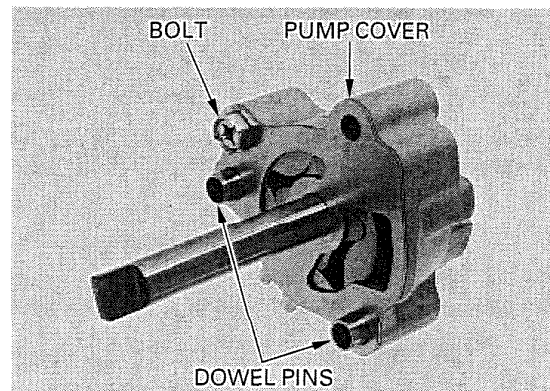
Remove the three mounting bolts and oil pump.



### DISASSEMBLY

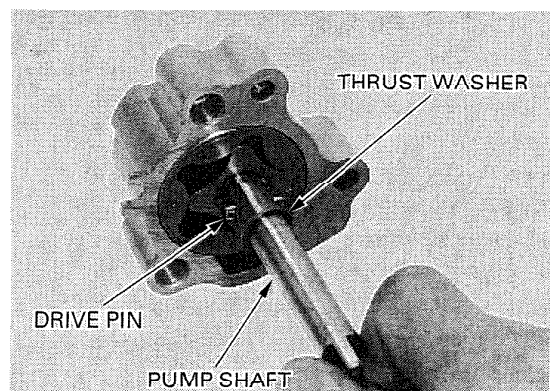
Remove the following:

- dowel pins
- bolt and pump cover



- pump shaft
- thrust washer
- drive pin
- inner and outer rotors.

Clean the disassembled parts thoroughly.



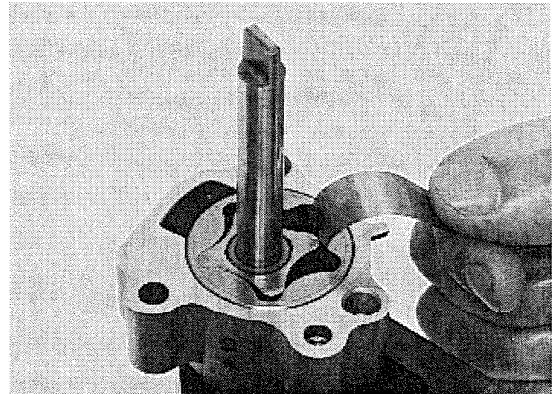
### INSPECTION

#### NOTE:

If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.

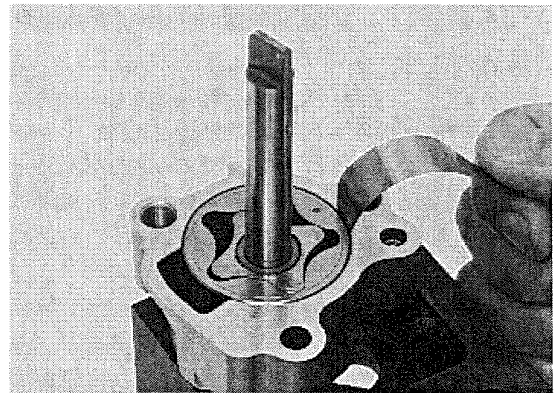
Temporarily assemble the oil pump.  
Measure the rotor tip clearance.

**SERVICE LIMIT:** 0.20 mm (0.008 in)



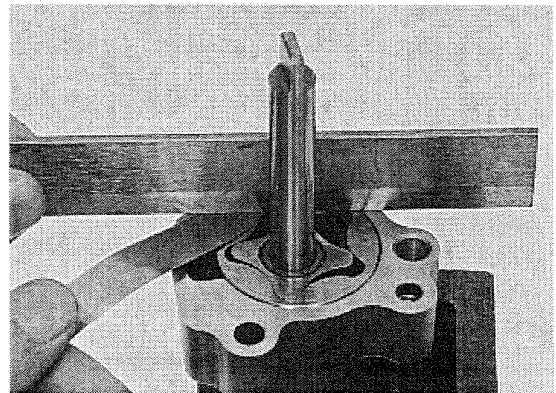
Measure the pump body clearance.

**SERVICE LIMIT:** 0.35 mm (0.014 in)



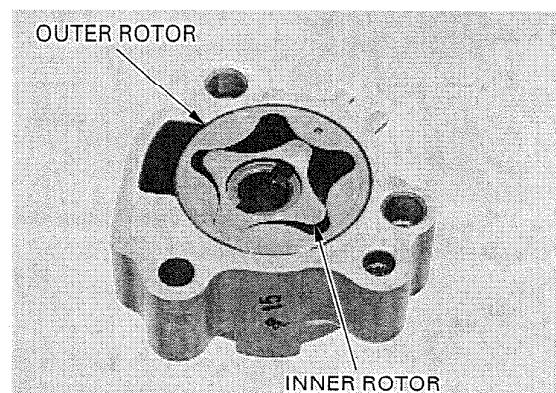
Measure the pump side clearance.

**SERVICE LIMIT:** 0.10 mm (0.004 in)



### ASSEMBLY

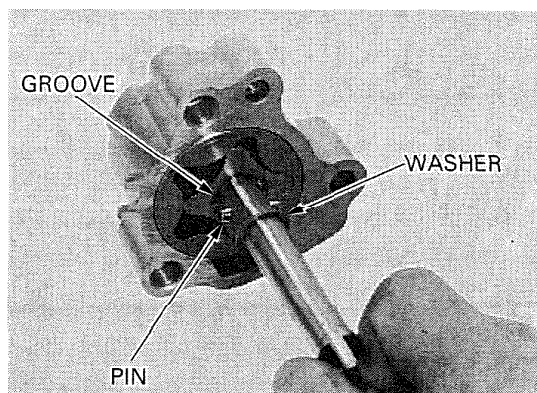
Install the outer and inner rotors into the pump body with the driver pin grooves in the inner rotor facing the pump cover.





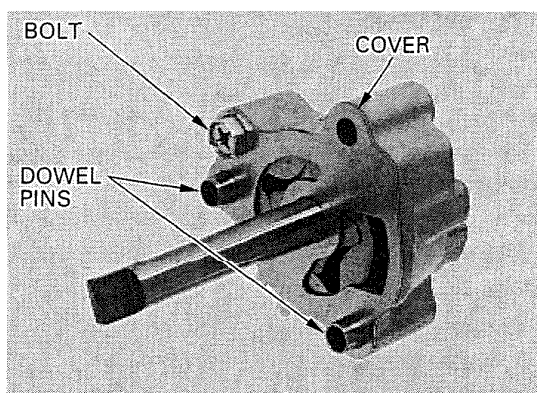
## LUBRICATION SYSTEM

Install the drive pin into the pump shaft.  
Install the pump shaft by aligning the pin with the grooves in the inner rotor.  
Install the thrust washer onto the inner rotor.



Install the pump cover and dowel pins, and tighten the bolt.

**TORQUE** : 8 N·m (0.8 kgf·m , 5.8 lbf·ft)

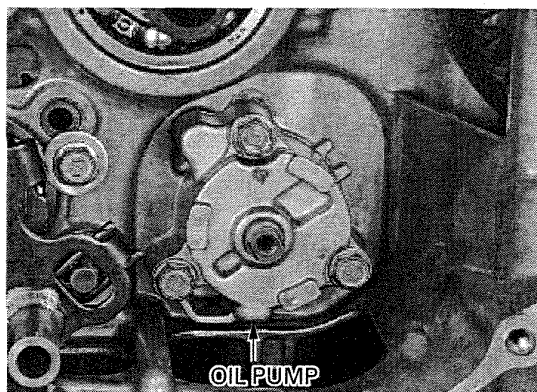


## INSTALLATION

Install the oil pump onto the crankcase while aligning the pump shaft lug with the water pump shaft groove by turning the pump shaft.

Install the pump mounting bolts and tighten them.

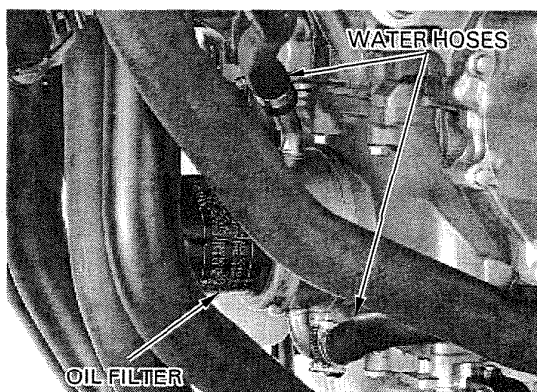
Install the clutch assembly (page 9-9).



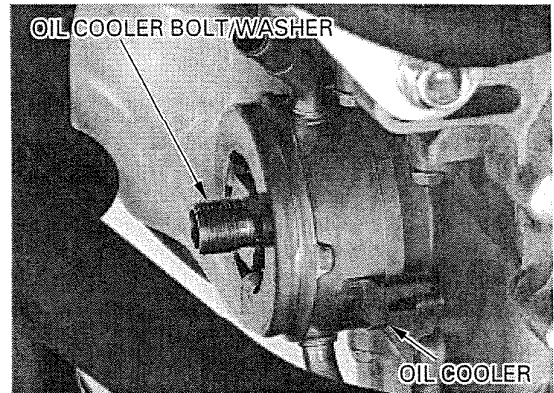
## OIL COOLER

### REMOVAL

Remove the oil filter (page 3-12).  
Drain the coolant from the system (page 6-5).  
Disconnect the water hoses from the oil cooler.



Remove the oil cooler bolt (filter boss), washer and oil cooler.  
Remove the O-ring from the oil cooler.

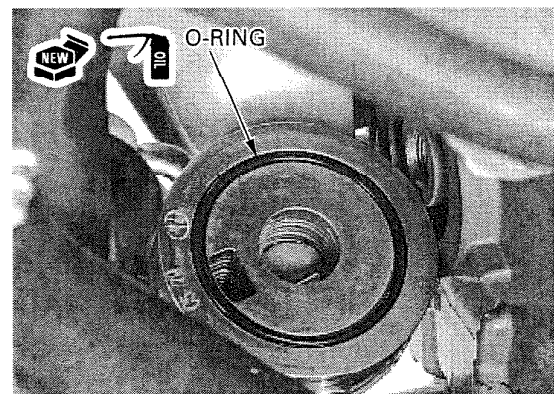


## INSPECTION

Check the oil cooler for damage.

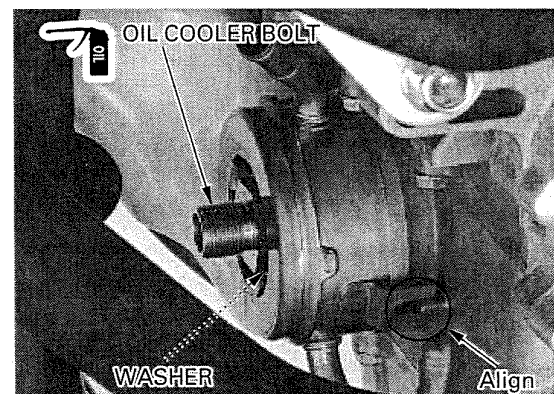
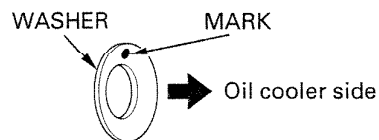
## INSTALLATION

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



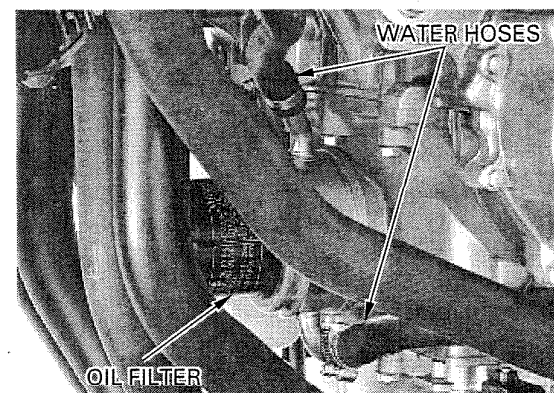
Apply engine oil to the oil cooler bolt threads and seating surface.  
Install the oil cooler by aligning the guide groove with the lug on the crankcase. Install the cooler bolt and washer with the concave of the washer ("O" mark) facing the oil cooler.  
Tighten the cooler bolt.

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



Connect the water hoses to the oil cooler.

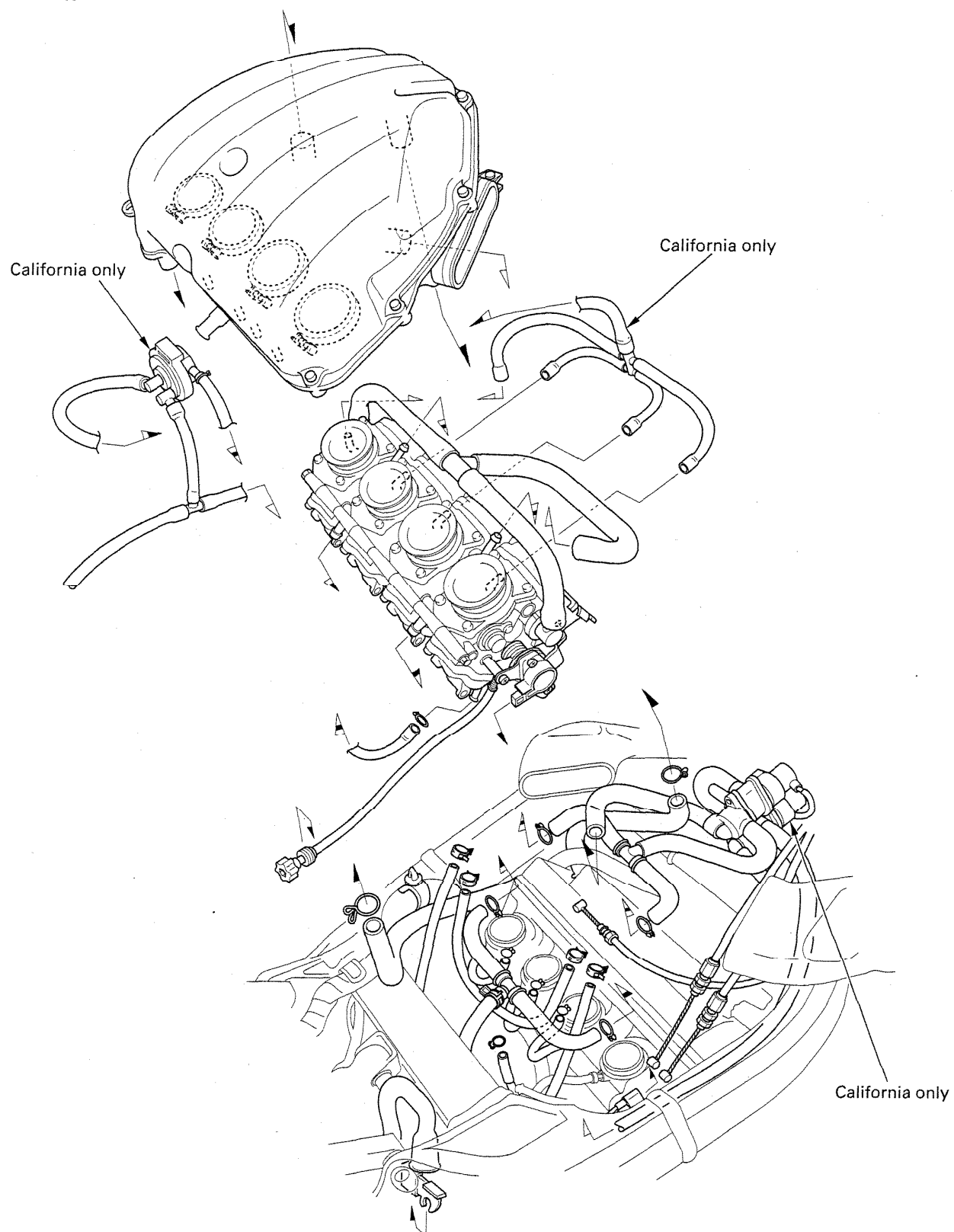
Install the oil filter (page 3-12).  
Fill and bleed the cooling system (page 6-4).



## FUEL SYSTEM

---

California type shown:



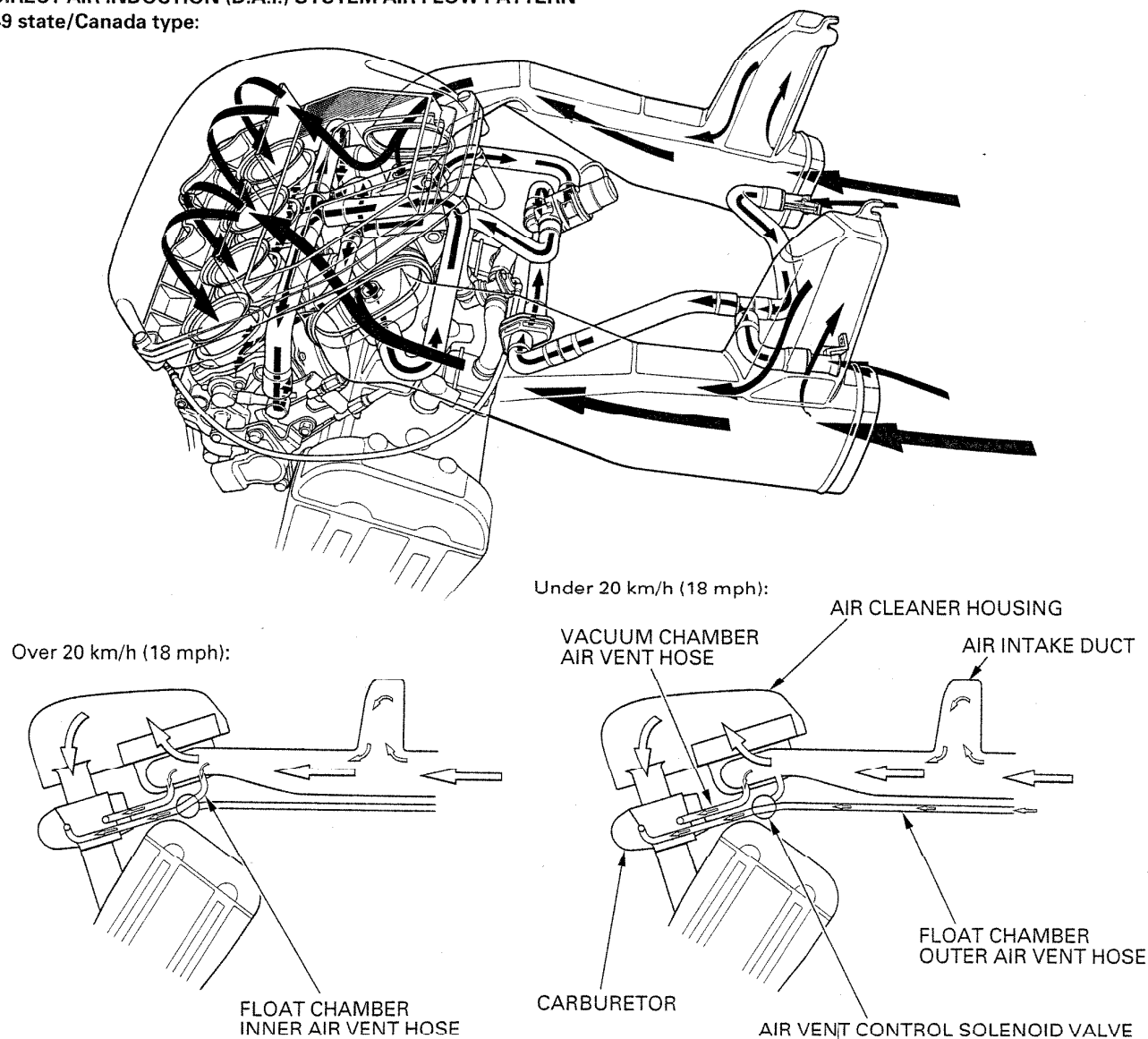


# 5. FUEL SYSTEM

SERVICE INFORMATION	5-3	CARBURETOR INSTALLATION	5-30
TROUBLESHOOTING	5-5	PILOT SCREW ADJUSTMENT	5-33
AIR CLEANER HOUSING	5-14	HIGH ALTITUDE ADJUSTMENT	5-34
CARBURETOR REMOVAL	5-15	DIRECT AIR INDUCTION (D.A.I.) SYSTEM	5-36
CARBURETOR SEPARATION	5-16	FUEL PUMP	5-37
CARBURETOR DISASSEMBLY/INSPECTION	5-18	SECONDARY AIR SUPPLY SYSTEM	5-37
CARBURETOR ASSEMBLY	5-22	EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	5-39
CARBURETOR COMBINATION	5-26		

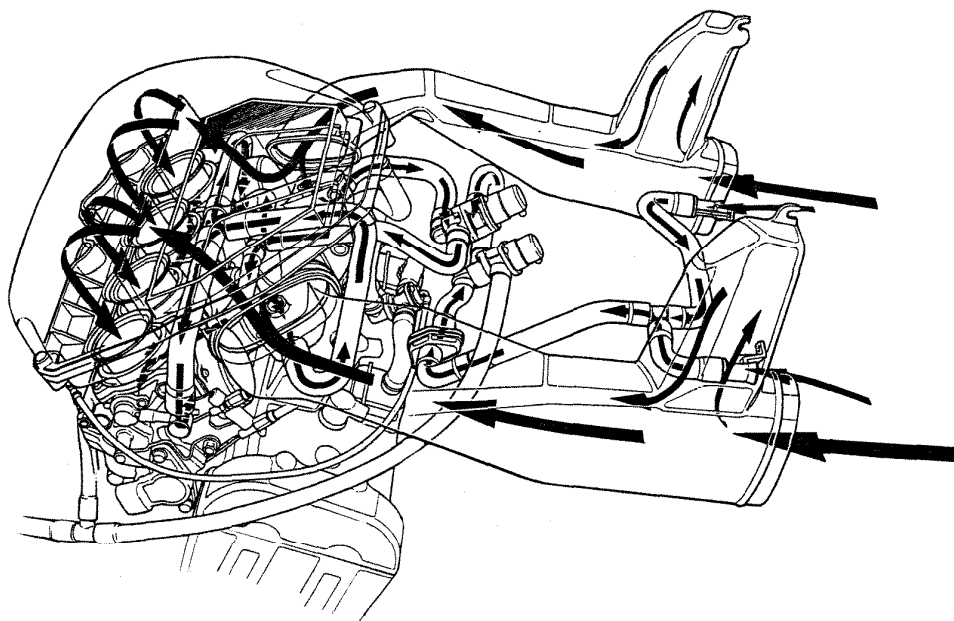
5

DIRECT AIR INDUCTION (D.A.I.) SYSTEM AIR FLOW PATTERN  
49 state/Canada type:



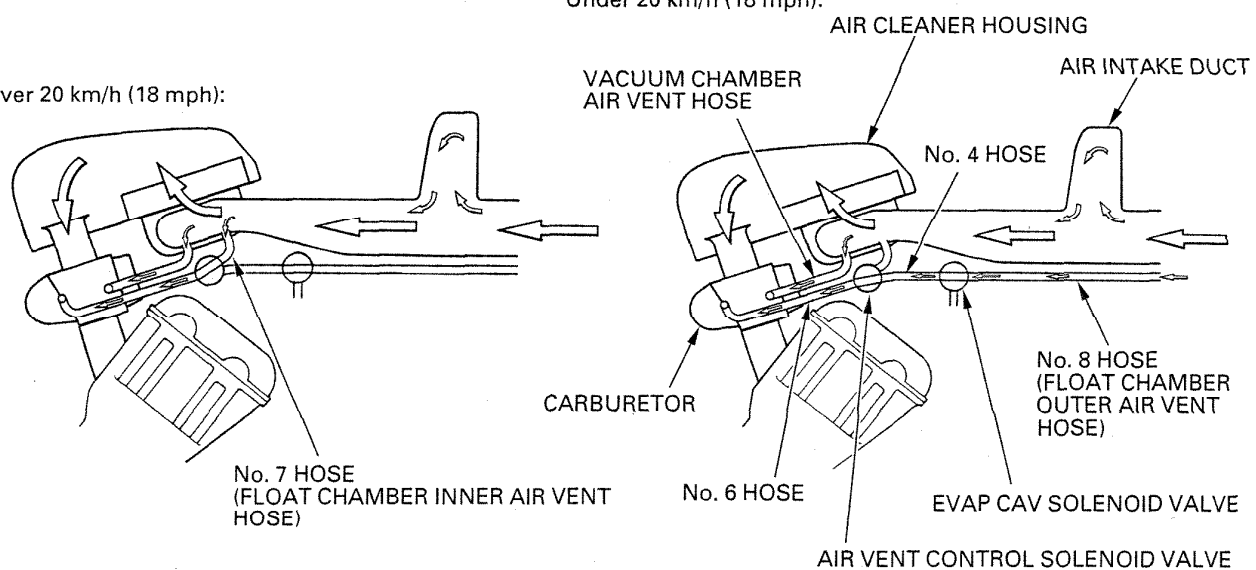
## FUEL SYSTEM

California type:



Under 20 km/h (18 mph):

Over 20 km/h (18 mph):



## SERVICE INFORMATION

### GENERAL

---

#### **▲WARNING**

- *Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*
  - *When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*
  - *Bending or twisting the control cables will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.*
- 

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

---

#### CAUTION:

*Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragms might be damaged.*

---

- For fuel tank and air intake duct removal and installation, see page 2-3.
- For throttle sensor inspection and replacement, see page 17-7.
- For carburetor synchronization, see page 3-13.
- Before disassembling the carburetors, place an approved fuel container under the carburetors, loosen the drain screws and drain the carburetors.
- After removing the carburetors, cover the intake ports of the cylinder heads with a piece of tape to prevent any foreign material from dropping into the engine.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The vacuum chamber and float chamber can be serviced with the carburetors combined.

---

#### NOTE:

If the vehicle is to be stored for more than one month, drain the float bowls. Fuel left in the float bowls may cause clogged jets, resulting in hard starting or poor driveability.

---

## FUEL SYSTEM

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	49 state/Canada type	VP64C
	California type	VP64B
Main jet	49 state/Canada type	No. 1/4 carburetor: # 132 , No. 2/3 carburetor: # 135
	California type	# 128 (all carburetors)
Slow jet		# 40
Pilot screw	initial/final opening	See page 5-33
	high altitude adjustment	See page 5-34
Float level		$13.7 \pm 0.5$ mm ( $0.54 \pm 0.02$ in)
Idle speed	49 state/Canada type	$1,300 \pm 100$ rpm
	California type	$1,400 \pm 100$ rpm
Carburetor vacuum difference (base carburetor: No. 4)		Within 30 mm Hg (1.2 in Hg)
Fuel pump flow capacity (minimum)		700 cm <sup>3</sup> (23.7 US oz , 24.6 Imp oz) /minute
Throttle grip free play		2–6 mm (1/16–1/4 in)

### TORQUE VALUES

Starting enrichment (SE) valve nut	2 N·m (0.2 kgf·m , 1.4 lbf·ft)
Carburetor connecting nut (6 mm)	9 N·m (0.9 kgf·m , 6.5 lbf·ft)
(5 mm)	5 N·m (0.5 kgf·m , 3.6 lbf·ft)
Reed valve cover bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)

### TOOL

Float level gauge	07401-0010000
Pilot screw wrench	07KMA-MN90100 or 07KMA-MS60101

## TROUBLESHOOTING

### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
  - Clogged fuel filter
  - Clogged fuel line
  - Clogged fuel tank breather tube
- Too much fuel getting to the engine
  - Clogged air cleaner
  - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Improper choke operation
- Improper throttle operation
- Fuel pump system malfunction
- No spark at plug (faulty ignition system—section 17)

### Engine stalls, hard to start, rough idling

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Restricted fuel tank breather tube
- Clogged air cleaner
- Clogged slow circuit
- Starting enrichment valve open
- Fuel pump system malfunction
- D.A.I. system malfunction
- Faulty EVAP CAV and/or EVAP purge control system (California type)
- Faulty ignition system (section 17)

### Afterburn when engine braking is used

- Lean mixture in slow circuit
- Faulty air cut-off valve
- Faulty pulse secondary air injection (PAIR) system
- Faulty ignition system (section 17)

### Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (section 17)

### Poor performance (driveability)

- Clogged fuel system
- Fuel pump system malfunction
- D.A.I. system malfunction
- Faulty EVAP CAV control system (California type)
- Faulty ignition system (section 17)

### Lean mixture

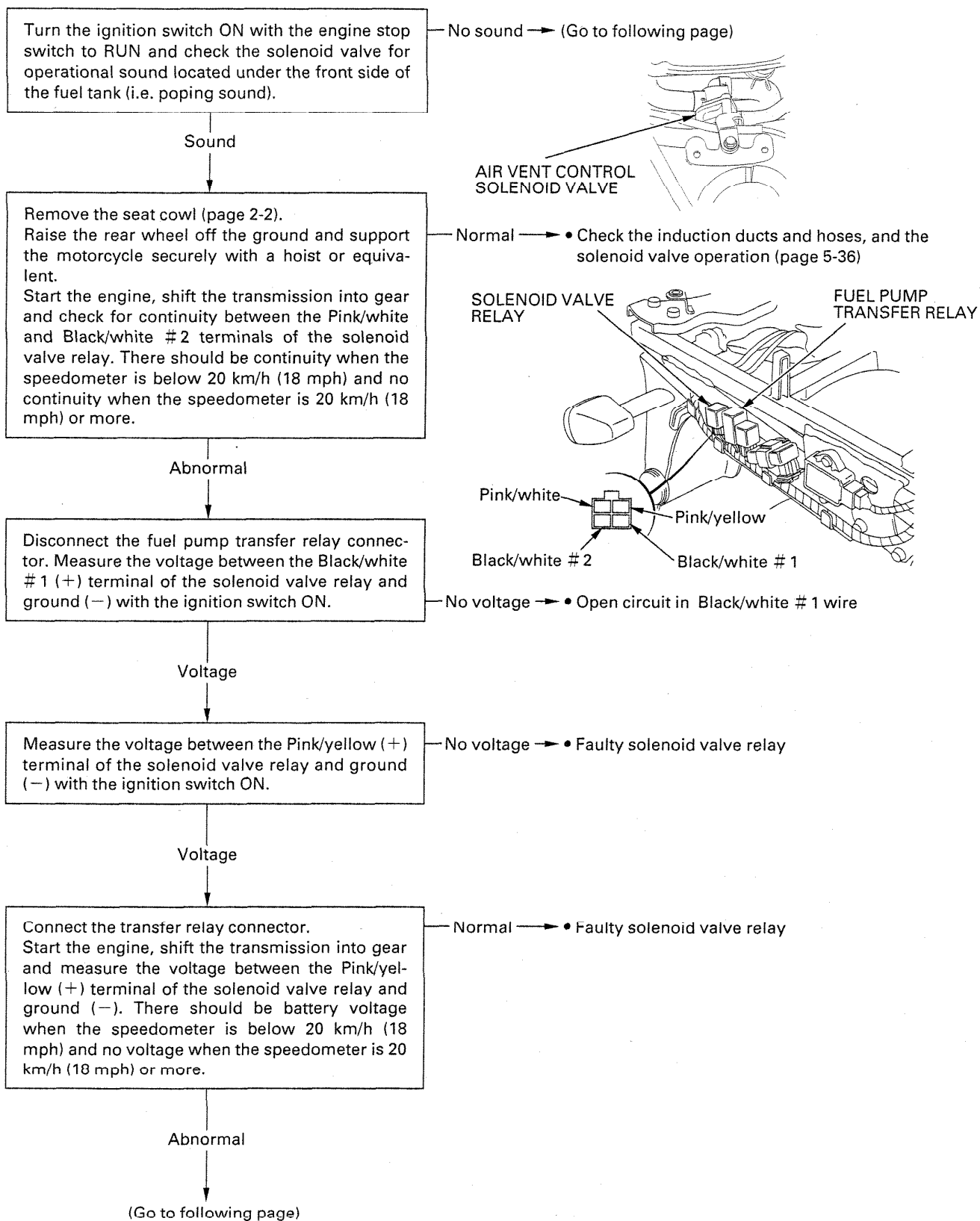
- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Restricted fuel tank breather tube
- Intake air leak
- Faulty vacuum piston
- Fuel pump system malfunction
- Faulty EVAP CAV control system (California type)

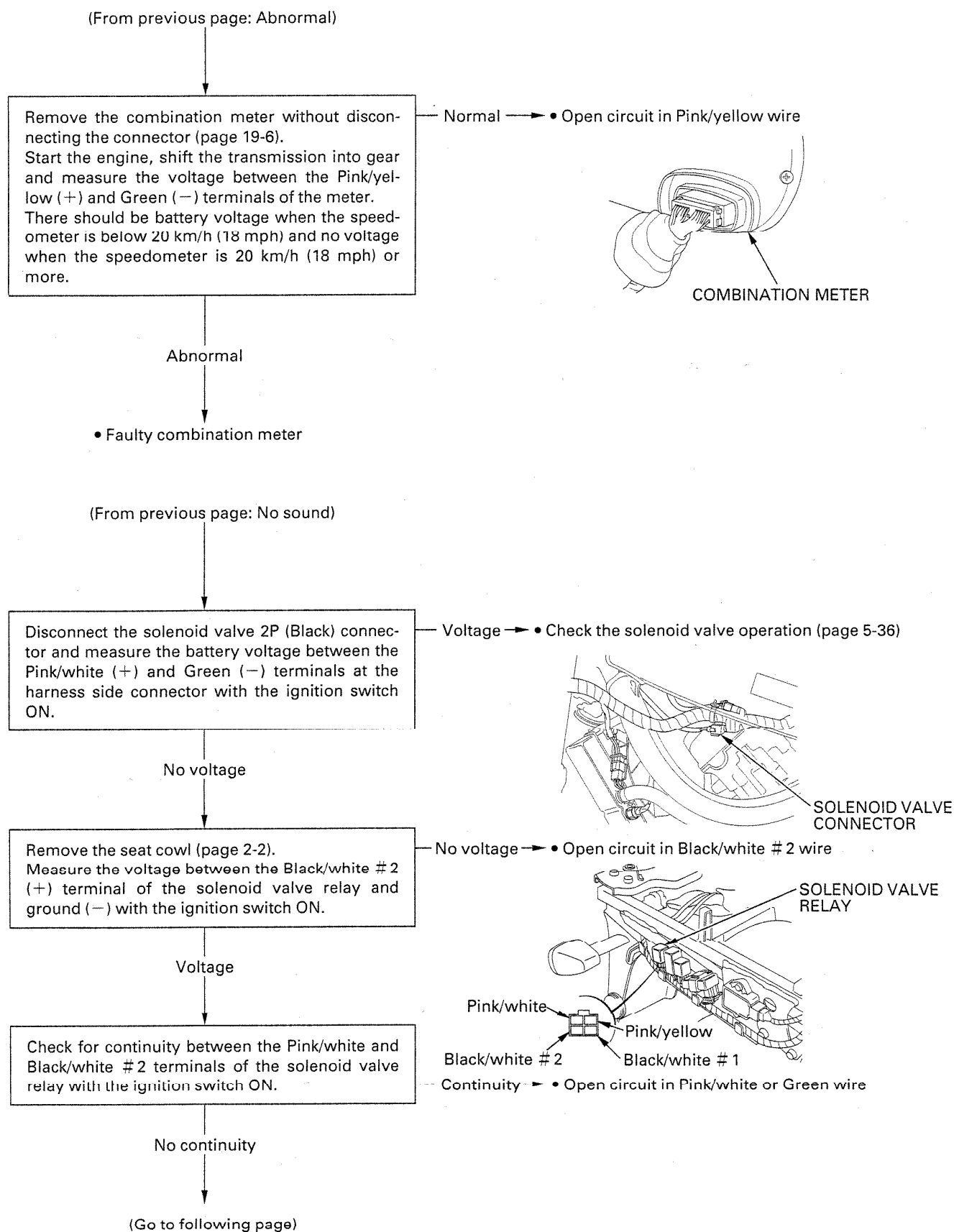
### Rich mixture

- Starting enrichment valve open
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Faulty vacuum piston
- Faulty EVAP purge control system (California type)

## FUEL SYSTEM

### Direct Air Induction (D.A.I.) system malfunction (49 STATE/CANADA type)





## FUEL SYSTEM

---

(From previous page: No continuity)

Measure the voltage between the Black/white # 2 (+) and Pink/yellow (-) terminals of the solenoid valve relay with the ignition switch ON.

No voltage → • Faulty solenoid valve relay

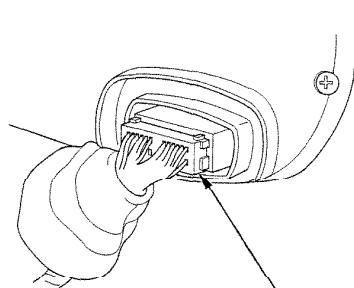
Voltage

Disconnect the combination meter connector (page 19-6).  
Check for continuity between the Pink/yellow terminal of the meter connector and ground.

Continuity → • Short circuit in Pink/yellow wire

No continuity

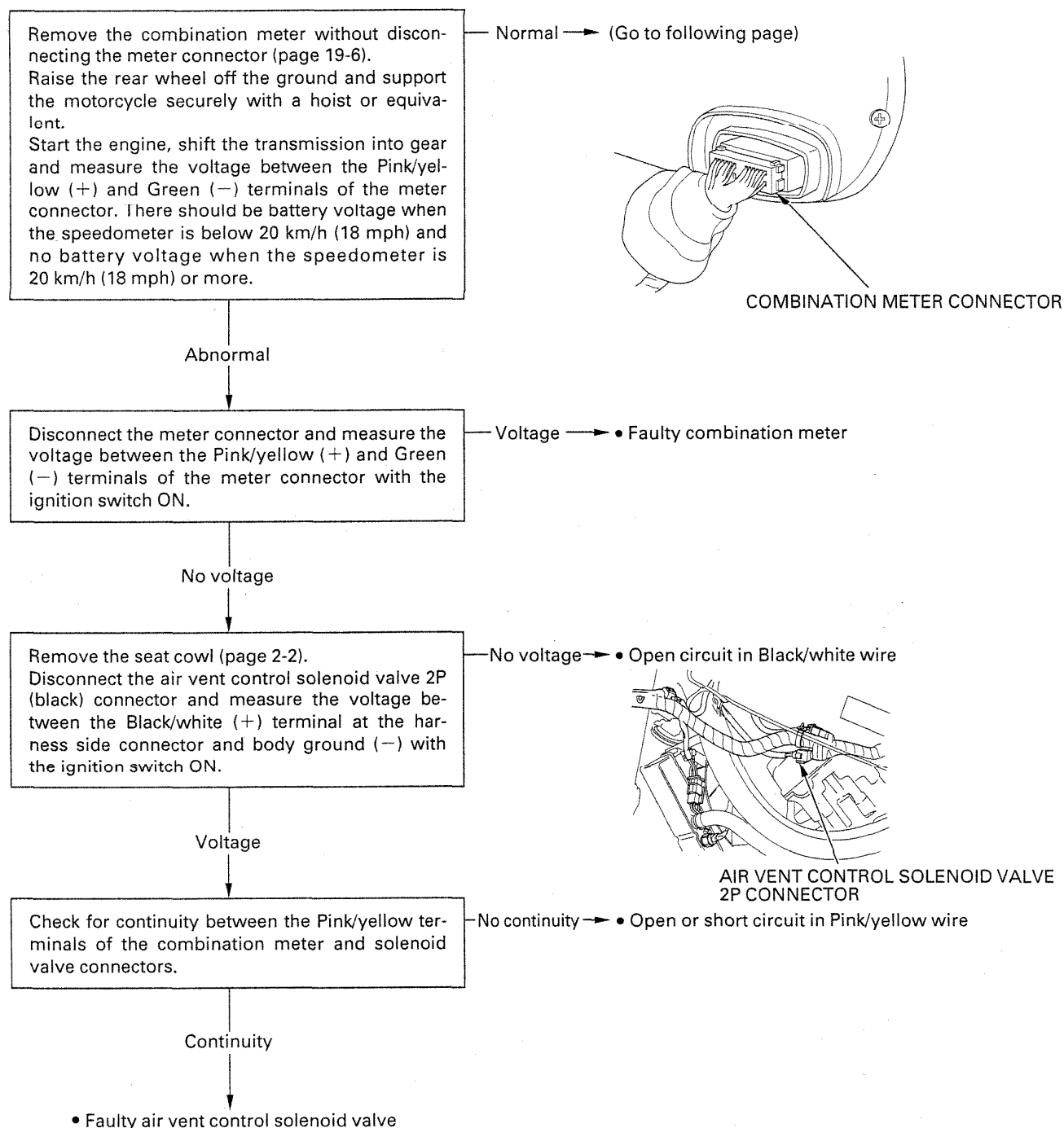
• Faulty combination meter



COMBINATION METER CONNECTOR



## Direct Air Induction (D.A.I.) system malfunction (CALIFORNIA type)



## FUEL SYSTEM

---

(From previous page: Normal)

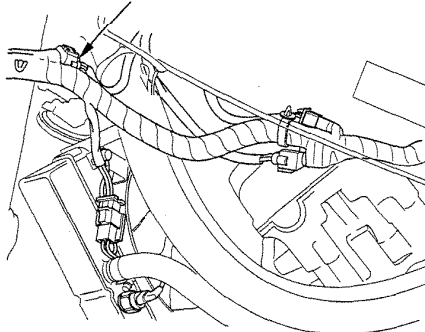
Disconnect the EVAP CAV solenoid valve 2P (black) connector.  
Measure the voltage between the Black (+) and Green (-) terminals at the harness side connector with the ignition switch ON.

No voltage → • Open circuit in Black or Green wire

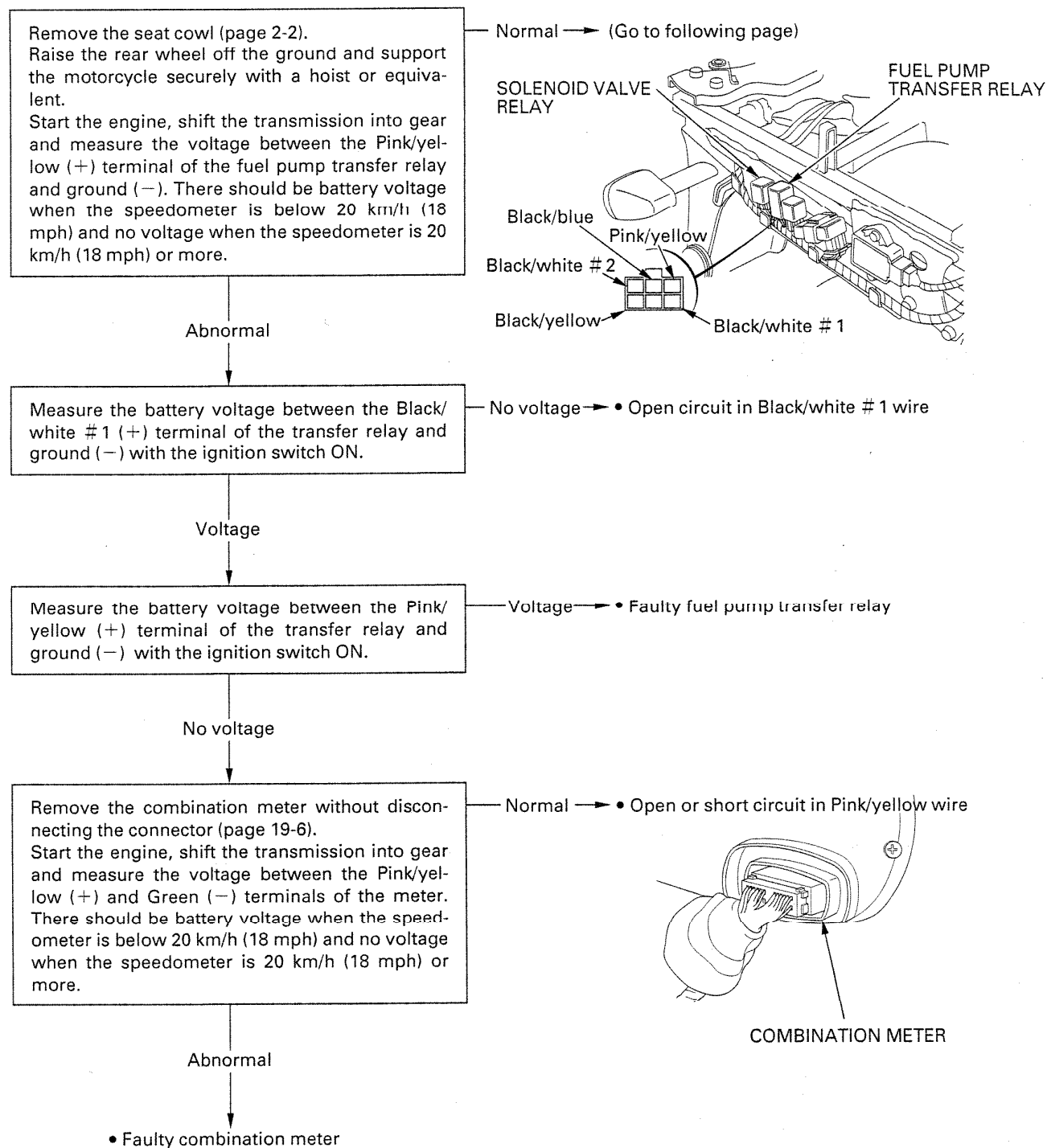
Voltage

- Check the induction ducts, hoses, and the air vent control solenoid valve and EVAP CAV solenoid valve operation (page 5-36 and 5-41)

EVAP CAV SOLENOID VALVE  
2P CONNECTOR



## Fuel pump system malfunction



## FUEL SYSTEM

(From previous page: Normal)

Disconnect the fuel pump transfer relay connector. Check for continuity between the Black/blue and Black/yellow terminals of the transfer relay. There should be no continuity while the 12V battery is connected to the Black/white # 1 (+) and Pink/yellow (-) terminals of the relay and continuity when the battery is disconnected.

Abnormal → • Faulty fuel pump transfer relay

Normal

Check for continuity between the Black/blue and Black/white # 2 terminals of the transfer relay. There should be continuity while the 12V battery is connected to the Black/white # 1 (+) and Pink/yellow (-) terminals of the relay and no continuity when the battery is disconnected.

Abnormal → • Faulty fuel pump transfer relay

Normal

Measure the battery voltage between the Black/white # 2 (+) terminal of the transfer relay connector and ground (-) with the ignition switch ON.

No voltage → • Open circuit in Black/white # 2 wire

Voltage

Check for continuity between the Black/blue terminal of the transfer relay connector and ground.

No continuity → • Open circuit in Black/blue or Green wire  
• Faulty fuel pump

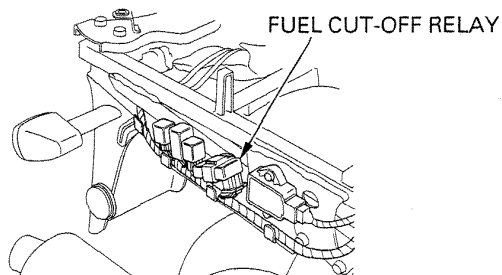
Continuity

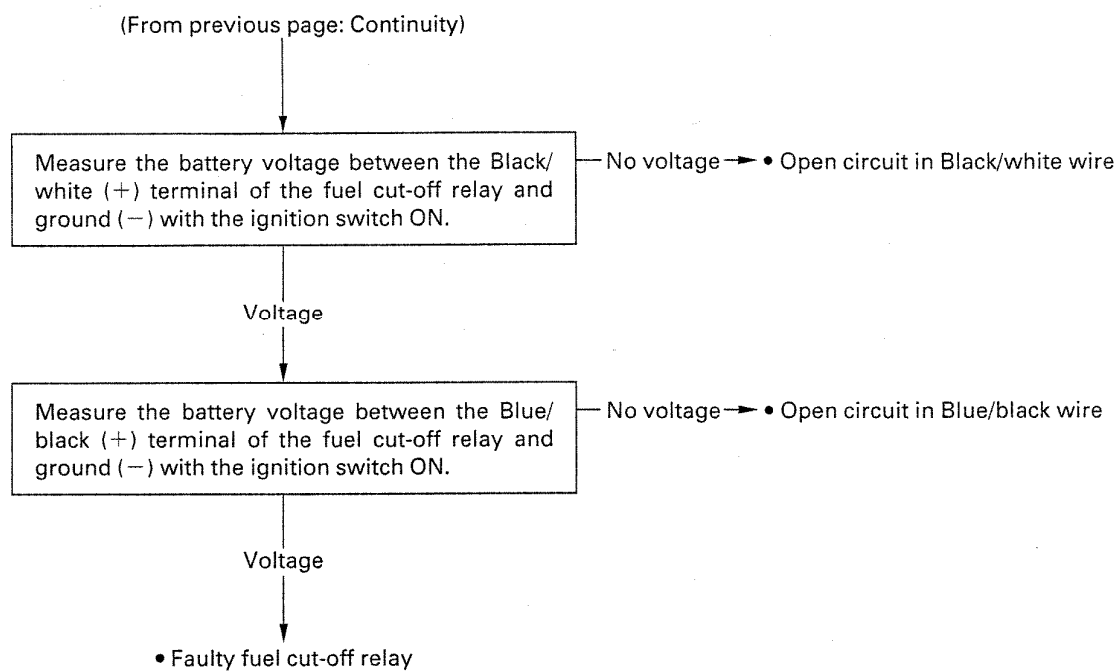
Check for continuity between the Black/yellow terminals of the fuel cut-off relay and transfer relay connectors.

No continuity → • Open circuit in Black/yellow wire

Continuity

(Go to following page)





## FUEL SYSTEM

### AIR CLEANER HOUSING

#### REMOVAL/INSTALLATION

Remove the fuel tank (page 2-3).

*California type only:* Remove the evaporative emission (EVAP) purge control valve from the air cleaner housing.

Remove the wire harness clip from the air cleaner housing.

*Be careful not to break the plastic plugs.* Disconnect the four vacuum tubes and secondary air supply hose (California: No. 15).

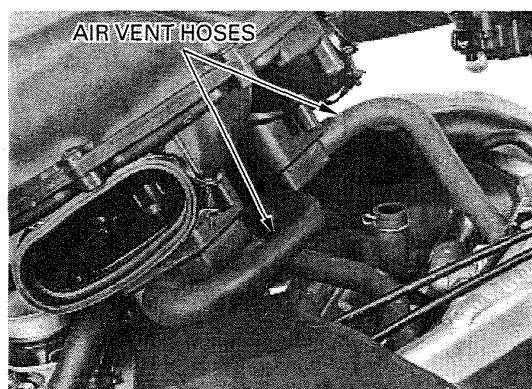
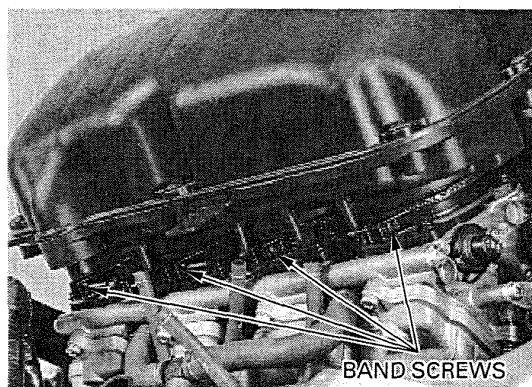
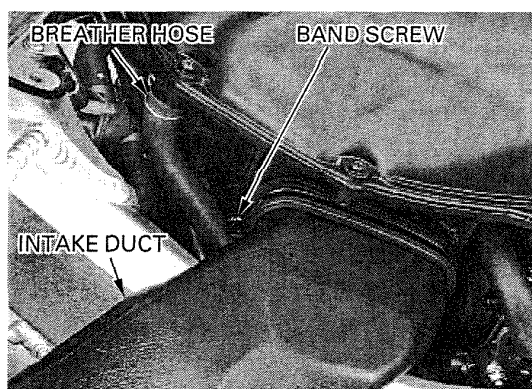
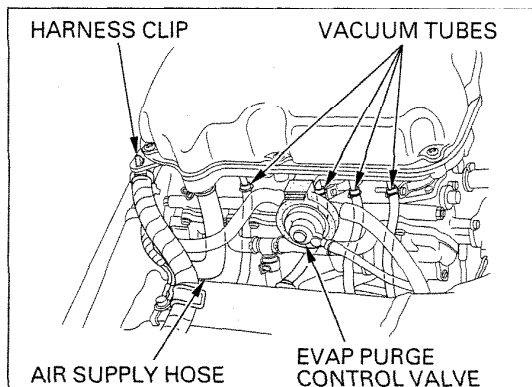
Disconnect the crankcase breather hose from the air cleaner housing.

Loosen the two connecting tube band screws of the air intake ducts.

Loosen the four connecting tube band screws. Remove the air cleaner housing off the carburetor intake ports and air intake ducts.

Disconnect the float chamber inner air vent hose (California: No. 7) and the vacuum chamber air vent hose.

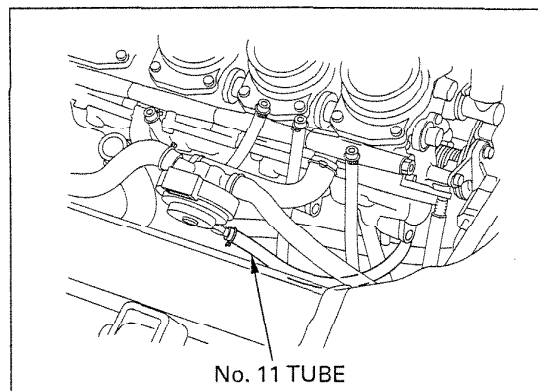
Installation is in the reverse order of removal.



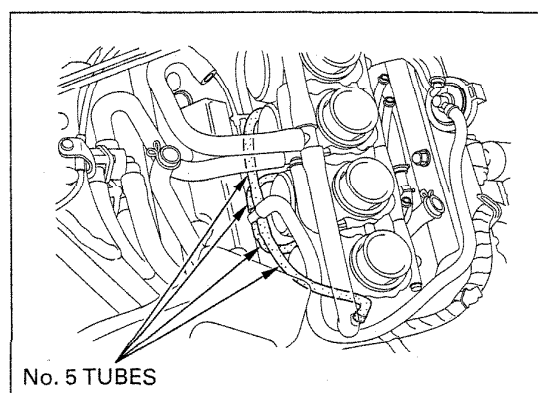
## CARBURETOR REMOVAL

Drain the coolant (page 6-5).  
Remove the air cleaner housing (page 5-14).

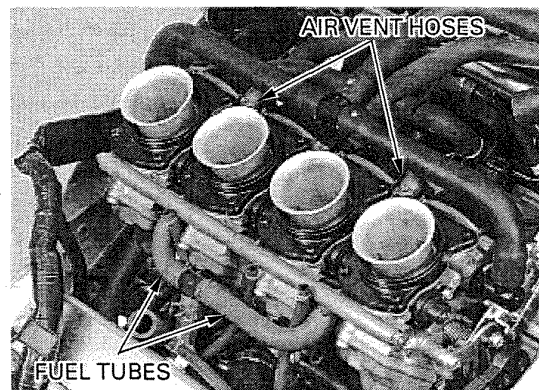
*California type only:* Disconnect the No. 11 tube.



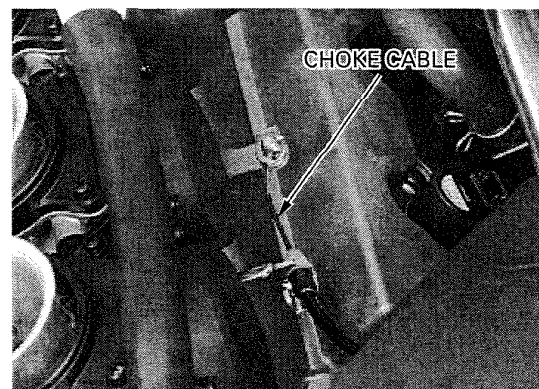
*California type only:* Disconnect the No. 5 tubes.



Disconnect the float chamber air vent hoses and the fuel tubes from the carburetor.

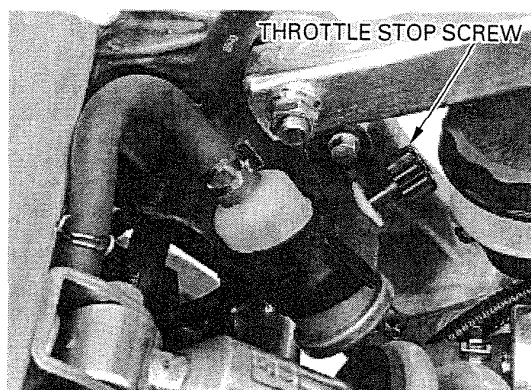


Remove the choke cable from the cable holder and disconnect it from the starting enrichment (SE) valve arm.

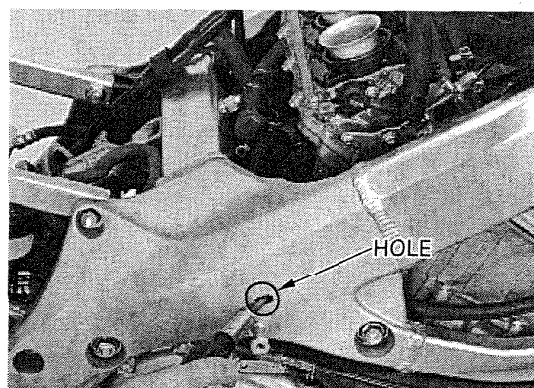


## FUEL SYSTEM

Remove the throttle stop screw from the holder.



Loosen the four carburetor insulator band screws at the engine side, using a long screwdriver through the hole in both sides of the frame.



*Place a clean shop towel over the intake ports to prevent any foreign material from dropping into the engine.*

Remove the carburetor assembly off the cylinder head intake ports.

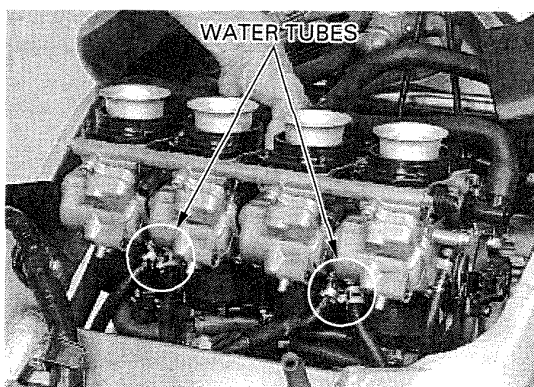
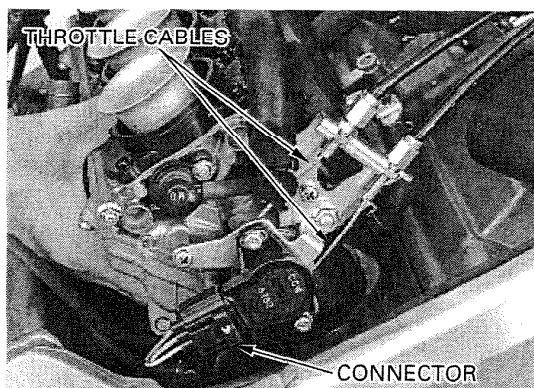
Disconnect the throttle sensor connector.

### NOTE:

Do not remove the throttle sensor unless it is necessary to replace it or disassemble the carburetor. For sensor inspection and replacement, see page 17-7.

Loosen the throttle cable lock nuts, then remove the cables from the cable holder and disconnect them from the throttle drum.

Disconnect the water tubes from the carburetor.





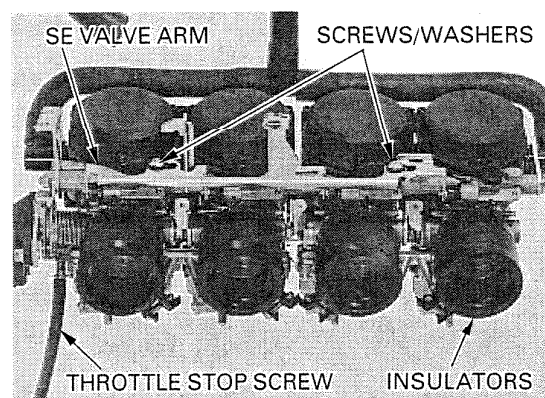
## CARBURETOR SEPARATION

### NOTE:

The vacuum chamber and float chamber can be serviced without separating the carburetors.

Remove the following:

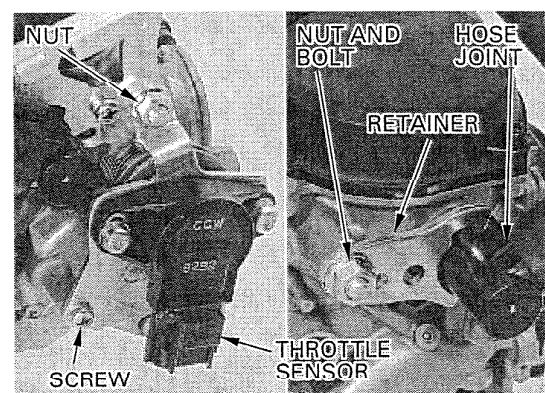
- throttle stop screw with spring and washer
- carburetor insulators by loosening band screws
- two screws and washers
- SE valve arm and return spring
- two collars



- front connecting nut, screw and throttle sensor.

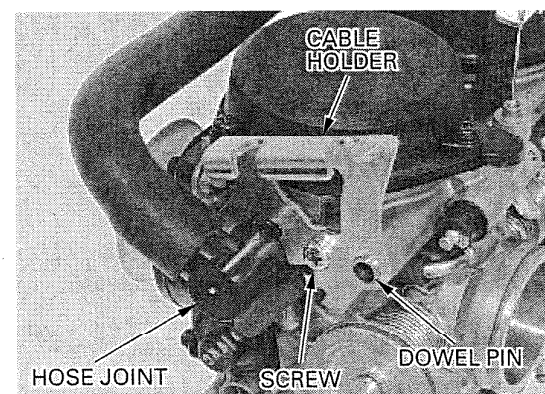
### CAUTION:

*Do not remove the throttle sensor from the bracket unless it requires replacement. It may cause the sensor to move out of position resulting in improper ignition timing.*

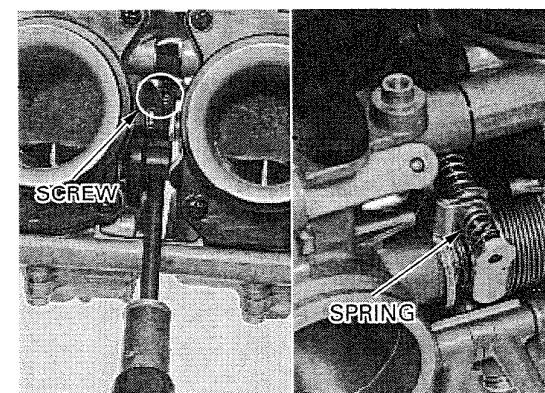


- connecting nut, bolt and joint retainer
- air vent hose joint with O-ring

- screw and throttle cable holder (joint retainer)
- dowel pin
- air vent hose joint with O-ring.



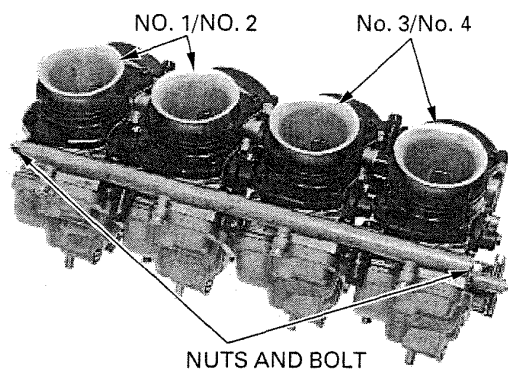
Loosen the synchronization adjusting screws to reduce the spring tension and remove the synchronization springs.



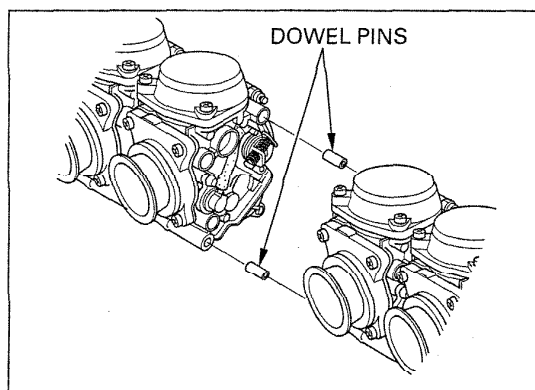
## FUEL SYSTEM

Remove the rear connecting nuts and bolt.

Separate the No. 1/2 and No. 3/4 carburetors.



Remove the dowel pins.

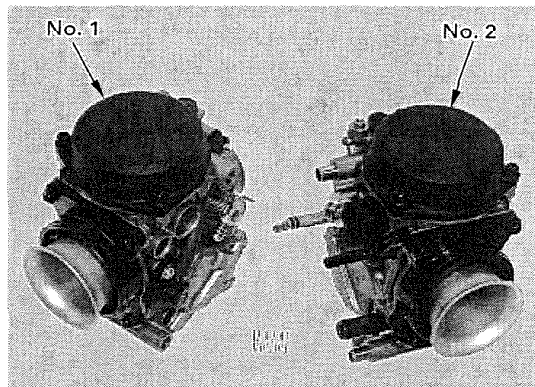


Refer to diagram on page 5-26 for identification of each component.

Separate the No. 1 and No. 2 carburetors then remove the thrust spring.

Remove the following:

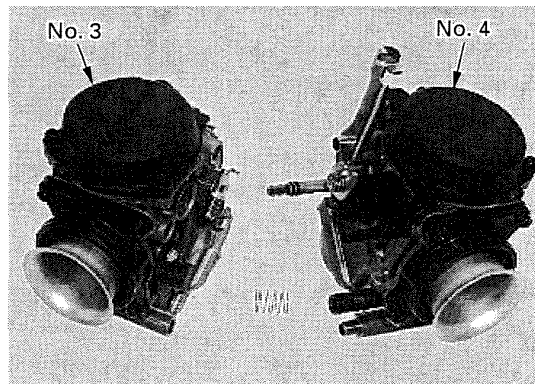
- joint collar
- fuel tube joint
- air vent hose joint
- water tube joint
- dowel pins.



Separate the No. 3 and No. 4 carburetors then remove the thrust spring.

Remove the following:

- choke cable holder
- joint collar
- fuel tube joint
- air vent hose joint
- water tube joint
- dowel pins.

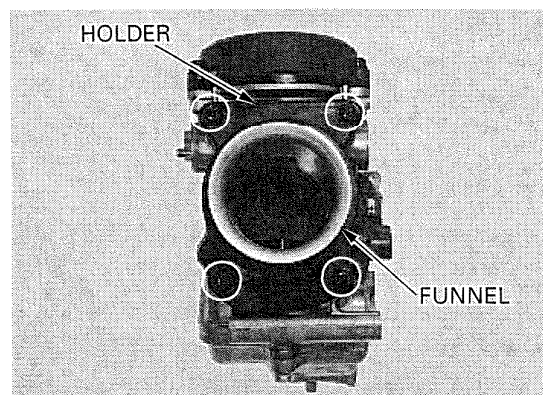


## CARBURETOR DISASSEMBLY/ INSPECTION

### AIR FUNNEL

Remove the following:

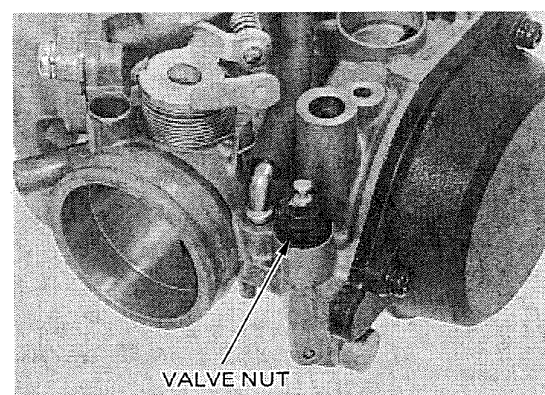
- four screws
- funnel holder
- air funnel
- O-ring.



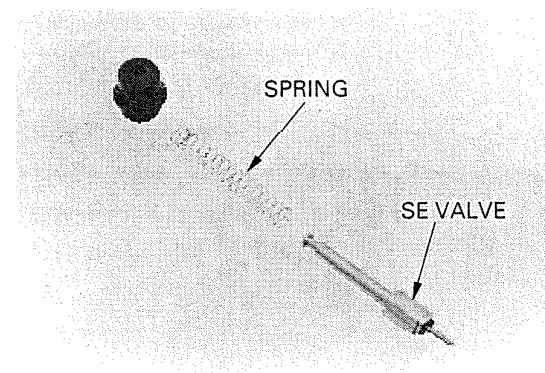
### STARTING ENRICHMENT (SE) VALVE

Remove the following:

- valve nut
- valve spring
- SE valve.



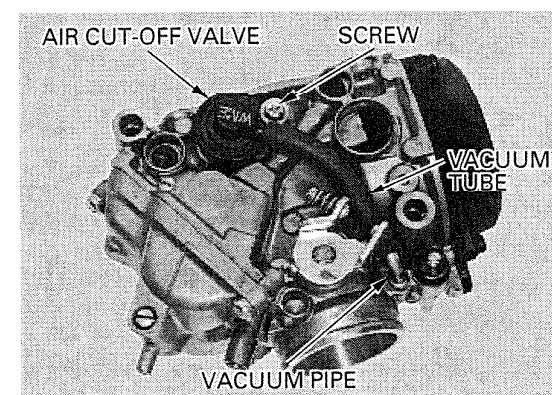
Check the SE valve for scoring, scratches or wear.  
Check the seat at the tip of the SE valve for stepped wear.



### AIR CUT-OFF VALVE

Disconnect the vacuum tube from the vacuum pipe.  
Remove the attaching screw and the air cut-off valve.

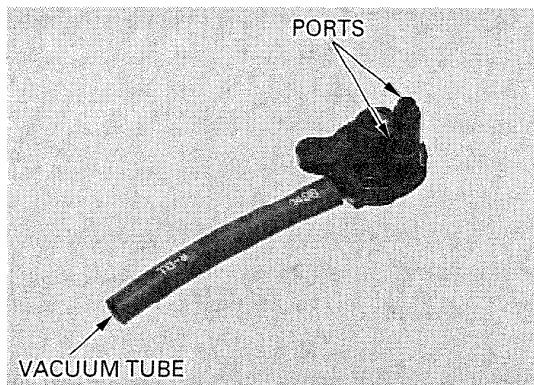
Remove the O-rings and joint pipe.



## FUEL SYSTEM

Apply vacuum to the vacuum tube.

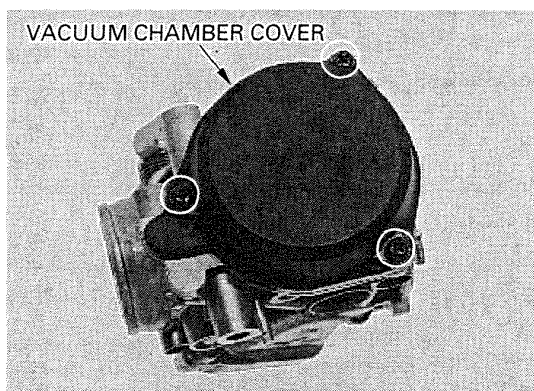
The vacuum should be maintained.  
Air should not flow through the valve ports when the vacuum is applied, and should flow when the vacuum is not applied.



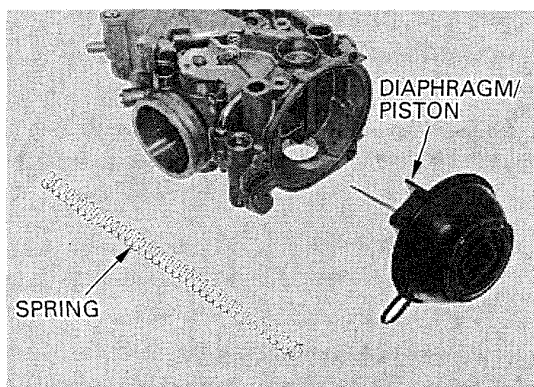
### VACUUM CHAMBER

*As the compression spring is very long, it will jump out of the carburetor when the cover is removed.*

Remove the three screws and the vacuum chamber cover.



Remove the compression spring and diaphragm/vacuum piston from the carburetor body.

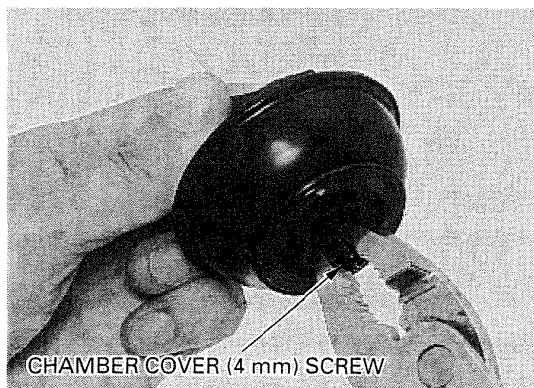


*Be careful not to damage the diaphragm.*

Screw one of the vacuum chamber cover (4 mm) screws into the jet needle holder. Pull the screw and remove the jet needle holder from the vacuum piston.

#### CAUTION:

***Do not remove the jet needle holder by pushing the jet needle.***

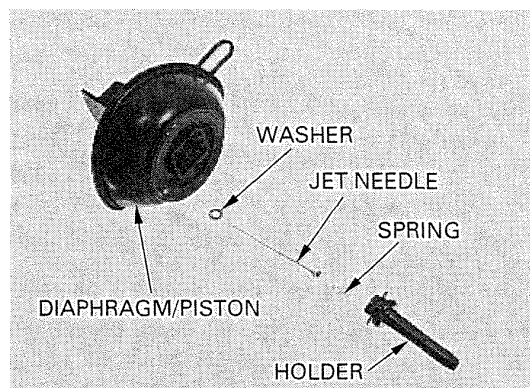


Remove the spring, jet needle and washer from the vacuum piston.

Check the jet needle for stepped wear.  
Check the vacuum piston for wear or damage.  
Check the diaphragm for pin hole, deterioration or damage.

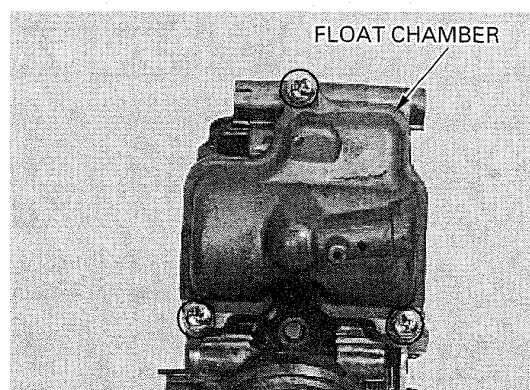
**NOTE:**

Air leaks out of the vacuum chamber if the diaphragm is damaged in any way, even a pin hole.



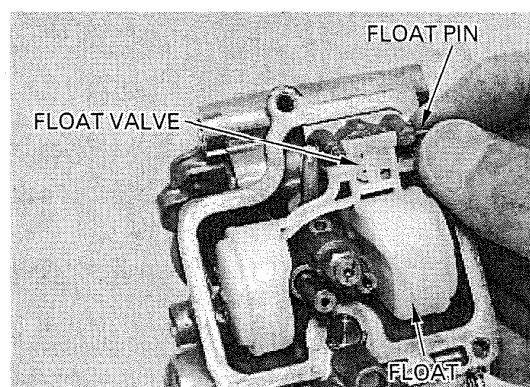
### FLOAT CHAMBER

Remove the three screws and the float chamber.

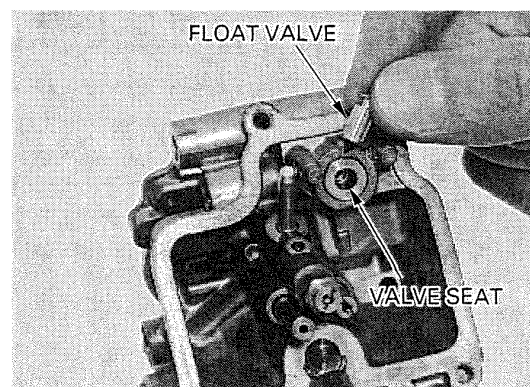


Remove the float pin, float and float valve.

Check the float for damage or fuel in the float.



Check the float valve and valve seat for scoring, scratches, clogging or damage.  
Check the tip of the float valve, where it contacts the valve seat, for stepped wear or contamination.  
Check the operation of the float valve.





## FUEL SYSTEM

Remove the main jet, needle jet holder and slow jet.

### CAUTION:

*Handle the jets with care. They can easily be scored or scratched.*

Turn the pilot screw in and carefully count the number of turns until it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screw.

### TOOL:

Pilot screw wrench      07KMA-MN90100 or  
07KMA-MS60101

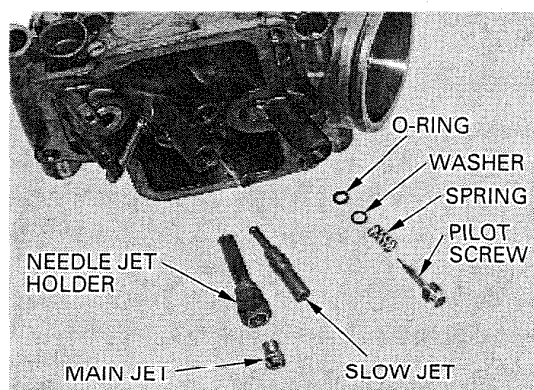
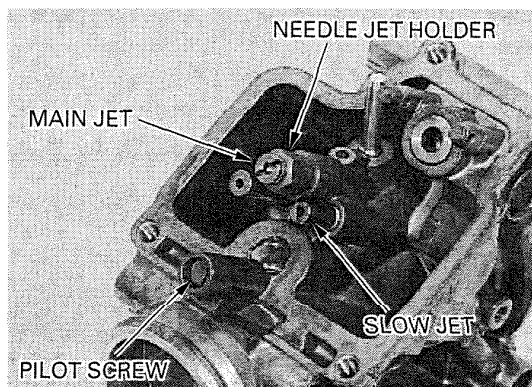
### CAUTION:

*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Remove the pilot screw, spring, washer and O-ring.

Check each jet for wear or damage.  
Check the pilot screw for wear or damage.

Clean the jets with cleaning solvent and blow open with compressed air.



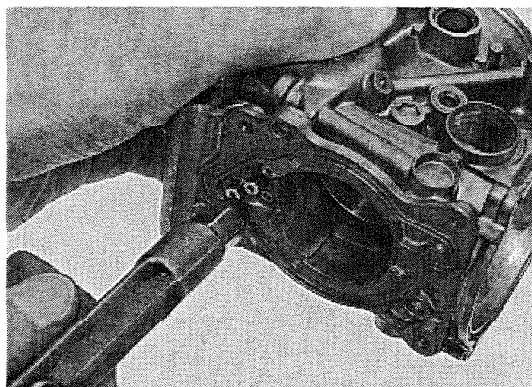
## CARBURETOR CLEANING

Remove the following:

- air funnel
- SE valve
- air cut-off valve
- diaphragm/vacuum piston.
- main jet, needle jet holder and slow jet.
- pilot screw.

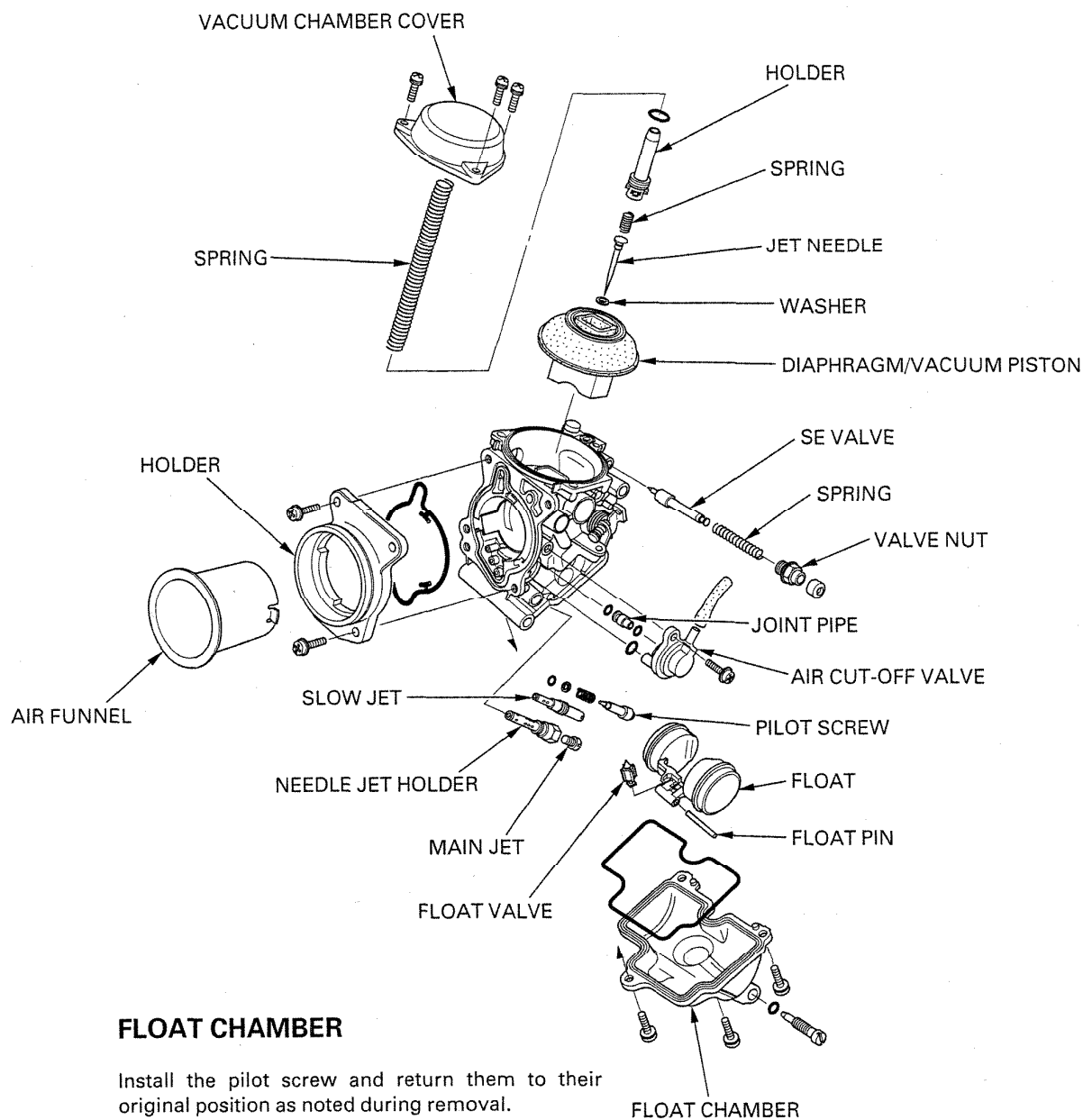
### CAUTION:

*Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.*



Blow open all air and fuel passages in the carburetor body with compressed air.

## CARBURETOR ASSEMBLY



### FLOAT CHAMBER

Install the pilot screw and return them to their original position as noted during removal.

#### TOOL:

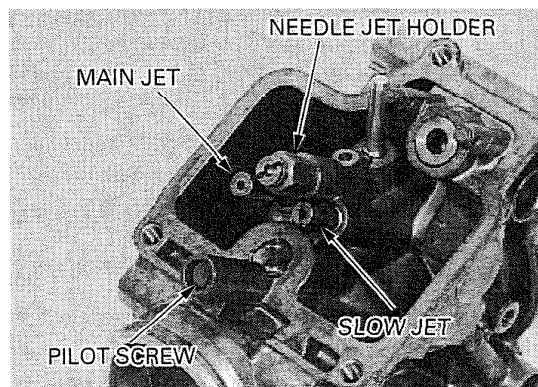
**Pilot screw wrench** 07KMA-MN90100 or  
07KMA-MS60101

Perform the pilot screw adjustment if new pilot screw is installed.

#### CAUTION:

*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Install the needle jet holder, main jet and slow jet.

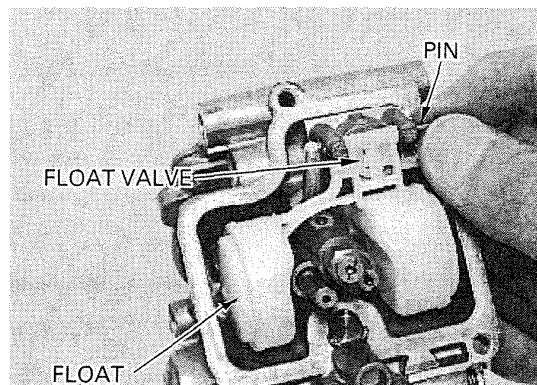


## FUEL SYSTEM

### CAUTION:

*Handle the jets with care. They can easily be scored or scratched.*

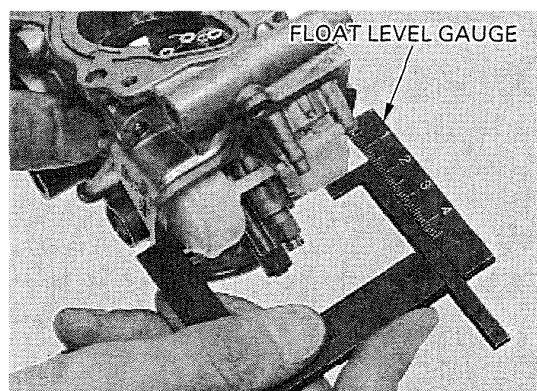
Hang the float valve onto the float arm lip.  
Install the float valve, float and float pin.



### FLOAT LEVEL INSPECTION

#### NOTE:

Set the float level gauge that it is perpendicular to the float chamber face at the highest point of the float.



With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

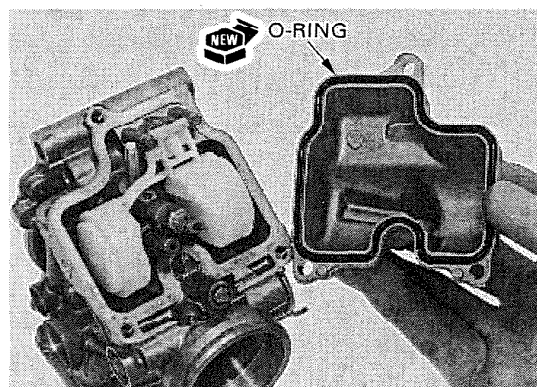
#### TOOL:

Float level gauge 07401-0010000

**FLOAT LEVEL:**  $13.7 \pm 0.5 \text{ mm}$  ( $0.54 \pm 0.02 \text{ in}$ )

The float cannot be adjusted.  
Replace the float assembly if the float level is out of specification.

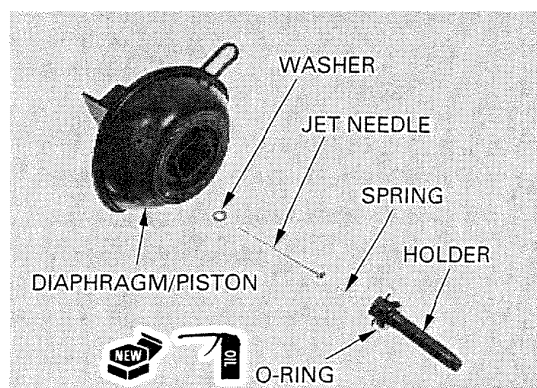
Install a new O-ring into the float chamber groove.  
Install the float chamber and tighten the three screws.



### VACUUM CHAMBER

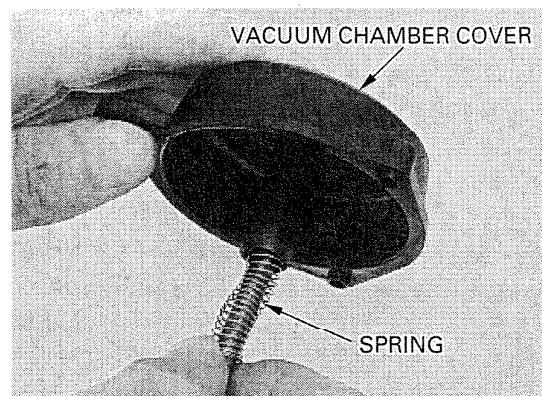
Coat a new O-ring with oil and install it into the holder groove, and the spring into the holder end hole.  
Install the washer onto the jet needle.

Install the jet needle and needle holder into the vacuum piston.  
Press the needle holder until you feel a click indicating that the O-ring is seated into the groove in the vacuum piston.





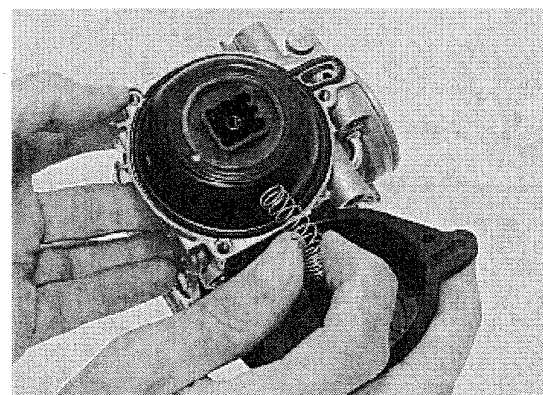
Install and compress the compression spring into the spring hole in the vacuum chamber cover using a screwdriver as a guide as shown.



*Be careful not to damage the jet needle.*

Install the diaphragm/vacuum piston into the carburetor body, then insert the jet needle into the needle jet.

Lift the bottom of the piston with your finger to set the diaphragm rib into the groove in the carburetor body, and install the spring and vacuum chamber cover.



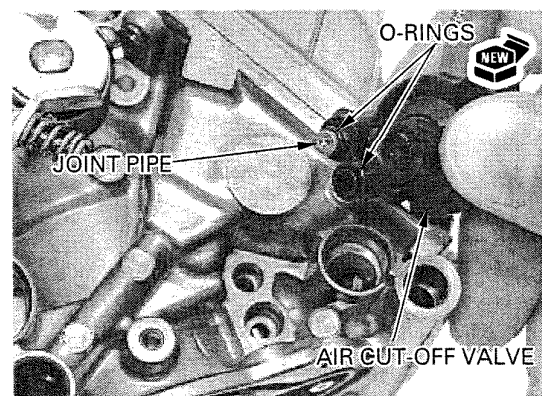
*Be careful not to pinch the diaphragm under the chamber cover.*

Install and tighten the three screws.

### AIR CUT-OFF VALVE

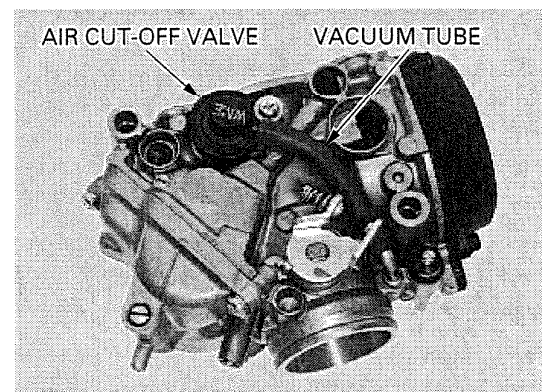
Install new O-rings onto the air cut-off valve and joint pipe.

Install the joint pipe into the cut-off valve with the stepped side facing the air cut-off valve.



Install the air cut-off valve and secure it with the screw.

Connect the vacuum tube to the vacuum pipe of the carburetor body.

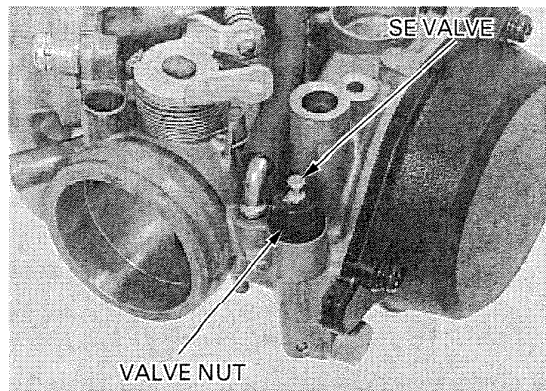


## FUEL SYSTEM

### SE VALVE

Install the spring over the SE valve and install it into the SE valve hole in the carburetor. Install the valve nut and tighten it.

**TORQUE:** 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

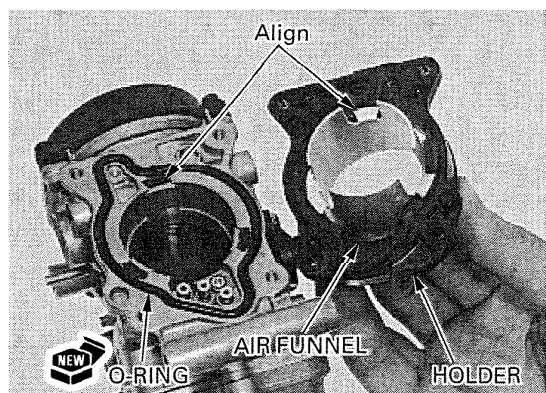


### AIR FUNNEL

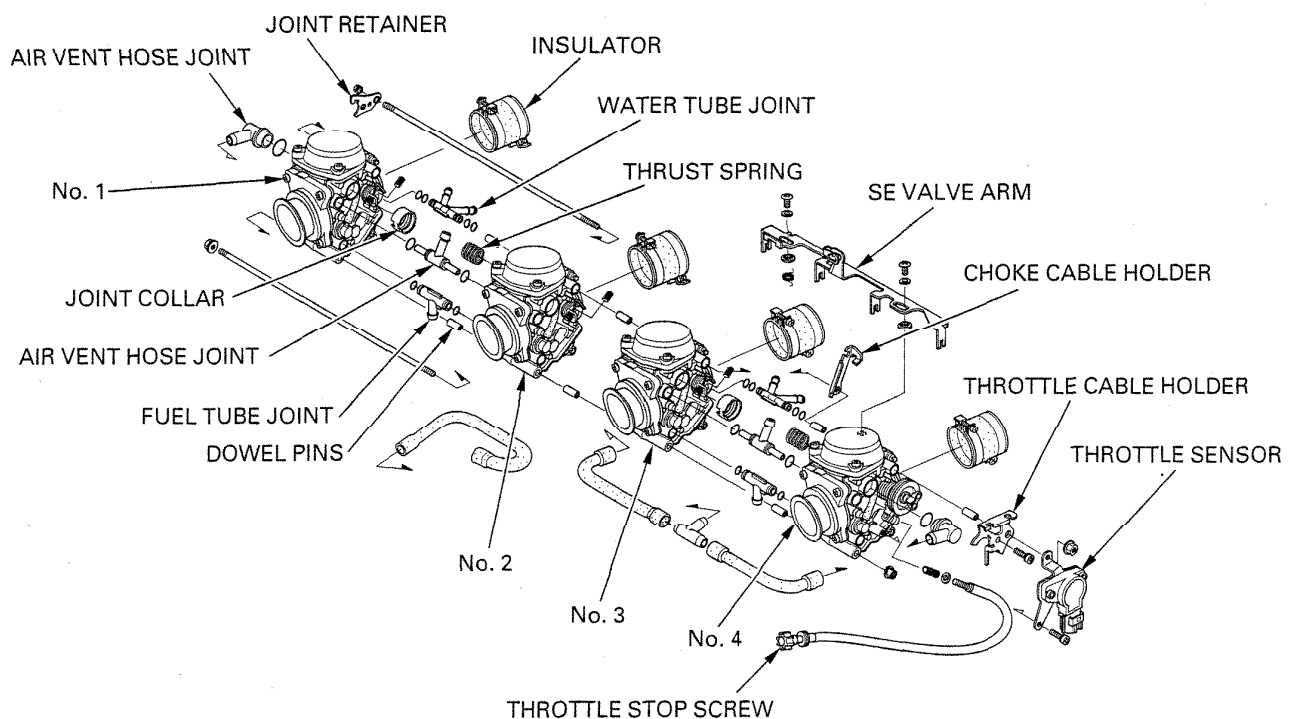
Install a new O-ring into the groove in the carburetor body.

Set the air funnel through the funnel holder as shown and install them by aligning the cut-outs in the funnel with the lugs of the carburetor body. Install the four screws and tighten them.

*Be careful not to pinch the O-ring.*



## CARBURETOR COMBINATION



## NOTE:

- Always replace the O-rings with new ones and coat them with oil.
- Apply grease to the synchronization adjusting screw tips.

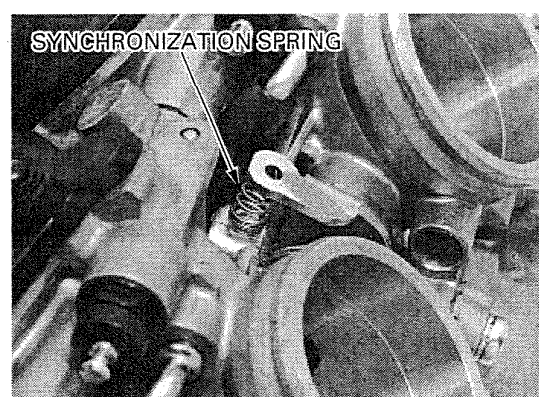
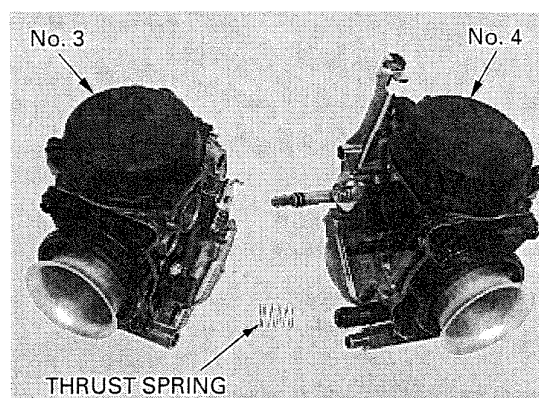
No. 3 and No. 4 carburetors:

Install the following onto the carburetor:

- dowel pins
- water tube joint with new O-rings
- air vent hose joint with new O-rings
- fuel tube joint with new O-rings
- joint collar
- choke cable holder, aligning groove with stopper
- thrust spring (place over the synchronization nut)

Assemble the No. 3 and No. 4 carburetors.

Install the synchronization spring.



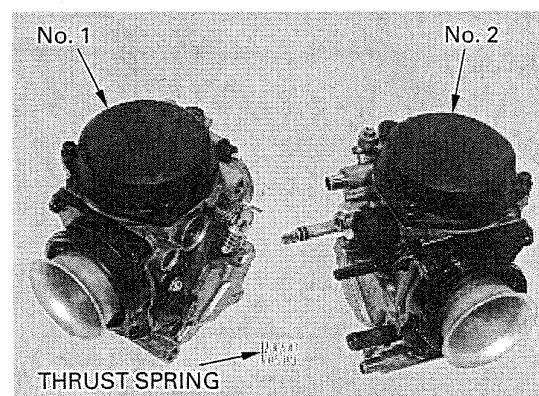
No. 1 and No. 2 carburetors:

Install the following onto the carburetor:

- dowel pins
- water tube joint with new O-rings
- air vent hose joint with new O-rings
- fuel tube joint with new O-rings
- joint collar
- thrust spring (place over the synchronization nut)

Assemble the No. 1 and No. 2 carburetors.

Install the synchronization spring.

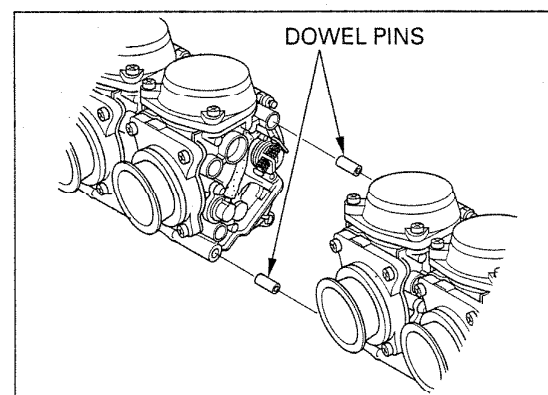


No. 1/2 and No. 3/4 carburetors:

Install the dowel pins onto the carburetor.

Assemble the No. 1/2 and No. 3/4 carburetors.

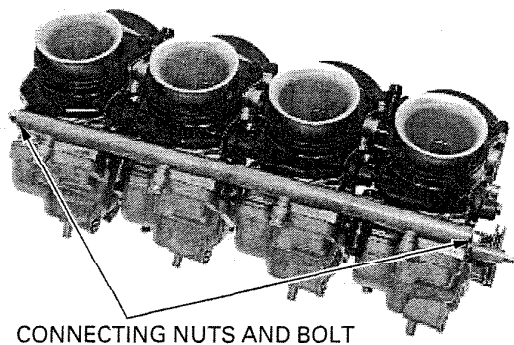
Install the synchronization spring.



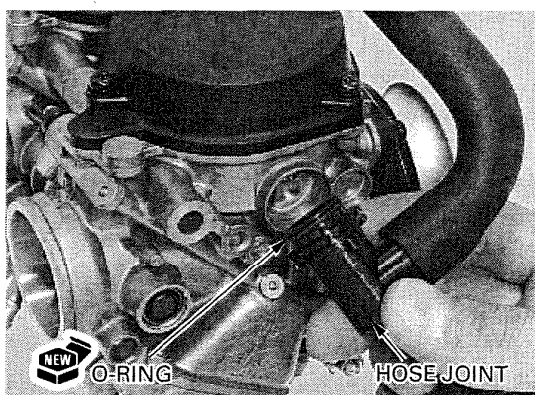
## FUEL SYSTEM

Be sure there is no clearance at the joint area of the carburetor bodies.

Install the rear connecting bolt and nuts, and temporarily tighten them.

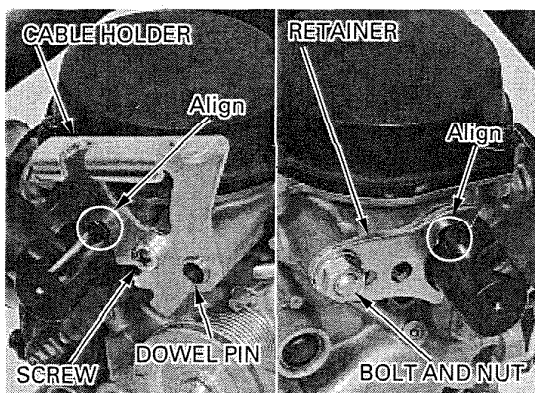


Install new O-rings into the tube joint grooves.  
Install the air vent hose joints into the carburetors.



Install the dowel pin.  
Install the throttle cable holder (joint retainer), aligning its groove with the joint lug and secure it with the screw.

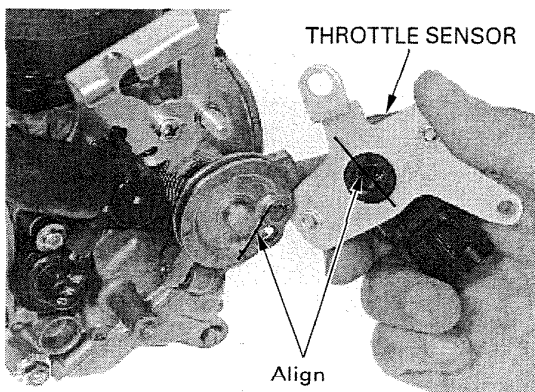
Install the connecting bolt, nut and tube joint retainer, aligning the retainer groove with the joint lug.



Install the throttle sensor by aligning the tabs of the throttle sensor with the flat of the shaft as shown.  
Install the nut and screw.

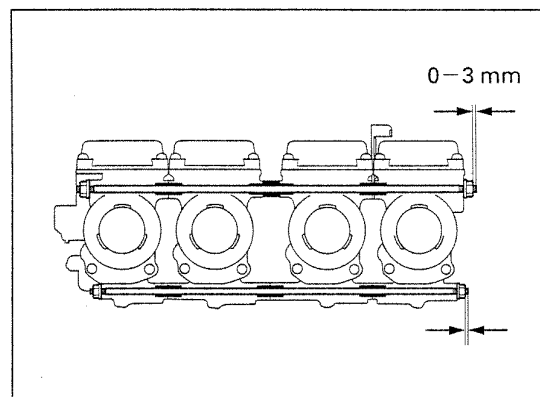
### CAUTION:

***Install the throttle sensor properly. Improper installation can cause damage to the throttle sensor.***

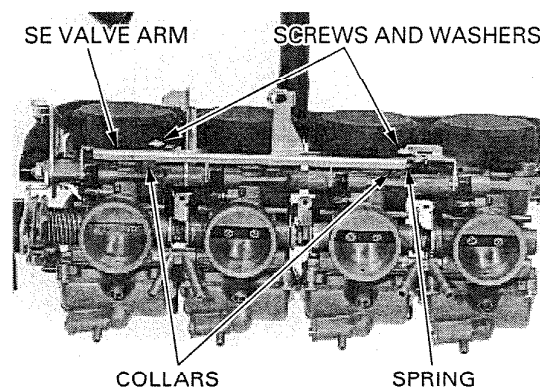


Tighten the each connecting nuts gradually and alternately, be sure the bolt threads projections are equal height (within 0–3 mm).  
Hold the nut and tighten the nut on other side.

**TORQUE:** 6 mm nut: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)  
5 mm nut: 5 N·m (0.5 kgf·m , 3.6 lbf·ft)

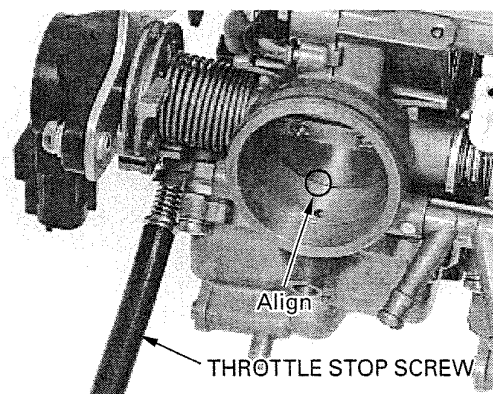


Install the arm return spring over the boss on the No. 2 carburetor.  
Install the plastic collars onto the SE valve arm bosses of the carburetors.  
Install the SE valve arm over the SE valves and onto the carburetors and attach the return spring.  
Install the plastic washers and screws and tighten them.



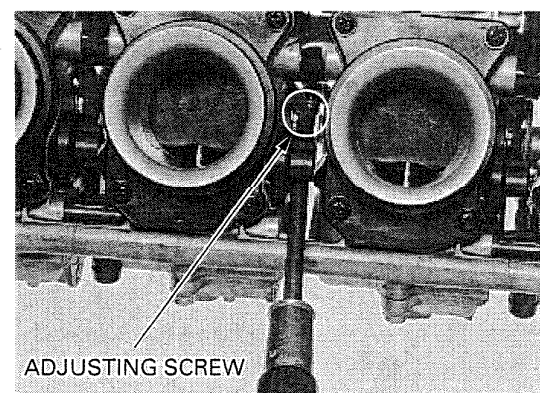
Install the throttle stop screw with the washer and spring.

Turn the throttle stop screw to align the throttle valve with the edge of the outside by-pass hole in the No. 4 carburetor.



Align each carburetor (No. 1, No. 2 and No. 3) throttle valve with the outside by-pass hole by turning the synchronization adjusting screw.

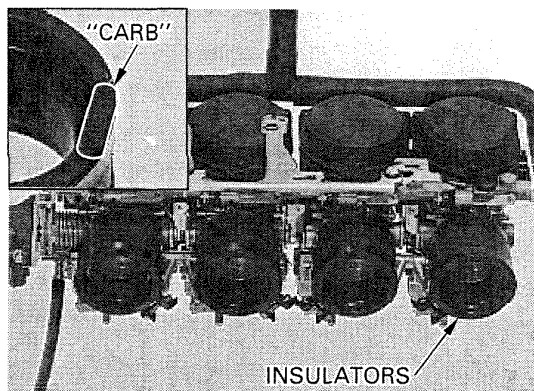
Rotate the throttle drum and be sure that each throttle valve opens and closes smoothly.





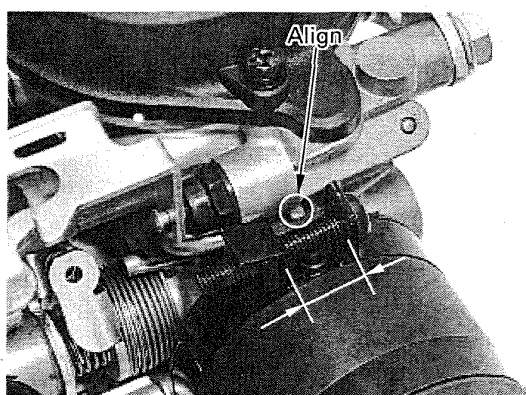
## FUEL SYSTEM

Install the carburetor insulators with the "CARB" mark facing the carburetor and the band screw heads facing the outside as shown.



Align each insulator groove with each carburetor lug to seat the insulators securely.

Align the band hole with the insulator boss. Tighten each band screw until the clearance between the band ends is 11 – 13 mm (0.4 – 0.5 in).

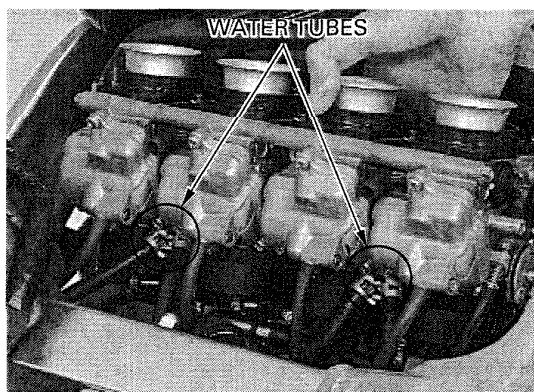


## CARBURETOR INSTALLATION

### NOTE:

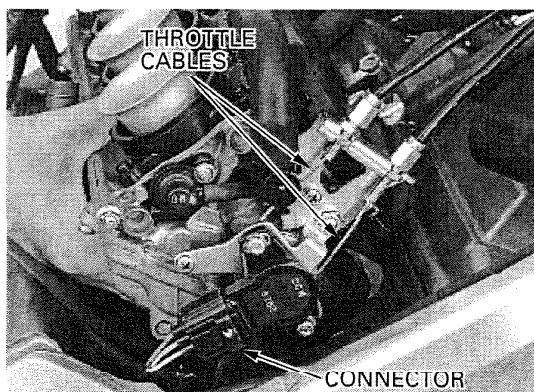
Route the tubes and cables properly (page 1-18).

Connect the water tubes to the carburetor.



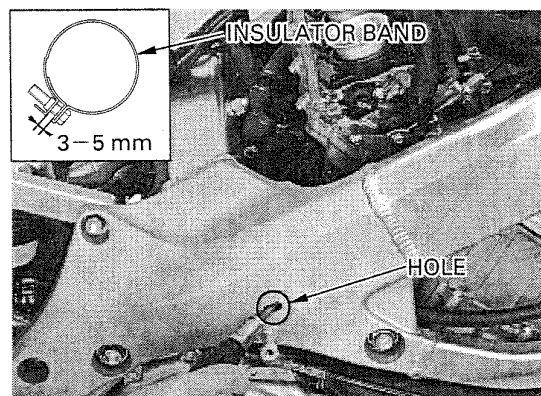
Connect the throttle cables to the throttle drum and install them into the cable holder.

Connect the throttle sensor connector.

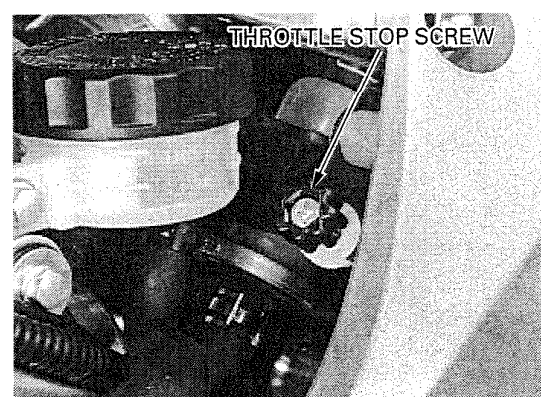


Install the carburetor assembly over the intake ports by pressing the assembly against the cylinder head surface securely.

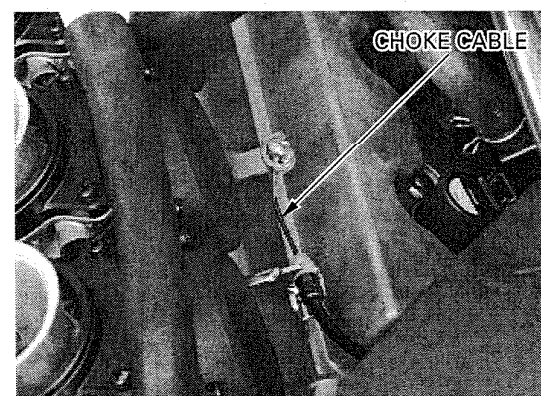
Insert the screwdriver through the hole in both sides of the frame and tighten the insulator band screws as shown.



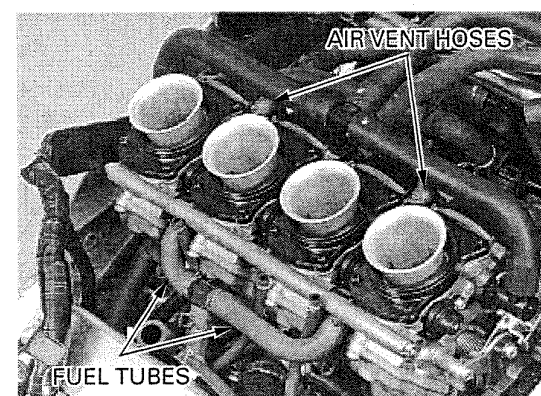
Install the throttle stop screw into the cable holder.



Connect the choke cable to the SE valve arm and install it into the cable holder.

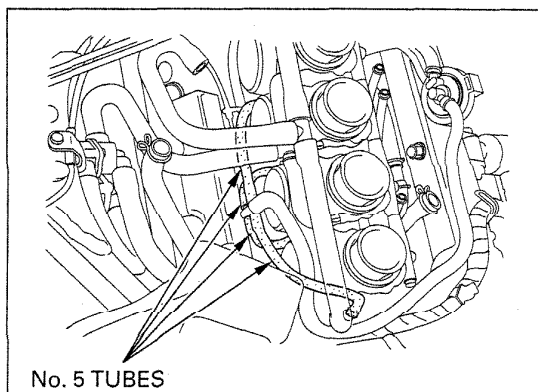


Connect the fuel tubes and the float chamber air vent hoses.



## FUEL SYSTEM

*California type only:* Connect the No. 5 tubes.

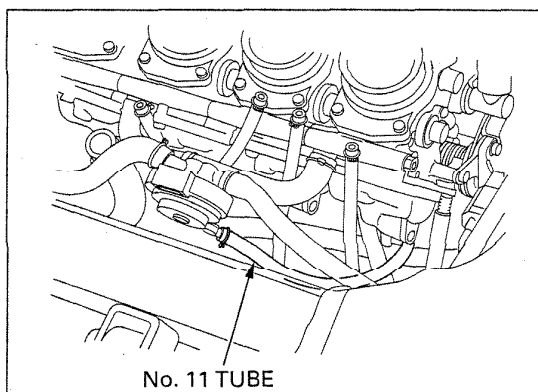


*California type only:* Connect the No. 11 tube.

Perform the following inspections and adjustment:  
— Throttle operation (page 3-4)  
— Carburetor choke (page 3-5).

Install the air cleaner housing (page 5-14).  
Fill and bleed the cooling system (page 6-4).

Adjust the carburetor synchronization if the carburetors were disassembled (page 3-13).





## PILOT SCREW ADJUSTMENT

### IDLE DROP PROCEDURE

#### NOTE:

- Make sure the carburetor synchronization is within specification before pilot screw adjustment.
- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

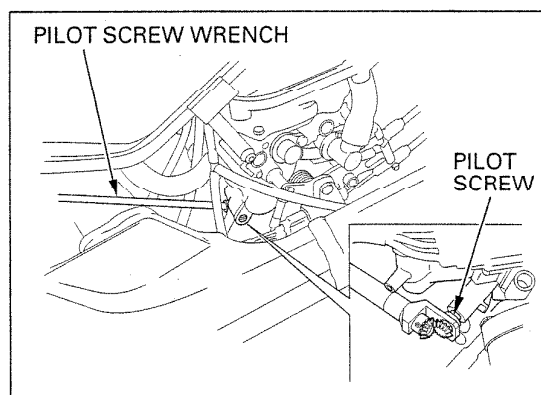
1. Raise the fuel tank and support it (page 2-3).  
Turn each pilot screw clockwise until it seats lightly, then back it out to the specification given. This is an initial setting prior to the final pilot screw adjustment.

#### CAUTION:

*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

#### TOOL:

Pilot screw wrench      07KMA-MN90100 or  
   07KMA-MS60101



#### INITIAL OPENING:

**49 state/Canada type:** 3-1/8 turns out  
**California type:** 2-3/8 turns out

2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Stop the engine and connect a tachometer according to the tachometer manufacturer's instructions.
4. Start the engine and adjust the idle speed with the throttle stop screw.

#### IDLE SPEED:

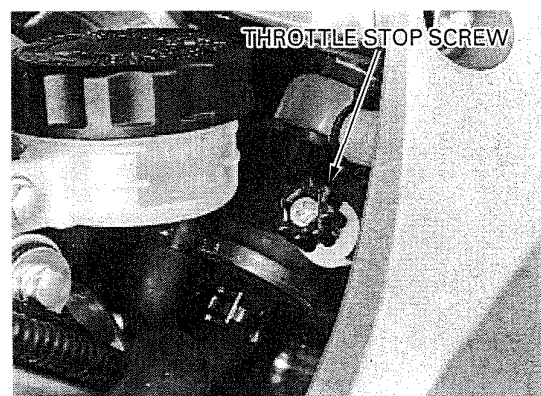
**49 state/Canada type:** 1,300 ± 100 rpm  
**California type:** 1,400 ± 100 rpm

5. Turn the No. 4 carburetor pilot screw in or out slowly to obtain the highest engine speed.
6. Perform step 5 for all carburetor pilot screws.
7. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw.
8. Turn the No. 4 carburetor pilot screw in until the engine speed drops by 50 rpm.
9. Turn the No. 4 carburetor pilot screw out to the final opening from the position obtained in step 8.

#### FINAL OPENING:

**49 state/Canada type:** 3/4 turns out  
**California type:** 1 turns out

10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for all carburetor pilot screws.



## FUEL SYSTEM

### HIGH ALTITUDE ADJUSTMENT

When the vehicle is to be operated continuously above 2,000 m (6,500 feet), the carburetors must be readjusted as described below to improve driveability and decrease exhaust emissions.

Remove the carburetor assembly from the intake ports of the cylinder head (page 5-15).

Drain the carburetors and remove the float chambers.

Change each main jet for a high altitude one.

#### HIGH ALTITUDE MAIN JET

**49 state/Canada type:**

**No. 1 and 4 carburetors:** # 130

**No. 2 and 3 carburetors:** # 132

**California type:** # 125

Install the float chambers.

Install the carburetor assembly (page 5-30).

Install the fuel tank and support it with the eye-let wrench (page 2-3).

Warm up the engine to operating temperature.

Stop and go driving for 10 minutes is sufficient.

Turn each pilot screw in to the specification given.

#### TOOL:

**Pilot screw wrench** 07KMA-MN90100 or  
07KMA-MS60101

**HIGH ALTITUDE SETTING:** 1/2 turn in

Adjust the idle speed with the throttle stop screw.

#### IDLE SPEED:

**49 state/Canada type:** 1,300  $\pm$  100 rpm

**California type:** 1,400  $\pm$  100 rpm

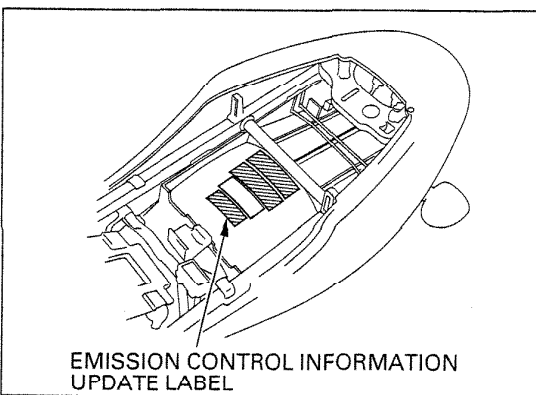
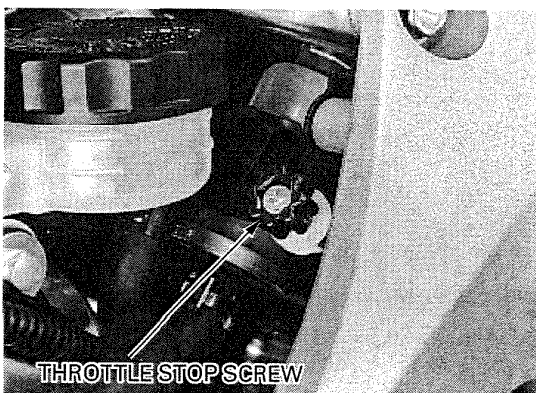
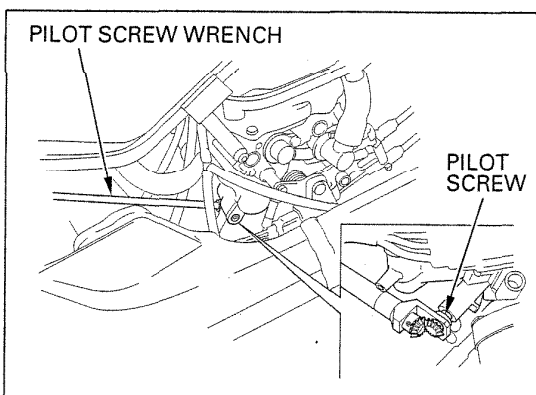
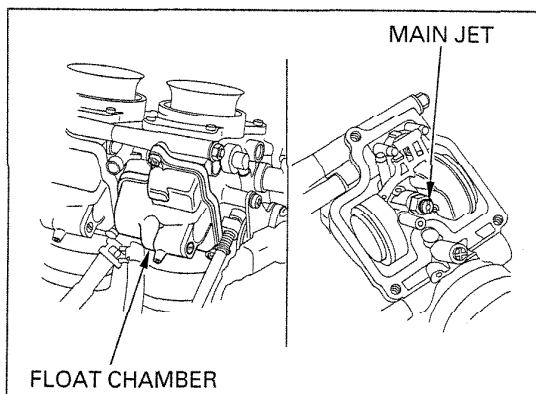
Attach the Vehicle Emission Control Information Update label on the rear fender under the seat as shown.

#### NOTE:

Do not attach the label to any part that can be easily removed from the vehicle.

#### CAUTION:

*Sustained operation at an altitude lower than 1,500 m (5,000 feet) with the carburetors adjusted for high altitude may cause the engine to idle roughly and the engine to stall in traffic. It may also cause engine damage due to overheating.*



*These adjustment must be made at low altitude to ensure proper low altitude operation.*

When the vehicle is to be operated continuously below 1,500 m (5,000 feet), readjust the carburetors as follows:

Change each main jet for the standard one.

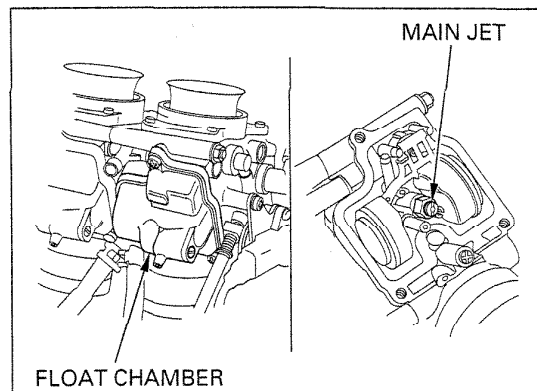
## STANDARD MAIN JET:

**49 state/Canada type:**

**No. 1 and 4 carburetors:** # 132

**No. 2 and 3 carburetors:** # 135

**California type:** # 128 (all carburetors)

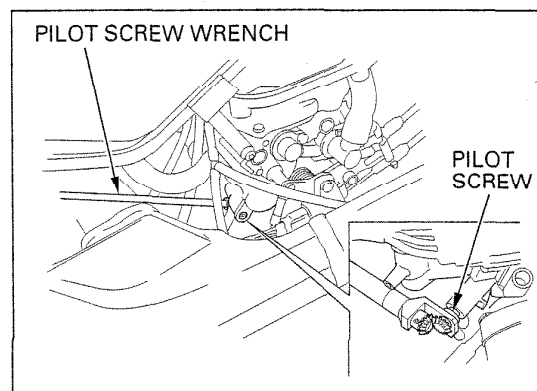


Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient. Turn each pilot screw out 1/2 turn to its original position.

## TOOL:

**Pilot screw wrench**

07KMA-MN90100 or  
07KMA-MS60101



Adjust the idle speed with the throttle stop screw.

## IDLE SPEED:

**49 state/Canada type:** 1,300  $\pm$  100 rpm

**California type:** 1,400  $\pm$  100 rpm

## NOTE:

*These adjustment must be made at low altitude to ensure proper low altitude operation.*

Remove the Vehicle Emission Control Information Update label that is attached to the rear fender under the seat after adjusting for low altitude.



## FUEL SYSTEM

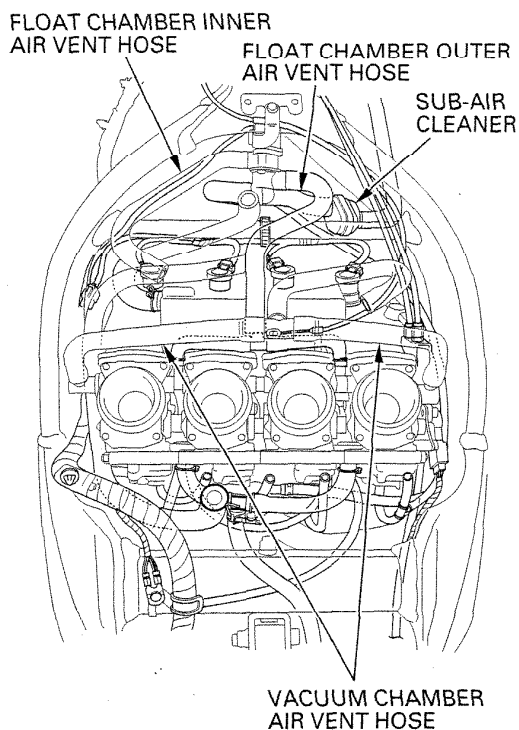
### DIRECT AIR INDUCTION (D.A.I.) SYSTEM

#### AIR VENT CONTROL SOLENOID VALVE INSPECTION

Raise the fuel tank and support it (page 2-3).  
Check the induction ducts and connecting tubes for  
damage or loose connection.

Remove the air cleaner housing (page 5-14).  
Remove the front fairing (page 2-5).  
Check the induction hoses for deterioration, dam-  
age or loose connections.  
Check the sub-air cleaner for clogging.

49 state/Canada type shown:

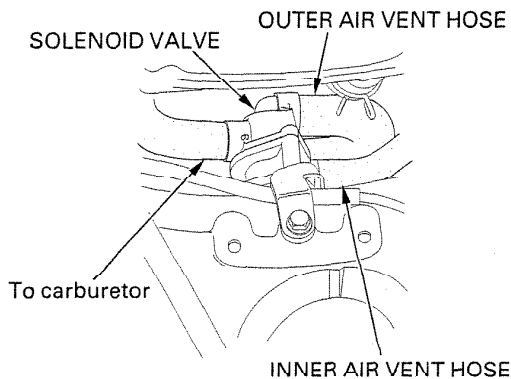


Disconnect the air vent hose (California: No. 6)  
from the 3-way joint that goes to the carburetor.  
Disconnect the No. 4 hose (California type).

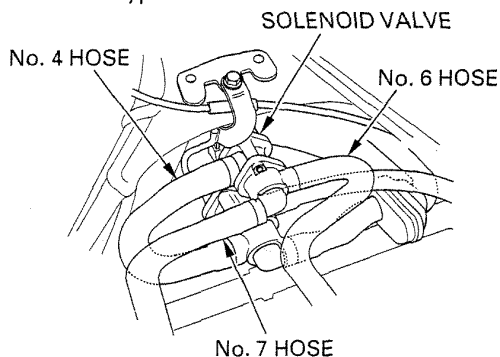
Blow air into the inner air vent hose (California:  
No. 7) with the ignition switch OFF.  
Blow air into the outer air vent hose (California:  
No. 4) with the ignition switch ON.

Air should flow through the solenoid valve and out  
the air vent hose (California: No. 6) that goes to the  
carburetor.

49 state/Canada type:



California type:



## FUEL PUMP

### DISCHARGE VOLUME INSPECTION

#### **⚠WARNING**

*Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.*

Raise the fuel tank and support it (page 2-3).  
Remove the seat cowl (page 2-2).

Short the Black/white and Black/blue terminals at the fuel pump transfer relay with the jumper wire.

Disconnect the fuel tube from the 3-way tube joint that goes to the carburetor.

Hold the graduated beaker under the fuel tube.

Turn the ignition switch ON (engine stopped) with the engine stop switch to RUN and let the fuel flow into the beaker for 5 seconds, then turn the ignition switch OFF.

Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

**FUEL PUMP FLOW CAPACITY (minimum):**  
700 cm<sup>3</sup> (23.7 US oz, 24.6 Imp oz)/minute

## SECONDARY AIR SUPPLY SYSTEM

### SYSTEM INSPECTION

Start the engine and warm it up to normal operating temperature.

Remove the air cleaner housing cover (page 3-5).

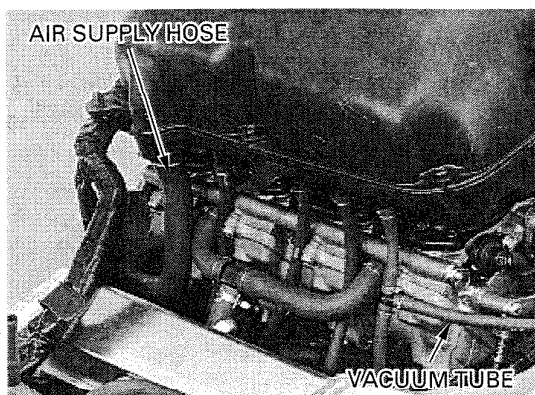
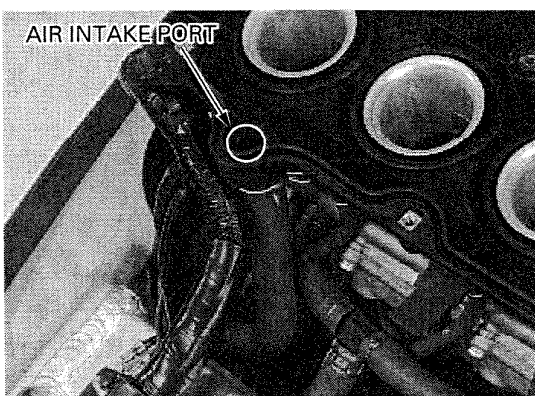
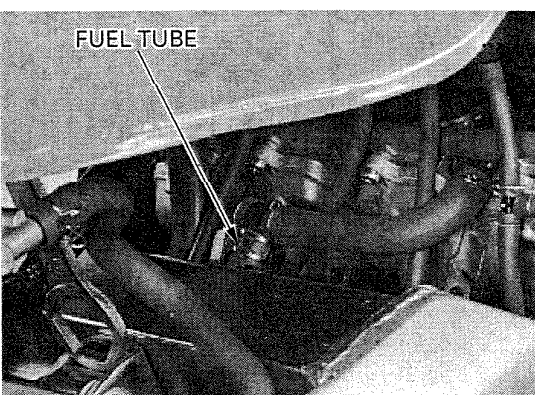
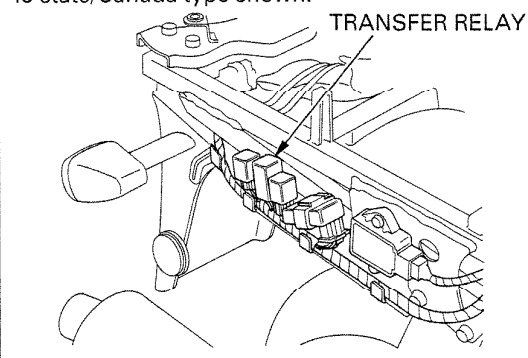
Check that the secondary air intake port is clean and free of carbon deposits.

Check the pulse secondary air injection (PAIR) check valves if the port is carbon fouled.

Disconnect the air supply (air cleaner housing-to-PAIR control valve) hose (California: No. 15) from the air cleaner housing.

Disconnect the PAIR control valve vacuum tube (California: No. 10) from the 3-way joint and plug the 3-way joint.

49 state/Canada type shown:



## FUEL SYSTEM

Connect a vacuum pump to the PAIR control valve vacuum tube (California: No. 10).

Start the engine and open the throttle slightly to be certain that air is sucked in through the air supply hose (California: No. 15).

If the air is not drawn in, check the air supply hoses for clogging.

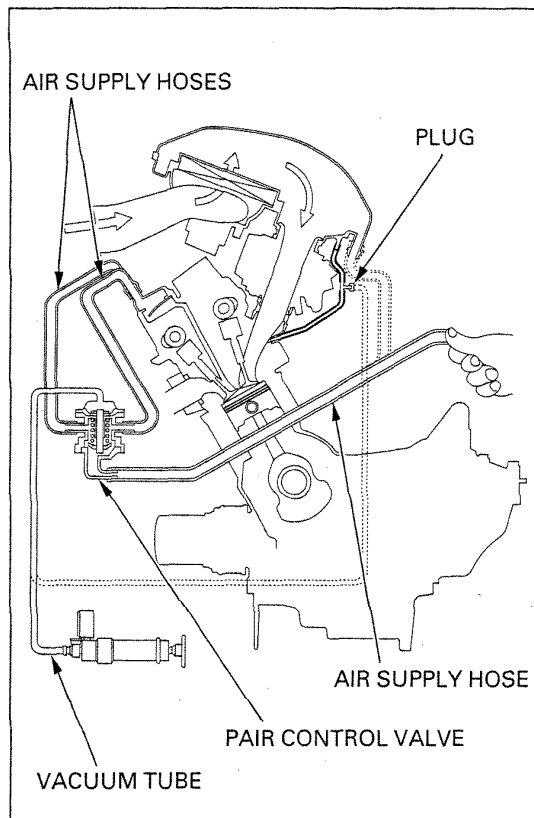
With the engine running, gradually apply vacuum to the PAIR control valve vacuum tube.

Check that the air supply hose stops drawing air, and that the vacuum does not bleed.

**SPECIFIED VACUUM:** 400 mm Hg (15.7 in Hg)

If the air is drawn in, or if the specified vacuum is not maintained, install a new PAIR control valve.

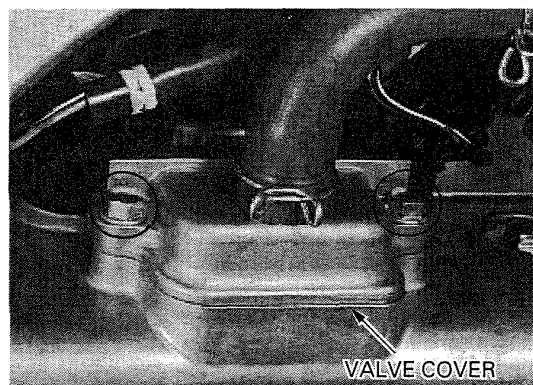
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



### PAIR CHECK VALVE INSPECTION

Remove the radiator without disconnecting the water hoses (page 3-6).

Remove the bolts and PAIR check valve cover from the cylinder head cover.



Remove the PAIR check valves.



Check the reed for damage or fatigue. Replace if necessary.

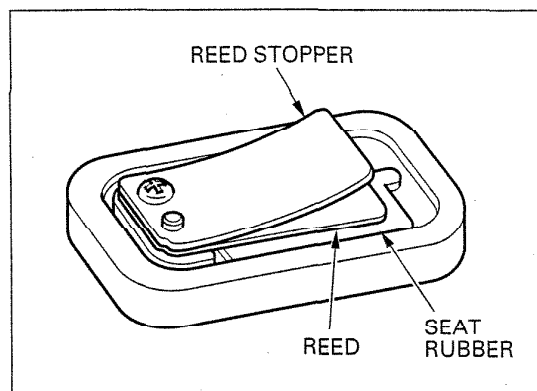
Replace the PAIR check valve if the seat rubber is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.

Install the PAIR check valves and cover onto the cylinder head cover.

Install the cover bolts and tighten them.

**TORQUE** : 13 N·m (1.3 kgf·m, 9 lbf·ft)

Install the radiator (page 3-7).

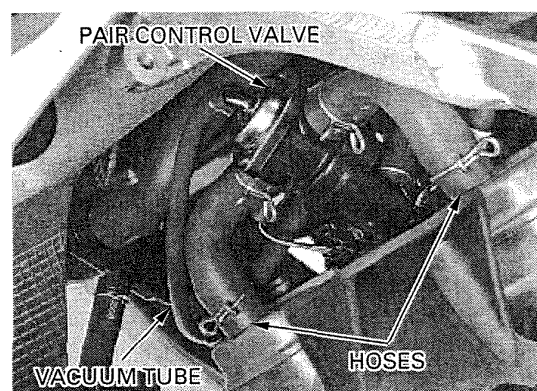


## PAIR CONTROL VALVE REMOVAL/INSTALLATION

Remove the radiator without disconnecting the water hoses (page 3-6).

Disconnect the air supply hoses and vacuum tube to remove the PAIR control valve.

Installation is in the reverse order of removal.



## EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

### NOTE:

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-18) for the tube connections and routing.

## EVAPORATIVE EMISSION (EVAP) CANISTER REMOVAL/INSTALLATION

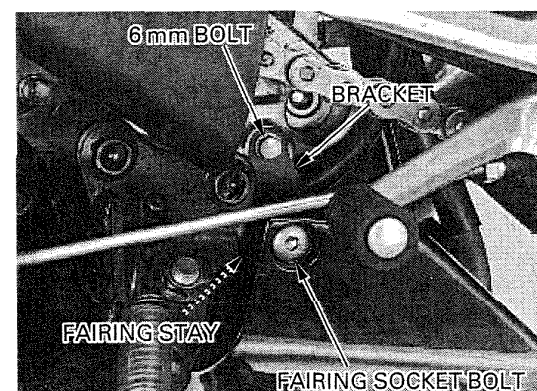
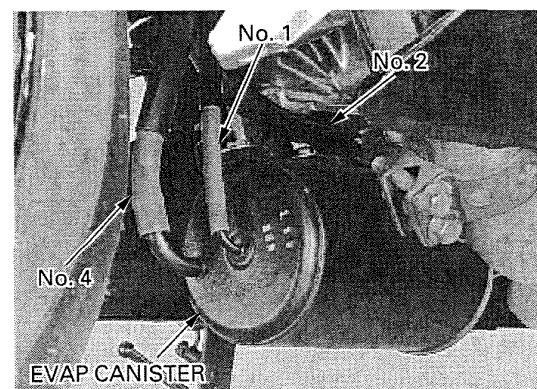
Disconnect the No. 1, No. 4 and No. 2 tubes from the EVAP canister.

Remove the 6 mm mounting bolt.

Remove the side fairing socket bolt and fairing stay, and the EVAP canister with the bracket.

Remove the two bolts, collars and bracket.

Install the EVAP canister in the reverse order of removal.



## FUEL SYSTEM

### EVAPORATIVE EMISSION (EVAP) PURGE CONTROL VALVE INSPECTION

#### NOTE:

The EVAP purge control valve should be inspected if hot restart is difficult.

Raise the fuel tank and support it (page 2-3).  
Remove the EVAP purge control valve.

Connect a vacuum pump to the No. 5 tube fitting (output port) that goes to the carburetors. Apply the specified vacuum to the EVAP purge control valve.

**SPECIFIED VACUUM:** 250 mm Hg (9.8 in Hg)

The specified vacuum should be maintained.  
Replace the EVAP purge control valve if vacuum is not maintained.

Remove the vacuum pump and connect it to the No. 11 tube fitting (vacuum port) that goes to the # 4 carburetor.  
Apply the specified vacuum to the EVAP purge control valve.

**SPECIFIED VACUUM:** 250 mm Hg (9.8 in Hg)

The specified vacuum should be maintained.  
Replace the EVAP purge control valve if vacuum is not maintained.

Connect a pressure pump to the No. 4 tube fitting (input port) that goes to EVAP canister.

#### CAUTION:

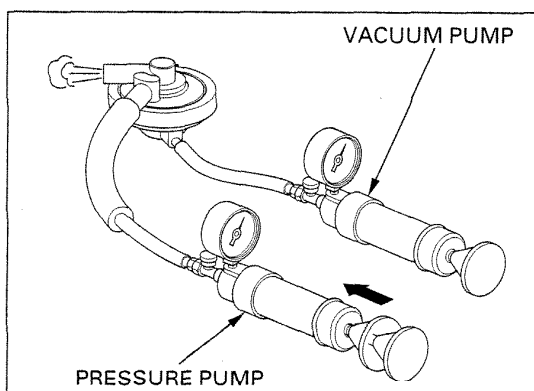
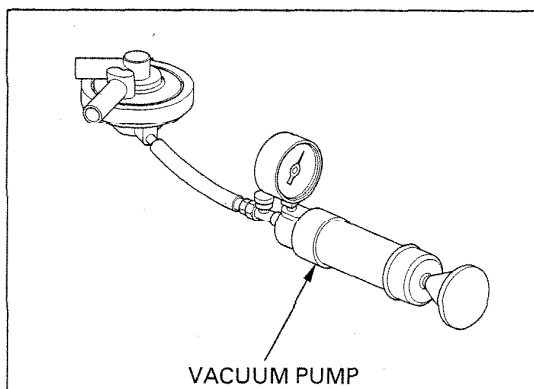
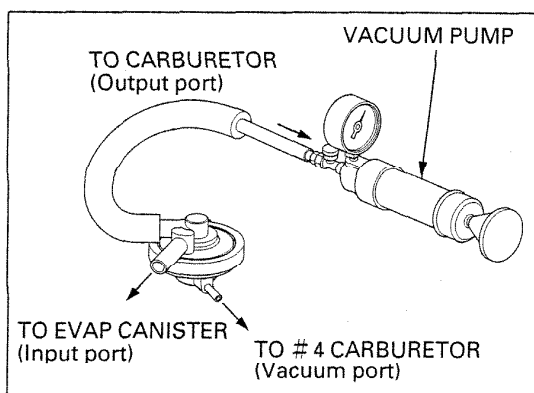
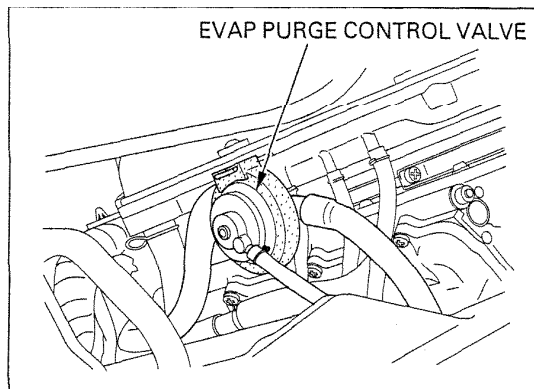
**Damage to the EVAP purge control valve may result from use of a high pressure air source. Use a hand-operated air pump only.**

While applying the specified vacuum to the EVAP purge control valve vacuum port, pump air through the input port.

**SPECIFIED VACUUM:** 250 mm Hg (9.8 in Hg)

Air should flow through the EVAP purge control valve and out the output port that goes to the carburetors.  
Replace the EVAP purge control valve if air does not flow out.

Remove the pumps and install the EVAP purge control valve.





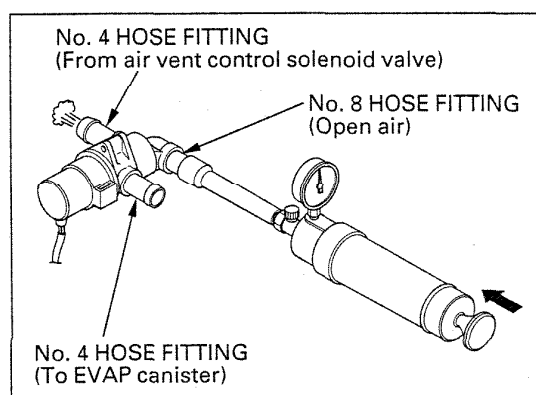
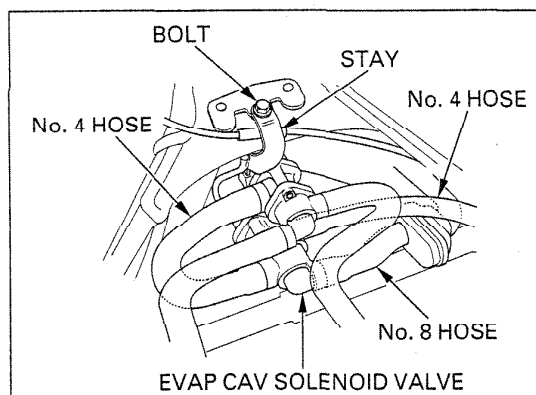
**EVAPORATIVE EMISSION  
CARBURETOR AIR VENT (EVAP CAV)  
SOLENOID VALVE INSPECTION****NOTE:**

The EVAP CAV solenoid valve should be inspected if hot restart is difficult.

Remove the air cleaner housing (page 5-14).  
Remove the bolt and solenoid valve stay from the frame.  
Disconnect the No. 8 and No. 4 hoses.

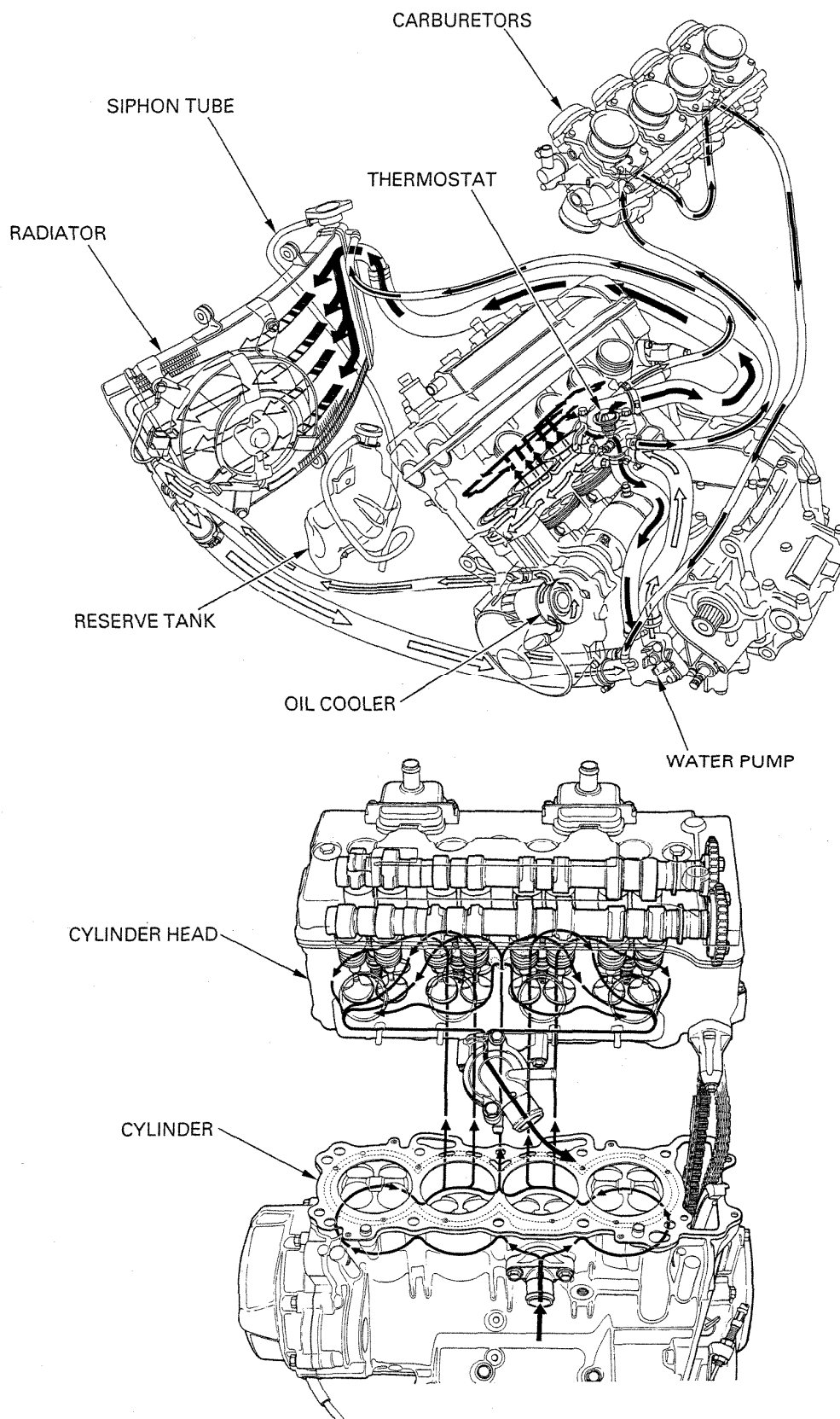
Blow air into the No. 4 hose fitting that goes to the EVAP canister with the ignition switch OFF.  
Blow air into the No. 8 hose fitting with the ignition switch ON.

Air should flow through the EVAP CAV solenoid valve and out the air vent port (No. 4 hose fitting) that goes to the air vent control solenoid valve.



## COOLING SYSTEM

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# 6. COOLING SYSTEM

SERVICE INFORMATION	6-1	THERMOSTAT	6-6
TROUBLESHOOTING	6-2	RADIATOR/COOLING FAN	6-8
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-11
COOLANT REPLACEMENT	6-4	WATER PUMP	6-12

## 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.

#### CAUTION:

Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passage.  
Using tap water may cause engine damage.

- 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 fan motor switch and thermosensor inspection.

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.7 ℓ (2.9 US qt , 2.4 Imp qt)
	Reserve tank	0.31 ℓ (0.33 US qt , 0.27 Imp qt)
Radiator cap relief pressure		108–137 kPa (1.1–1.4 kgf/cm <sup>2</sup> , 16–20 psi)
Thermostat	Begin to open	73–77 °C (163–171 °F)
	Fully open	90 °C (194 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors.

## TORQUE VALUES

Water pump assembly bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)
Thermostat cover bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)

## COOLING SYSTEM

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### TROUBLESHOOTING

#### Engine temperature too high

- Faulty temperature gauge or thermosensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passenges blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- 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

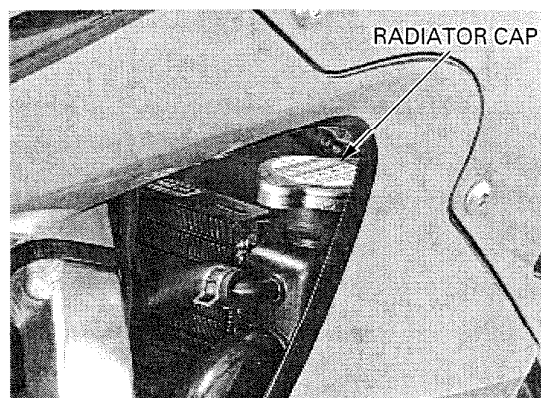
# SYSTEM TESTING

## ⚠ WARNING

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

Remove the right air intake duct (page 2-6).

Remove the radiator cap.

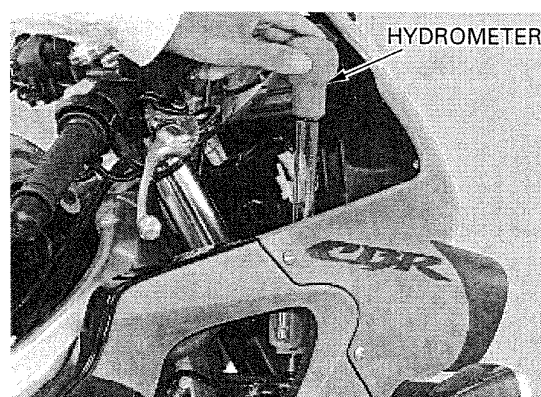


## COOLANT (HYDROMETER TEST)

Test the coolant gravity using a hydrometer.

**STANDARD COOLANT CONCENTRATION: 50%**

Look for contamination and replace the coolant if necessary.



Coolant temperature °(°F)	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
Coolant ratio %											
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

## COOLING SYSTEM

### 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:

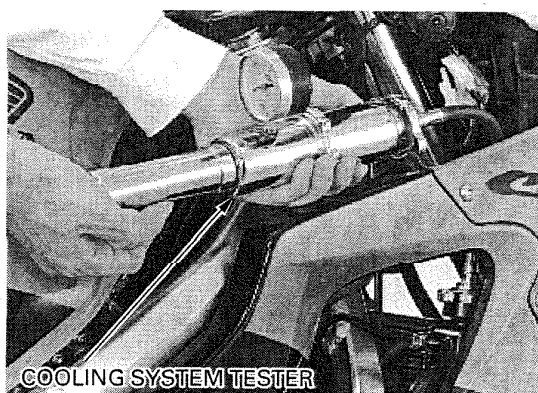
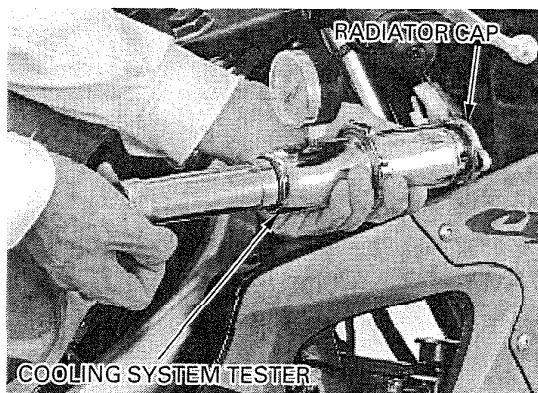
108–137 kPa (1.1–1.4 kgf/cm<sup>2</sup>, 16–20 psi)

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/cm<sup>2</sup>, 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.**

#### CAUTION:

*Using coolant with silicate corrosion inhibitors may cause premature wear of water pump seals or blockage of radiator passage. Using tap water may cause engine damage.*

#### NOTE:

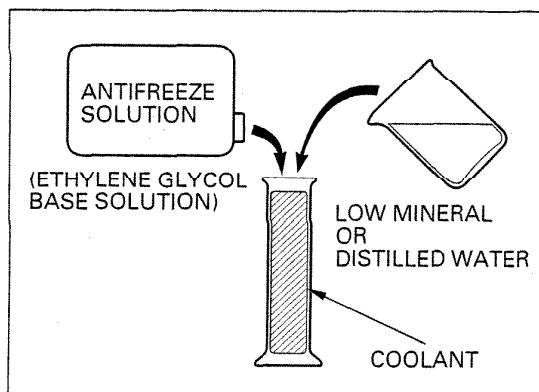
- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the antifreeze.

#### RECOMMENDED MIXTURE:

50–50 (Distilled water and antifreeze)

#### RECOMMENDED ANTIFREEZE:

Pro Honda HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors



## REPLACEMENT/AIR BLEEDING

### ⚠ WARNING

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

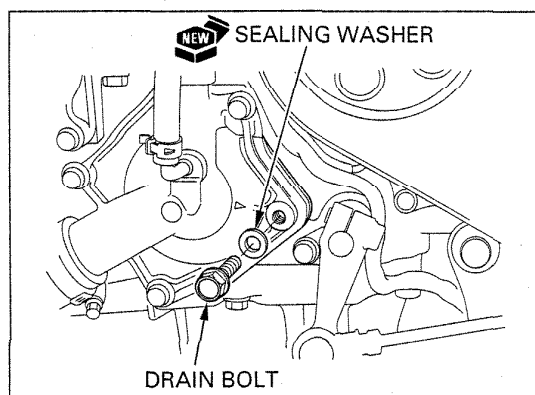
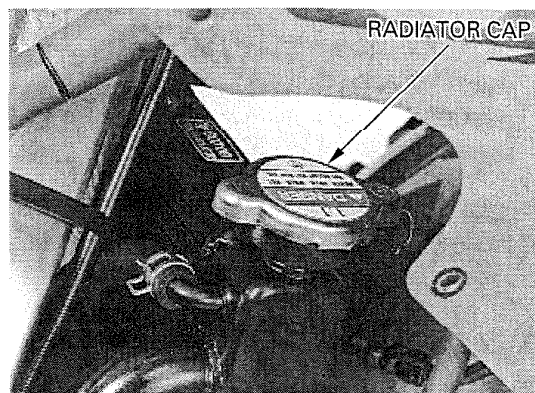
### NOTE

When filling the system or reserve tank with a coolant (checking the coolant level), place the motorcycle upright on a flat, level surface.

Remove the right air intake duct (page 2-6).  
Remove the left side fairing (page 2-4).

Remove the radiator cap.

Remove the drain bolt on the water pump and drain the coolant from the system.



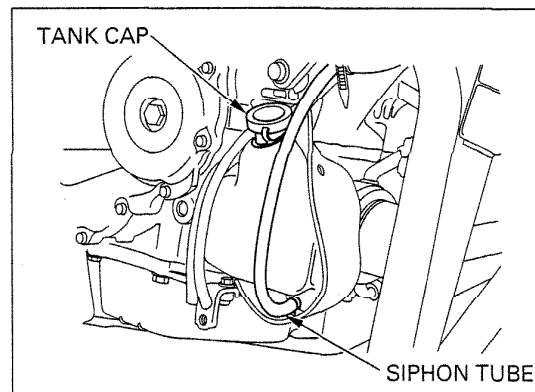
Remove the radiator without disconnecting the water hoses (page 3-6).  
Remove the drain bolt on the cylinder and drain the coolant from the cylinder.



Remove the reserve tank cap.  
Slide the heat guard rubber out of the way, disconnect the siphon tube, and drain the coolant from the reserve tank.

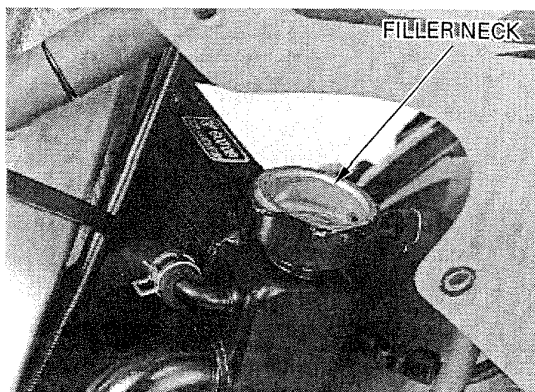
Connect the siphon tube and install the drain bolts with new sealing washers.

Install the radiator onto the frame (page 3-7).



## COOLING SYSTEM

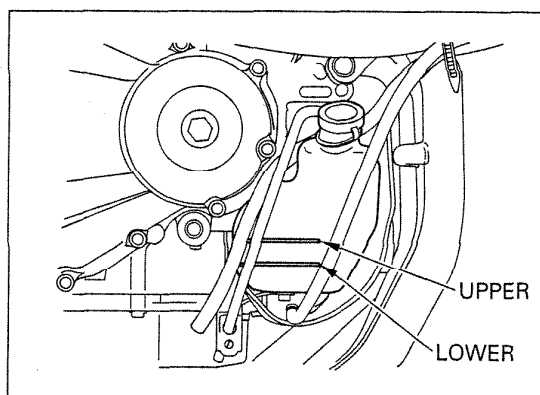
Fill the system with the recommended coolant up to the filler neck.



Fill the reserve tank to the upper level line.

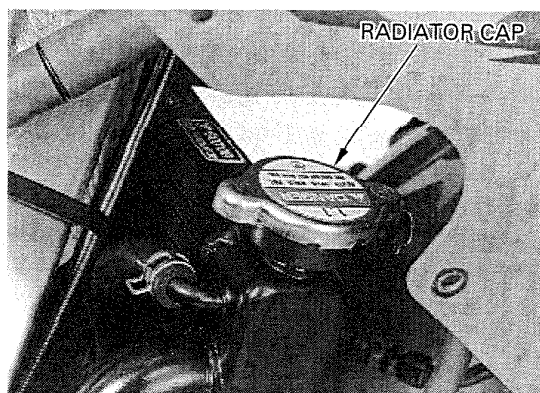
Bleed air from the system as follows:

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 and install the reserve tank cap.

Install the right air intake duct (page 2-6).  
Install the side fairings (page 2-4).



## THERMOSTAT

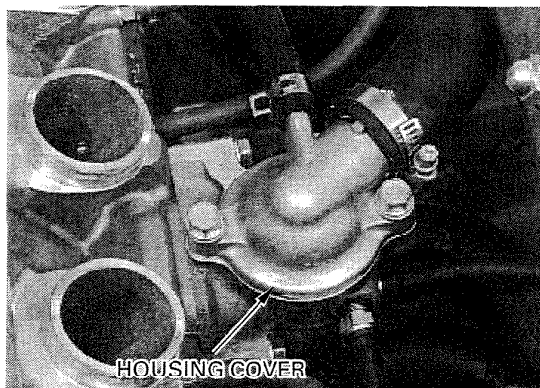
### REMOVAL

#### ▲WARNING

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

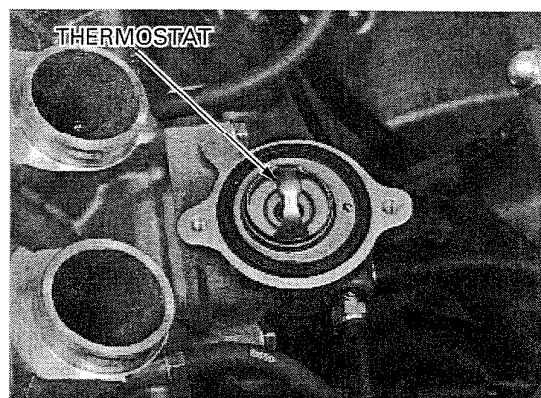
Drain the coolant from the system (page 6-5).  
Remove the carburetor (page 5-15).

Remove the bolts and thermostat housing cover.





Remove the thermostat.



## 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.

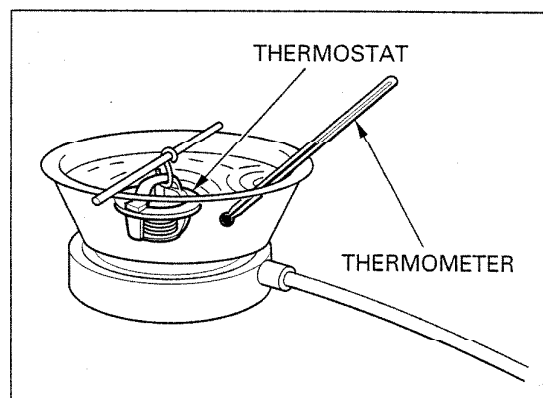
### THERMOSTAT BEGINS TO OPEN:

73–77 °C (163–171 °F)

### VALVE LIFT:

8 mm (0.3 in) minimum at 90 °C (194 °F)

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



## INSTALLATION

Install a new seal rubber over the thermostat flange.

Apply coolant to the seal rubber and install the thermostat into the housing with its hole facing rearward.

### CAUTION:

*Do not allow the seal rubber to turn inside out. It will cause the coolant to leak.*



## COOLING SYSTEM

Install the thermostat housing cover and tighten the cover bolts.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the carburetor (page 5-30).  
Fill and bleed the cooling system (page 6-4).



## RADIATOR/COOLING FAN

### CAUTION:

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

### RADIATOR REMOVAL/ INSTALLATION

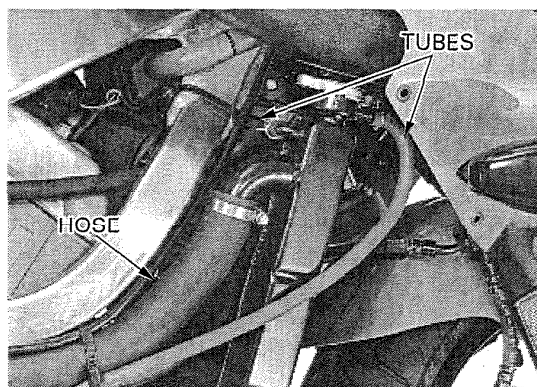
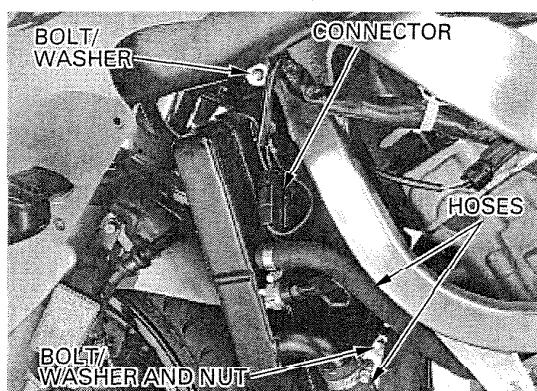
Drain the coolant from the system by removing the drain bolt on the water pump (page 6-5).

Disconnect the fan motor 2P (Black) connector.

Disconnect the horn connectors. Remove the horn bolt and horn.

Disconnect the water hoses and tubes from the radiator.

Remove the radiator mounting bolts, washers and nut.  
Remove the radiator from the mounting boss of the frame.



Remove the air guide rubber from the engine.

Installation is in the reverse order of removal.

### NOTE:

Set the air guide rubber properly, being careful not to pinch it between the frame and radiator.

Fill and bleed the cooling system (page 6-4).

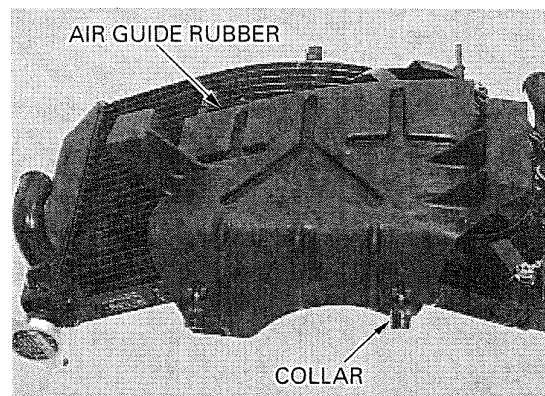


### COOLING FAN DISASSEMBLY

Remove the radiator (page 6-8).

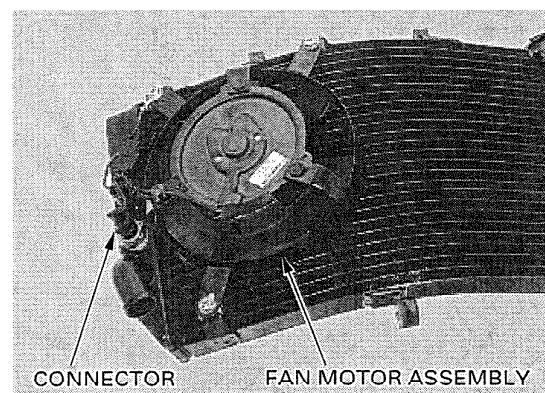
Remove the mounting collar.

Remove the air guide rubber from the radiator.

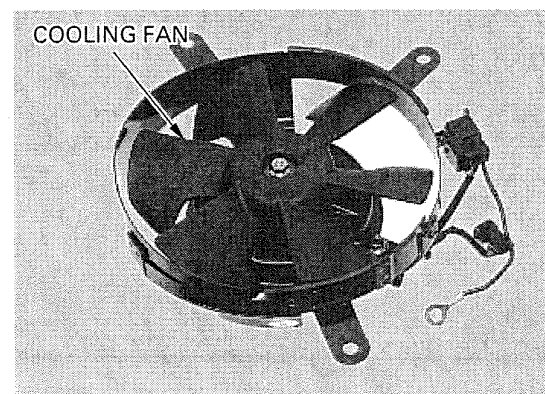


Disconnect the fan motor switch connector.

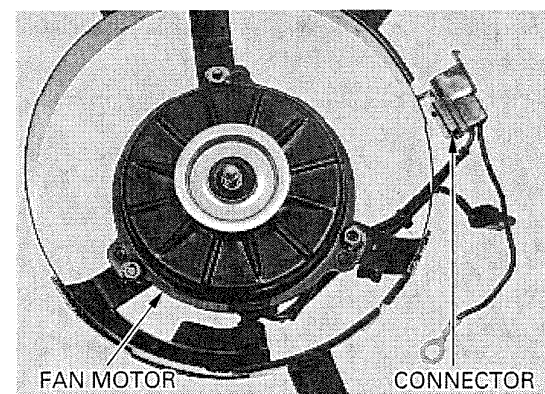
Remove the fan motor assembly by removing the three bolts and ground terminal.



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



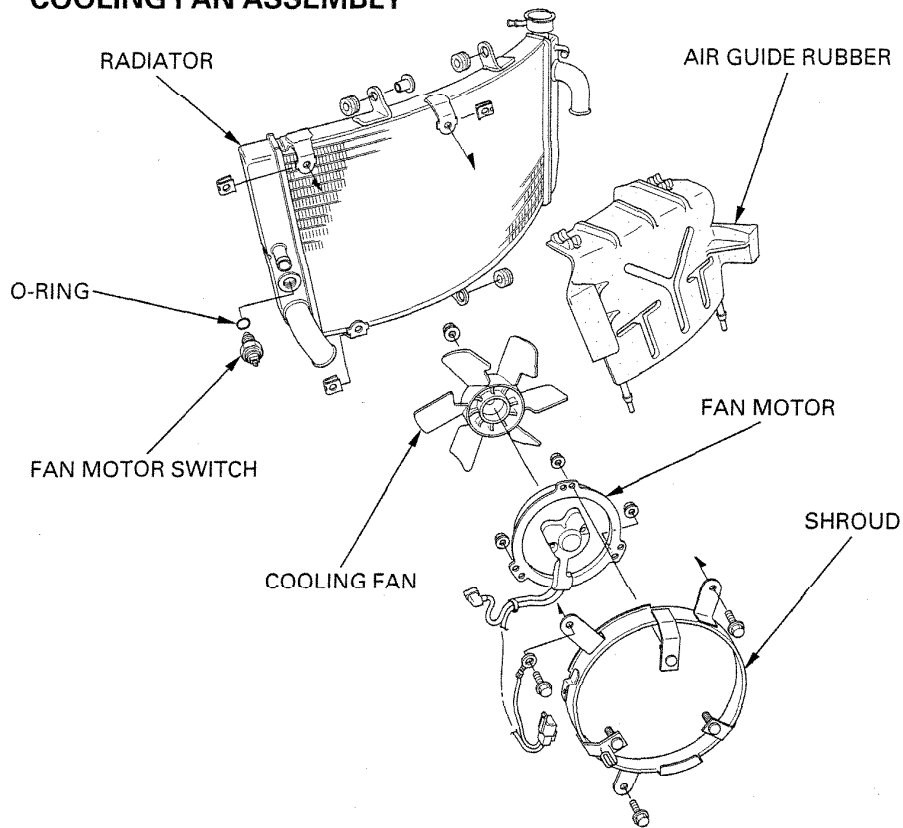
Remove the fan motor connector from the shroud and the motor wire from the clamp.  
Remove the nuts and the fan motor.



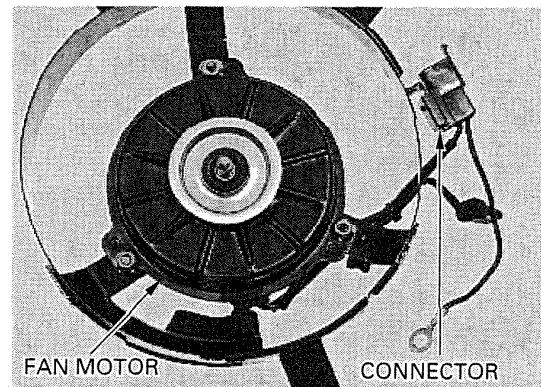
## COOLING SYSTEM

---

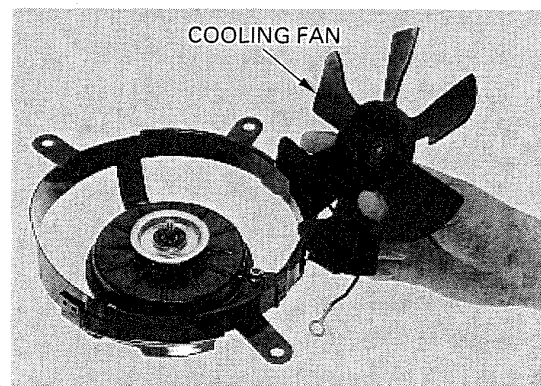
### COOLING FAN ASSEMBLY



Install the fan motor onto the shroud as shown.  
Install and tighten the nuts.  
Install the fan motor connector onto the shroud and  
secure the wire with the clamp.

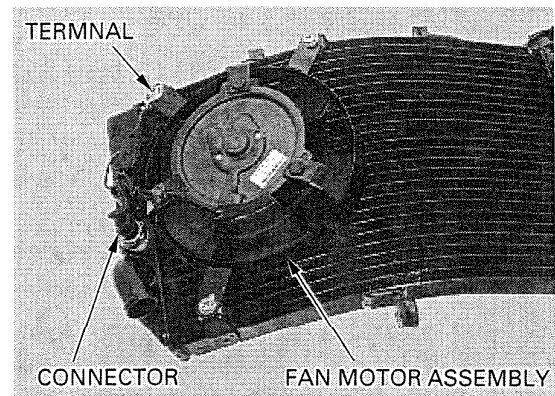


Install the cooling fan onto the motor shaft by align-  
ing the flat surfaces.  
Install and tighten the nut.



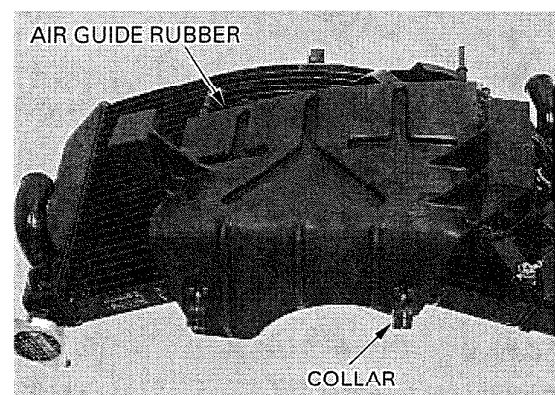
Install the fan motor assembly onto the radiator and tighten the mounting bolts with the ground terminal.

Connect the fan motor switch connector.



Install the air guide rubber over the radiator stays properly.  
Install the mounting collar into the right side of the left grommet.

Install the radiator (page 6-8).



## RADIATOR RESERVE TANK REMOVAL/INSTALLATION

Drain the coolant from the reserve tank (page 6-5).

Remove the breather tube from the reserve tank stay.

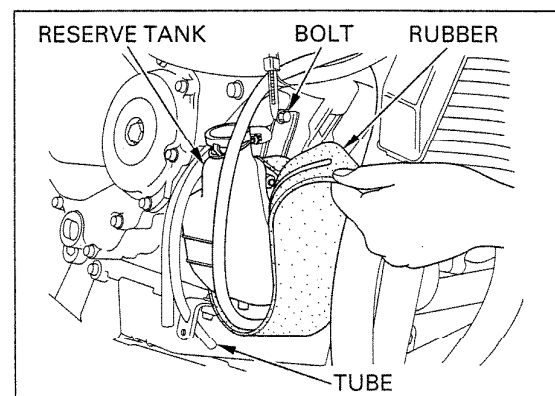
Remove the mounting bolt, and the reserve tank and heat guard rubber from the stay.

*Align the locating pin with the hole in the stay.*

Installation is in the reverse order of removal.

### NOTE:

Route the tubes properly (page 1-19).



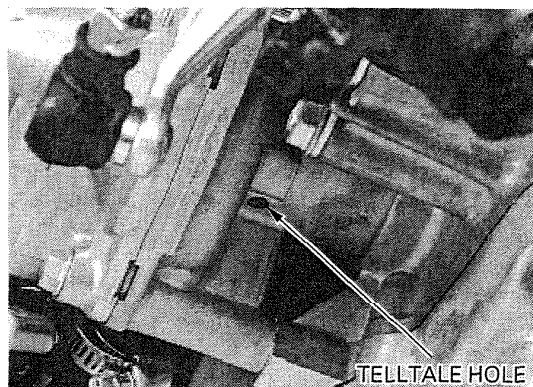
Fill the reserve tank with recommended coolant to the upper level line (page 3-14).

## COOLING SYSTEM

### WATER PUMP

#### MECHANICAL SEAL INSPECTION

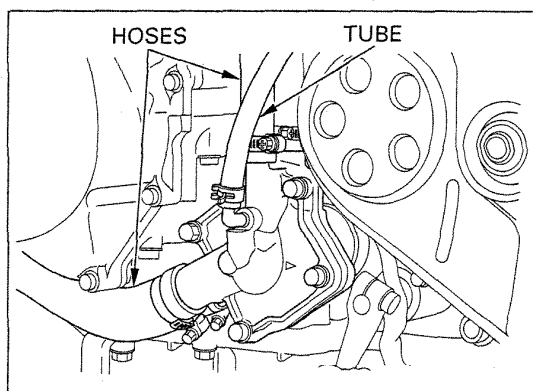
Inspect the telltale hole for signs of coolant leakage. If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



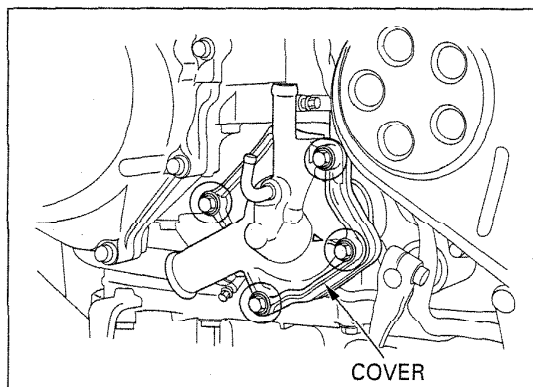
#### REMOVAL

Drain the coolant from the system by removing the drain bolt on the water pump (page 6-5).

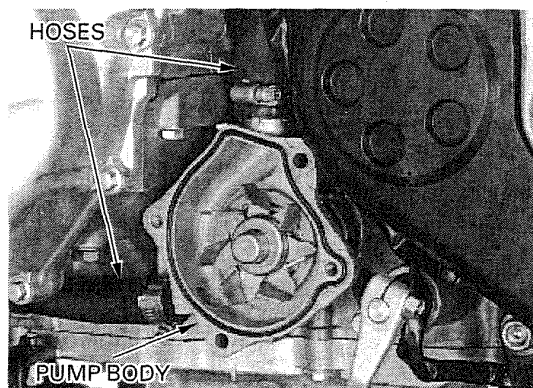
Disconnect the water tube and hoses from the water pump cover.



Remove the four bolts and water pump cover.



Remove the O-ring.  
Disconnect the water hoses.  
Remove the pump body from the crankcase.





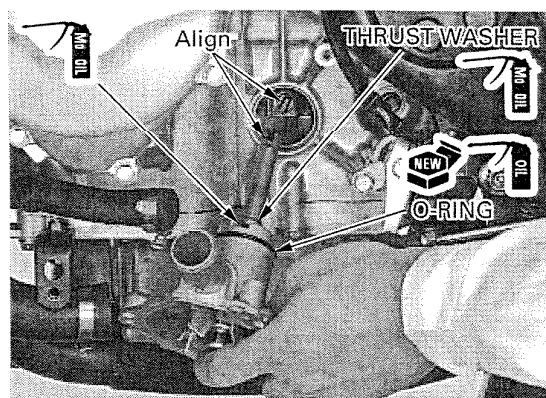
## INSTALLATION

Pour the molybdenum oil solution into the hole in the water pump as shown.

Apply molybdenum oil solution to the thrust washer.

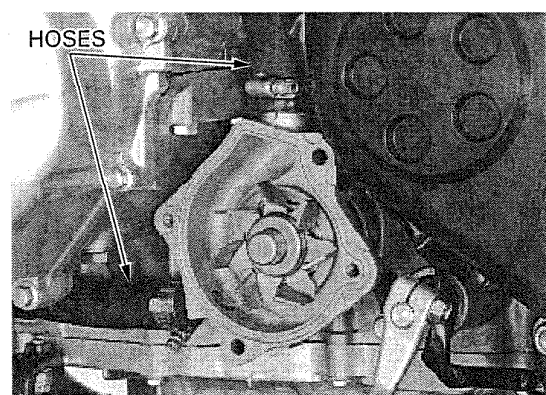
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with the oil pump shaft end by turning the pump shaft.

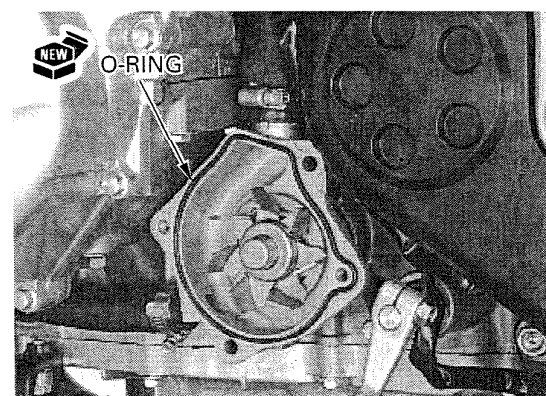


Align the bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

Connect the water hoses to the pump body.



Install a new O-ring into the groove in the water pump body.

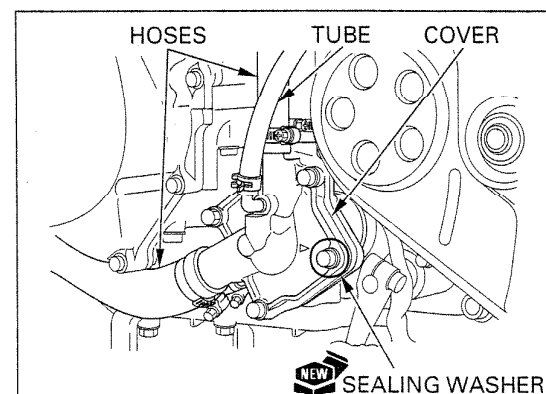


Install the water pump cover and tighten the bolts with a new sealing washer.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

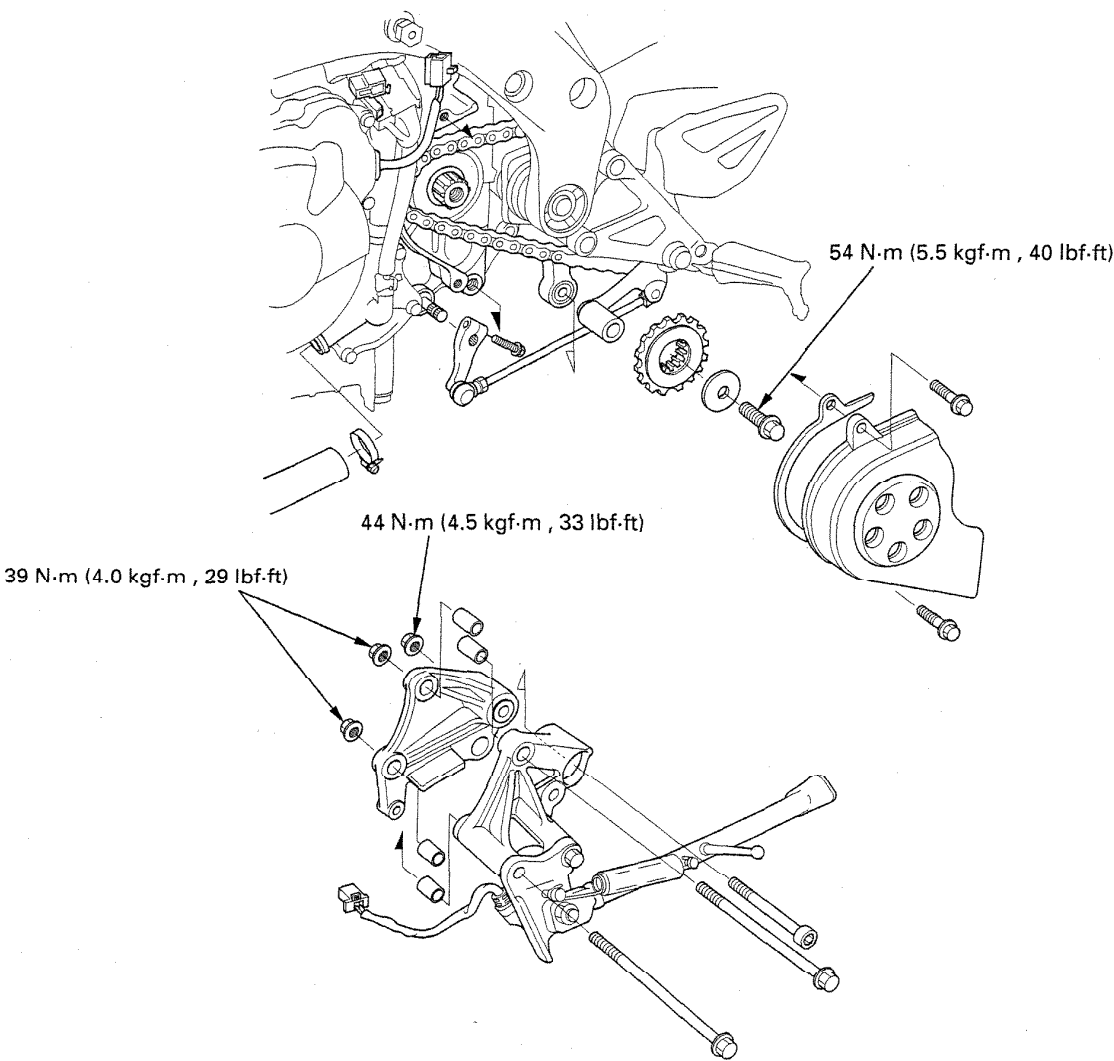
Connect the water hoses and tube.

Fill and bleed the cooling system (page 6-4).



**ENGINE REMOVAL/INSTALLATION**

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# 7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

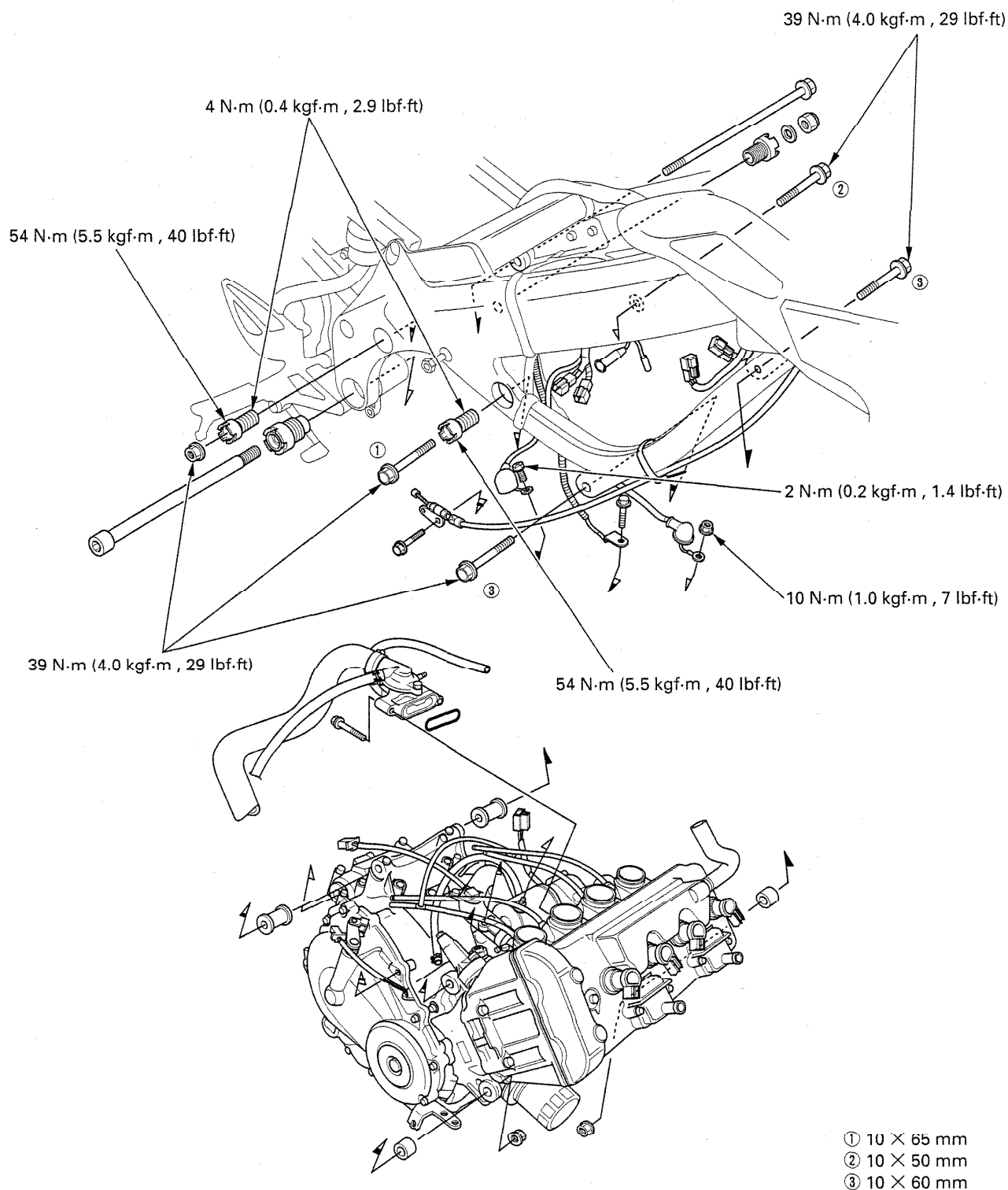
7-2

ENGINE INSTALLATION

7-6

ENGINE REMOVAL

7-3



## 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	59 kg (130 lbs)
Engine oil capacity after disassembly	3.7 ℓ (3.9 US qt, 3.3 Imp qt)
Coolant capacity (radiator and engine)	2.7 ℓ (2.9 US qt, 2.4 Imp qt)

#### TORQUE VALUES

Front engine hanger bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Center engine hanger bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Center engine hanger adjusting bolt (right side)	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Center engine hanger lock nut (right side)	54 N·m (5.5 kgf·m, 40 lbf·ft)
Rear engine hanger nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Rear engine hanger adjusting bolt (right side)	4 N·m (0.4 kgf·m, 2.9 lbf·ft)
Rear engine hanger lock nut (right side)	54 N·m (5.5 kgf·m, 40 lbf·ft)
Shock link bracket nut	39 N·m (4.0 kgf·m, 29 lbf·ft)
Shock link-to-bracket nut	44 N·m (4.5 kgf·m, 33 lbf·ft)
Drive sprocket bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)
Starter motor terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)
Oil pressure switch terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)

#### TOOL

Lock nut wrench	07VMA-MBB0100
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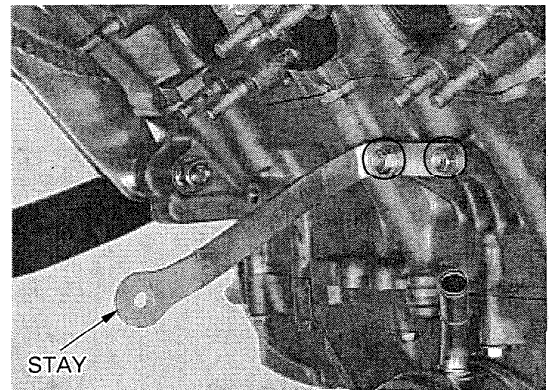
## ENGINE REMOVAL

Drain the engine oil (page 3-12).

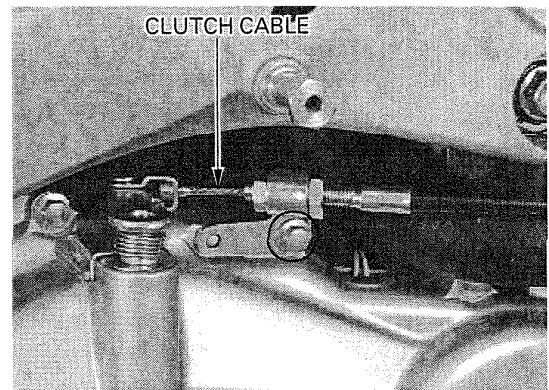
Remove the following:

- radiator (page 6-8)
- radiator reserve tank (page 6-11)
- exhaust system (page 2-7)
- carburetor (page 5-15)
- pulse secondary air injection (PAIR) control valve (page 5-39)
- EVAP canister (California only; page 5-39)
- direct ignition coil connectors.

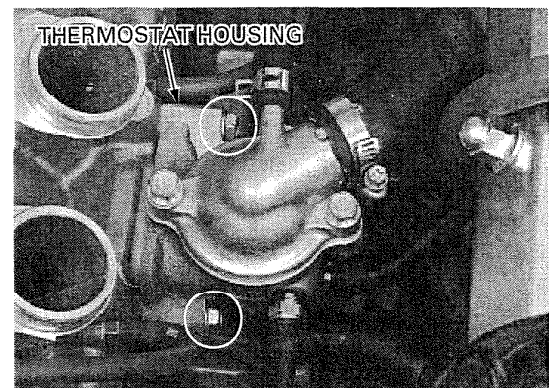
Remove the two bolts and radiator stay.



Remove the cable holder bolt and disconnect the clutch cable from the clutch arm.



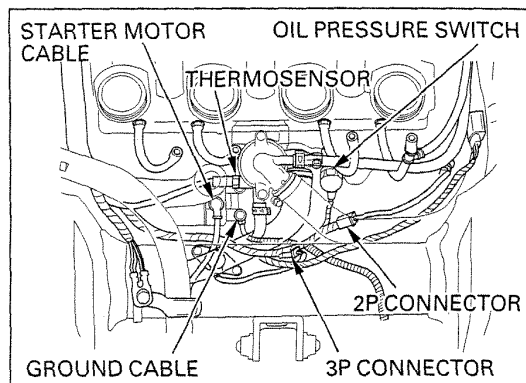
Remove the two bolts and thermostat housing.  
Remove the O-ring.



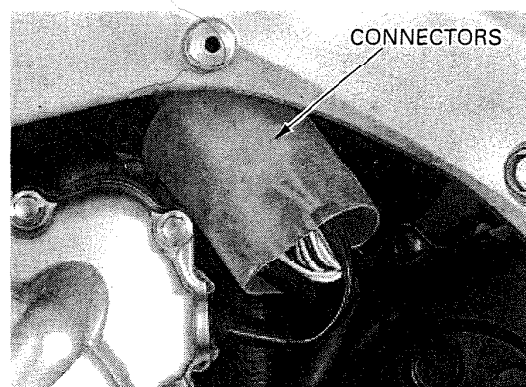
## ENGINE REMOVAL/INSTALLATION

Disconnect the following:

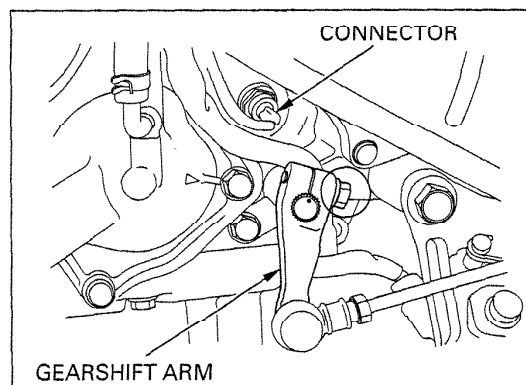
- ignition pulse generator 2P (Red) connector
- speed sensor 3P (Black) connector
- oil pressure switch wire by removing screw
- starter motor cable by removing terminal nut
- ground cable by removing motor mounting bolt
- thermosensor connector



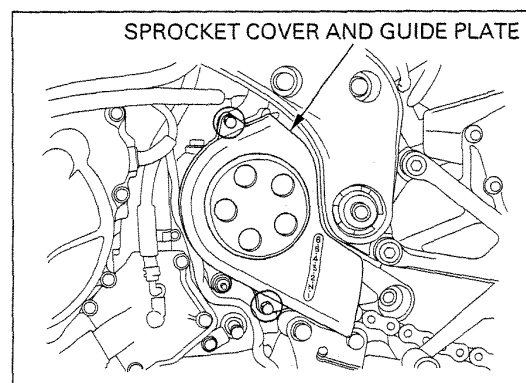
- alternator 3P (White) connector
- side stand 2P (Green) connector



- gearshift arm by removing bolt
- neutral switch connector

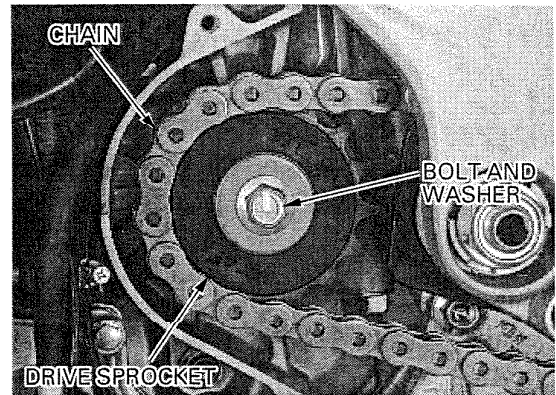


Remove the two bolts, sprocket cover and guide plate.



## ENGINE REMOVAL/INSTALLATION

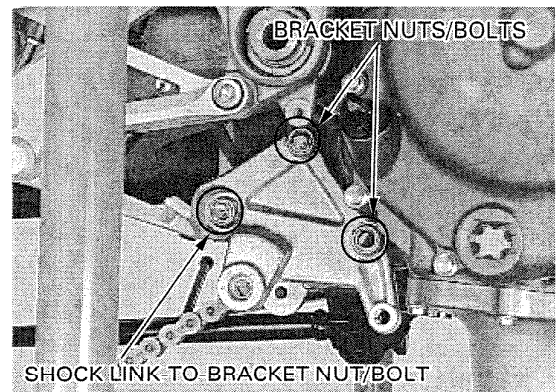
Loosen the rear axle nut and drive chain adjusters. Remove the drive sprocket bolt, washer and the drive sprocket with the drive chain from the countershaft.



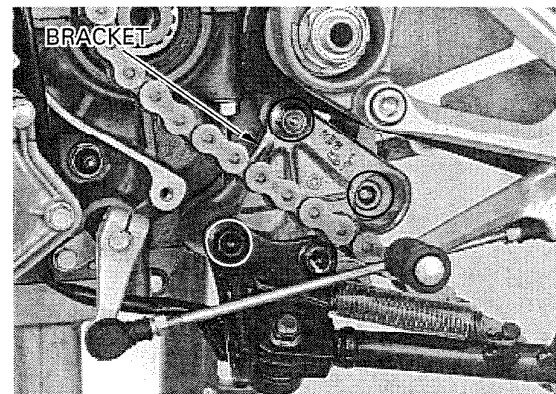
Support the motorcycle securely with a hoist or equivalent.

Remove the following:

- shock link-to-bracket nut and bolt
- shock link bracket nuts and bolts



- shock link brackets from engine and shock link
- four dowel pins.



*Support the swingarm securely.* Loosen the left and right swingarm pivot lock nuts (page 14-13).

Remove the pivot nut and washer, and the pivot bolt.

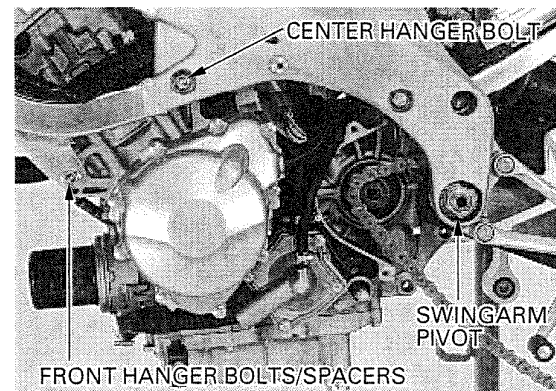
Place a floor jack or other adjustable support under the engine.

### NOTE:

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

Remove the following:

- front hanger bolts and spacers (both sides)
- center hanger bolt (left side).



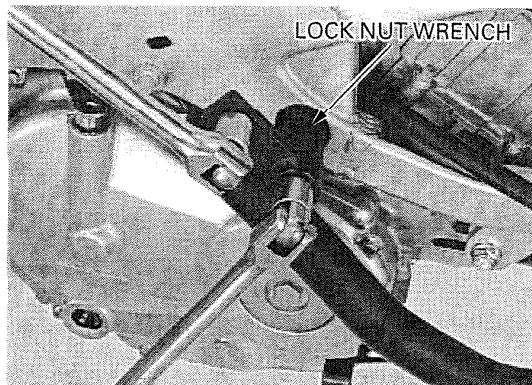
## ENGINE REMOVAL/INSTALLATION

Hold the center hanger bolt (right side) and loosen the lock nut using the special tool.

**TOOL:**

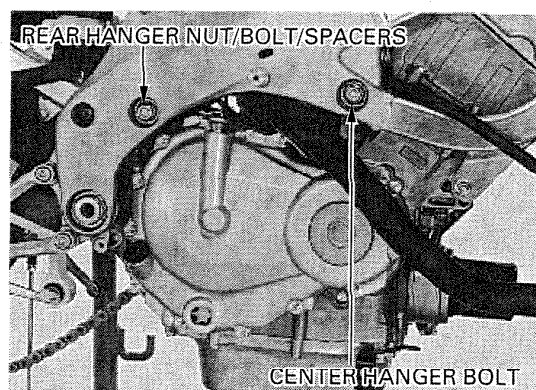
Lock nut wrench                      07VMA-MBB0100

Hold the rear hanger nut and loosen the lock nut using the same tool.



Remove the following:

- center hanger bolt (right side)
- rear hanger nut, bolt and spacers
- lock nuts and adjusting bolts
- 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 7-2 "SERVICE INFORMATION".
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wires and cables properly (page 1-18).

**CAUTION:**

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

Carefully align the hanger bolt holes in the frame and engine.

Install the engine into the frame and swingarm.

Install the following:

- center hanger bolt (B)
- front hanger bolts (A) and (D) with spacers

1. Tighten the center hanger bolt (B).

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

2. Tighten the front hanger bolt (A).

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

3. Tighten the front hanger bolt (D).

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

4. Install the center adjusting bolt (E) until it just contacts to the engine. Tighten the adjusting bolt (E) to the specified torque, then turn it out 180°.

**TORQUE** : 4 N·m (0.4 kgf·m , 2.9 lbf·ft)

5. Install the lock nut (E). Hold the adjusting bolt (E) and tighten the lock nut (E).

**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)

6. Set the right spacer (F) between the frame and engine (Temporarily install the rear hanger bolt (C) to align the spacer). Install the adjusting bolt (F) until it just contacts to the spacer.

Remove the hanger bolt (C) and tighten the rear adjusting bolt (F) to the specified torque, then turn it out 180°.

**TORQUE** : 4 N·m (0.4 kgf·m , 2.9 lbf·ft)

7. Install the lock nut (F). Hold the adjusting bolt (F) and tighten the lock nut (F).

**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)

8. Install the center hanger bolt (E) and tighten it.

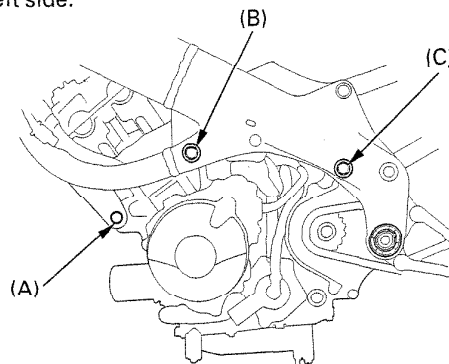
**TORQUE** : 39 N·m (4.0 kgf·m , 29 lbf·ft)

9. Install the rear hanger bolt (C) from the left side with the left spacer.  
 Install the rear hanger nut (F) and tighten it.

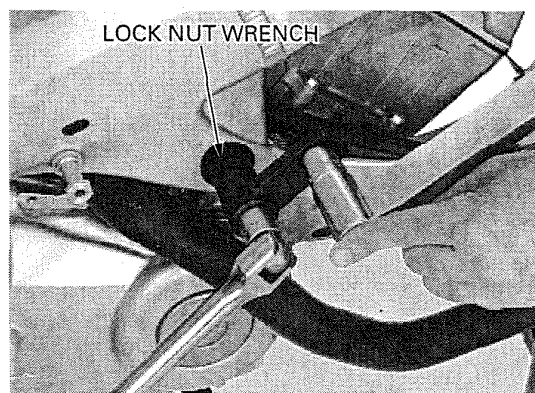
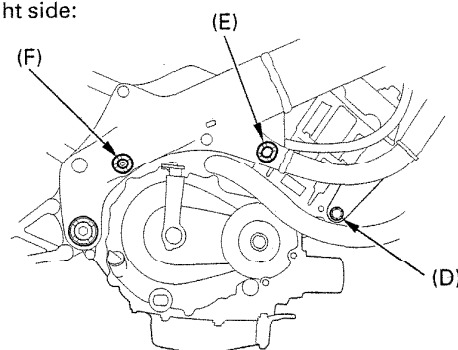
**TORQUE** : 39 N·m (4.0 kgf·m , 29 lbf·ft)

10. Install the swingarm pivot bolt (page 14-17).

Left side:



Right side:





## ENGINE REMOVAL/INSTALLATION

Install the four dowel pins into the bracket bolt holes in the engine.

Install the link brackets onto the engine and set the shock link between the brackets.

*Carefully align the bolt holes in the brackets and shock link.*

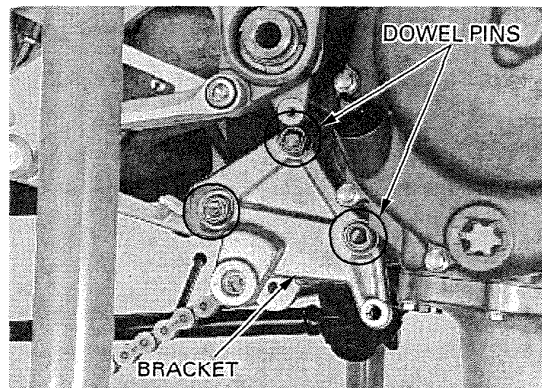
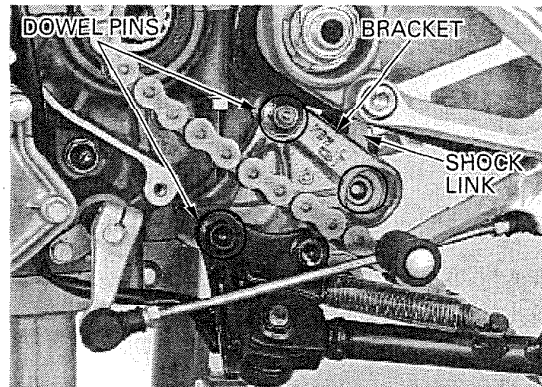
Install the bracket bolts and shock link-to-bracket bolt from the left side.

Install the bracket and shock link-to-bracket nuts. Tighten the bracket nuts, then the shock link-to-bracket nut.

### TORQUE :

**Bracket nut:** 39 N·m (4.0 kgf·m , 29 lbf·ft)

**Shock link-to-bracket:** 44 N·m (4.5 kgf·m , 33 lbf·ft)

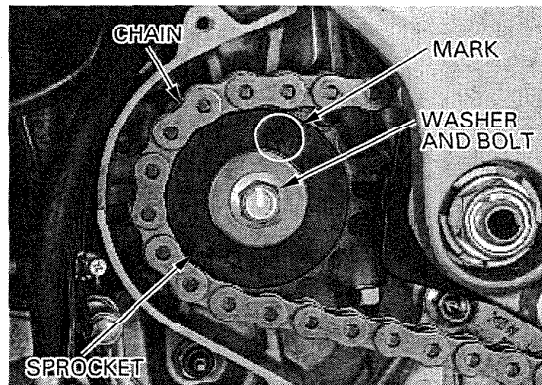


*Install with the sprocket's mark facing out.*

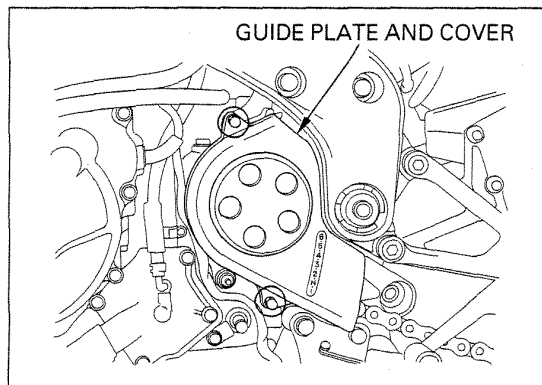
Install the drive sprocket with the drive chain onto the countershaft.

Install the washer and bolt, and tighten the bolt.

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



Install the drive sprocket cover with the guide plate and tighten the two bolts.

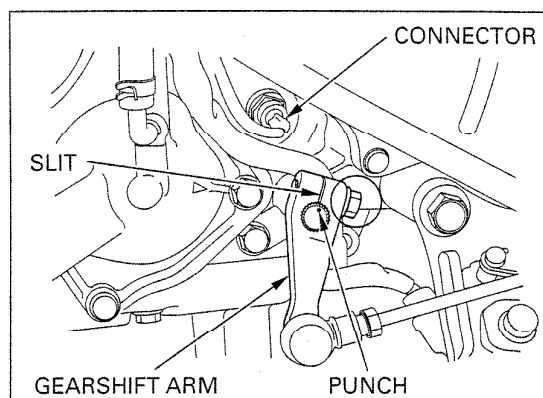




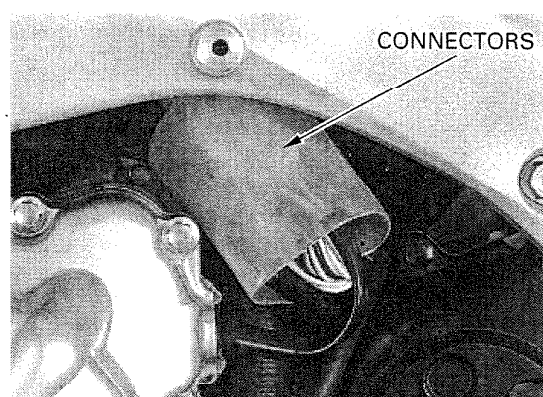
## ENGINE REMOVAL/INSTALLATION

Install the gearshift arm onto the spindle by aligning the slit of the arm with the punch mark on the spindle.  
Tighten the pinch bolt.

Connect the following:  
— neutral switch connector



— side stand 2P (Green) connector  
— alternator 3P (White) connector



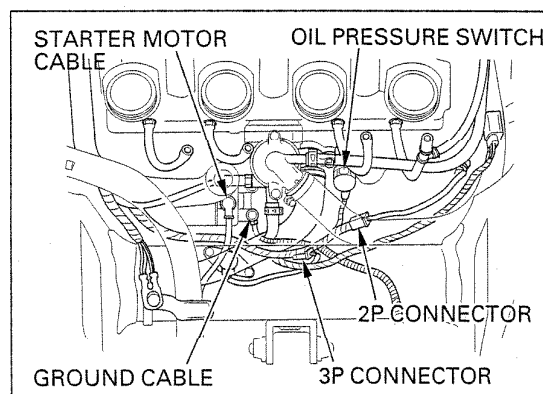
— starter motor cable

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

— ground cable  
— oil pressure switch wire

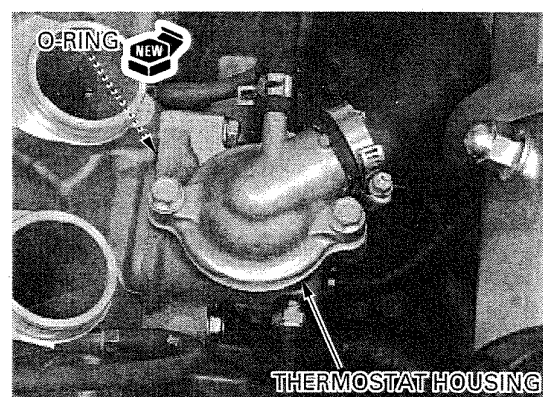
**TORQUE** : 2 N·m (0.2 kgf·m , 1.4 lbf·ft)

— speed sensor 3P (Black) connector  
— ignition pulse generator 2P (Red) connector  
— thermosensor connector



Install a new O-ring into the thermostat housing groove.

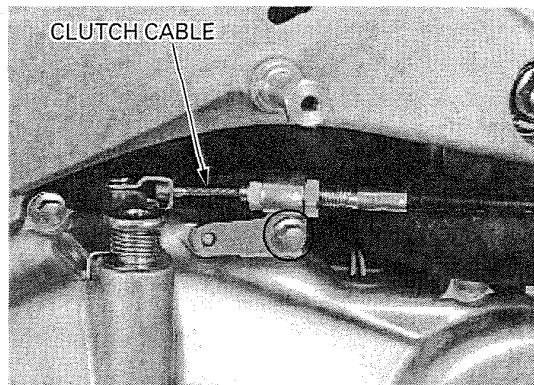
Install the thermostat housing onto the cylinder head and tighten the two bolts.



## ENGINE REMOVAL/INSTALLATION

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Connect the clutch cable to the clutch arm and install the cable holder, then tighten the holder bolt.



Install the radiator stay and tighten the two bolts.

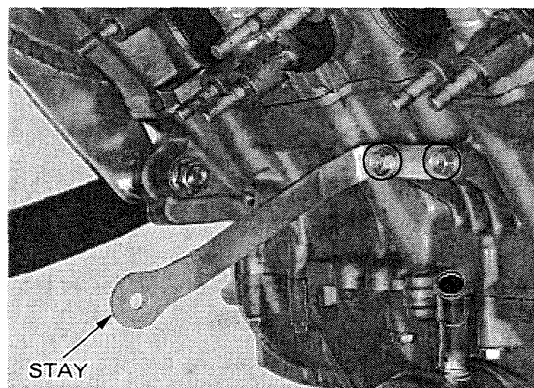
Install the following:

- direct ignition coil connectors
- EVAP canister ( California only; page 5-39)
- pulse secondary air injection (PAIR) control valve (page 5-39)
- carburetor (page 5-30)
- exhaust system (page 2-7)
- radiator reserve tank (page 6-11)
- radiator (page 6-8).

Adjust the following:

- drive chain slack (page 3-16)
- clutch lever free play (page 3-23).

Fill the crankcase with recommended engine oil (page 3-12)

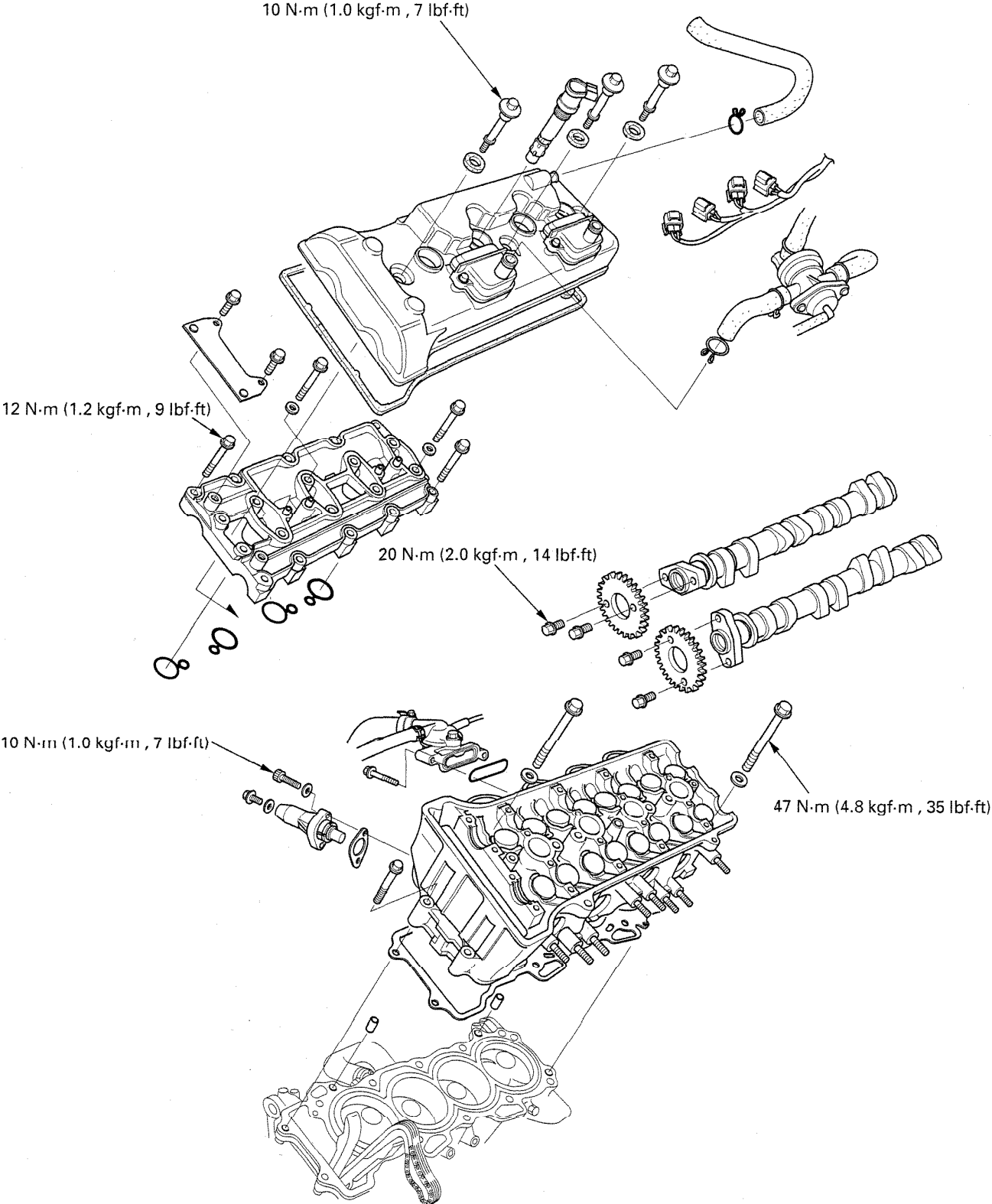


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**MEMO**

**CYLINDER HEAD/VALVE**

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# 8. CYLINDER HEAD/VALVE

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-12
TROUBLESHOOTING	8-2	VALVE SEAT INSPECTION/REFACING	8-13
CYLINDER COMPRESSION	8-3	CYLINDER HEAD ASSEMBLY	8-16
CYLINDER HEAD COVER REMOVAL	8-3	CYLINDER HEAD INSTALLATION	8-17
CAMSHAFT REMOVAL	8-4	CAMSHAFT INSTALLATION	8-19
CYLINDER HEAD REMOVAL	8-7	CYLINDER HEAD COVER INSTALLATION	8-21
CYLINDER HEAD DISASSEMBLY	8-8		

## SERVICE INFORMATION

### GENERAL

8

- 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 rpm				1,226 kPa (12.5 kgf/cm <sup>2</sup> , 178 psi)	————
Valve clearance			IN	0.20 ± 0.03 (0.008 ± 0.001)	————
			EX	0.28 ± 0.03 (0.011 ± 0.001)	————
Camshaft	Cam lobe height	49 state/Canada type	IN	36.600–36.760 (1.4409–1.4472)	36.57 (1.440)
			EX	35.380–35.540 (1.3929–1.3992)	35.35 (1.392)
		California type	IN	34.640–34.720 (1.3638–1.3669)	34.61 (1.363)
			EX	33.920–34.000 (1.3354–1.3386)	33.89 (1.334)
		Runout			————
	Oil clearance			0.020–0.062 (0.0008–0.0024)	0.10 (0.004)
Valve lifter	Valve lifter O.D.			25.978–25.993 (1.0228–1.0233)	25.97 (1.022)
	Valve lifter bore I.D.			26.010–26.026 (1.0240–1.0246)	26.04 (1.025)
Valve, valve guide	Valve stem O.D.		IN	3.975–3.990 (0.1565–0.1571)	3.965 (0.1561)
			EX	3.965–3.980 (0.1561–0.1567)	3.955 (0.1557)
	Valve guide I.D.		IN/EX	4.000–4.012 (0.1575–0.1580)	4.04 (0.159)
	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		IN	16.1–16.4 (0.63–0.65)	————
			EX	14.3–14.6 (0.56–0.57)	————
	Valve seat width		IN/EX	0.90–1.10 (0.035–0.043)	1.5 (0.06)
Valve spring	Free length		IN	39.87 (1.570)	38.27 (1.507)
			EX	36.23 (1.426)	34.73 (1.367)
Cylinder head warpage				————	0.10 (0.004)

## CYLINDER HEAD/VALVE

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### TORQUE VALUES

Cam chain tensioner pivot bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply locking agent to the threads
Cam chain guide washer bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Cylinder head bolt (9 mm)	47 N·m (4.8 kgf·m , 35 lbf·ft)	Apply molybdenum oil solution to the threads and seating surface
Camshaft holder bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply oil to the threads and seating surface
Cam sprocket bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	Apply locking agent to the threads
Cylinder head cover bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Cam chain tensioner lifter mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Spark plug	12 N·m (1.2 kgf·m , 9 lbf·ft)	

### TOOLS

Compression gauge attachment	07RMJ-MY50100	
Valve spring compressor	07757-0010000	
Valve spring compressor attachment	07959-KM30101	
Tappet hole protector	07HMG-MR70002	
Valve guide driver	07JMD-KY20100	
Valve guide reamer, 4.008 mm	07MMH-MV90100	
Valve seat cutter, 27.5 mm (IN 45°)	07780-0010200	or equivalent commercially available in U.S.A.
Valve seat cutter, 24.5 mm (EX 45°)	07780-0010100	
Flat cutter, 27 mm (IN 32°)	07780-0013300	
Flat cutter, 24 mm (EX 32°)	07780-0012500	
Interior cutter, 26 mm (IN 60°)	07780-0014500	
Interior cutter, 22 mm (EX 60°)	07780-0014202	
Cutter holder, 4.0 mm	07781-0010500	

## 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 problem (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 direct ignition coils (page 3-6).

Install the compression gauge with the gauge attachment.

### TOOL:

**Compression gauge attachment** 07RMJ-MY50100

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:

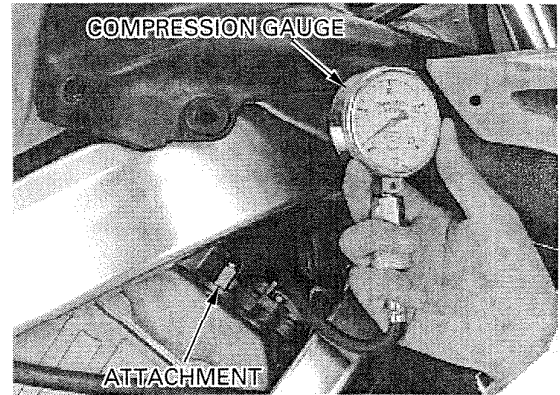
1,226 kPa (12.5 kgf/cm<sup>2</sup> , 178 psi)

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:

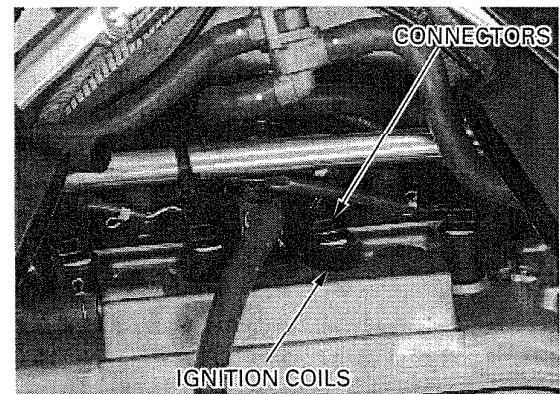
- carbon deposits in combustion chamber or on piston head



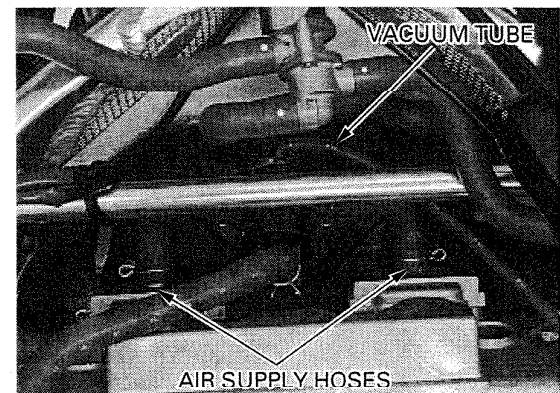
## CYLINDER HEAD COVER REMOVAL

Remove the carburetor (page 5-15).

Disconnect the ignition coil 2P connectors and remove the direct ignition coils.



Disconnect the air supply hoses and the vacuum tube to remove the pulse secondary air injection (PAIR) control valve.

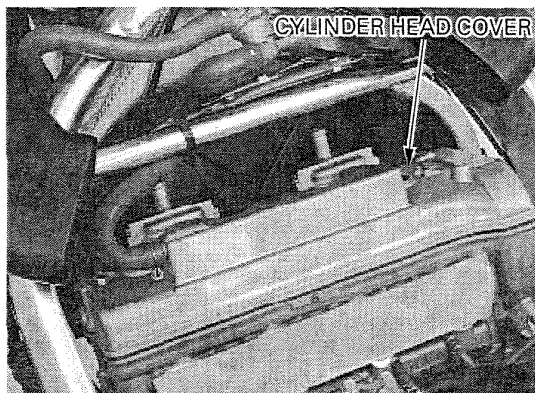


## CYLINDER HEAD/VALVE

Remove the three bolts and the cylinder head cover.

### NOTE:

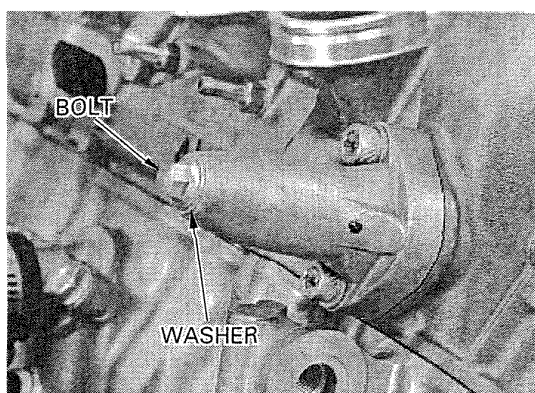
Do not remove the dowel pins and the breather plate from the head cover.



## CAMSHAFT REMOVAL

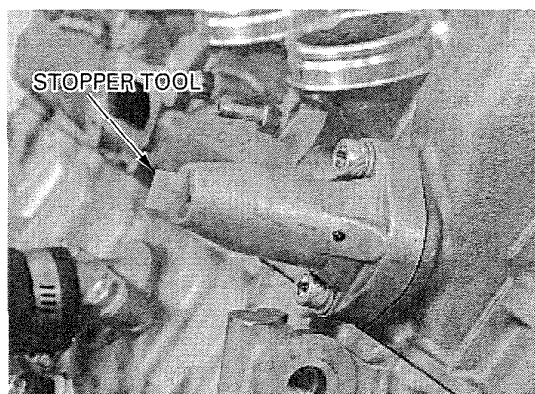
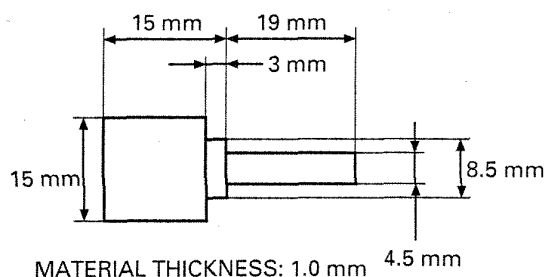
Remove the cylinder head cover (page 8-3).

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

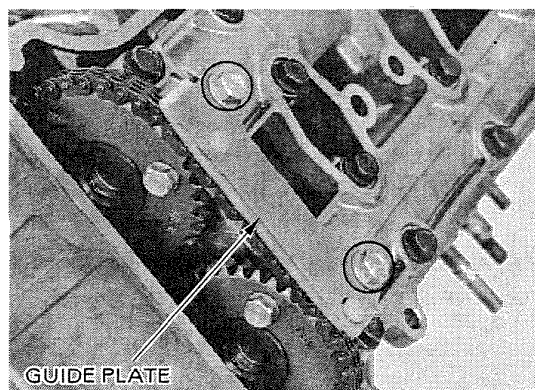


Turn the cam chain tensioner lifter shaft clockwise fully and secure it with a stopper tool.

This tool can easily be made from a thin (1 mm of thickness) piece of steel as shown below.

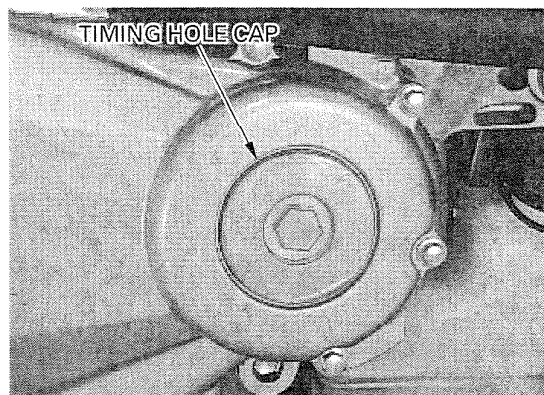


Remove the two bolts and cam chain guide plate from the camshaft holder.





Remove the timing hole cap.



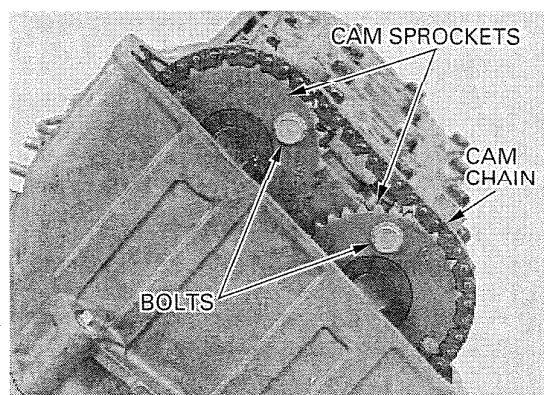
*Be careful not to drop the sprocket bolts and cam sprockets into the crankcase.*

Remove the cam sprocket bolts from the intake and exhaust camshafts.

Turn the crankshaft clockwise 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.

To replace the cam chain, remove the cam chain tensioner and guide (page 8-11).



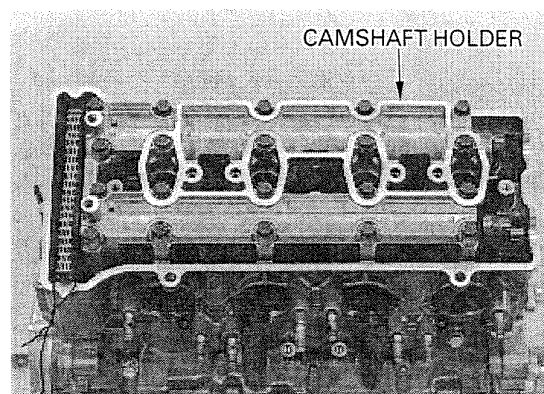
Loosen the camshaft holder bolts in a crisscross pattern in several steps from the outside to inside to prevent damage the camshaft holder and camshafts.

Remove the camshaft holder.

Remove the camshafts.

#### NOTE:

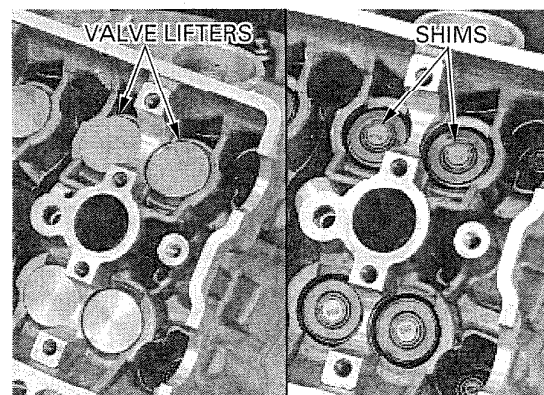
Do not forcibly remove the dowel pins from the camshaft holder.



Remove the valve lifters and shims.

#### NOTE:

- Be careful not to damage the valve lifter bore.
- Shims 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 tweezers or a magnet.



## CYLINDER HEAD/VALVE

---

### INSPECTION

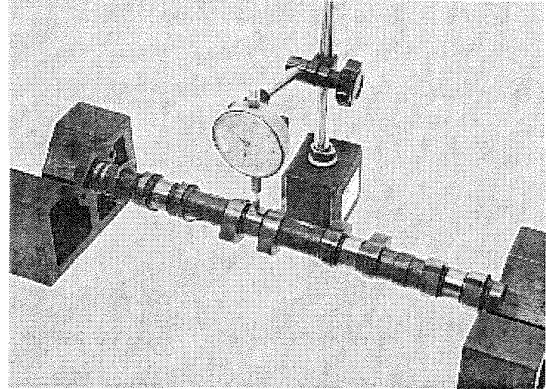
#### CAMSHAFT

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.

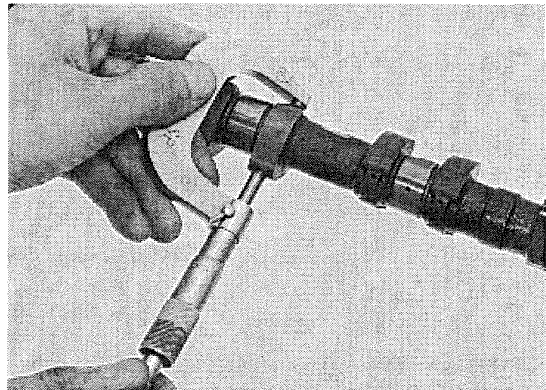
#### SERVICE LIMITS:

**49 state/Canada type:** IN: 36.57 mm (1.440 in)

EX: 35.35 mm (1.392 in)

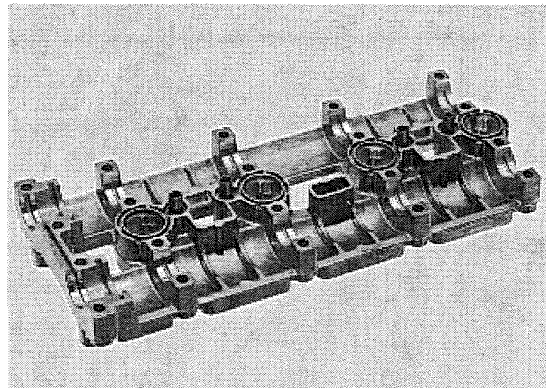
**California type:** IN: 34.61 mm (1.363 in)

EX: 33.89 mm (1.334 in)



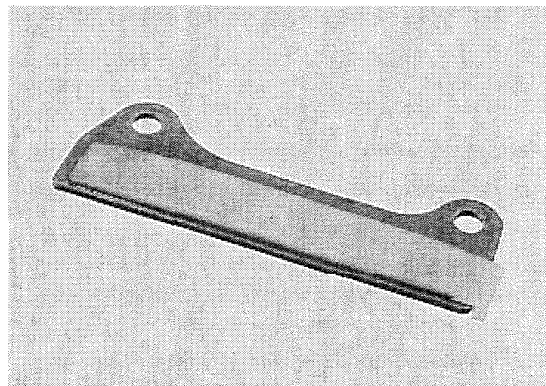
#### CAMSHAFT JOURNAL

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



#### CAM CHAIN GUIDE PLATE

Check the guide plate for excessive wear or damage and replace it if necessary.

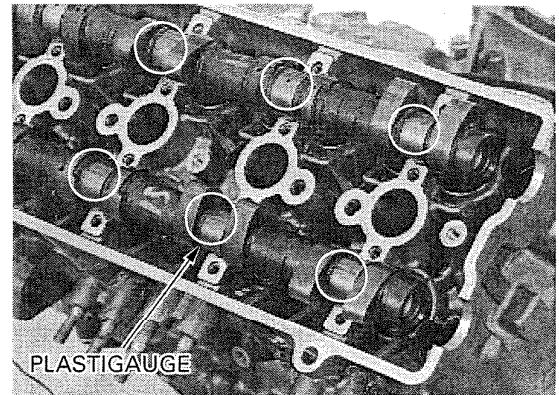


**CAMSHAFT OIL CLEARANCE****NOTE:**

Do not rotate the camshaft during inspection.

The camshafts  
have the identi-  
fication mark:  
— IN: intake  
— EX: exhaust

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 avoiding the oil hole.



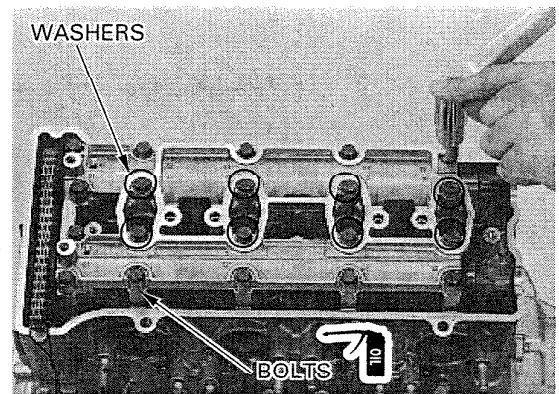
Carefully install the camshaft holder onto the camshafts.

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts.

Install the twenty holder bolts with the eight washers as shown.

The camshaft holder have the number "1 thru. 20". Temporarily tighten the four bolts of the center area gradually in the sequence 6-5-8-7 until the dowel pins on the camshaft holder inserts into the pin holes in the cylinder head properly (The clearance between the holder and head is 1–5 mm).

Next, tighten the all bolts in numerical order cast on the camshaft holder (1 thru. 20) in several steps.

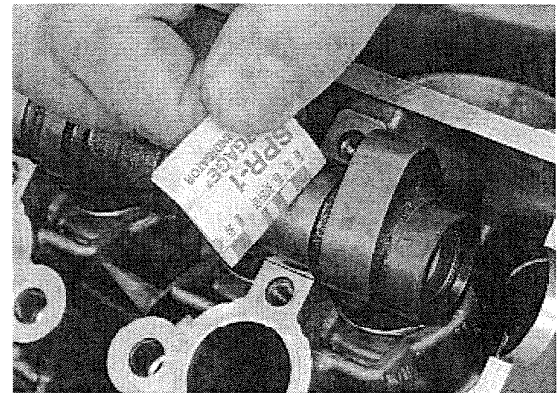


**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

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

**SERVICE LIMIT:** 0.10 mm (0.004 in)

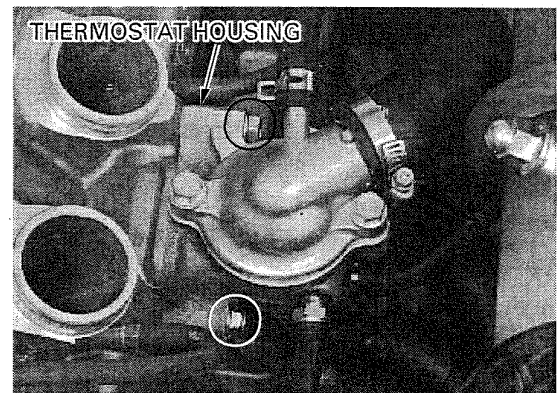
If the oil clearance exceeds the service limit, replace the camshaft and recheck the oil clearance. Replace the cylinder head and camshaft holders as a set if the oil clearance still exceeds the service limit.

**CYLINDER HEAD REMOVAL**

Drain the coolant (page 6-5).

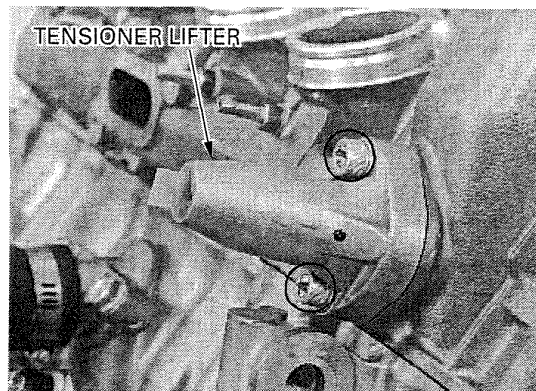
Remove the following:

- camshafts (page 8-4)
- two bolts and thermostat housing



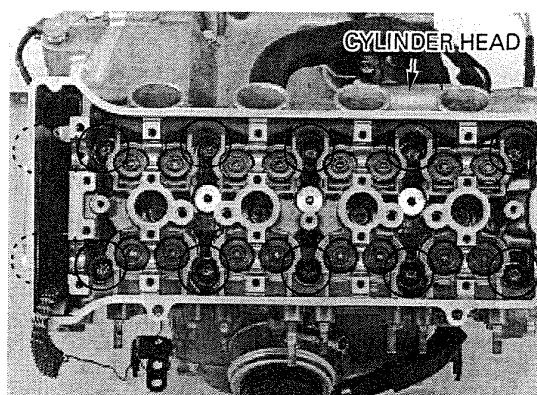
## CYLINDER HEAD/VALVE

—two bolts, washers and cam chain tensioner lifter.

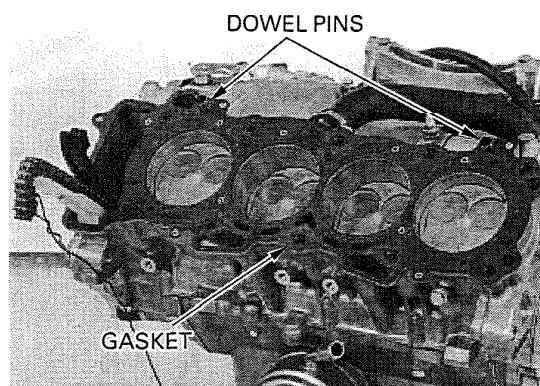


Remove the two 6 mm cylinder head bolts.  
Loosen the ten 9 mm cylinder head bolts in a criss-cross pattern in 2 or 3 steps, and remove them.

Remove the cylinder head.



Remove the gasket and dowel pins.

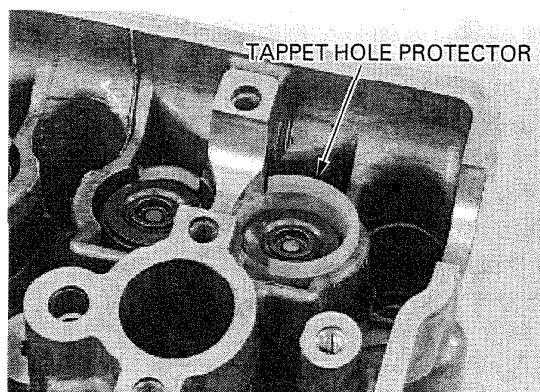


## CYLINDER HEAD DISASSEMBLY

Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

**TOOL:**  
Tappet hole protector      07HMG-MR70002





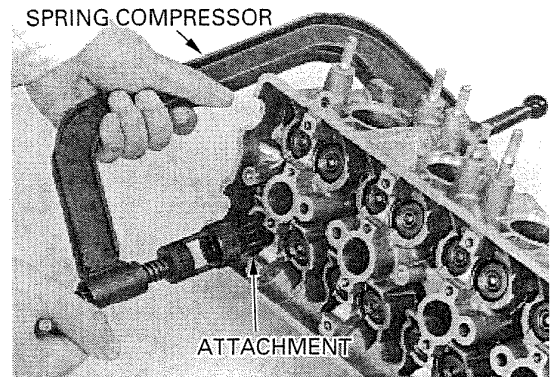
Remove the valve spring cotters using the special tools.

**TOOLS:**

Valve spring compressor 07757-0010000  
Compressor attachment 07959-KM30101

**CAUTION:**

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

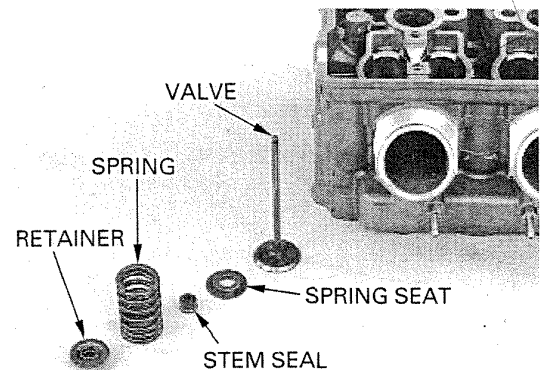


Remove the following:

- spring retainer
- valve springs
- valve
- stem seal
- spring seats

**NOTE:**

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

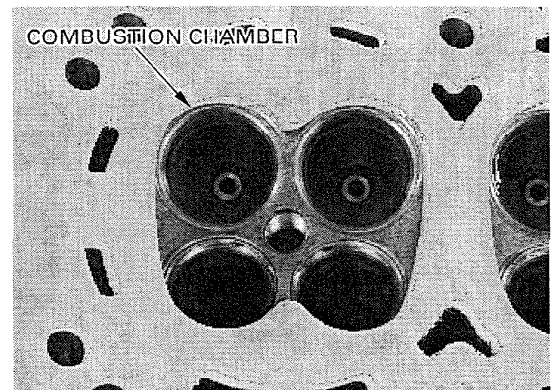


## INSPECTION

### CYLINDER HEAD

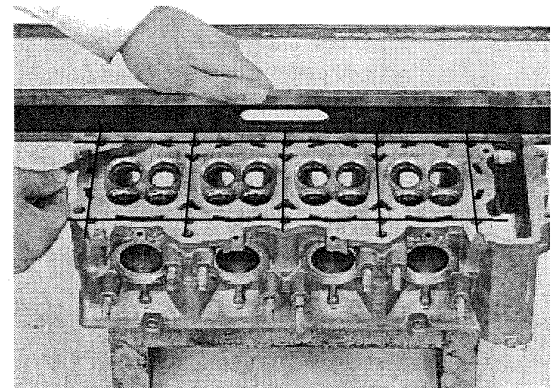
Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface.

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)

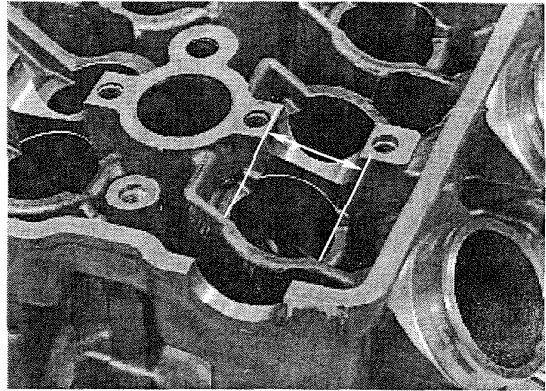


## CYLINDER HEAD/VALVE

Check the valve lifter bore for scoring, scratches or damage.

Measure the each valve lifter bore I.D.

**SERVICE LIMIT:** 26.04 mm (1.025 in)

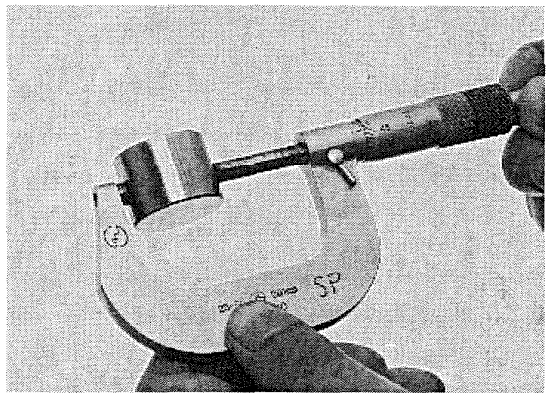


### VALVE LIFTER

Check the valve lifter for scoring, scratches or damage.

Measure the each valve lifter O.D.

**SERVICE LIMIT:** 25.97 mm (1.022 in)

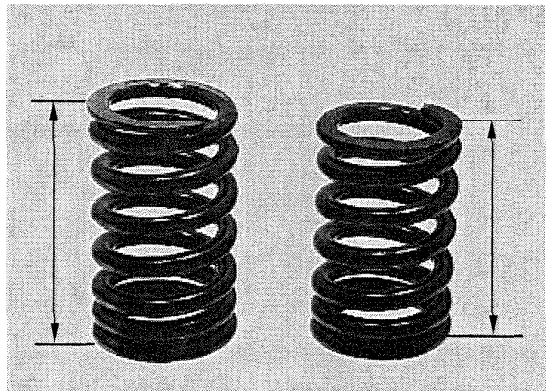


### VALVE SPRING

Measure the valve spring free length.

**SERVICE LIMITS:** IN: 38.27 mm (1.507 in)

EX : 34.73 mm (1.367 in)



### VALVE/VALVE GUIDE

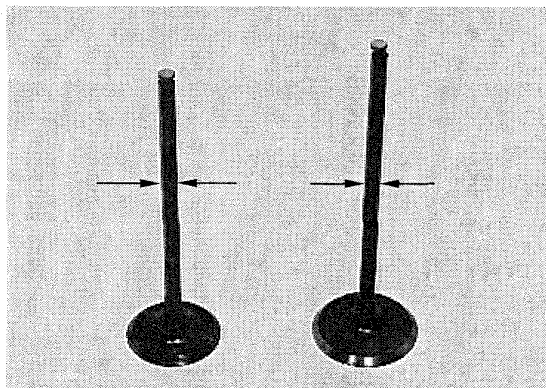
Check that the valve moves smoothly in the guide.

Check the valve for bending, burning or abnormal wear.

Measure each valve stem O.D. and record it.

**SERVICE LIMITS:** IN: 3.965 mm (0.1561 in)

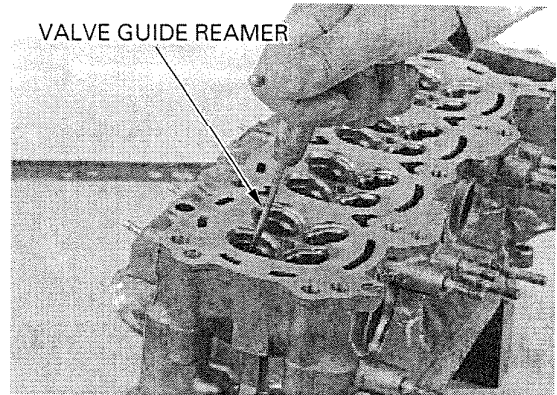
EX : 3.955 mm (0.1557 in)



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                      07MMH-MV90100



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

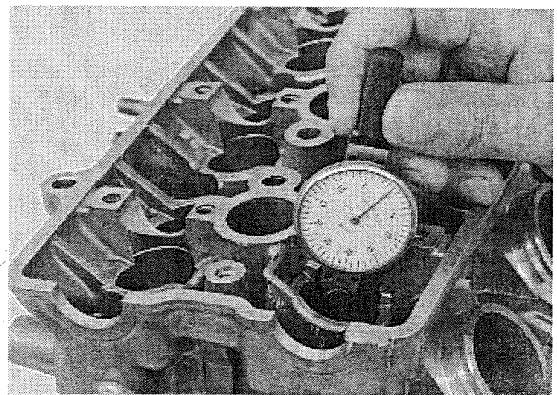
**SERVICE LIMIT: IN/EX:** 4.04 mm (0.159 in)

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

**SERVICE LIMIT: 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.

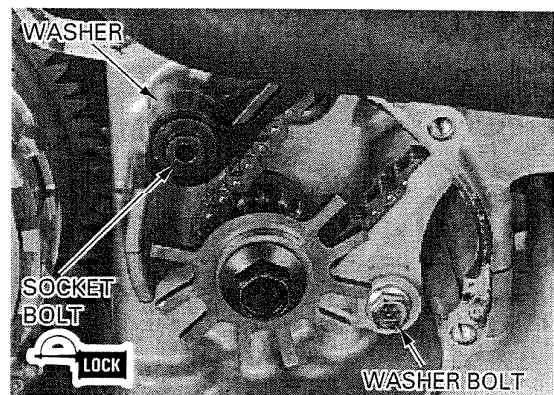


**NOTE:**

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

**CAM CHAIN TENSIONER/GUIDE**

Remove the right crankcase cover (page 9-3). Remove the socket bolt and the cam chain tensioner, then the washer (between the engine and tensioner). Remove the washer bolt and the cam chain guide.



## CYLINDER HEAD/VALVE

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

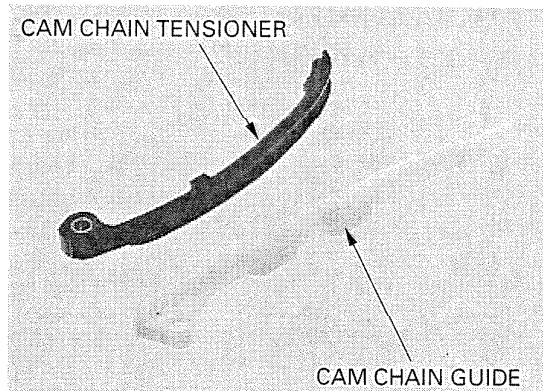
Install the cam chain tensioner and guide in the reverse order of removal.

*Apply locking agent to the tensioner (socket) bolt threads.*

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

**Guide:** 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the right crankcase cover (page 9-14).



## VALVE GUIDE REPLACEMENT

Chill new valve guides in the freezer section of a refrigerator for about an hour.

Heat the cylinder head to 130–140 °C (275–290 °F) with a hot plate or oven.

### ⚠ WARNING

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

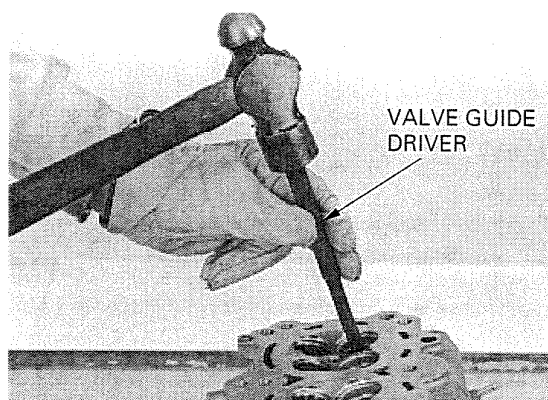
### CAUTION:

*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 driver 07JMD-KY20100



While the cylinder head is still heated, drive new valve guides in the cylinder head from the camshaft side until the exposed height is following dimensions.

### TOOL:

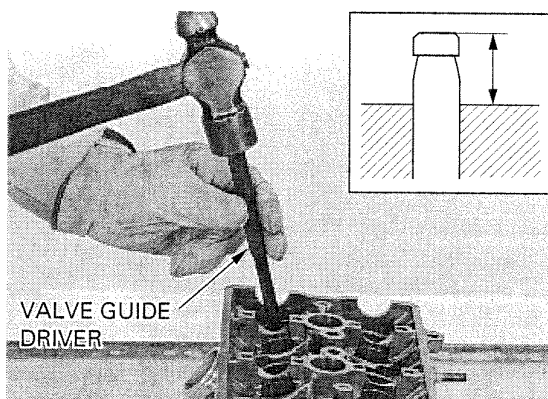
Valve guide driver 07JMD-KY20100

### VALVE GUIDE PROJECTION:

**IN:** 16.1–16.4 mm (0.63–0.65 in)

**EX:** 14.3–14.6 mm (0.56–0.57 in)

Let the cylinder head cool to room temperature.





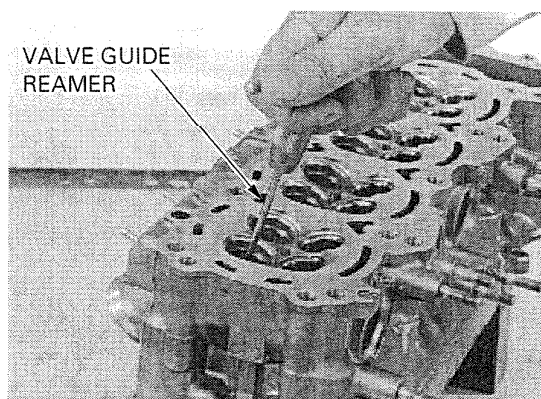
Ream the new valve guides.  
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

**TOOL:**

Valve guide reamer, 4.008 mm 07MMH-MV90100

**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.

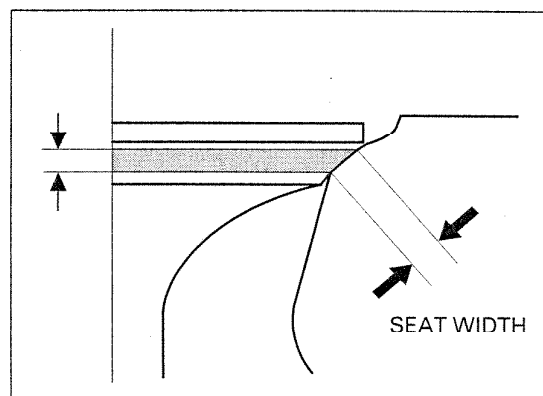
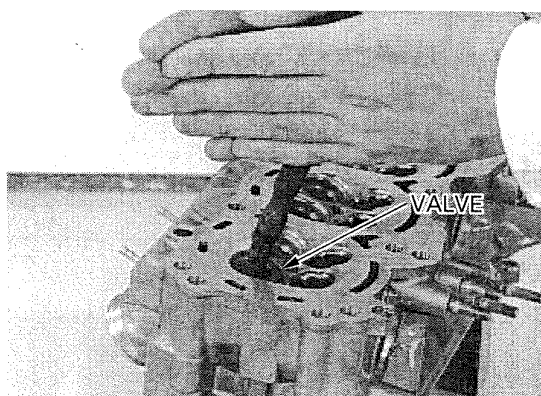
Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

**STANDARD :**

**IN/EX:** 0.90–1.10 mm (0.035–0.043 in)

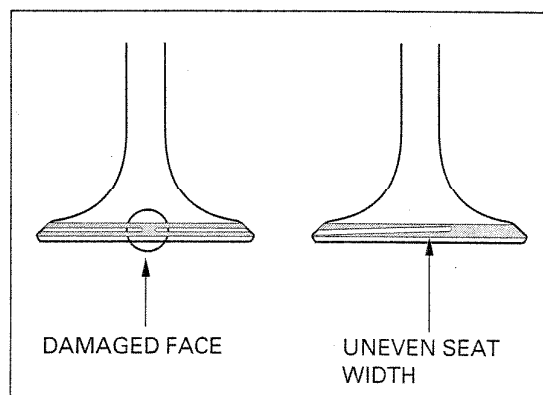
**SERVICE LIMIT: IN/EX:** 1.5 mm (0.06 in)

If the valve seat width is not within specification, reface the valve seat (page 8-14).



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.

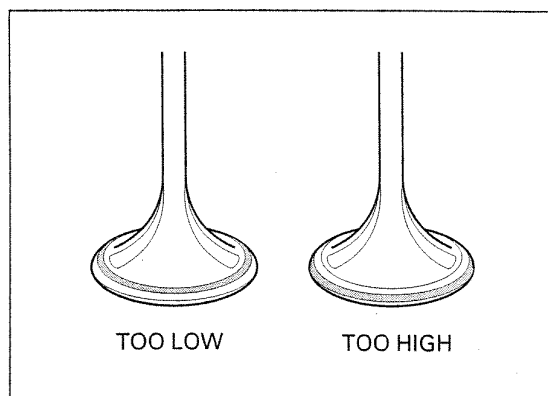


## CYLINDER HEAD/VALVE

- Contact area (too high or too low)
- Reface the valve seat.

### NOTE:

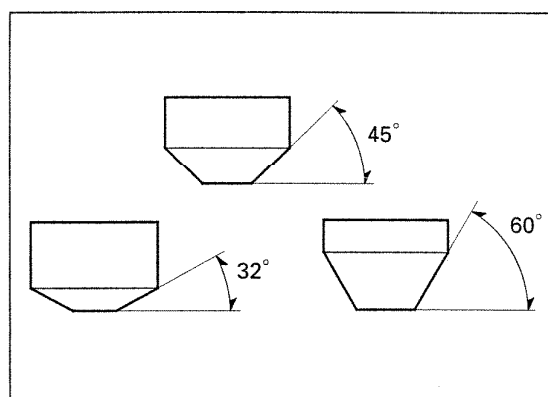
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



## REFACING

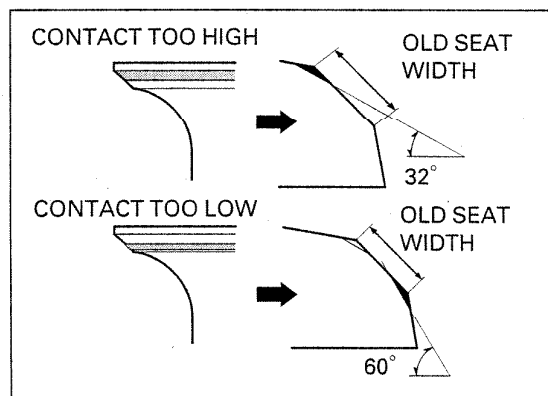
### NOTE:

- 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.

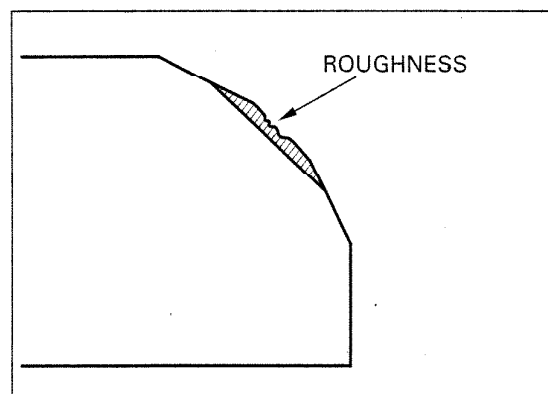
If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



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

### TOOLS:

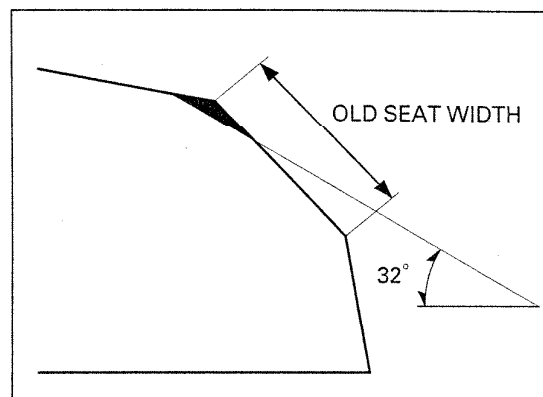
Seat cutter, 27.5 mm 07780-0010200  
Seat cutter, 24.5 mm 07780-0010100  
Cutter holder, 4.0 mm 07781-0010500 or  
equivalent commercially  
available in U.S.A.



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

**TOOLS:**

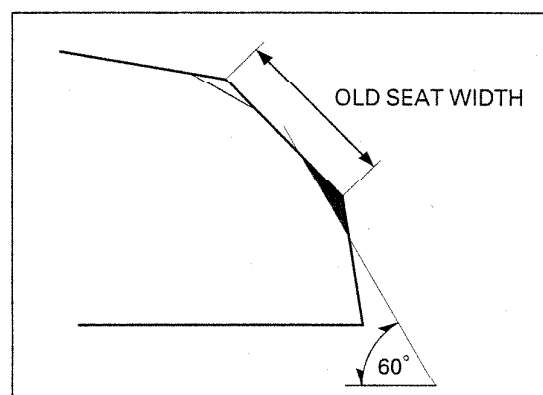
**Flat cutter, 27 mm (IN)** 07780-0013300  
**Flat cutter, 24 mm (EX)** 07780-0012500  
**Cutter holder, 4.0 mm** 07781-0010500 or equivalent commercially available in U.S.A.



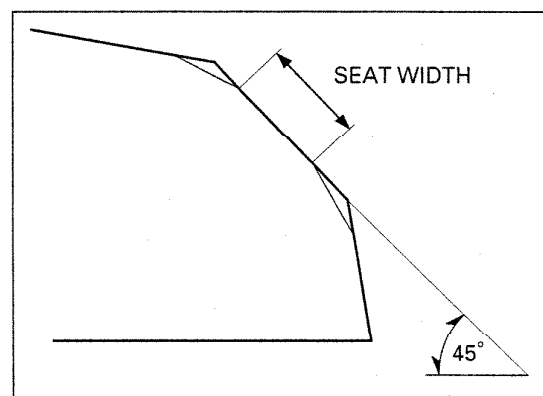
Using a 60° interior cutter, remove 1/4 of the existing valve seat material.

**TOOLS:**

**Interior cutter, 26 mm** 07780-0014500  
**Interior cutter, 22 mm** 07780-0014202  
**Cutter holder, 4.0 mm** 07781-0010500 or equivalent commercially available in U.S.A.



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

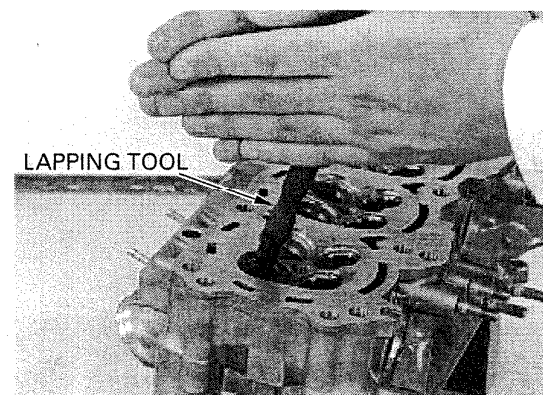


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

**CAUTION:**

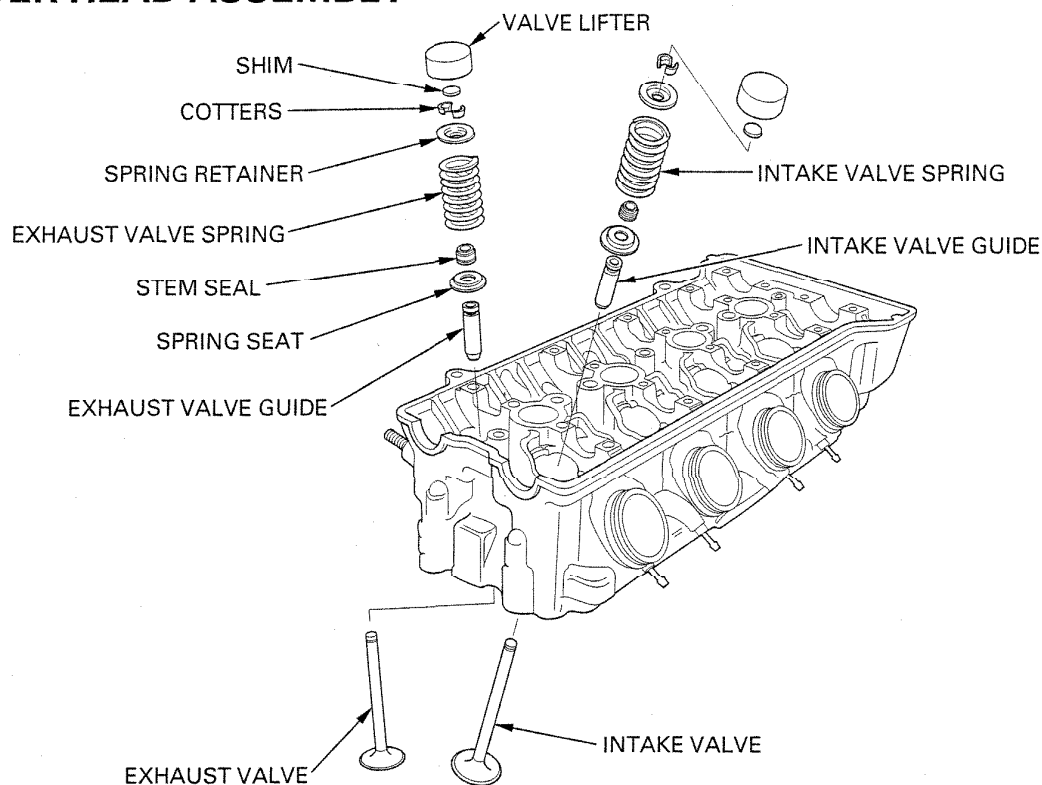
- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of lapping tool frequently to prevent uneven seat wear.*
- *Do not allow lapping compound to enter the guides.*

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



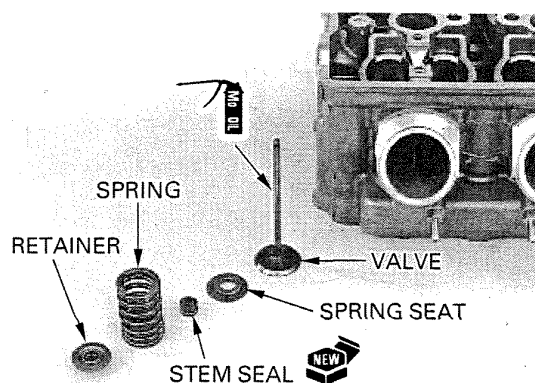
## CYLINDER HEAD/VALVE

### CYLINDER HEAD ASSEMBLY



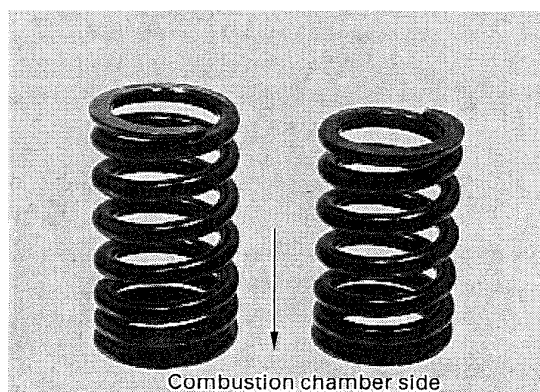
Blow through all oil passages in the cylinder head with compressed air.  
Install the spring seats and new stem seals.

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 valve spring with the tightly wound coils facing the combustion chamber.

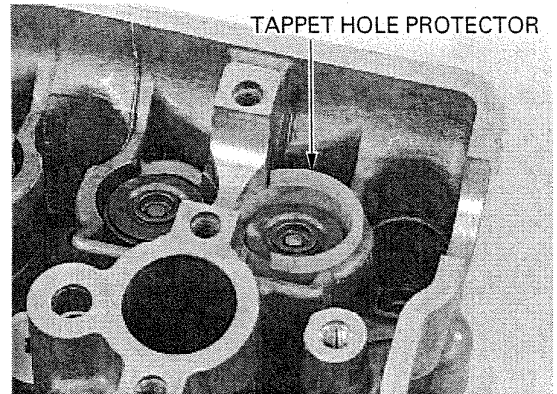
Install the spring retainer.



## CYLINDER HEAD/VALVE

Install the tappet hole protector into the valve lifter bore.

**TOOL:**  
Tappet hole protector      07HMG-MR70002

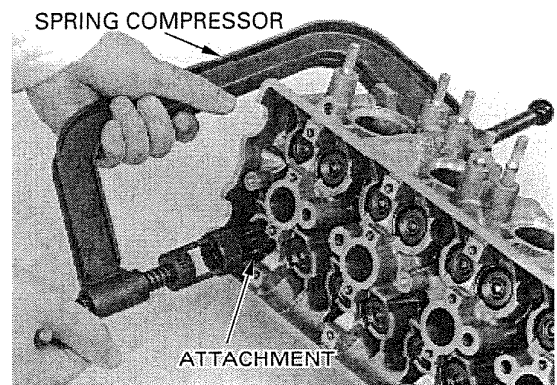


*Grease the cotters to ease installation.* Install the valve spring cotters using the valve spring compressor.

**TOOLS:**  
Valve spring compressor      07757-0010000  
Compressor attachment      07959-KM30101

**CAUTION:**

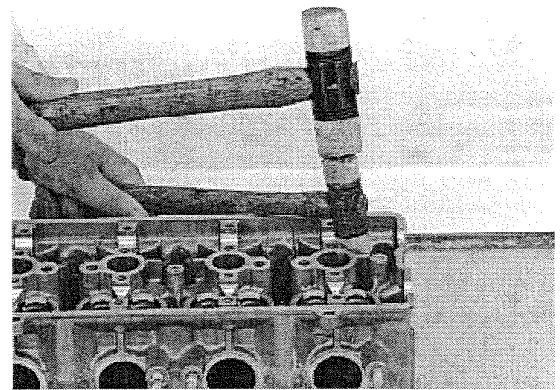
*To prevent loss of tension, do not compress the valve springs more than necessary to install the cotters.*



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.

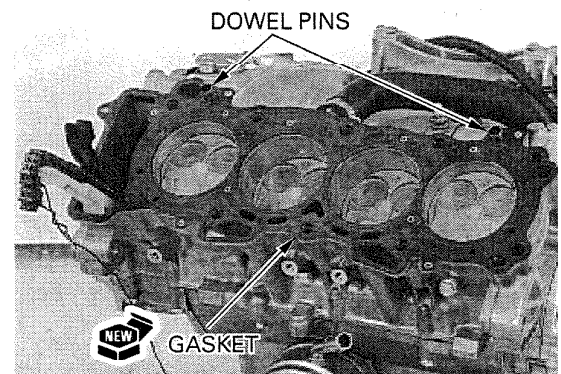
Install and tighten the spark plugs.

**TORQUE :** 12 N·m (1.2 kgf·m , 9 lbf·ft)



## CYLINDER HEAD INSTALLATION

Install the dowel pins and a new gasket.



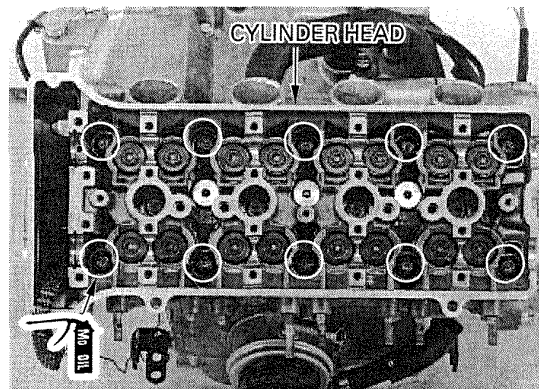
## CYLINDER HEAD/VALVE

Install the cylinder head onto the cylinder.

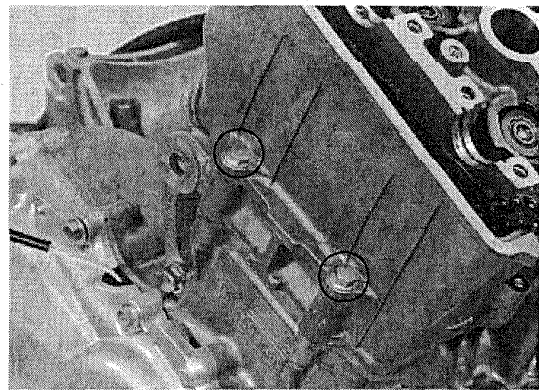
Apply molybdenum oil solution to the threads and seating surfaces of the 9 mm cylinder head bolts and install them.

Tighten the 9 mm bolts in a crisscross pattern in 2 or 3 steps.

**TORQUE** : 47 N·m (4.8 kgf·m , 35 lbf·ft)

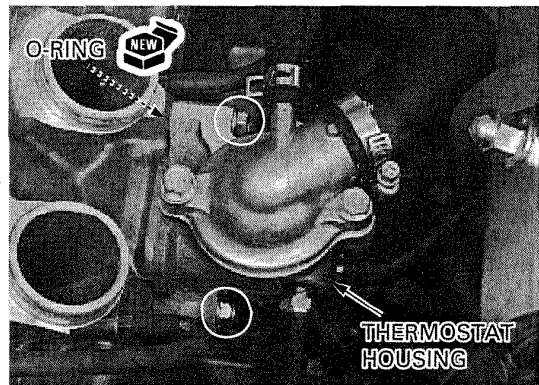


Install and tighten the two 6 mm bolts.

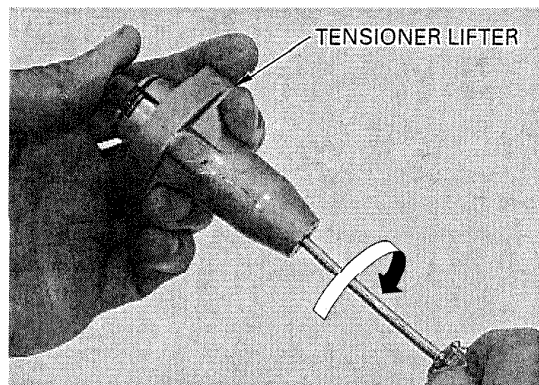


*If the engine is out of the frame, do not install the thermostat yet.*

Install a new O-ring into the thermostat housing groove.  
Install thermostat housing onto the cylinder head and tighten the two bolts.

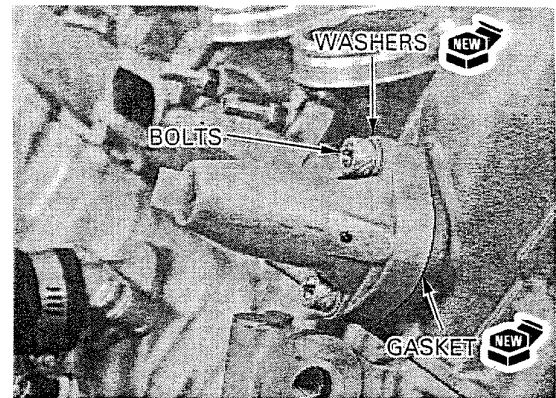


Turn the cam chain tensioner lifter shaft clockwise fully to retract the tensioner lifter and secure it with a stopper tool.



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

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

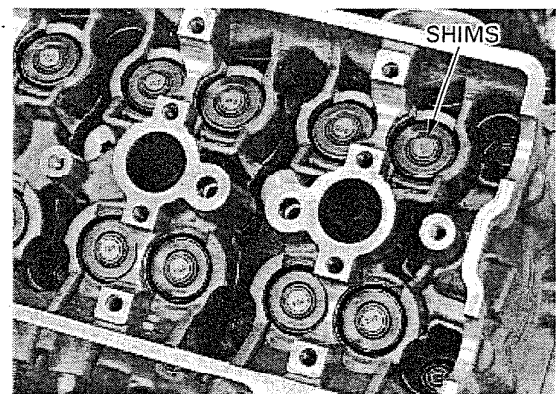


## CAMSHAFT INSTALLATION

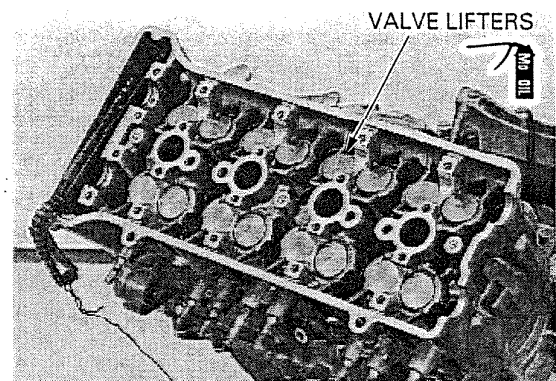
### CAUTION:

*Do not get molybdenum oil solution to the camshaft holder mating surfaces and holder bolt holes. It may fail to tighten the camshaft holder bolts for correct torque value.*

Install the valve shims in their original locations.



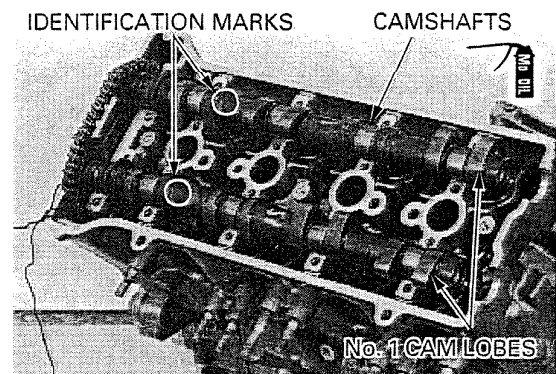
Coat the outer surfaces of the valve lifters with molybdenum oil solution.  
Install the valve lifters in their original lifter bores, being careful not to damage the sliding surfaces of the lifters and bores.



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

The camshafts have the identification mark:  
— IN: intake  
— EX: exhaust

Install the camshafts onto the cylinder head with both No. 1 cam lobes facing up diagonally as shown.





## CYLINDER HEAD/VALVE

Coat new O-rings with oil and install them into the grooves in the camshaft holder.

Loosely install the camshaft holder.

*Be sure the dowel pins in the camshaft holder align properly with the holes in the cylinder head.*

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts. Install the twenty bolts with eight new washers as shown. Finger tighten the bolts.

The camshaft holder has the numbers "1 through 20" cast into it. Gradually tighten the the #6, #5, #8, #7, #2 and #1 bolts (in that order) 1/2 turn at a time to draw the holder down evenly until the clearance between the cylinder head and the holder is 2-3mm all the way around.

If the holder tilts toward the #1 cylinder during this process, readjust bolts #6, #5, #8, #7, #2 and #1 as necessary to keep the holder level. When the holder is parallel with the cylinder head, resume tightening the bolts in the sequence specified above.

Once the clearance is within 2-3mm, begin tightening all the bolts in numerical order (#1, #2, #3...#20) 1/4 to 1/2 turn at a time until the holder is fully seated against the cylinder head.

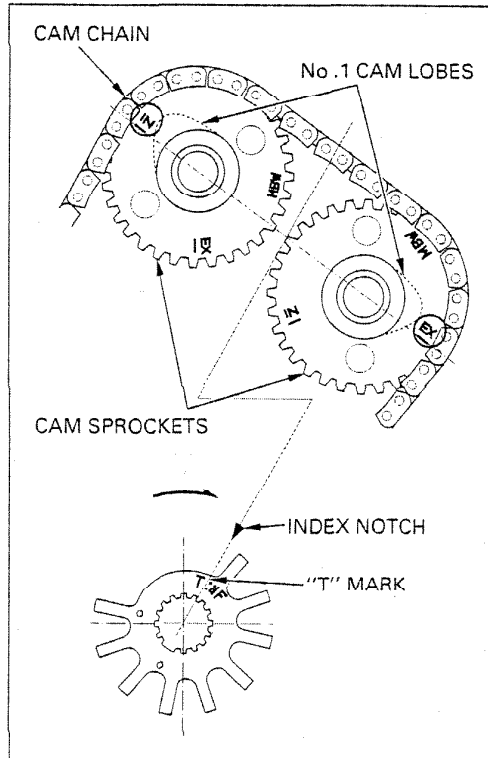
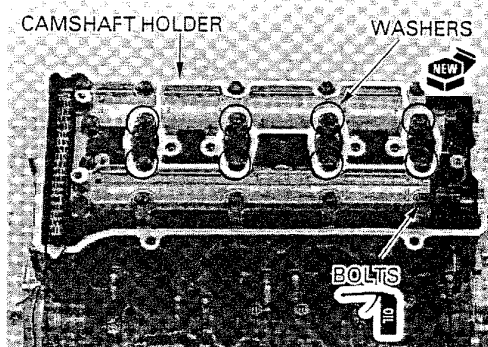
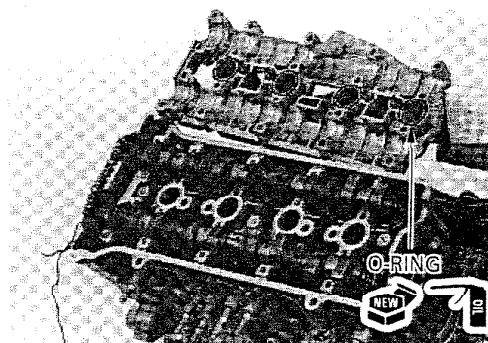
**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

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

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

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

Make sure that both No. 1 cam lobes are facing up diagonally, align the bolt holes in the cam sprockets and camshafts.





Apply locking agent to the cam sprocket bolt threads.

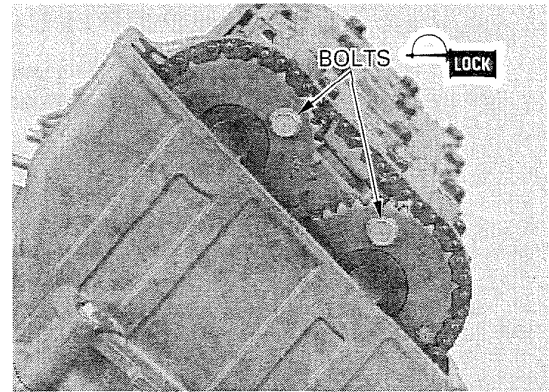
Install the cam sprocket bolts.

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

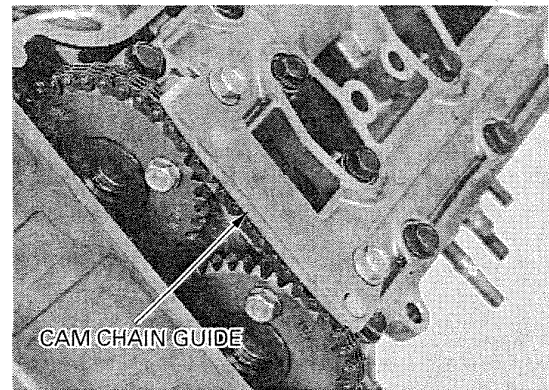
Tighten the cam sprocket bolts.

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

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



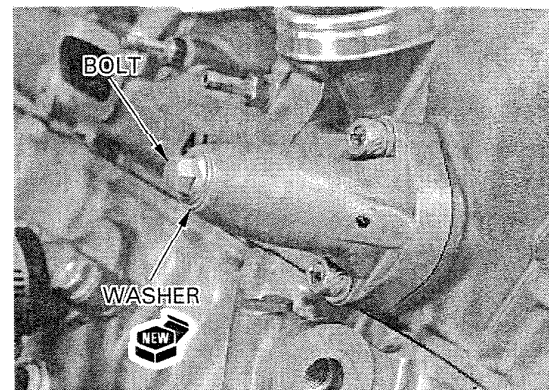
Install the cam chain guide plate and tighten the two bolts.



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

Install the timing hole cap (page 3-11).

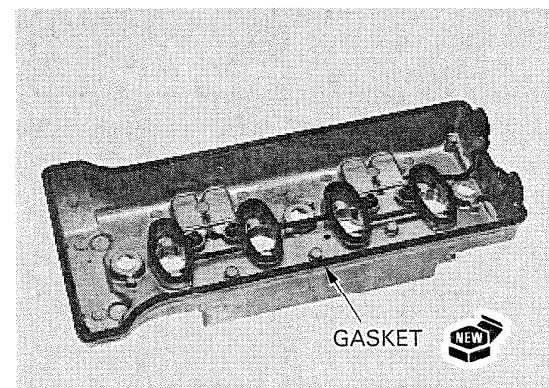
Install the cylinder head cover.



## CYLINDER HEAD COVER INSTALLATION

Install a new gasket in the head cover groove.

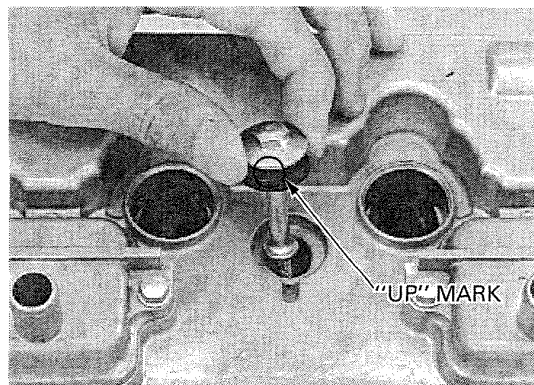
Apply sealant to the cylinder head semi-circular areas.



## CYLINDER HEAD/VALVE

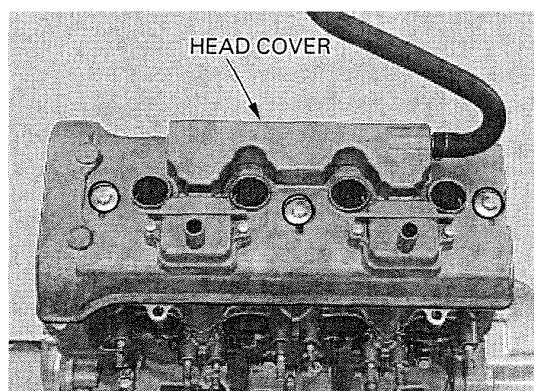
Install the head cover onto the cylinder head.

Install the special washers onto the head cover bolts with the "UP" mark facing the bolt head.

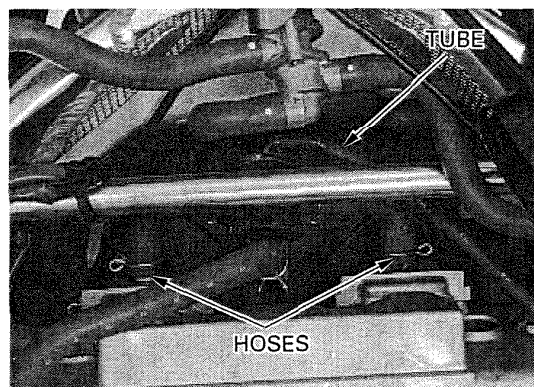


Install the three head cover bolts by aligning them with the bolt hole in the cylinder head properly. Tighten the bolts in 2 or 3 steps.

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



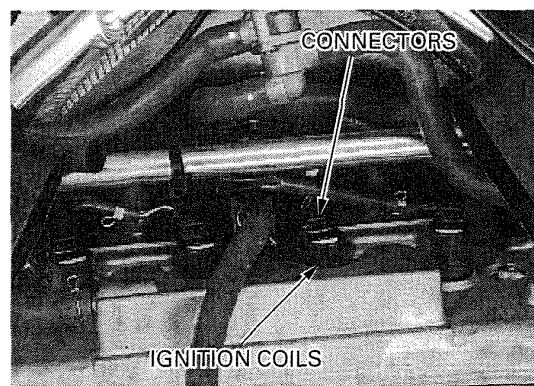
Connect the air supply hoses and the vacuum tube to install the PAIR control valve.



*The cylinder numbers are printed on each ignition coil wire.*

Install the direct ignition coils onto the spark plugs. Connect each 2P connector to the correct ignition coil.

Install the carburetor (page 5-30).  
Fill and bleed the cooling system if the cylinder head was removed (page 6-4).



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**MEMO**

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# 9. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	9-1	GEARSHIFT LINKAGE	9-12
TROUBLESHOOTING	9-2	RIGHT CRANKCASE COVER INSTALLATION	9-14
RIGHT CRANKCASE COVER REMOVAL	9-3		
CLUTCH	9-4		

## SERVICE INFORMATION

### GENERAL

- The clutch and gearshift linkage can be serviced with the engine installed in the frame.
- Engine oil viscosity and level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil and oil level before servicing the clutch system.
- The crankcase must be separated when the transmission, shift drum and shift forks require service (section 11).

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	_____
Clutch	Spring free length	46.5 (1.83)	45.2 (1.78)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	Plate warpage	_____	0.30 (0.012)
Clutch outer guide	I.D.	25.000 – 25.021 (0.9843 – 0.9851)	25.03 (0.985)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.97 (1.377)
Mainshaft O.D. at clutch outer guide		24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)

Unit: mm (in)

9

### TORQUE VALUES

Clutch center lock nut	127 N·m (13.0 kgf·m , 94 lbf·ft)	Apply oil to the threads and seating surface and stake
Clutch bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply locking agent to the threads
Gearshift cam bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Gearshift stopper arm bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Right crankcase cover bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	page 9-15

### TOOLS

Clutch center holder	07724-0050002 or equivalent commercially available in U.S.A.
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Attachment, 37 × 40 mm	07746-0010200
Attachment, 42 × 47 mm	07746-0010300
Pilot, 17 mm	07746-0040400
Pilot, 35 mm	07746-0040800

## CLUTCH/GEARSHIFT LINKAGE

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### TROUBLESHOOTING

#### **Clutch lever too hard**

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing

#### **Clutch will not disengage or motorcycle creeps with clutch disengaged**

- Too much clutch lever free play
- Warped clutch plates
- Loose clutch lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

#### **Clutch slips**

- No clutch lever free play
- Worn clutch discs
- Weak clutch springs
- Clutch lifter sticking
- Engine oil level too low or oil additive used

#### **Hard to shift**

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged gearshift cam
- Bent fork shaft or damaged shift forks and shift drum (section 11)

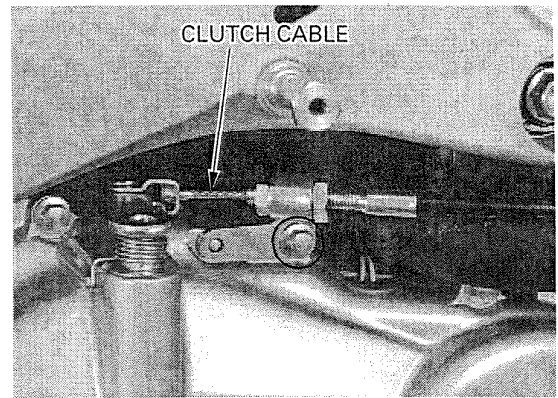
#### **Transmission jumps out of gear**

- Broken shift drum stopper arm
- Weak or broken shift linkage return springs
- Worn or damaged gearshift cam
- Bent fork shaft or worn shift forks and shift drum (section 11)
- Worn gear dogs or slots (section 11)

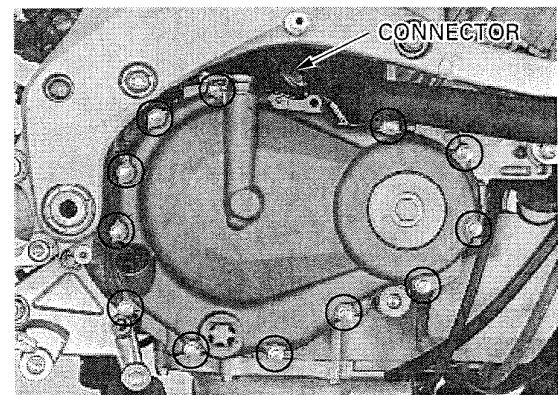
## RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-12).  
 Remove the right side fairing (page 2-4).  
 Raise the fuel tank and support it (page 2-3).

Remove the cable holder bolt and clutch cable holder, and disconnect the clutch cable from the clutch lifter arm.



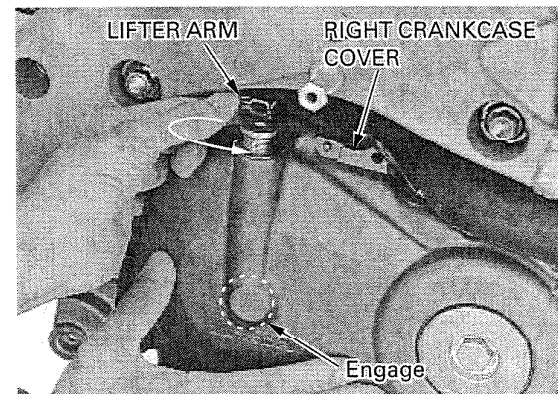
Disconnect the ignition pulse generator 2P connector.



Remove the crankcase cover bolts.

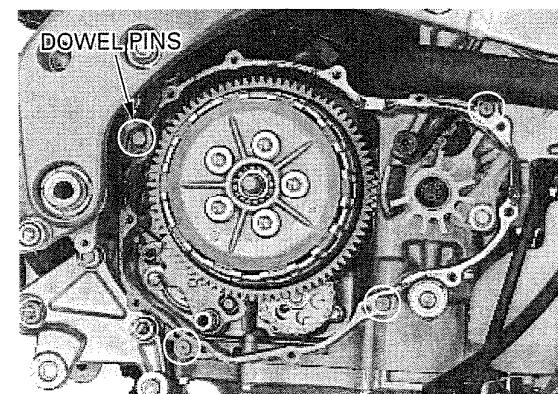
*The lifter arm spindle is engaged with the clutch lifter piece inside the right crankcase cover.*

Remove the crankcase cover while turning the clutch lifter arm counterclockwise to disengage the lifter arm spindle from the lifter piece.



Remove the four dowel pins.

Clean any sealant from the crankcase cover mating surfaces.



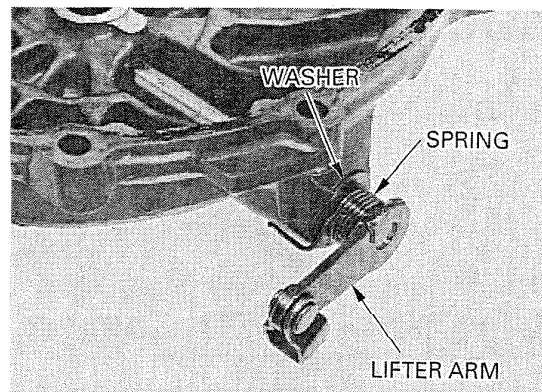


## CLUTCH/GEARSHIFT LINKAGE

### CLUTCH LIFTER ARM

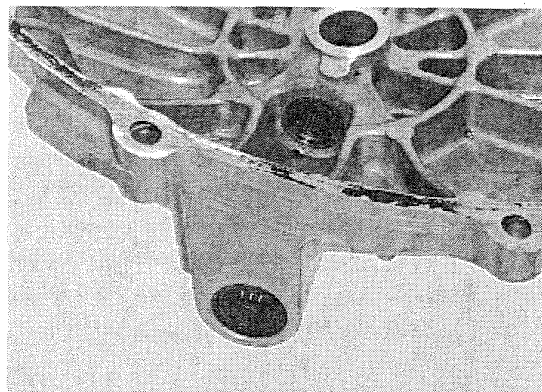
Remove the clutch lifter arm, return spring and washer from the right crankcase cover.

Check the lifter arm spindle for wear or damage.  
Check the return spring for fatigue or damage.



Check the lifter arm oil seal and needle bearings for wear or damage.

Install the clutch lifter arm with the spring and washer as shown.

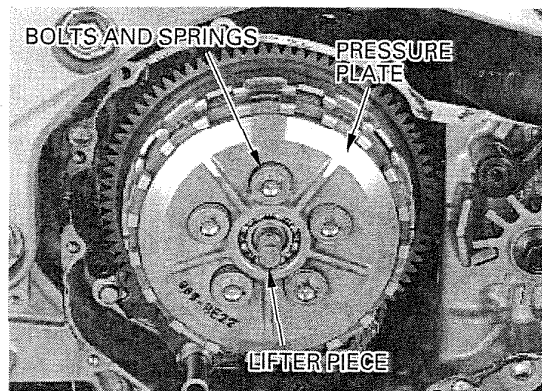


## CLUTCH

### DISASSEMBLY

Remove the right crankcase cover (page 9-3).

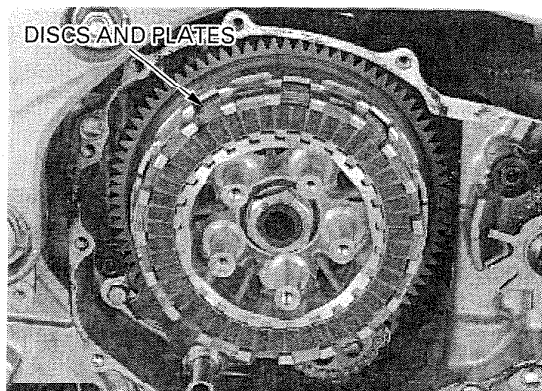
Remove the clutch bolts, springs and pressure plate.  
Remove the clutch lifter piece.



Remove the seven clutch discs and six plates.

#### NOTE:

The two discs (B) on both ends are different from the five discs (A). Do not confuse the discs A and B.

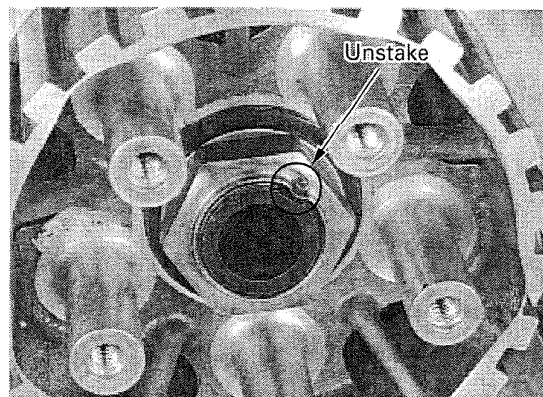




## CLUTCH/GEARSHIFT LINKAGE

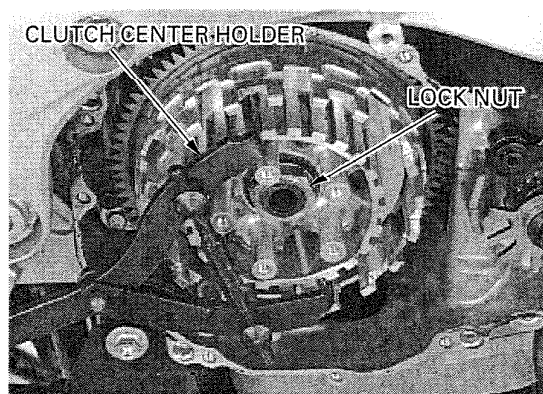
*Be careful not to damage the mainshaft threads.*

Unstake the clutch center lock nut.

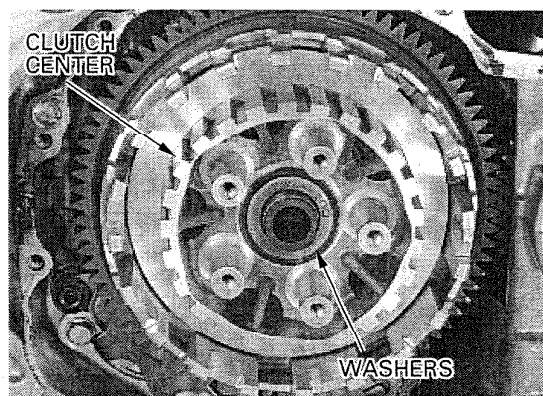


Hold the clutch center with the special tool and remove the clutch center lock nut.

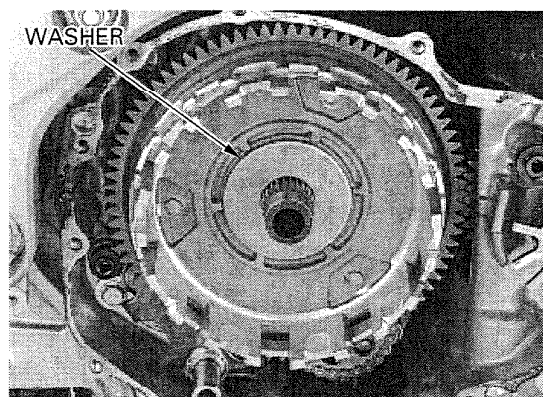
**TOOL:**  
**Clutch center holder** 07724-0050002 or equivalent commercially available in U.S.A.



Remove the special washer, plain washer and clutch center.



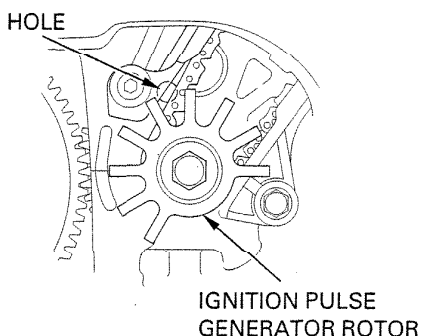
Remove the thrust washer.



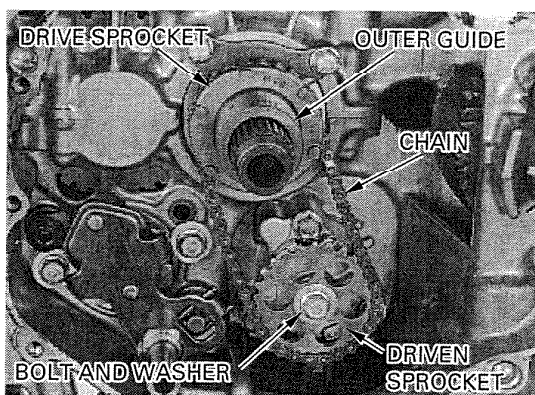
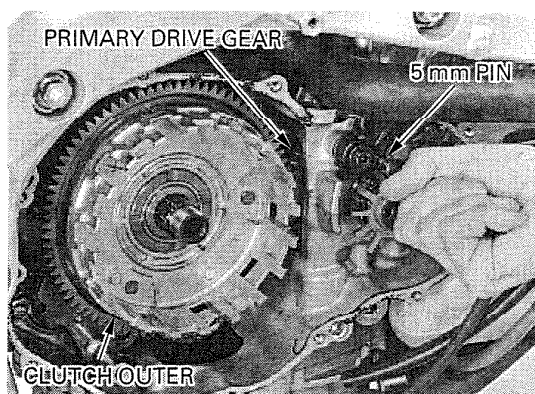
## CLUTCH/GEARSHIFT LINKAGE

*Be careful not to bend the ignition pulse generator rotor tangs.*

Raise the fuel tank and support it (page 2-3).  
Loosen the cam chain tensioner (page 8-4).  
Align the gear teeth of the scissors gears (primary drive gear and sub-gear) by inserting a 5 mm steel pin or screwdriver at least 61 mm in length into the gear hole through the hole in the crankcase, and remove the clutch outer.  
The ignition pulse generator rotor must be aligned as shown.



Remove the oil pump driven sprocket bolt and washer.  
Remove the oil pump driven sprocket, drive chain and drive sprocket as a set.  
Remove the clutch outer guide.



## INSPECTION

### LIFTER BEARING

Turn the inner race of the lifter bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that the outer race of the bearing fits tightly in the pressure plate.  
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the pressure plate.

Drive the bearing out of the pressure plate.

Drive a new bearing into the plate with its mark side facing out.

### TOOLS:

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400

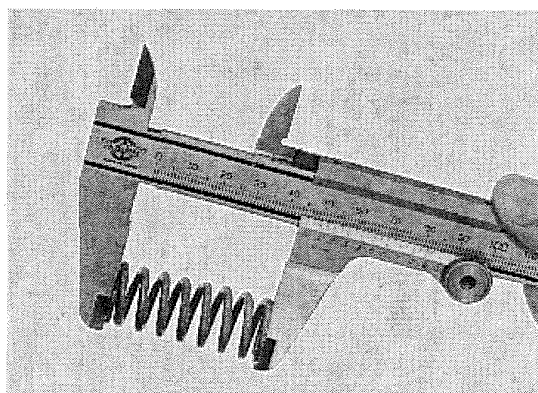
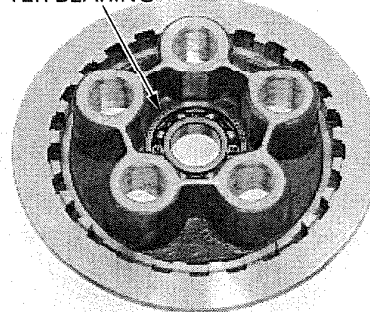
### CLUTCH SPRING

*Replace the clutch springs as a set.*

Measure the clutch spring free length.

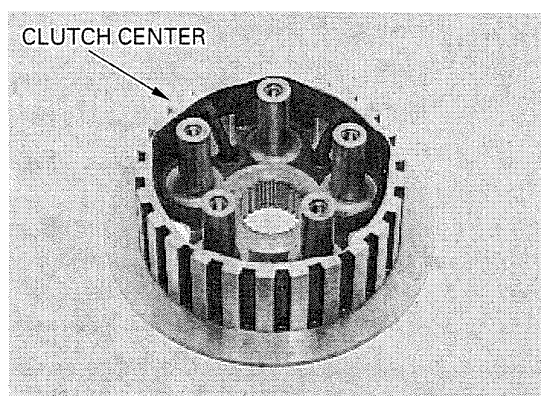
**SERVICE LIMIT:** 45.2 mm (1.78 in)

### LIFTER BEARING



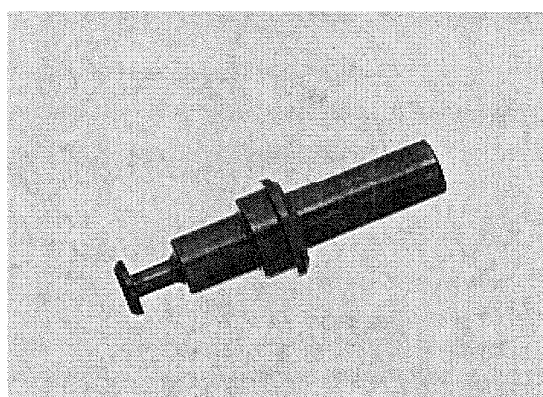
### CLUTCH CENTER

Check the clutch center and pressure plate for nicks, indentations or abnormal wear made by the plates.



### CLUTCH LIFTER PIECE

Check the lifter piece for damage or abnormal wear.

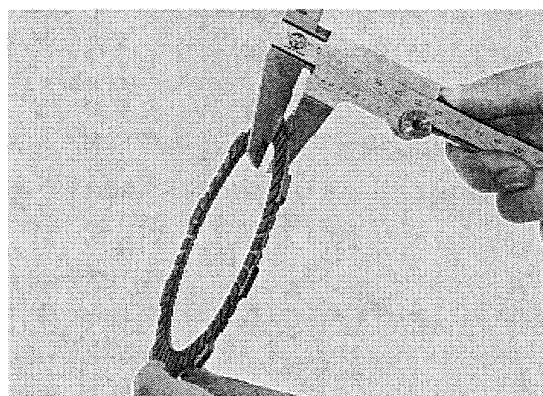


### CLUTCH DISC

*Replace the clutch discs and plates as a set.*

Check the clutch discs for signs of scoring or discoloration. Measure the clutch disc thickness.

**SERVICE LIMIT:** 2.6 mm (0.10 in)

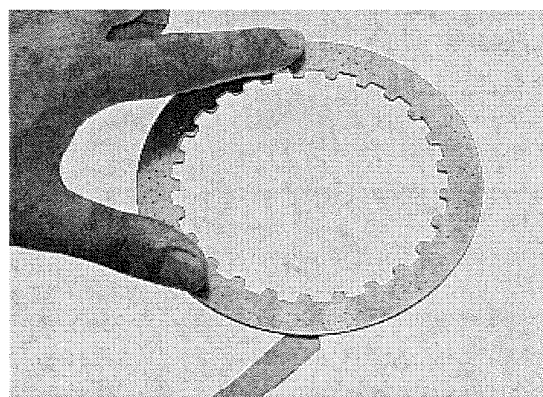


### CLUTCH PLATE

*Replace the clutch discs and plates as a set.*

Check the plates for discoloration. Check the plate warpage on a surface plate using a feeler gauge.

**SERVICE LIMIT:** 0.30 mm (0.012 in)

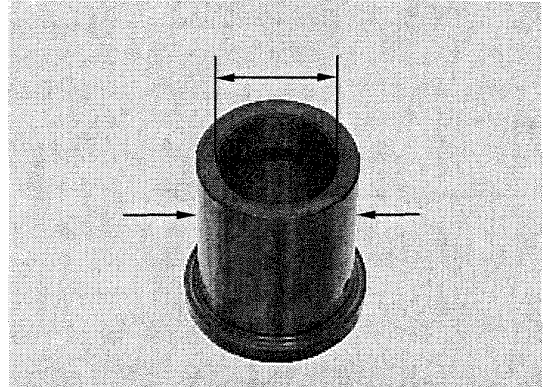


## CLUTCH/GEARSHIFT LINKAGE

### CLUTCH OUTER GUIDE

Measure the clutch outer guide I.D. and O.D.

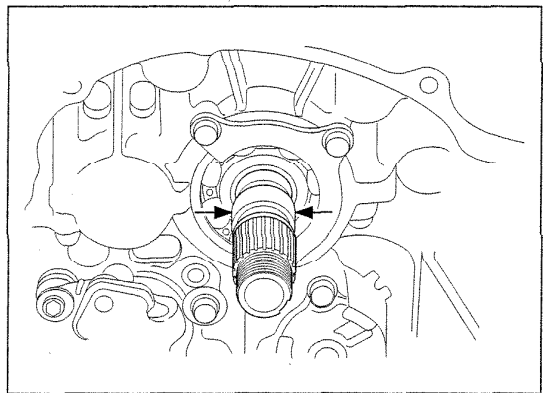
**SERVICE LIMITS:** I.D.: 25.03 mm (0.985 in)  
O.D.: 34.97 mm (1.377 in)



### MAINSHAFT

Measure the mainshaft O.D. at the clutch outer guide.

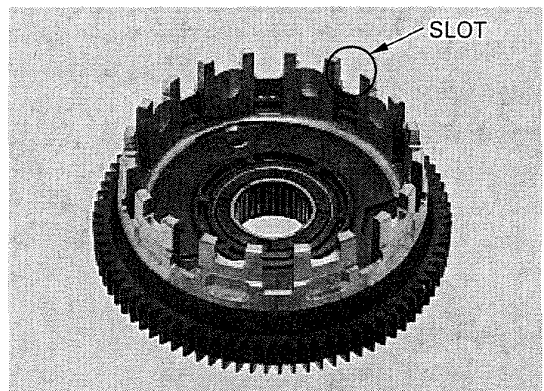
**SERVICE LIMIT:** 24.96 mm (0.983 in)



### CLUTCH OUTER

Check the slots in the clutch outer for nicks, indentation or abnormal wear made by the clutch discs.

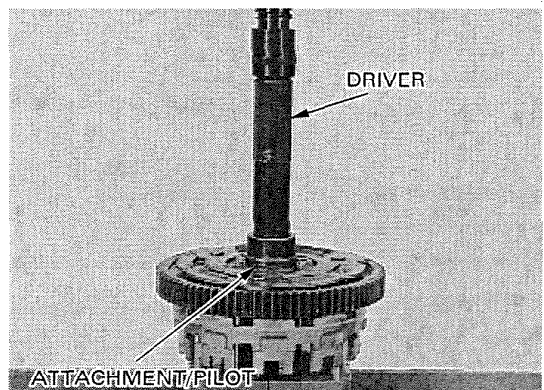
Check the needle bearing for wear or damage.  
Replace the bearing if necessary.



Press the needle bearing out of the clutch outer using the special tools.

#### TOOLS:

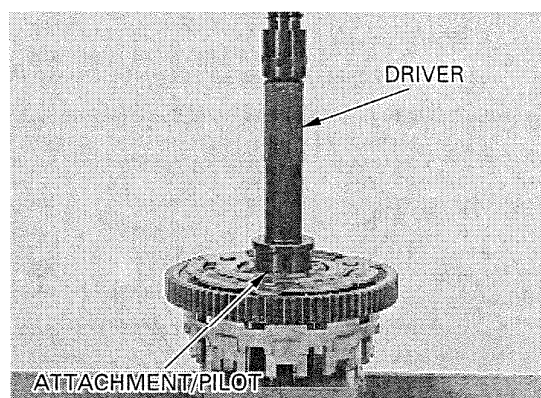
<b>Driver</b>	07749-0010000
<b>Attachment, 37 × 40 mm</b>	07746-0010200
<b>Pilot, 35 mm</b>	07746-0040800



Using the special tools, press the needle bearing in the clutch outer until the depth below the raised portion of the clutch outer surface (oil pump drive sprocket side) is 0.4–0.6 mm.

### TOOLS:

<b>Driver</b>	07749-0010000
<b>Attachment, 42 × 47 mm</b>	07746-0010300
<b>Pilot, 35 mm</b>	07746-0040800



## ASSEMBLY

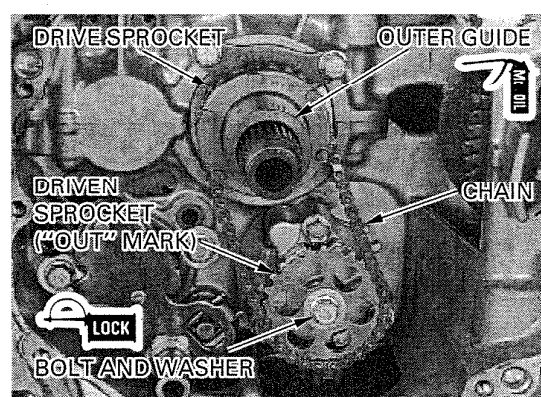
*If removed, install the gearshift linkage (page 9-13).*

Coat the clutch outer guide with molybdenum oil solution and install it onto the mainshaft with the flange side facing the crankcase.

Install the oil pump drive sprocket (with the pins facing out), drive chain and driven sprocket as a set with the "OUT" mark on the driven sprocket facing out.

Apply locking agent to the oil pump driven sprocket bolt threads.

Install the bolt with the washer and tighten it..

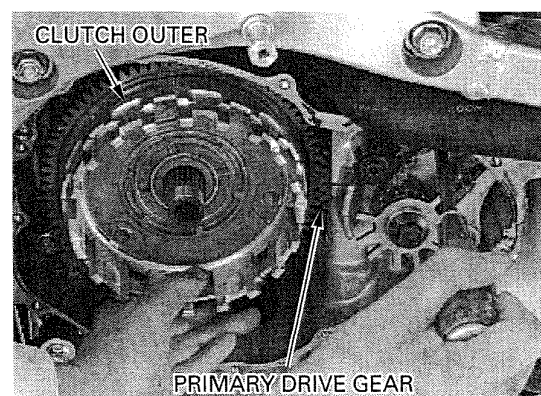


**TORQUE** : 15 N·m (1.5 kgf·m , 11 lbf·ft)

*Be careful not to bend the ignition pulse generator rotor tangs.*

Align the gear teeth of the scissors gears (primary drive gear and sub-gear) by prying the gears with a screwdriver, then install the clutch outer.

Align the holes in the clutch outer with the pins on the oil pump drive sprocket by turning the oil pump driven sprocket while pushing in the clutch outer.



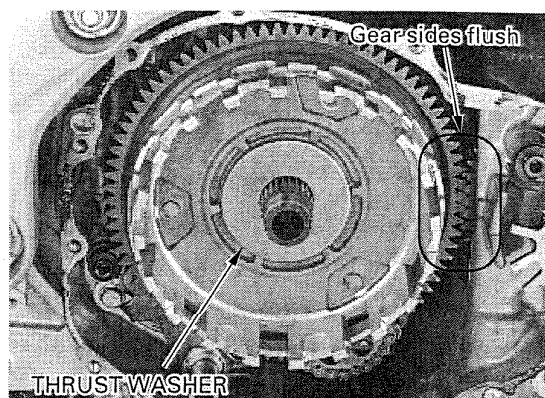


## CLUTCH/GEARSHIFT LINKAGE

Make sure that the primary driven gear of the clutch outer is flush with the primary drive sub-gear.

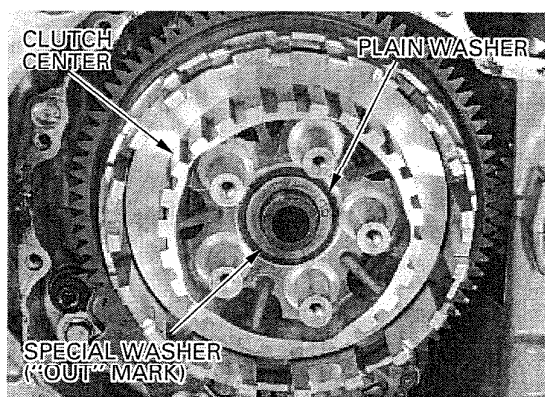
Release the cam chain tensioner lifter (page 8-21).

Install the thrust washer.



Install the clutch center.

Install the plain washer and special washer with the "OUT" mark on the special washer facing out.



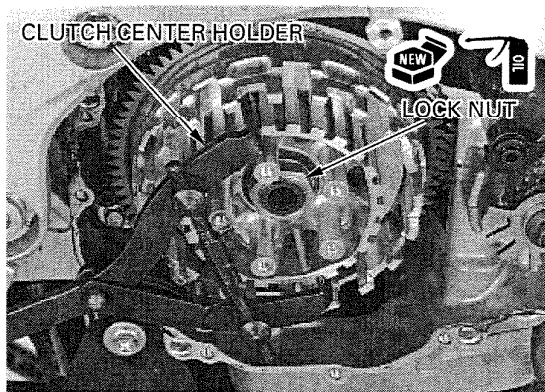
Apply engine oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft.

Hold the clutch center with the special tool and tighten the lock nut.

### TOOL:

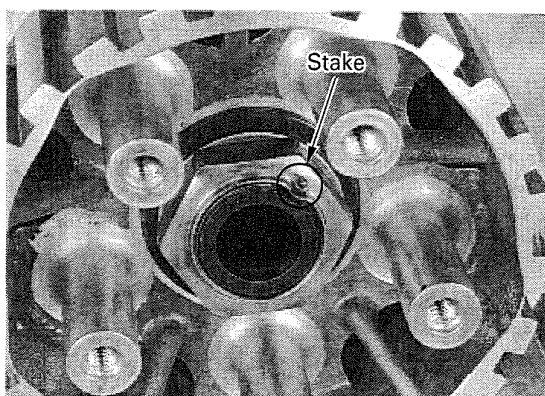
**Clutch center holder** 07724-0050002 or equivalent commercially available in U.S.A.

**TORQUE** : 127 N·m (13.0 kgf·m , 94 lbf·ft)



*Be careful not to damage the mainshaft threads.*

Stake the clutch center lock nut into the mainshaft groove.



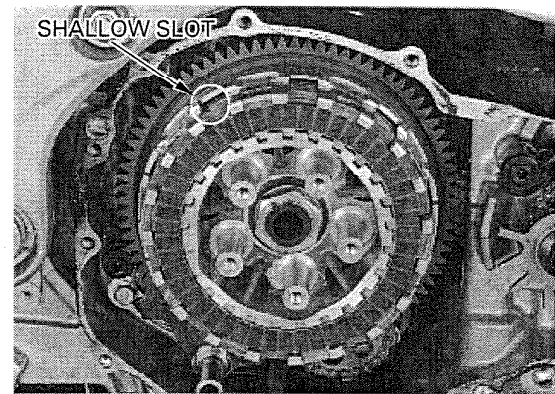
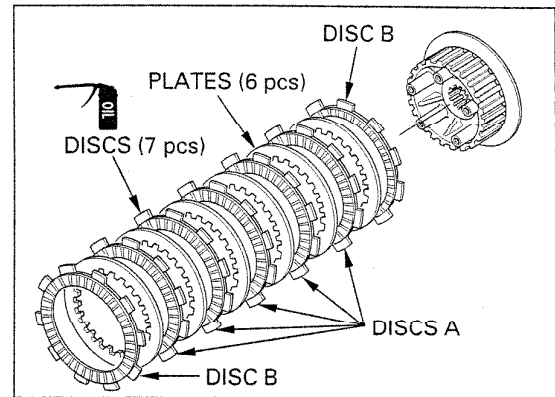
**NOTE:**

Do not confuse the clutch discs A and B.

*Install the outside clutch disc (B) tabs into the shallow slots of the clutch outer.*

Coat the clutch discs with clean engine oil.

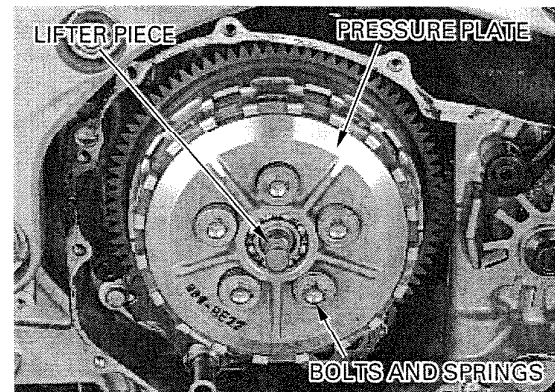
Install the seven clutch discs and six plates alternately, starting with the disc (B). (The two discs (B) are installed onto both ends.)



Install the clutch lifter piece into the lifter bearing.  
Install the pressure plate and the clutch bolts with the springs.  
Tighten the bolts in a crisscross pattern in 2 or 3 steps.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the right crankcase cover (page 9-14).



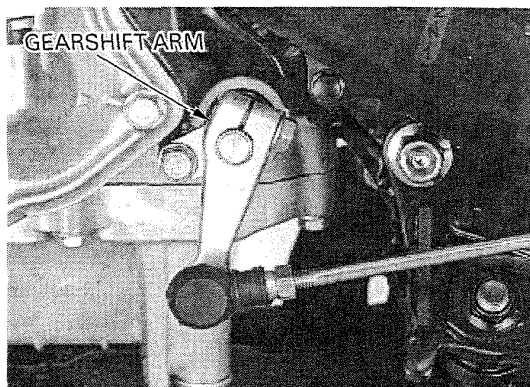
## CLUTCH/GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE

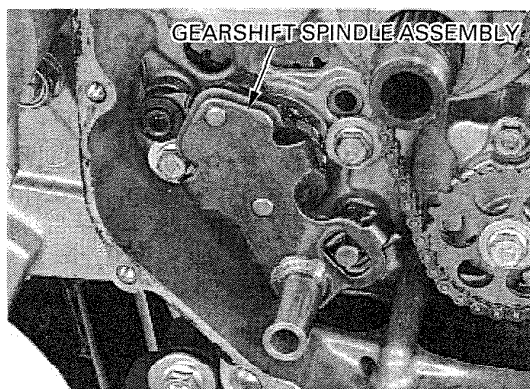
#### REMOVAL

Disassemble the clutch to the clutch outer (page 9-4).

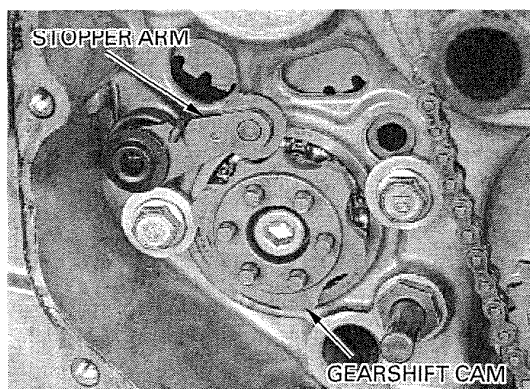
Remove pinch bolt and the gearshift arm.



Remove the gearshift spindle assembly and thrust washer.

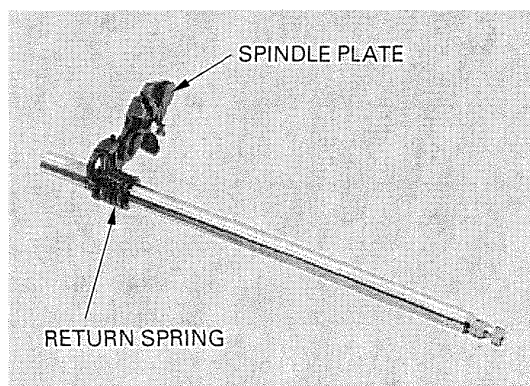


Remove the gearshift cam bolt and gearshift cam.  
Remove the dowel pin from the shift drum.  
Remove the stopper arm bolt, arm, washer and return spring.



#### INSPECTION

Check the gearshift spindle for bending.  
Check the spindle plate for wear or damage.  
Check the spindle return spring for fatigue or damage.

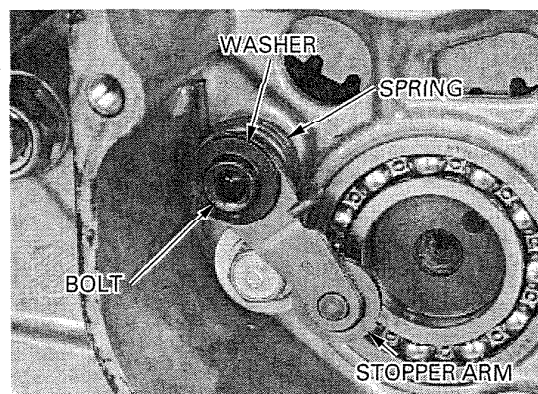




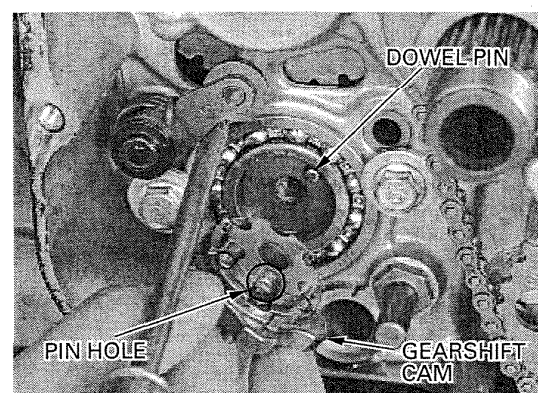
### INSTALLATION

Install the return spring, washer (between the spring and arm), stopper arm and bolt, and tighten the bolt.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

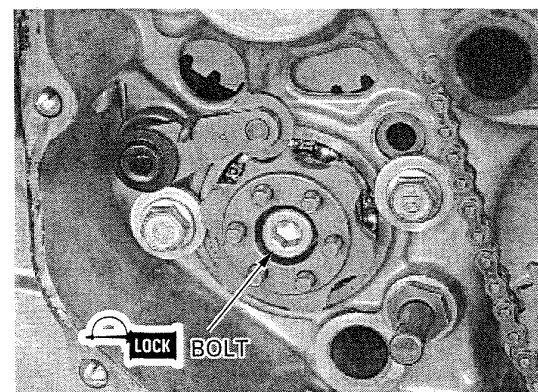


Install the dowel pin into the shift drum.  
Lift the stopper arm with a screwdriver and install the gearshift cam by aligning the pin hole in the cam with the dowel pin.

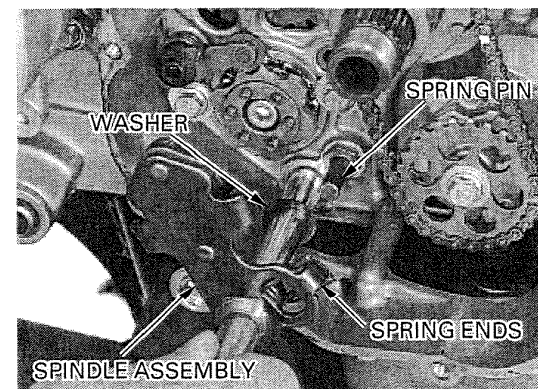


Apply locking agent to the gearshift cam bolt threads.  
Install and tighten the bolt.

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



Install the thrust washer onto the gearshift spindle, and insert the spindle into the crankcase, aligning the return spring ends with the spring pin.

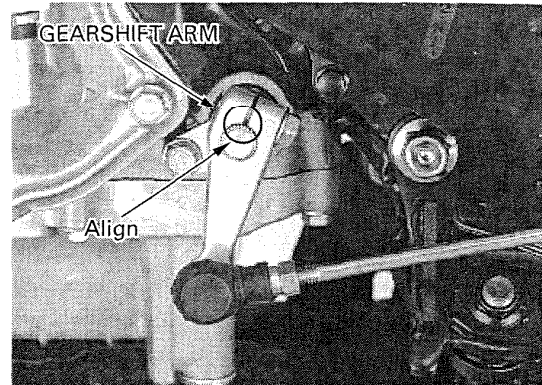


## CLUTCH/GEARSHIFT LINKAGE

Install the gearshift arm onto the spindle, aligning the slit of the arm with the punch mark on the spindle.

Tighten the pinch bolt securely.

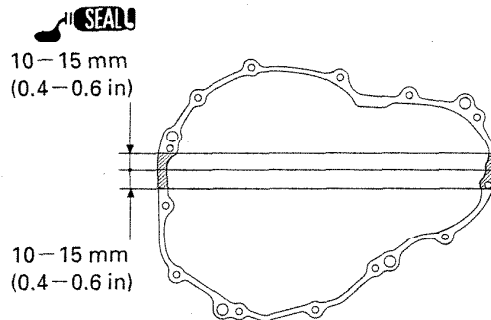
Assemble the clutch (page 9-9).



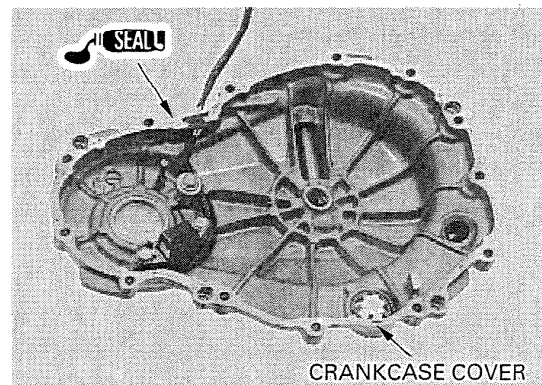
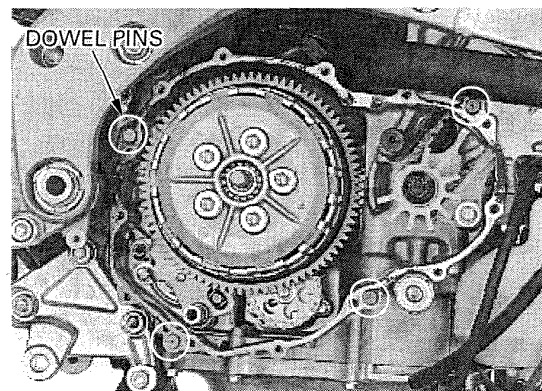
## RIGHT CRANKCASE COVER INSTALLATION

Install the four dowel pins.

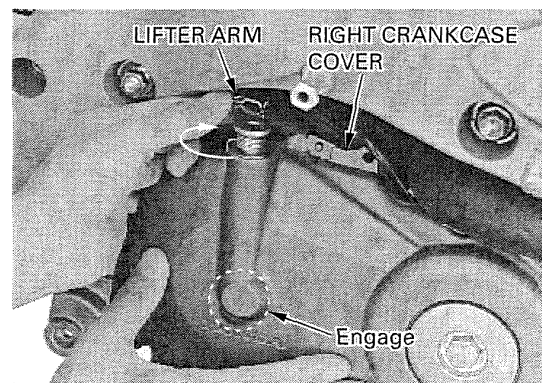
Apply sealant to the crankcase mating surfaces as shown.



Apply sealant to the right crankcase cover mating surface.

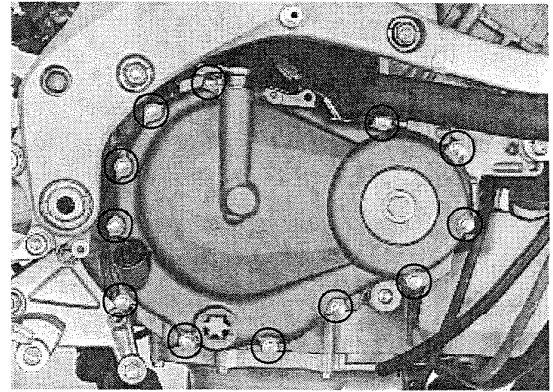


Install the right crankcase cover while turning the lifter arm clockwise to engage the lifter arm groove with the lifter piece flange.



## CLUTCH/GEARSHIFT LINKAGE

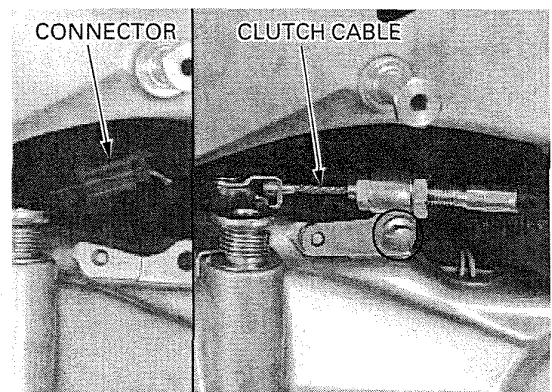
Install the cover bolts.



*Do not pinch the ignition pulse generator wire between the water hose and engine.*

Connect the ignition pulse generator 2P connector.

Connect the clutch cable to the lifter arm and install the cable holder with the bolt.



Tighten the four cover bolts first in a numerical order on the crankcase cover in 2 or 3 steps.

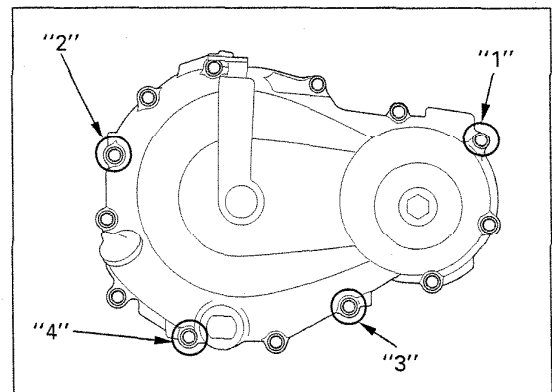
**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Tighten the other cover bolts to the same torque.

Fill the crankcase with recommended engine oil (page 3-12).

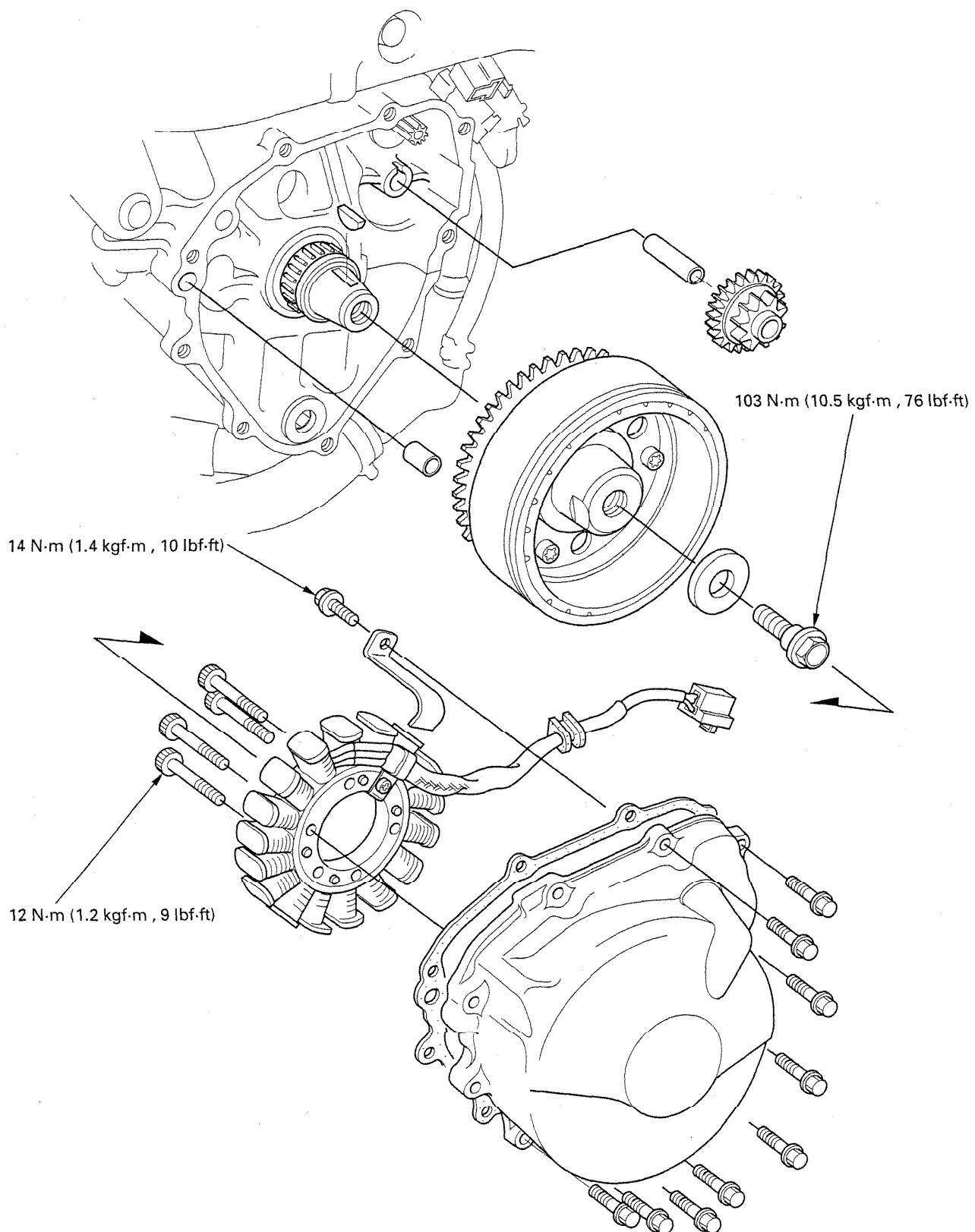
Adjust the clutch cable (page 3-23).

Install the side fairing (page 2-4).



## ALTERNATOR/STARTER CLUTCH

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# 10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTER CLUTCH	10-4
ALTERNATOR STATOR	10-2	FLYWHEEL INSTALLATION	10-6

## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. These parts can be removed with the engine installed in the frame.
- Refer to section 16 for alternator stator inspection.
- Refer to section 18 for starter motor servicing.

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699–51.718 (2.0354–2.0361)	51.684 (2.0348)

### TORQUE VALUES

10

Stator wire clamp bolt	14 N·m (1.4 kgf·m , 10 lbf·ft)	
Alternator stator bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Starter clutch bolt	16 N·m (1.6 kgf·m , 12 lbf·ft)	Apply locking agent to the threads
Flywheel bolt	103 N·m (10.5 kgf·m , 76 lbf·ft)	Apply oil to the threads and seating surface

### TOOLS

Flywheel holder	07725-0040000 or equivalent commercially available in U.S.A.
Rotor puller	07733-0020001 or 07933-3950000

## TROUBLESHOOTING

### Engine does not turn

- Faulty starter clutch
- Damaged reduction gear/shaft

## ALTERNATOR/STARTER CLUTCH

### ALTERNATOR STATOR

#### LEFT CRANKCASE COVER REMOVAL

Remove the left side fairing (page 2-4).

Disconnect the alternator 3P (White) connector.  
Remove the left crankcase cover bolts and the left crankcase cover.

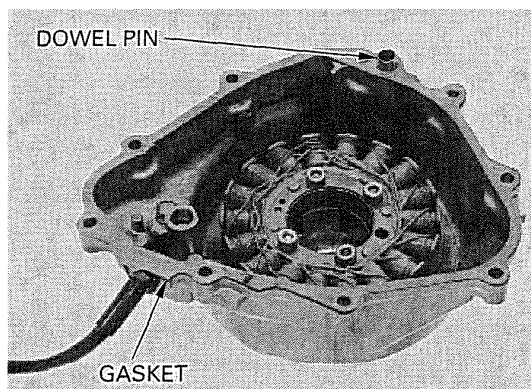
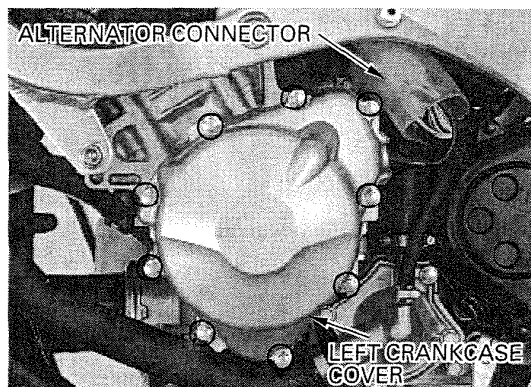
#### CAUTION:

*The left crankcase cover (stator) is magnetically attached to the flywheel, be careful during removal.*

#### NOTE:

The engine oil will run out when the left crankcase cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.

Remove the gasket and dowel pin.



#### STATOR REPLACEMENT

Remove the clamp bolt and clamp.  
Remove the four bolts, grommet and stator from the left crankcase cover.

Install a new stator onto the left crankcase cover.  
Apply sealant to the grommet seating surface and install it into the cover groove properly.  
Set the wire properly and install the wire clamp with the bolt.

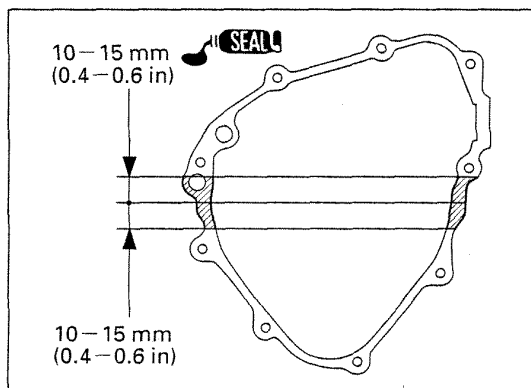
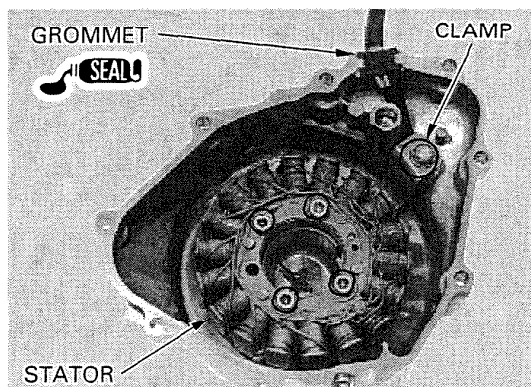
**TORQUE** : 14 N·m (1.4 kgf·m , 10 lbf·ft)

Install and tighten the stator bolts.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

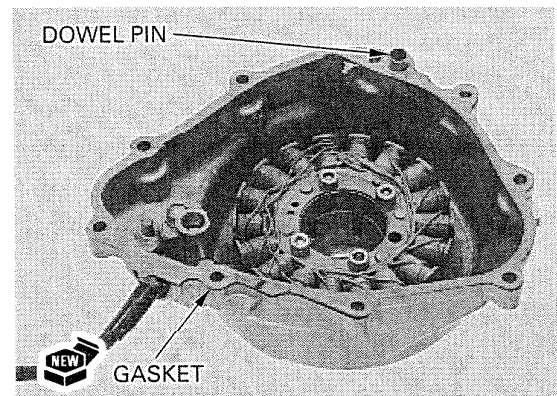
#### LEFT CRANKCASE COVER INSTALLATION

Apply sealant to the crankcase mating surfaces as shown.





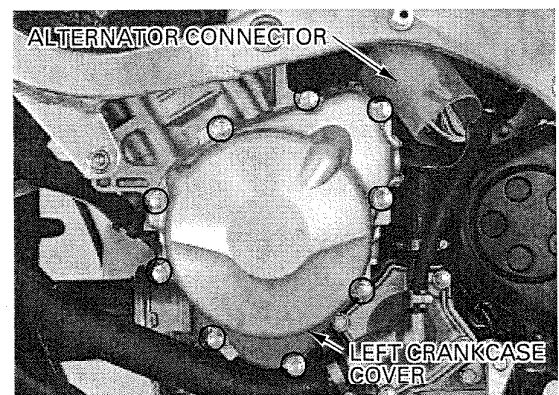
Install the dowel pin and a new gasket.



Install the left crankcase cover and tighten the cover bolts securely.

Connect the alternator 3P (White) connector.

Install the left side fairing (page 2-4).  
Check the oil level and add recommended engine oil if necessary (page 3-11).



## FLYWHEEL REMOVAL

Remove the left crankcase cover (page 10-2).

Remove the starter reduction gear and shaft.

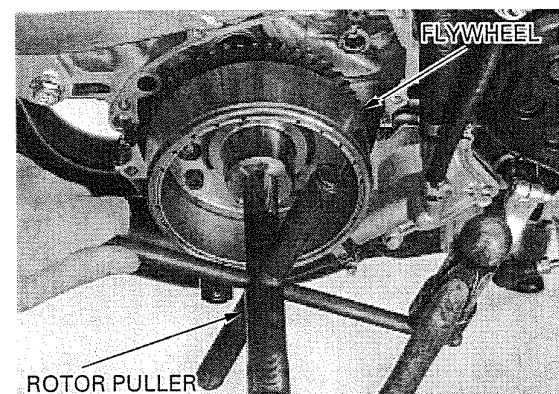
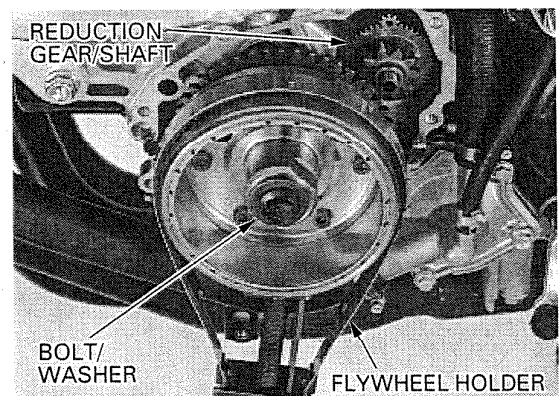
Hold the flywheel with the special tool and loosen the flywheel bolt.

**TOOL:**  
**Flywheel holder** 07725-0040000 or  
equivalent commercially  
available in U.S.A.

Remove the flywheel bolt and special washer.

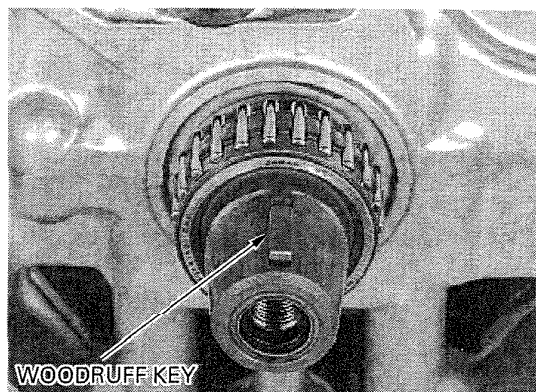
Remove the flywheel using the special tool.

**TOOL:**  
**Rotor puller** 07733-0020001 or  
07933-3950000



## ALTERNATOR/STARTER CLUTCH

Remove the woodruff key from the crankshaft.

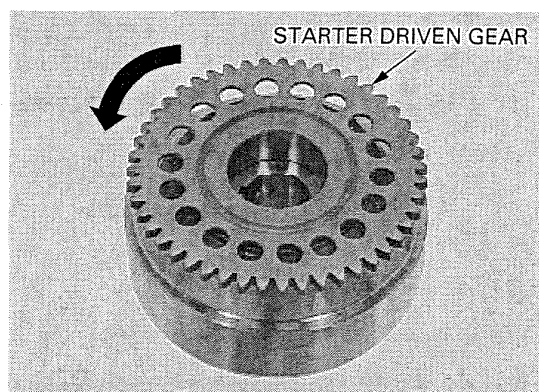


## STARTER CLUTCH

### REMOVAL

Remove the flywheel (page 10-3).

Remove the starter driven gear while turning it counterclockwise.



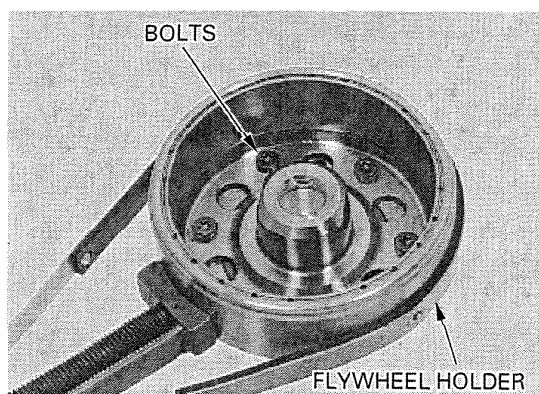
Hold the flywheel with the special tool and remove the starter clutch bolts.

#### TOOL:

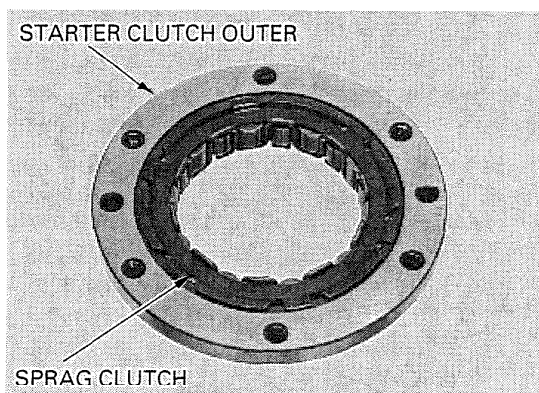
**Flywheel holder**

07725 0040000 or  
equivalent commercially  
available in U.S.A.

Remove the starter clutch assembly from the flywheel.



Remove the sprag clutch from the starter clutch outer.



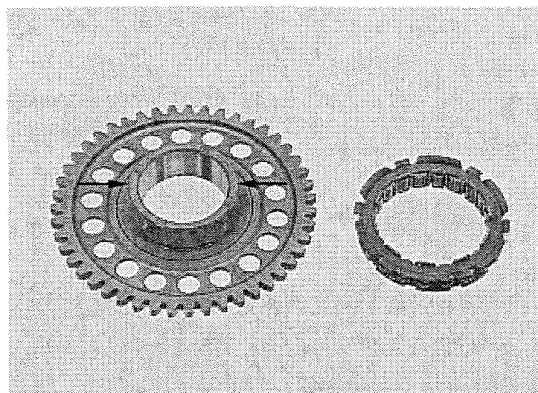


### INSPECTION

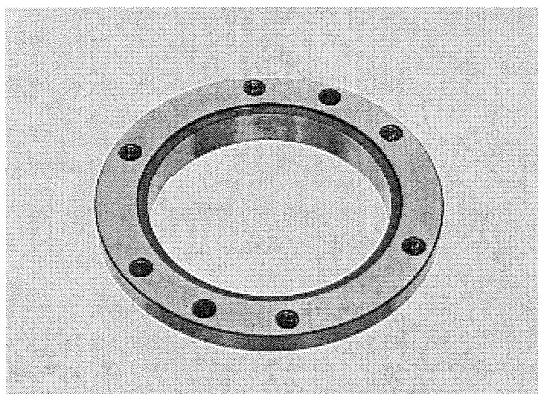
Check the starter driven gear, reduction gear and sprag clutch for abnormal wear or damage.

Measure the starter driven gear O.D.

**SERVICE LIMIT:** 51.684 mm (2.0348 in)



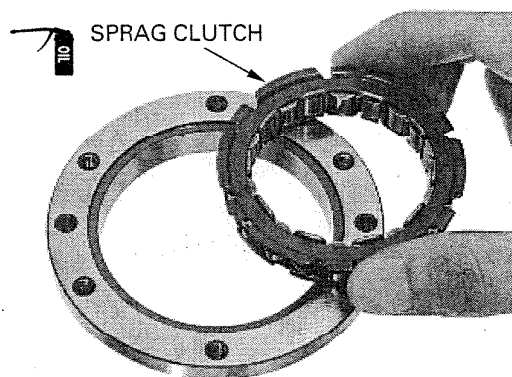
Check the inner contact surface of the clutch outer for damage.



### INSTALLATION

Apply engine oil to the sprag clutch contacting surfaces.

Install the sprag clutch into the starter clutch outer as shown.



Apply locking agent to the starter clutch bolt threads.

Install the starter clutch assembly onto the flywheel and install the bolts.

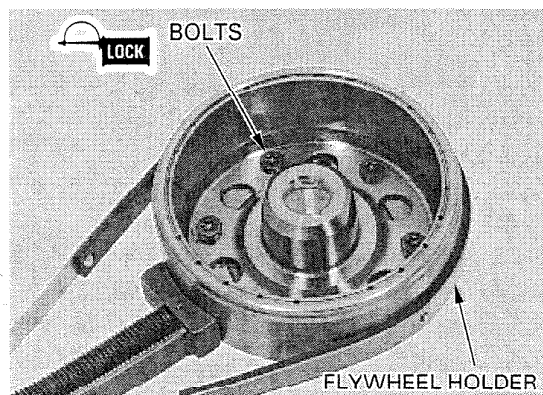
Hold the flywheel with the special tool and tighten the bolts.

#### TOOL:

**Flywheel holder**

07725-0040000 or  
equivalent commercially  
available in U.S.A.

**TORQUE:** 16 N·m (1.6 kgf·m, 12 lbf·ft)

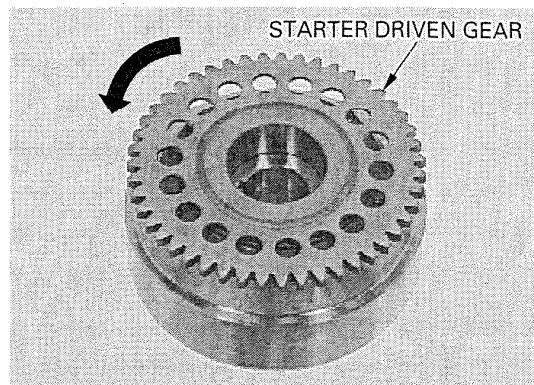


## ALTERNATOR/STARTER CLUTCH

Install the starter driven gear while turning it counterclockwise.

Make sure that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

Install the flywheel (see below).

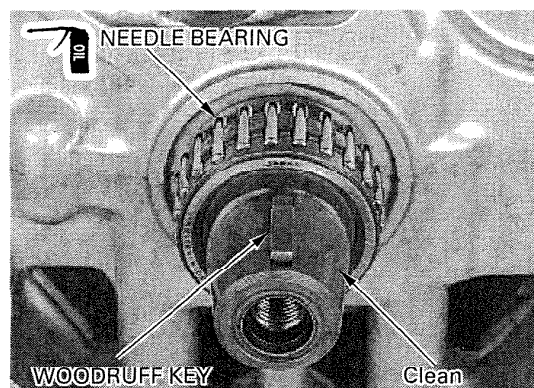


## FLYWHEEL INSTALLATION

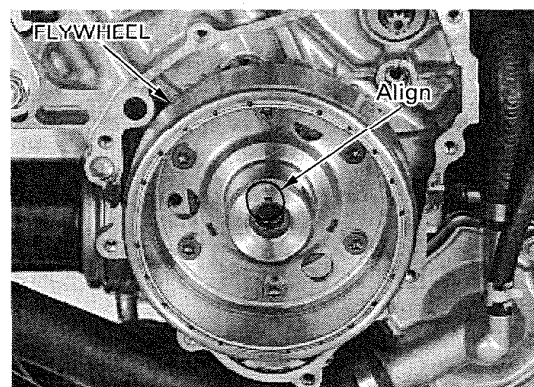
Apply oil to the needle bearing.

Clean any oil from the tapered portion of the crankshaft and flywheel.

Install the woodruff key in the crankshaft key groove.



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



Apply engine oil to the flywheel bolt threads and seating surface.  
Install the special washer and flywheel bolt.

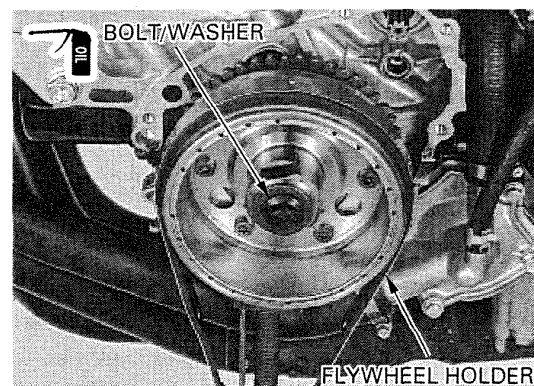
Hold the flywheel with the special tool and tighten the bolt.

### TOOL:

**Flywheel holder**

07725-0040000 or  
equivalent commercially  
available in U.S.A.

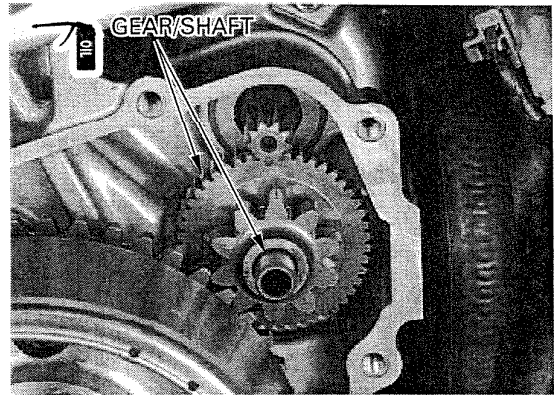
**TORQUE** : 103 N·m (10.5 kgf·m , 76 lbf·ft)



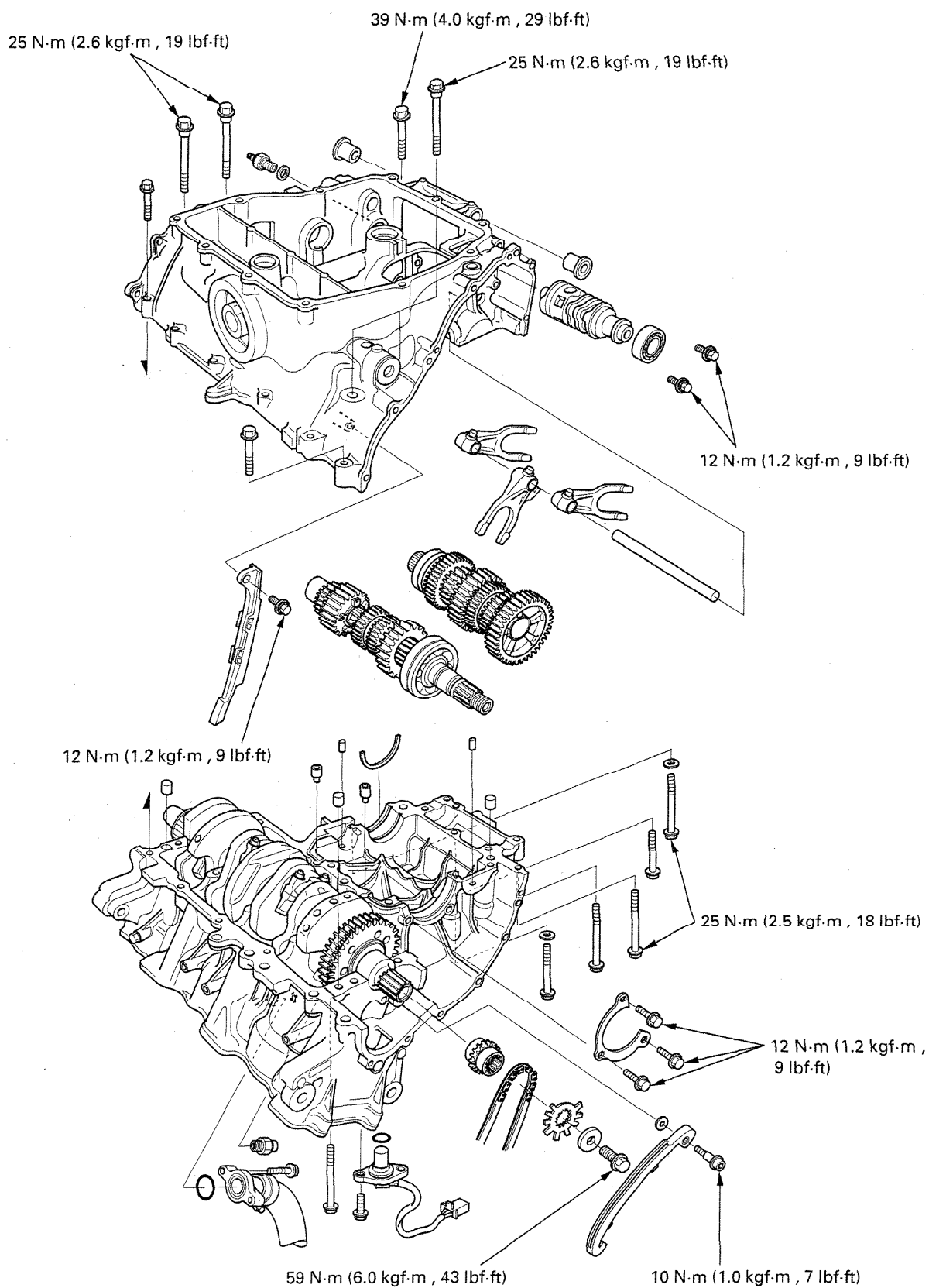
Apply oil to the starter reduction gear and gear shaft.

Install the reduction gear and shaft.

Install the left crankcase cover (page 10-2).



## CRANKCASE/TRANSMISSION



# 11. CRANKCASE/TRANSMISSION

SERVICE INFORMATION	11-1	SHIFT FORK/SHIFT DRUM	11-4
TROUBLESHOOTING	11-2	TRANSMISSION	11-6
CRANKCASE SEPARATION	11-3	CRANKCASE ASSEMBLY	11-11

## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the following:
  - transmission
  - crankshaft (section 12)
  - piston/connecting rod (section 12)
- The following components must be removed before separating the crankcase:
  - engine (section 7)
  - oil pan, oil pump and oil cooler (section 4)
  - water pump (section 6)
  - cylinder head (section 8)
  - clutch/gearshift linkage (section 9)
  - flywheel (section 10)
  - starter motor (section 18)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

11

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D.		12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
Shift fork shaft	O.D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)
Transmission	Gear I.D.	M5, M6	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C2, C3, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
	Gear bushing O.D.	M5, M6	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	30.955 – 30.980 (1.2187 – 1.2197)	30.94 (1.218)
		C3, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Gear-to-bushing clearance	M5, M6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.10 (0.004)
		C3, C4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Gear bushing I.D.	M5	24.985 – 25.006 (0.9837 – 0.9845)	25.016 (0.9849)
		C2	27.985 – 28.006 (1.1018 – 1.1026)	28.021 (1.1032)
	Mainshaft O.D.	at M5	24.967 – 24.980 (0.9830 – 0.9835)	24.96 (0.983)
	Countershaft O.D.	at C2	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.06 (0.002)
		C2	0.005 – 0.039 (0.0002 – 0.0015)	0.06 (0.002)

## CRANKCASE/TRANSMISSION

---

### TORQUE VALUES

Mainshaft bearing set plate bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply locking agent to the threads
Gearshift drum bearing and fork shaft set bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply locking agent to the threads
Cam chain tensioner pivot bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply locking agent to the threads
Cam chain guide washer bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Ignition pulse generator rotor bolt	59 N·m (6.0 kgf·m , 43 lbf·ft)	
Crankcase bolt (Main journal)	25 N·m (2.6 kgf·m , 19 lbf·ft)	Apply oil to the threads and seating surface
Crankcase bolt (10 mm)	39 N·m (4.0 kgf·m , 29 lbf·ft)	
Crankcase bolt (Upper side)	25 N·m (2.5 kgf·m , 18 lbf·ft)	

### TOOLS

Inner driver C	07746-0030100
Attachment, 25 mm I.D.	07746-0030200

## TROUBLESHOOTING

### Hard to shift

- Improper clutch operation (section 9)
- Incorrect engine oil weight
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Bent gearshift spindle

### Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

### Excessive engine noise

- Worn or damaged transmission gears
- Worn or damaged transmission bearings

## CRANKCASE SEPARATION

Refer to Service Information (page 11-1) for removal of necessary parts before disassembling the crankcase.

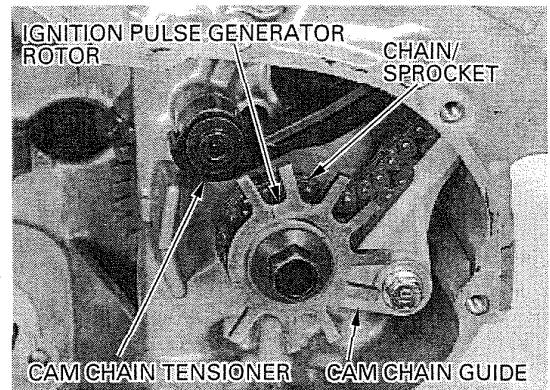
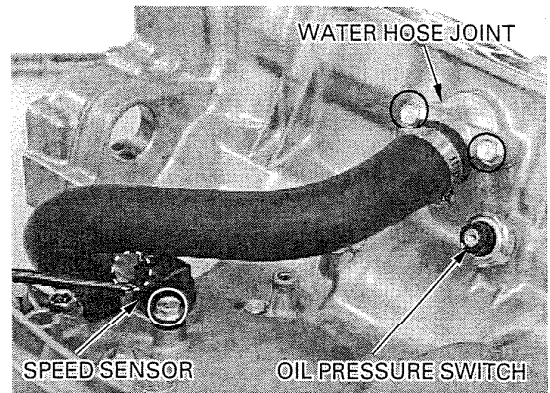
Remove the bolts and water hose joint.  
Remove the oil pressure switch.  
Remove the bolts and speed sensor.

### CAUTION:

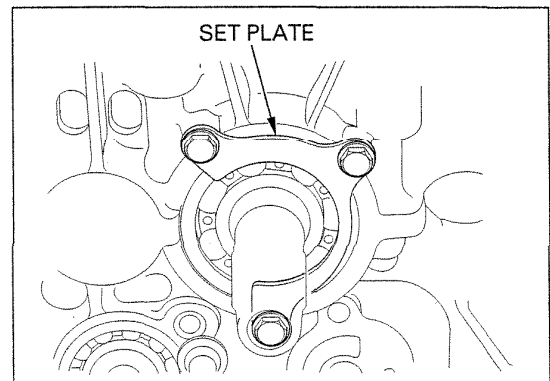
**Remove the speed sensor before separating the crankcase. Do not separate or assemble the crankcase with the speed sensor installed.**

*Do not use the ignition pulse generator rotor tangs to hold it in place while removing the bolt.*

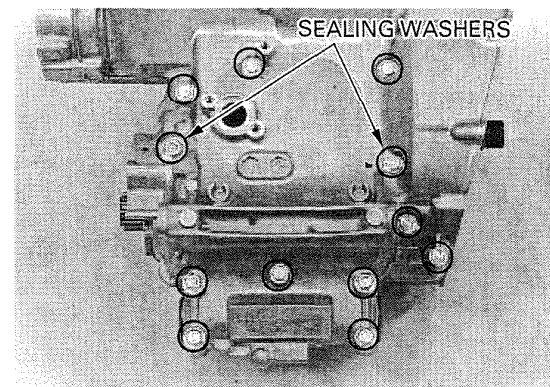
Remove the bolt, washer and ignition pulse generator rotor.  
Remove the washer bolt and cam chain guide.  
Remove the cam chain and timing sprocket.  
Remove the pivot bolt, cam chain tensioner and washer.



Remove the three bolts and bearing set plate.



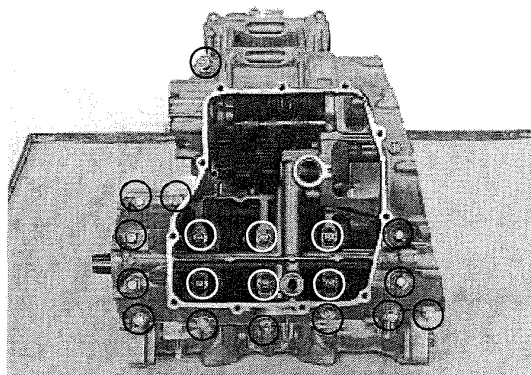
Loosen the seven 6 mm bolts and five 8 mm bolts in a crisscross pattern in 2 or 3 steps.  
Remove the bolts and sealing washers.



## CRANKCASE/TRANSMISSION

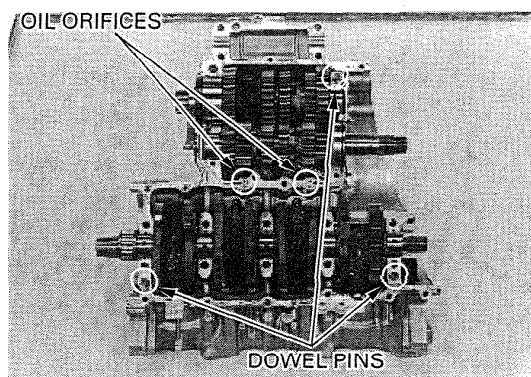
Place the engine with the upper side down.  
Loosen the eight 6 mm bolts, ten 8 mm bolts and 10 mm bolt in a crisscross pattern in 2 or 3 steps.  
Remove the bolts.

Separate the lower crankcase from the upper crankcase.



Remove the dowel pins and oil orifices.

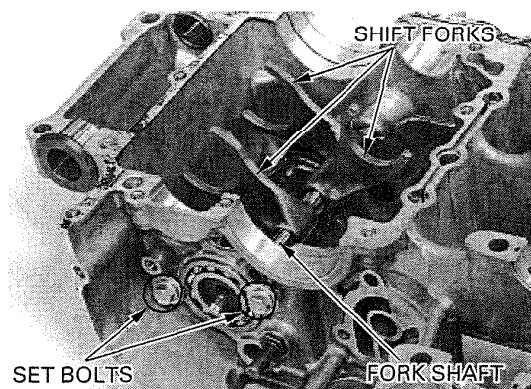
Clean any sealant from the crankcase mating surfaces.



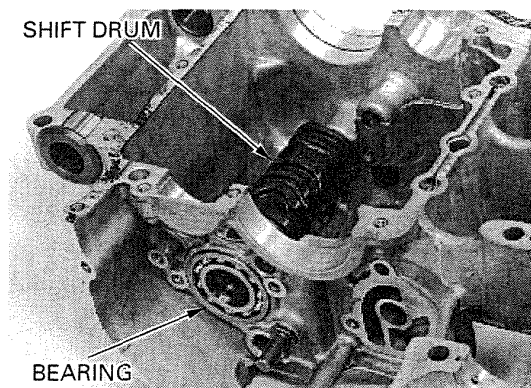
## SHIFT FORK/SHIFT DRUM REMOVAL

Separate the crankcase halves (page 11-3).

Remove the bearing set bolts.  
Remove the shift fork shaft and shift forks.



Remove the shift drum and bearing.





### INSPECTION

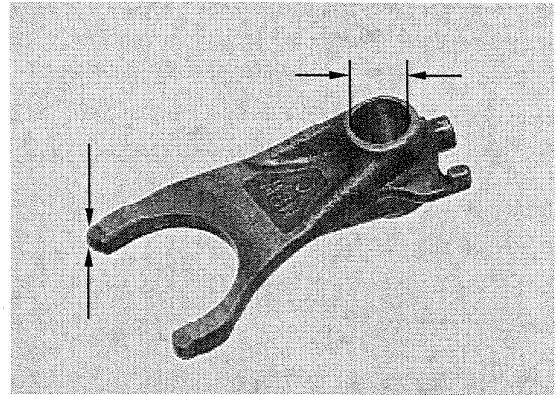
Check the shift fork guide pins for abnormal wear or damage.

Measure the shift fork I.D.

**SERVICE LIMIT:** 12.03 mm (0.474 in)

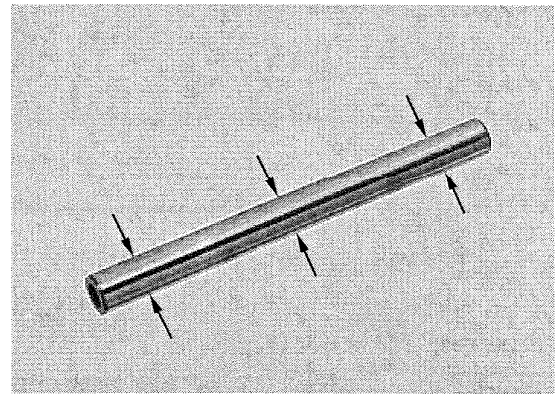
Measure the shift fork claw thickness.

**SERVICE LIMIT:** 5.9 mm (0.23 in)



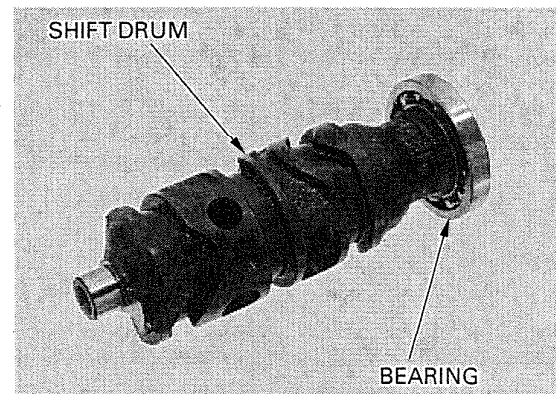
Measure the shift fork shaft O.D.

**SERVICE LIMIT:** 11.95 mm (0.470 in)



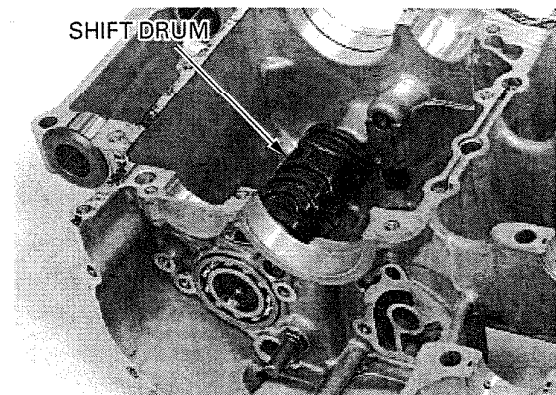
Check the shift drum guide groove for abnormal wear or damage.

Check the shift drum bearing for smooth rotation.



### INSTALLATION

Install the shift drum and bearing into the lower crankcase.

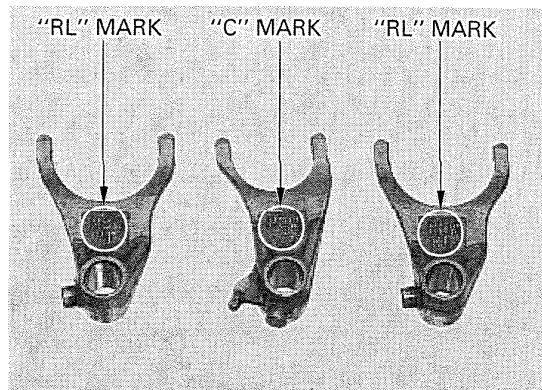


## CRANKCASE/TRANSMISSION

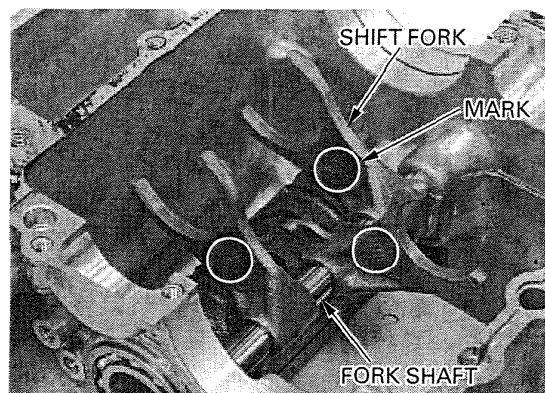
The shift forks have the following identification marks:

RL: right and left shift forks

C: center shift fork



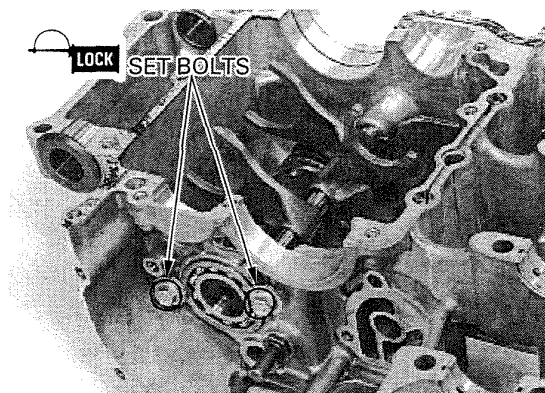
Install the shift forks into the shift drum guide groove with the identification marks facing toward the right side of the engine and insert the fork shaft.



Apply locking agent to the bearing set bolt threads. Install the set bolts and tighten them.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Assemble the crankcase halves (page 11-11).



## TRANSMISSION

### DISASSEMBLY

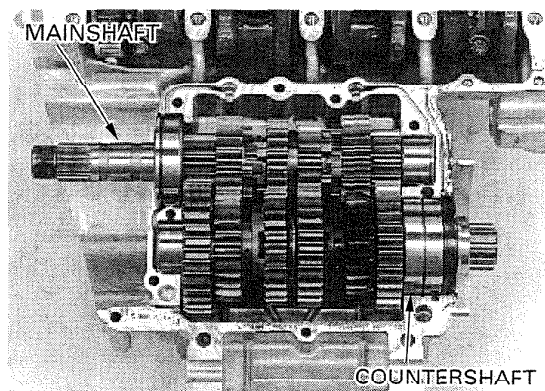
Separate the crankcase halves (page 11-3).

Remove the mainshaft and countershaft assemblies.

Disassemble the mainshaft and countershaft.

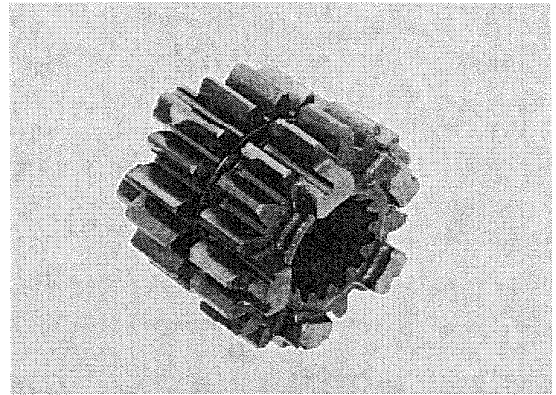
Clean all disassembled parts in solvent thoroughly.

Check the mainshaft and countershaft needle bearings for abnormal wear or damage.



## INSPECTION

Check the gear shifter groove for abnormal wear or damage.



Check the gear dogs and teeth for abnormal wear or damage.  
Measure the gear I.D.

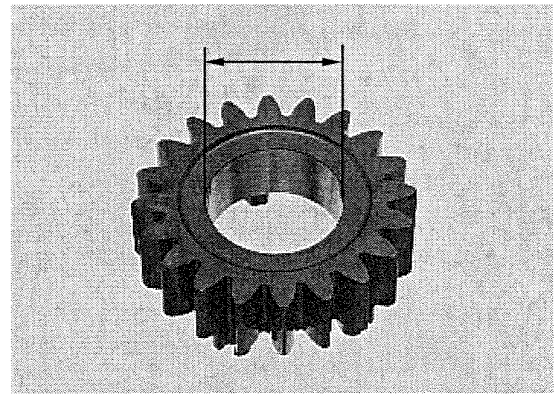
### SERVICE LIMITS:

**M5, M6:** 28.04 mm (1.104 in)  
**C2, C3, C4:** 31.04 mm (1.222 in)

Measure the gear bushing O.D.

### SERVICE LIMITS:

**M5, M6:** 27.94 mm (1.100 in)  
**C3, C4:** 30.93 mm (1.218 in)  
**C2:** 30.94 mm (1.218 in)



Calculate the gear-to-bushing clearance.

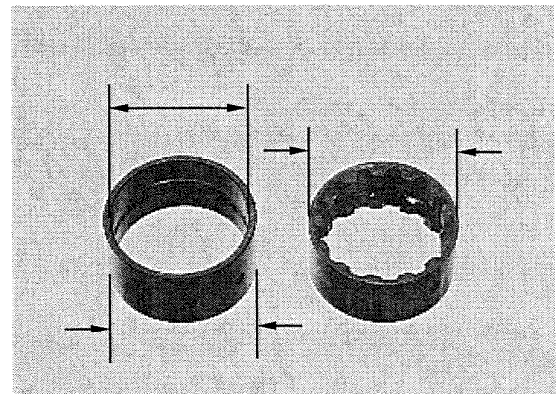
### SERVICE LIMITS:

**M5, M6:** 0.10 mm (0.004 in)  
**C3, C4:** 0.11 mm (0.004 in)  
**C2:** 0.10 mm (0.004 in)

Measure the gear bushing I.D.

### SERVICE LIMITS:

**M5:** 25.016 mm (0.9849 in)  
**C2:** 28.021 mm (1.1032 in)



Check the mainshaft and countershaft for abnormal wear or damage.  
Measure the mainshaft O.D. at the M5 gear.

**SERVICE LIMIT:** 24.96 mm (0.983 in)

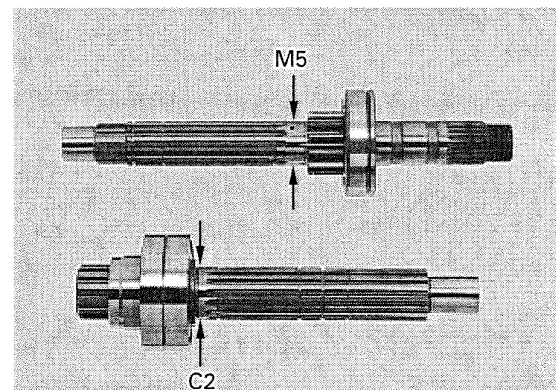
Measure the countershaft O.D. at the C2 gear.

**SERVICE LIMIT:** 27.96 mm (1.101 in)

Calculate the gear bushing-to-shaft clearance.

### SERVICE LIMITS:

**M5:** 0.06 mm (0.002 in)  
**C2:** 0.06 mm (0.002 in)



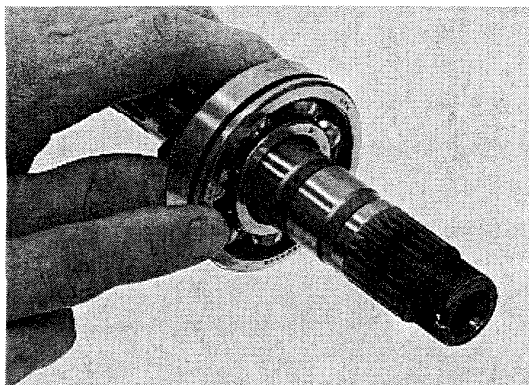
## CRANKCASE/TRANSMISSION

Turn the ball bearing outer race with your finger. The bearing should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft.

Replace the bearing if the outer race does not turn smoothly, quietly, or if the inner race fits loosely on the shaft.

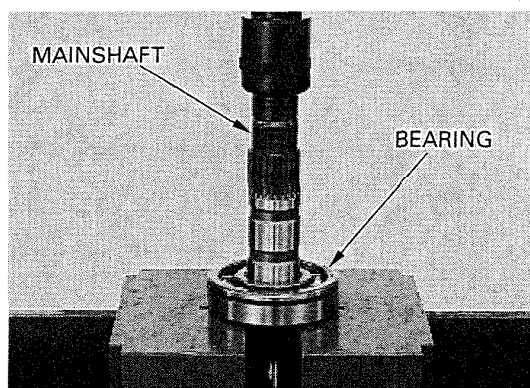
### NOTE:

The countershaft ball bearing cannot be replaced. If the countershaft bearing is faulty, replace the countershaft.



## MAINSHAFT BEARING REPLACEMENT

Press the mainshaft out of the bearing.



*Install with the groove side facing up.*

Press a new bearing onto the mainshaft with the special tools.

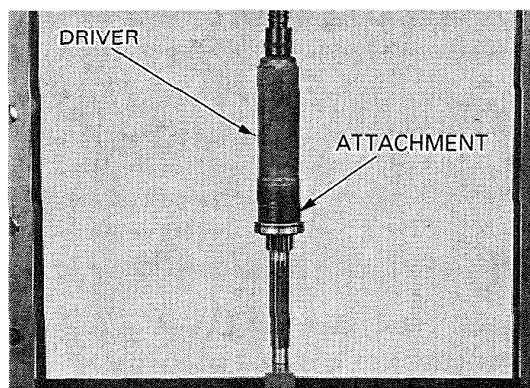
### TOOL:

**Inner driver C**

07746-0030100

**Attachment, 25 mm I.D.**

07746-0030200

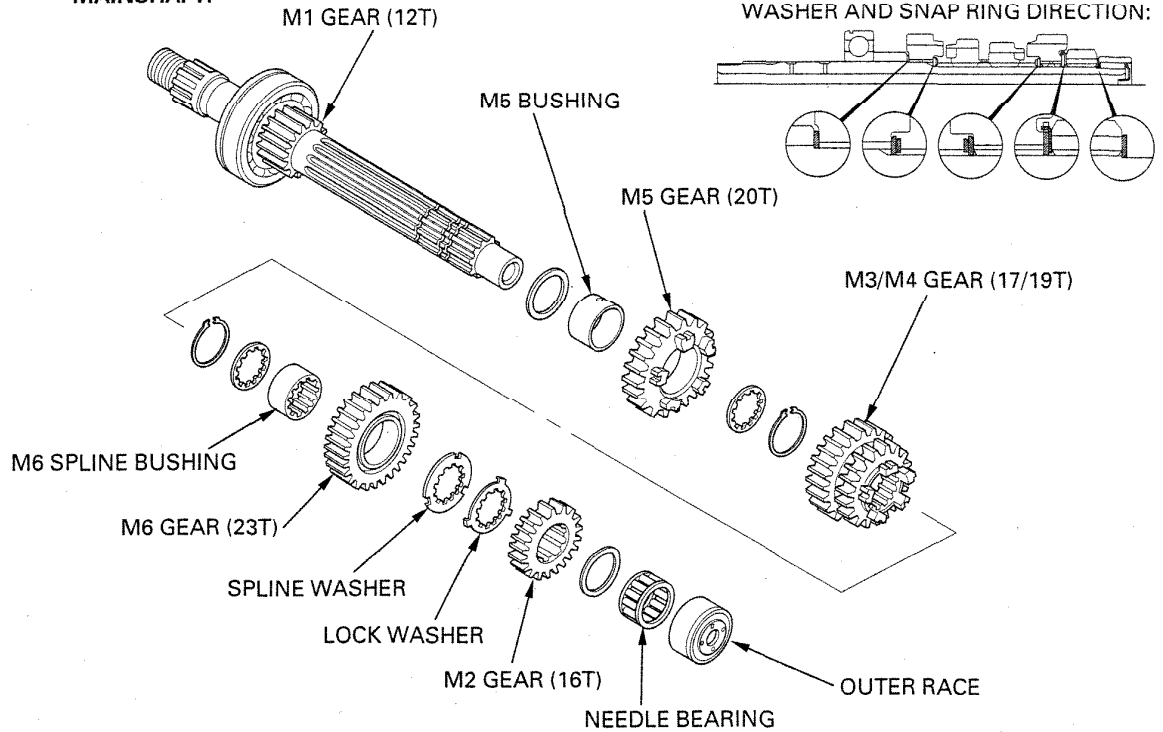


## ASSEMBLY

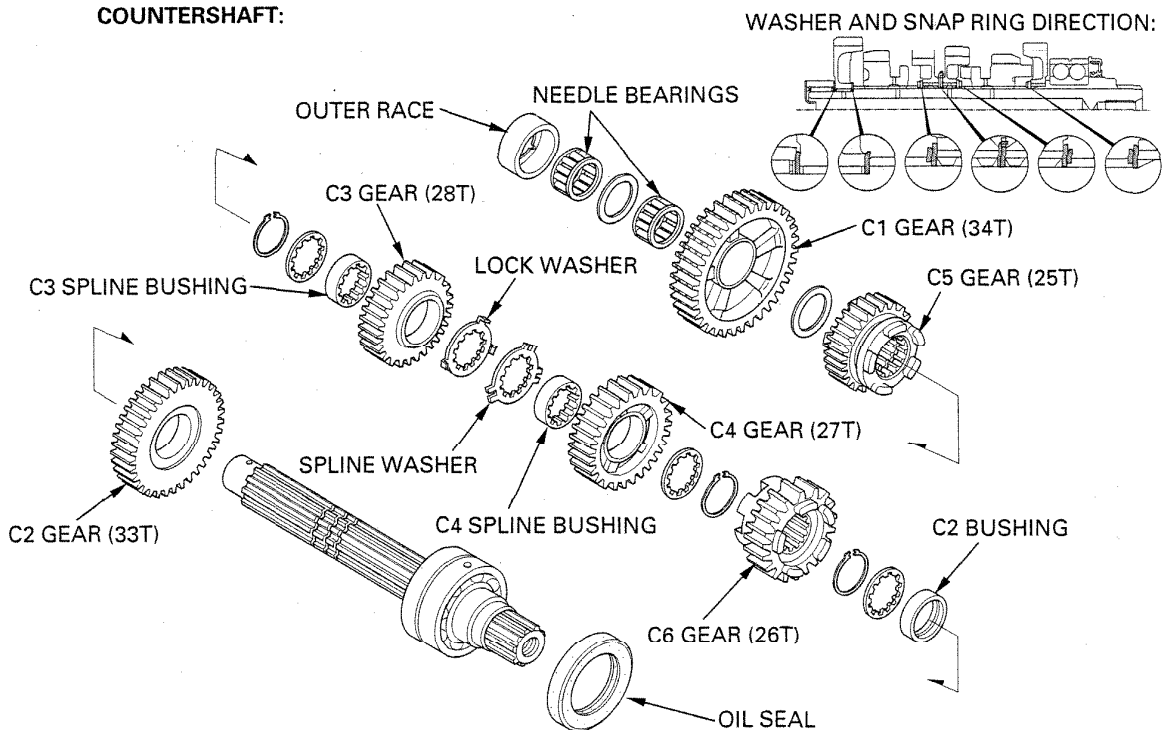
Apply molybdenum oil solution to the gear teeth, sliding surface, shifter grooves and bushings.

Assemble the mainshaft and countershaft.

### MAINSHAFT:



### COUNTERSHAFT:

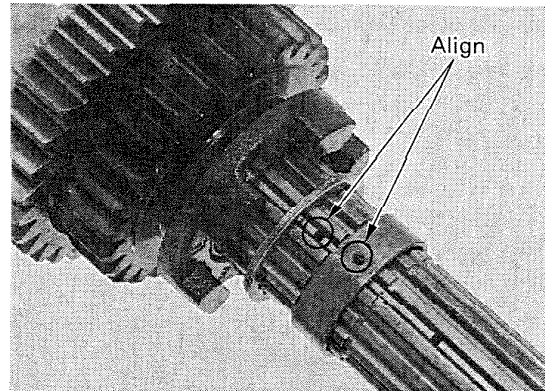




## CRANKCASE/TRANSMISSION

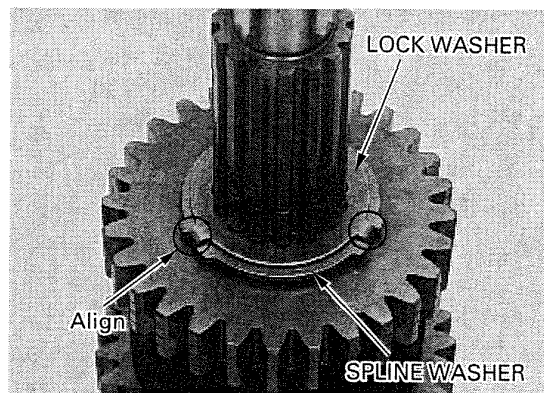
**NOTE:**

Align the oil holes in the M6 bushing and mainshaft, and the C3, C4 spline bushings and countershaft.

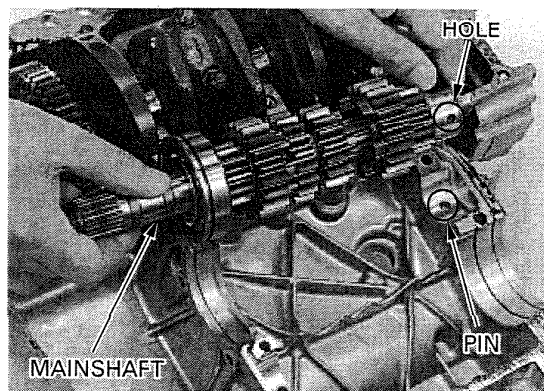


**NOTE:**

- Align the lock washer tabs with the spline washer grooves.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.



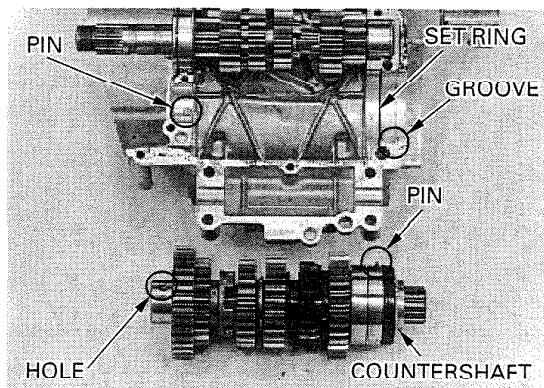
Install the mainshaft assembly by aligning the hole in the needle bearing outer race with the dowel pin.



Install the countershaft assembly by aligning the hole in the needle bearing outer race with the dowel pin, and the ring groove with the set ring.

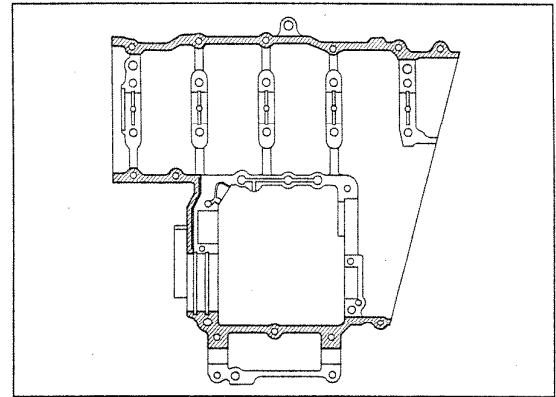
Rest the pin on the ball bearing into the pin groove.

Assemble the crankcase halves (page 11-11).



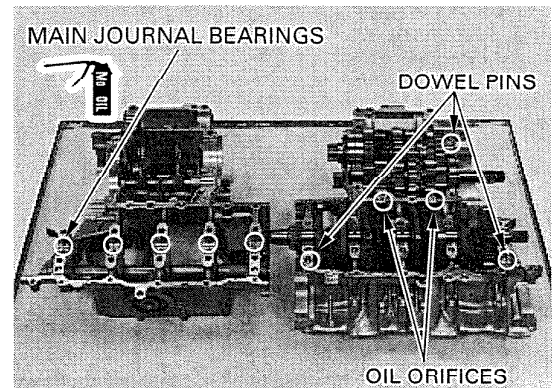
# CRANKCASE ASSEMBLY

Apply sealant to the crankcase mating surfaces as shown.



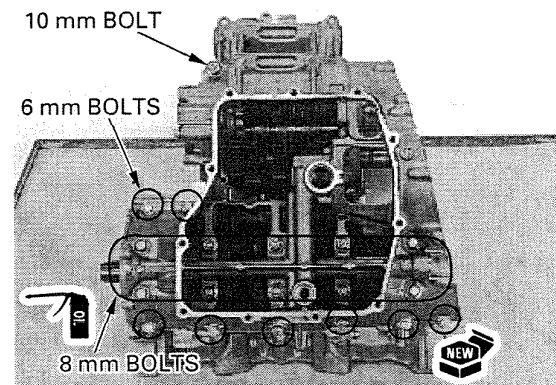
Install the three dowel pins and the two oil orifices by aligning the flat surfaces.

Apply molybdenum oil solution to the main journal bearing surfaces on the lower crankcase. Install the lower crankcase onto the upper crankcase, aligning the shift forks with the gear shifter grooves.



Apply engine oil to the 8 mm bolt threads and seating surfaces. Install the 10 mm bolt, ten 8 mm bolts and eight 6 mm bolts and tighten them in a crisscross pattern in 2 or 3 steps.

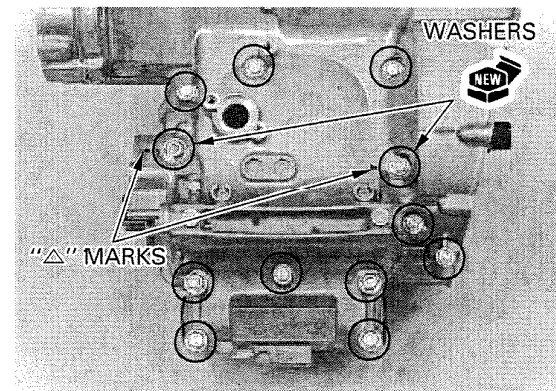
**TORQUE: 10 mm bolt:** 39 N·m (4.0 kgf·m , 29 lbf·ft)  
**8 mm bolt:** 25 N·m (2.6 kgf·m , 19 lbf·ft)



*Install the sealing washers indicated by the "△" marks.*

Install the five 8 mm bolts and seven 6 mm bolts with new sealing washers. Tighten the bolts in a crisscross pattern in 2 or 3 steps.

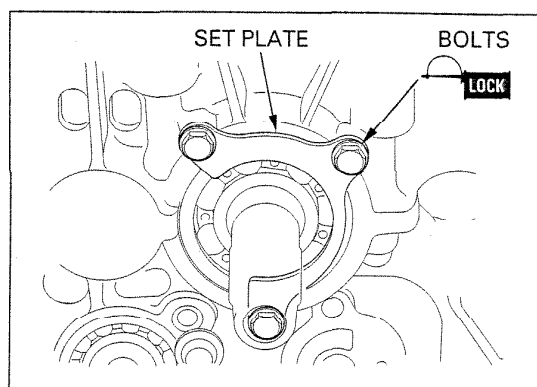
**TORQUE: 8 mm bolt:** 25 N·m (2.5 kgf·m , 18 lbf·ft)



## CRANKCASE/TRANSMISSION

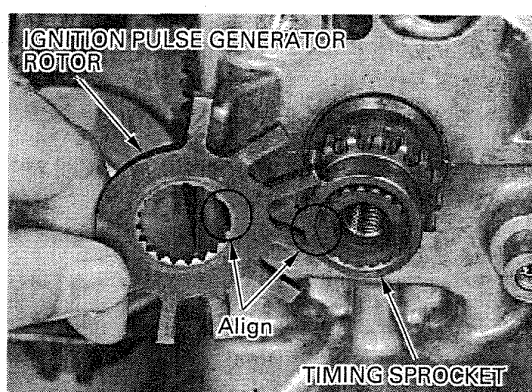
Apply locking agent to the set plate bolt threads.  
Install the bearing set plate with "OUT SIDE" mark facing out and tighten the three bolts.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)



Install the timing sprocket and the ignition pulse generator rotor, aligning the wide groove with the wide tooth.  
Install the bolt with the washer and tighten it.

**TORQUE** : 59 N·m (6.0 kgf·m , 43 lbf·ft)

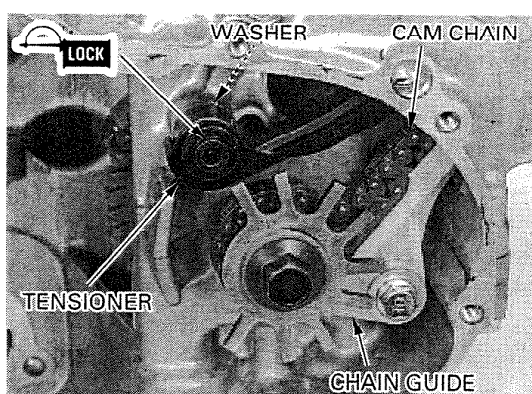


Install the cam chain.  
Apply locking agent to the pivot bolt threads.  
Install the cam chain tensioner, washer (between the tensioner and crankcase) and pivot bolt.  
Tighten the bolt.

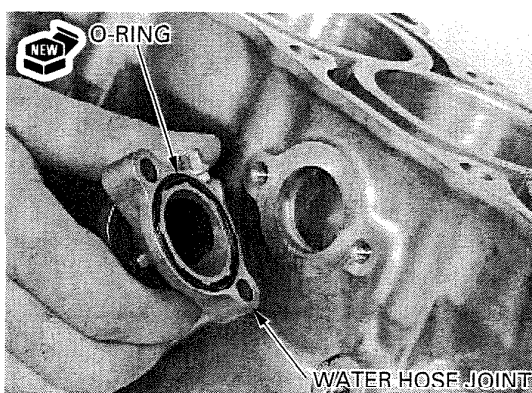
**TORQUE** : 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the cam chain guide and washer bolt.  
Tighten the bolt.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)



Install a new O-ring into the groove in the water hose joint.  
Install the hose joint with the spout facing down and tighten the bolts.



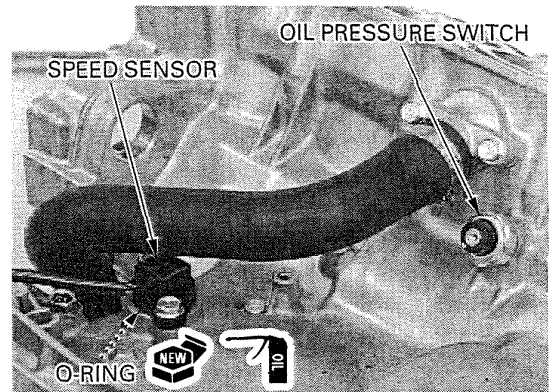


Coat a new O-ring with oil and install it onto the speed sensor.

Install the speed sensor and tighten the bolts.

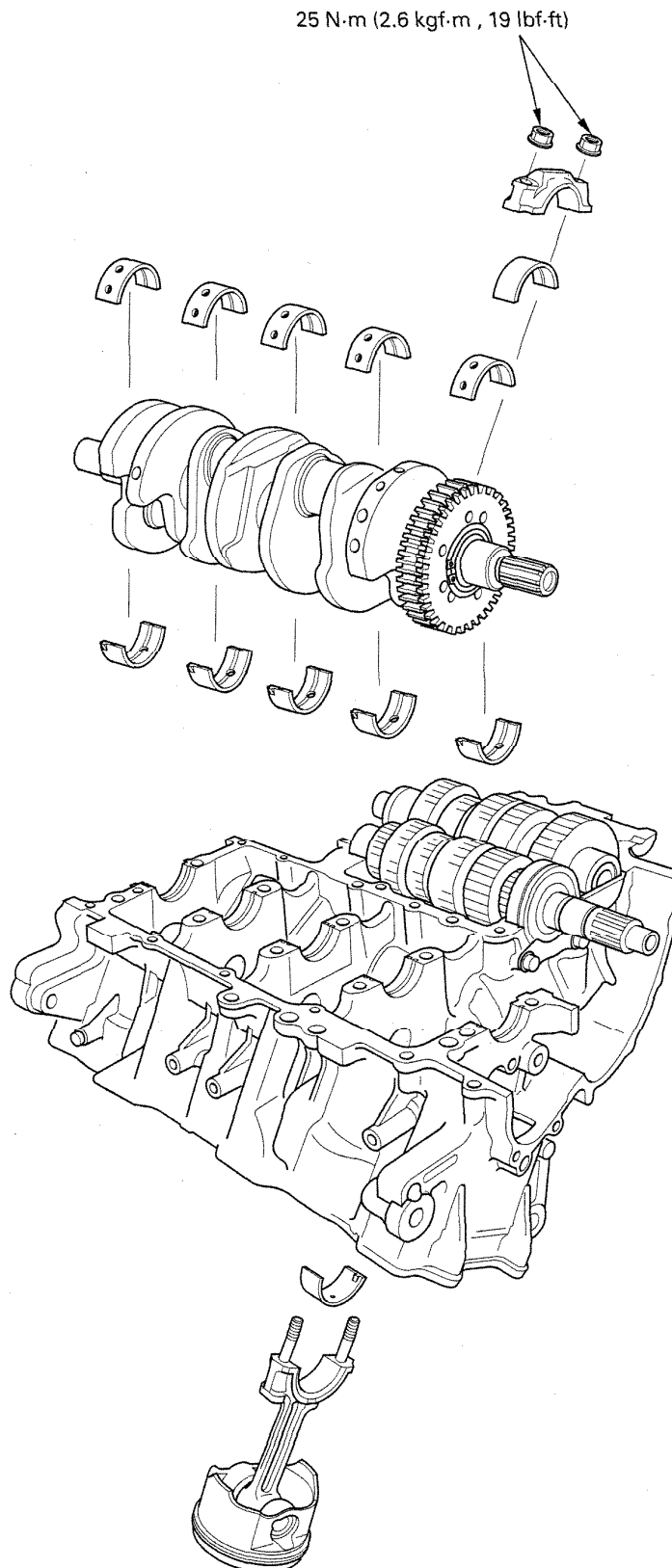
Install the following:

- oil pressure switch (page 4-3)
- oil pump, oil cooler, oil strainer, pressure relief valve and oil pan (section 4)
- water pump (section 6)
- starter motor (section 18)
- flywheel (section 10)
- gearshift linkage and clutch (section 9)
- cylinder head, camshafts and head cover (section 8)
- engine (section 7)



## CRANKSHAFT/PISTON/CYLINDER

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# 12. CRANKSHAFT/PISTON/CYLINDER

SERVICE INFORMATION	12-1	MAIN JOURNAL BEARING	12-6
TROUBLESHOOTING	12-2	CRANKPIN BEARING	12-8
CRANKSHAFT	12-3	PISTON/CYLINDER	12-10

## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the crankshaft and piston/connecting rod. Refer to section 11 for crankcase separation and assembly.
- Mark and store the connecting rods, bearing caps, pistons and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance	0.10 – 0.25 (0.004 – 0.010)	0.30 (0.012)
	Crankpin bearing oil clearance	0.028 – 0.052 (0.0011 – 0.0020)	0.06 (0.002)
	Main journal bearing oil clearance	0.020 – 0.038 (0.0008 – 0.0015)	0.05 (0.002)
	Runout	—	0.05 (0.002)
Piston, piston pin, piston ring	Piston O.D. at 15 (0.6) from bottom	66.965 – 66.985 (2.6364 – 2.6372)	66.90 (2.634)
	Piston pin hole I.D.	17.002 – 17.008 (0.6694 – 0.6696)	17.02 (0.670)
	Piston pin O.D.	16.994 – 17.000 (0.6691 – 0.6693)	16.98 (0.669)
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring end gap	Top	0.10 – 0.20 (0.004 – 0.008)
		Second	0.18 – 0.30 (0.007 – 0.012)
		Oil (side rail)	0.2 – 0.7 (0.01 – 0.03)
	Piston ring-to-ring groove clearance	Top	0.020 – 0.050 (0.0008 – 0.0020)
		Second	0.015 – 0.050 (0.0006 – 0.0020)
Cylinder	I.D.	67.000 – 67.015 (2.6378 – 2.6384)	67.10 (2.642)
	Out of round	—	0.10 (0.004)
	Taper	—	0.10 (0.004)
	Warpage	—	0.10 (0.004)
Cylinder-to-piston clearance		0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
Connecting rod small end I.D.		17.016 – 17.034 (0.6699 – 0.6706)	17.04 (0.671)
Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)

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## CRANKSHAFT/PISTON/CYLINDER

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### TORQUE VALUES

Connecting rod bearing cap nut	25 N·m (2.6 kgf·m , 19 lbf·ft)	Apply oil to the threads and seating surface
Crankcase bolt (Main journal)	25 N·m (2.6 kgf·m , 19 lbf·ft)	Apply oil to the threads and seating surface

### TOOLS

Inner driver C	07746-0030100
Attachment, 30 mm I.D.	07746-0030300
Universal bearing puller	07631-0010000

## TROUBLESHOOTING

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

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

### Compression too high, overheating or knocking

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

### Excessive smoke

- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

### Abnormal noise

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

## CRANKSHAFT

Separate the crankcase halves (page 11-3).

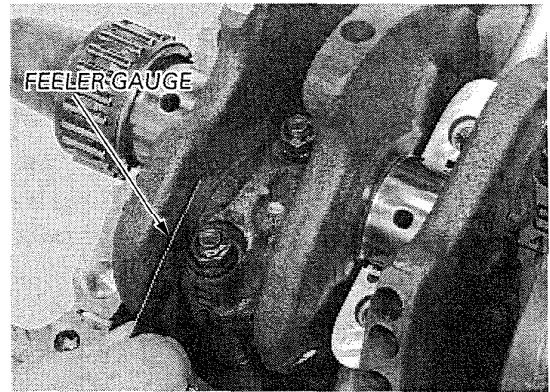
### SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

**SERVICE LIMIT:** 0.30 mm (0.012 in)

If the clearance exceeds the service limit, replace the connecting rod.

Recheck and if it is still out of limit, replace the crankshaft.



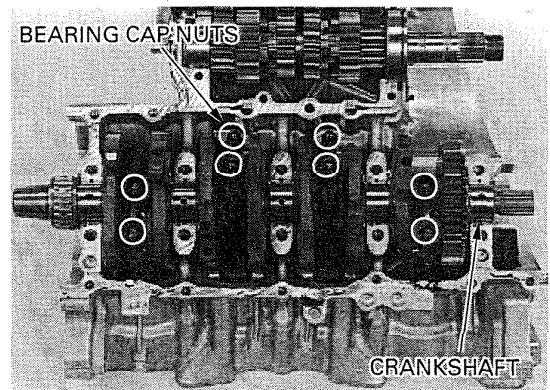
### REMOVAL

#### CAUTION:

*Be careful not to damage the crankpin, main journal and bearing inserts.*

#### NOTE:

- Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for re-assembly.
- Tap the side of the cap lightly if the bearing cap is hard to removed.



Remove the connecting rod bearing cap nuts and bearing caps.

Lower the pistons to the top dead center to avoid damaging the crankshaft by the connecting rod bolts.

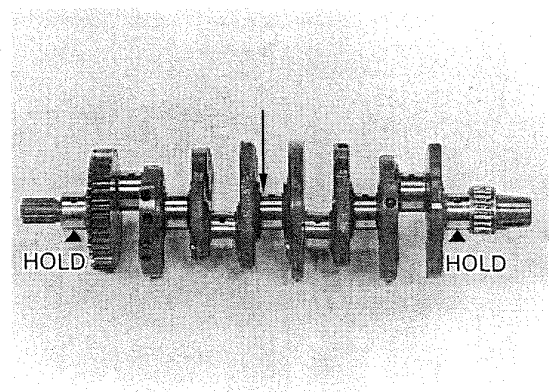
Remove the crankshaft.

### INSPECTION

Hold the crankshaft both end.

Set a dial indicator on the center main journal of the crankshaft.

Rotate the crankshaft two revolutions and read the runout.



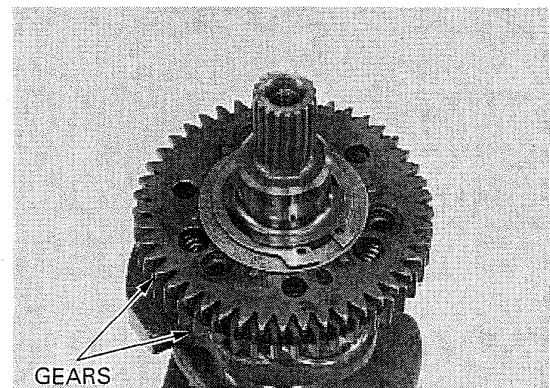
**SERVICE LIMIT:** 0.05 mm (0.002 in)

Check the primary drive gear and sub-gear teeth for abnormal wear or damage.

### SUB-GEAR REMOVAL/INSTALLATION

Remove the following:

- snap ring
- cone spring
- sub-gear
- gear springs
- stopper pins

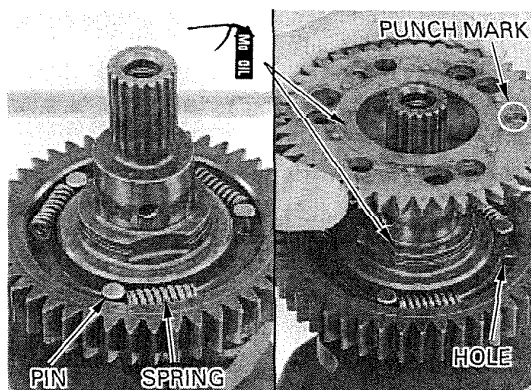


## CRANKSHAFT/PISTON/CYLINDER

Install the stopper pins and gear springs onto the primary drive gear as shown.

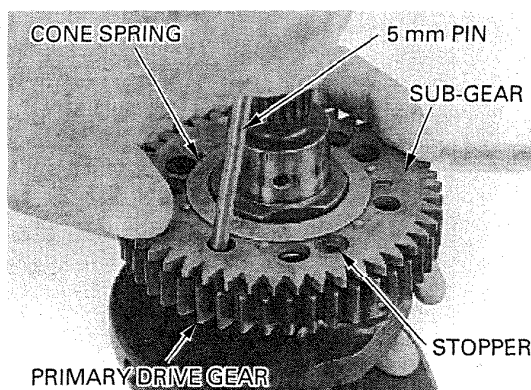
Apply molybdenum oil solution to the sub-gear sliding surface.

Temporarily install the sub-gear by aligning the punch mark with the hole in the primary drive gear.



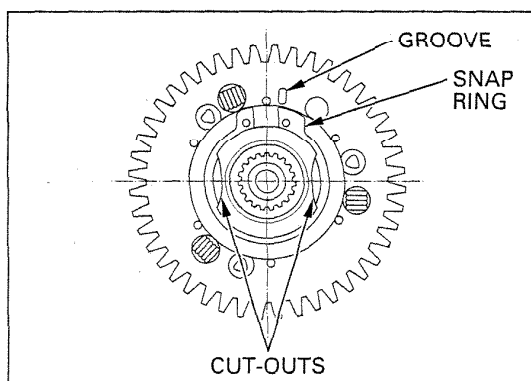
Install the cone spring onto the sub-gear.

Install the sub-gear onto the primary drive gear so that it evenly touches the primary drive gear by prying the sub-gear with a 5 mm pin or screwdriver while the stoppers on the reverse side of the sub-gear are pushing against the gear springs.



*Install with the large tab facing the right and the chamfered side facing the gear.*

Install a new snap ring into the ring groove in the crankshaft securely with the end gap at right angle to the crankshaft cut-outs by aligning the large tab edge with the sub-gear groove as shown.



## STARTER CLUTCH NEEDLE BEARING REPLACEMENT

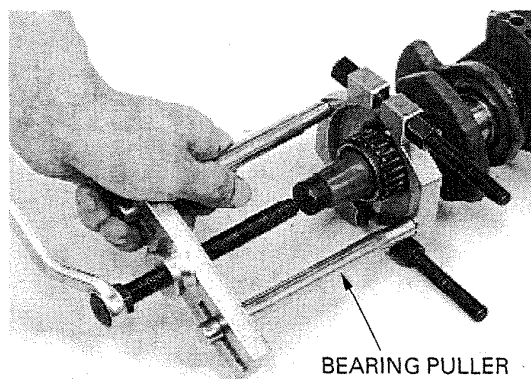
Remove the needle bearing with the bearing puller.

### TOOL:

Universal bearing puller 07631-0010000

### CAUTION:

*To protect the crankshaft main journal from the bearing puller claws, cover the mainshaft journal properly; worn main journal bearings are usable as protectors.*



Press with the bearing's marked side facing up.

Press a new needle bearing onto the crankshaft using the special tools until its edge is flush with the groove in the crankshaft. Make sure that the height from the crankshaft end is 27.6–27.9 mm (1.09–1.10 in).

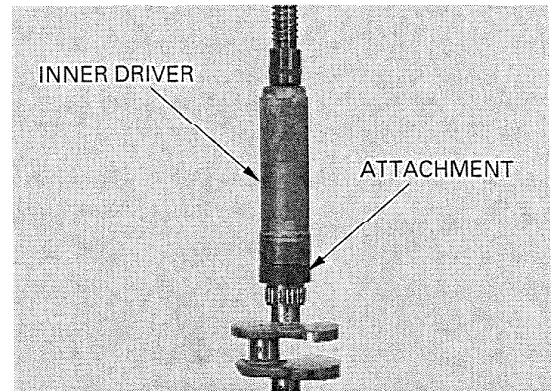
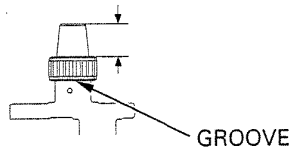
## TOOLS:

Inner driver C

07746-0030100

Attachment, 30 mm I.D.

07746-0030300

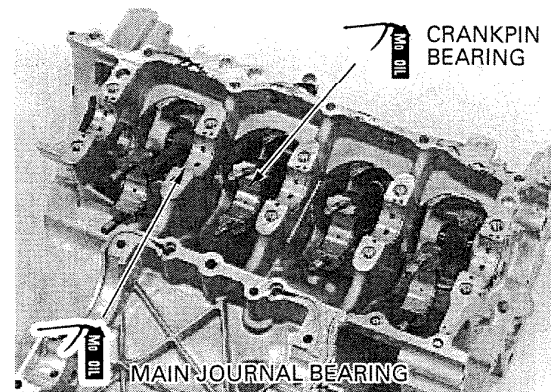


## INSTALLATION

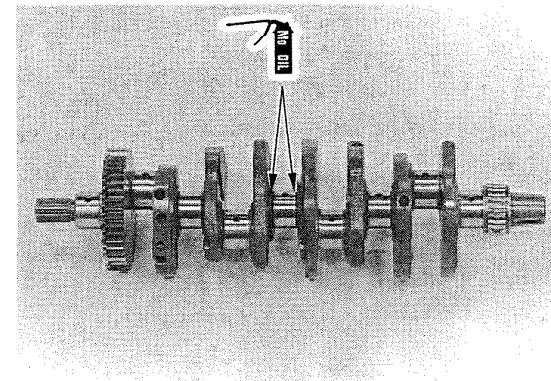
### CAUTION:

*Do not get the molybdenum oil solution to the connecting rod bolts and bearing cap nuts. It may cause the cap nuts to be tightened to an incorrect torque value.*

Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase and the crankpin bearing sliding surfaces on the connecting rods.



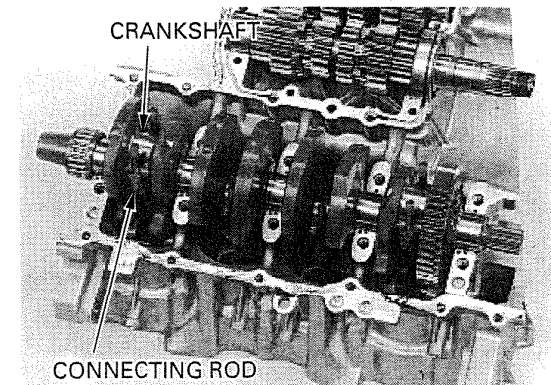
Apply molybdenum oil solution to the thrust surfaces of the crankshaft as shown.



Lower all the pistons to the top dead center to avoid damaging the crankpin by the connecting rod bolts.

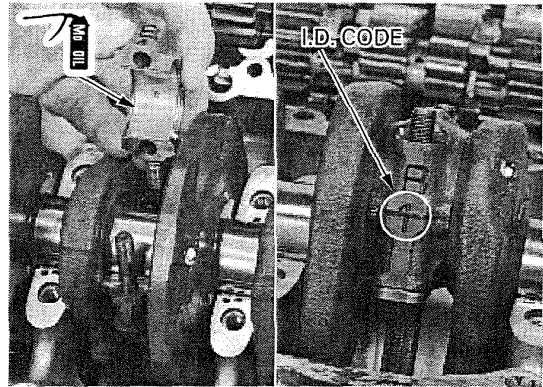
Carefully install the crankshaft onto the upper crankcase.

Set the connecting rods onto the crankpins.



## CRANKSHAFT/PISTON/CYLINDER

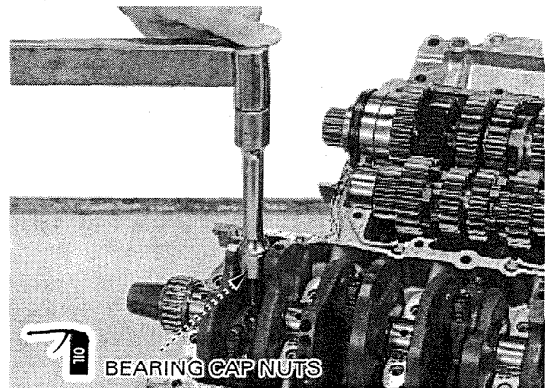
Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the bearing caps. Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap. Be sure each part is installed in its original position, as noted during removal.



Apply engine oil to the bearing cap nut threads and seating surfaces and install the cap nuts. Tighten the nuts in 2 or 3 steps.

**TORQUE** : 25 N·m (2.6 kgf·m , 19 lbf·ft)

Assemble the crankcase halves (page 11-11).

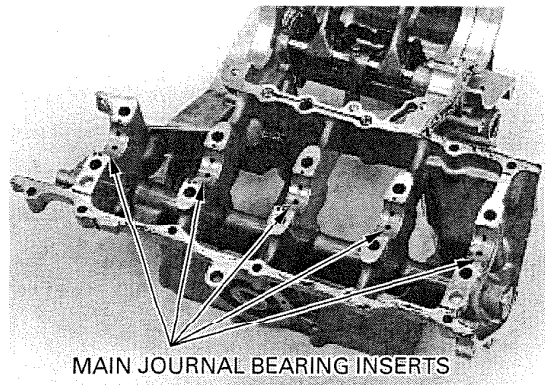


## MAIN JOURNAL BEARING

Remove the crankshaft (page 12-3).

### BEARING INSPECTION

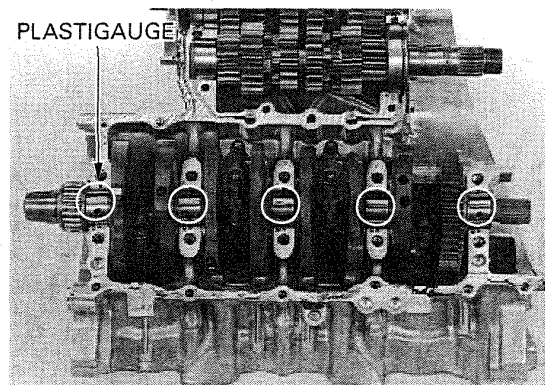
Check the bearing inserts on the upper and lower crankcases for unusual wear or peeling. Check the bearing tabs for damage.



### OIL CLEARANCE INSPECTION

*Do not rotate the crankshaft during inspection.*

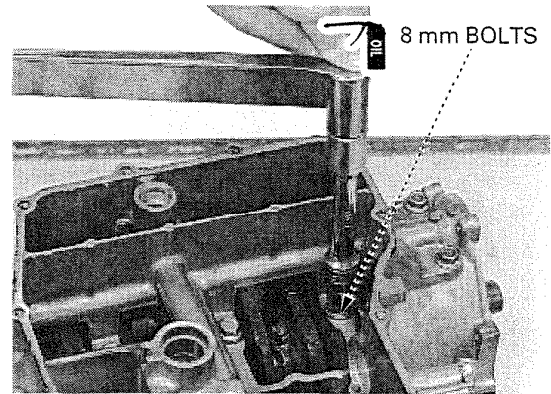
Clean off any oil from the bearing inserts and main journals. Install the crankshaft onto the upper crankcase. Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.





Install the dowel pins and oil orifices.  
Carefully install the lower crankcase on the upper crankcase.  
Apply engine oil to the main journal 8 mm bolt threads and seating surfaces and install them.  
Tighten the bolts in a crisscross pattern in 2 or 3 steps.

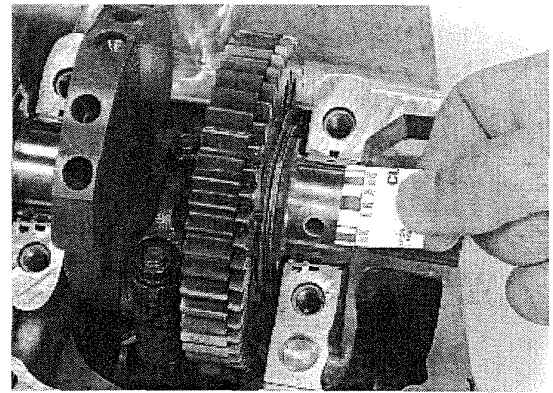
**TORQUE** : 25 N·m (2.6 kgf·m , 19 lbf·ft)



Remove the lower crankcase and measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

**SERVICE LIMIT:** 0.05 mm (0.002 in)

If the oil clearance exceeds the service limit, select the correct replacement bearings.

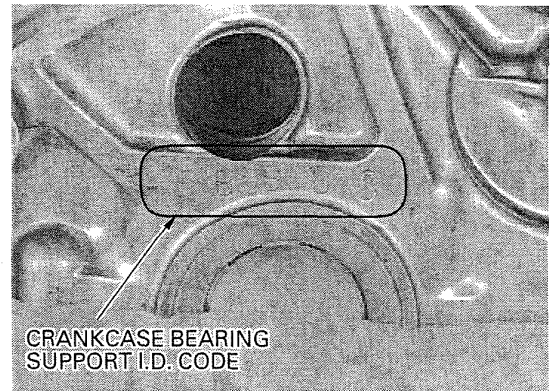


### BEARING SELECTION

Record the crankcase bearing support I.D. code letters.

**NOTE:**

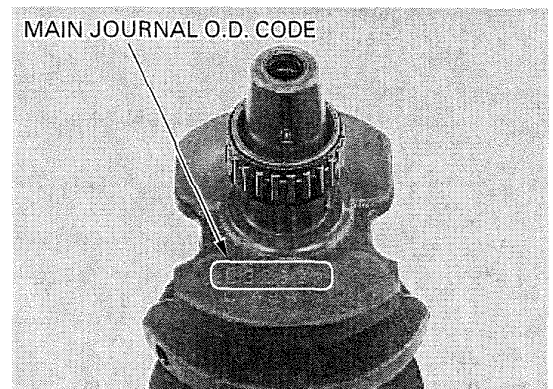
Letters (A, B or C) on the left side of upper crankcase are the codes for the bearing support I.D. s from left to right.



Record the corresponding main journal O.D. code numbers.

**NOTE:**

Numbers (1, 2 or 3) on the crank weight are the codes for the main journal O.D. s from left to right.



## CRANKSHAFT/PISTON/CYLINDER

Cross reference the main journal and bearing support codes to determine the replacement bearing color code.

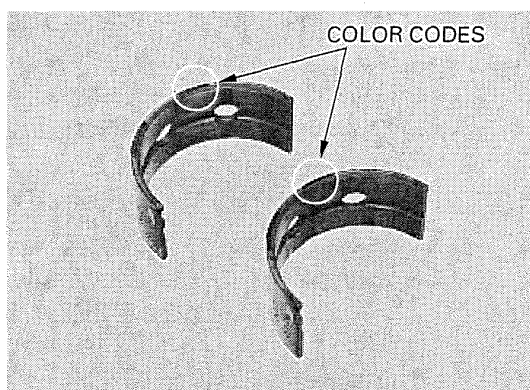
		Unit: mm (in)		
Bearing support I.D. code	Main journal O.D. code	A	B	C
		33.000–33.006 (1.2992–1.2994)	33.006–33.012 (1.2994–1.2997)	33.012–33.018 (1.2997–1.2999)
1	30.000–30.006 (1.1811–1.1813)	E (Pink)	D (Yellow)	C (Green)
2	29.994–30.000 (1.1809–1.1811)	D (Yellow)	C (Green)	B (Brown)
3	29.988–29.994 (1.1806–1.1809)	C (Green)	B (Brown)	A (Black)

### MAIN JOURNAL BEARING INSERT THICKNESS:

A: Black: 1.506–1.509 mm (0.0593–0.0594 in)  
B: Brown: 1.503–1.506 mm (0.0592–0.0593 in)  
C: Green: 1.500–1.503 mm (0.0591–0.0592 in)  
D: Yellow: 1.497–1.500 mm (0.0589–0.0591 in)  
E: Pink: 1.494–1.497 mm (0.0588–0.0589 in)

### CAUTION:

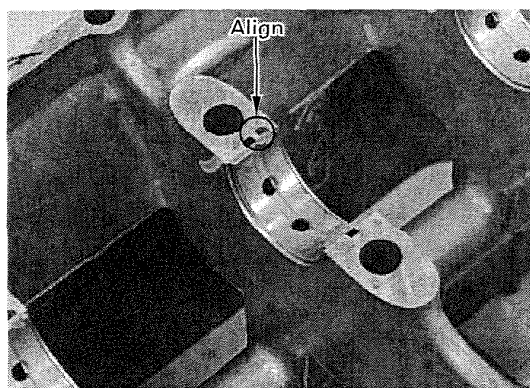
*After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.*



## BEARING INSTALLATION

Clean the bearing outer surfaces and crankcase bearing supports.

Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each groove.



## CRANKPIN BEARING

Remove the crankshaft (page 12-3).

### BEARING INSPECTION

Check the bearing inserts for unusual wear or damage.

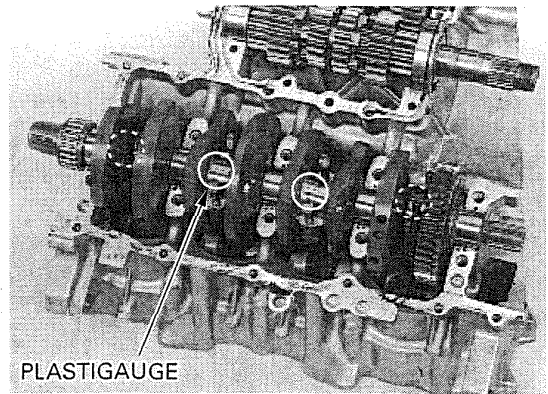
Check the bearing tabs for damage.



### OIL CLEARANCE INSPECTION

*Do not rotate the crankshaft during inspection.*

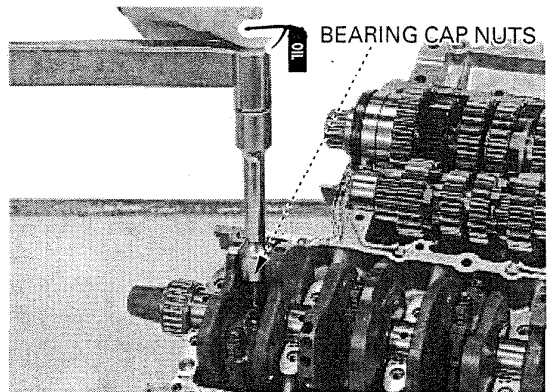
Clean off any oil from the bearing inserts and crankpin.  
Carefully install the crankshaft onto the upper crankcase.  
Set the connecting rods onto the crankpin.  
Put a strip of plastigauge lengthwise on the crankpin avoiding the oil hole.



Carefully install the bearing caps by aligning the I.D. code.

Apply engine oil to the connecting rod bearing cap nut threads and seating surfaces and install them.  
Tighten the cap nuts in 2 or 3 steps.

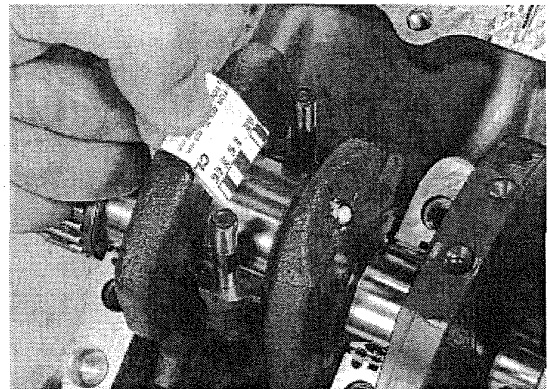
**TORQUE** : 25 N·m (2.6 kgf·m , 19 lbf·ft)



Remove the bearing caps and measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

**SERVICE LIMIT:** 0.06 mm (0.002 in)

If the oil clearance exceeds the service limit, select the correct replacement bearings.

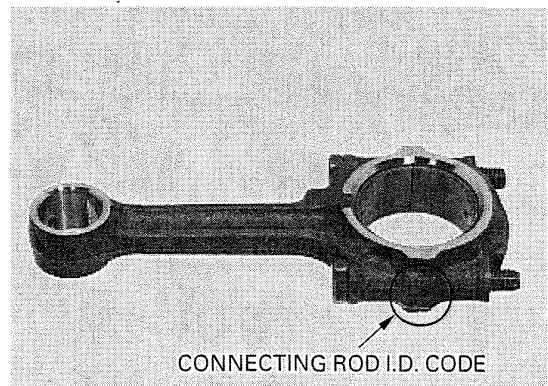


### BEARING SELECTION

Record the connecting rod I.D. code numbers.

**NOTE:**

Numbers (1 or 2) on the connecting rods are the codes for the connecting rod I.D.



## CRANKSHAFT/PISTON/CYLINDER

Record the crankpin O.D. code letters.

### NOTE:

Letters (A or B) on the crank weight are the codes for the crankpin O.D. s from left to right.

Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

		Unit: mm (in)	
Connecting rod		1	2
I.D. code		34.000—34.008 (1.3386—1.3389)	34.008—34.016 (1.3389—1.3392)
Crankpin			
O.D. code			
A	31.492—31.500 (1.2398—1.2402)	Yellow	Green
B	31.484—31.492 (1.2395—1.2398)	Green	Brown

### CRANKPIN BEARING INSERT THICKNESS:

Brown: 1.244—1.248 mm (0.0490—0.0491 in)

Green: 1.240—1.244 mm (0.0488—0.0490 in)

Yellow: 1.236—1.240 mm (0.0487—0.0488 in)

### CAUTION:

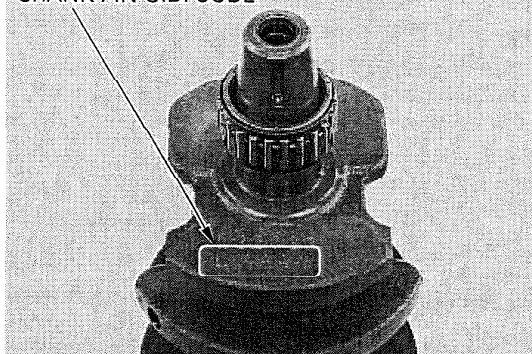
*After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.*

## BEARING INSTALLATION

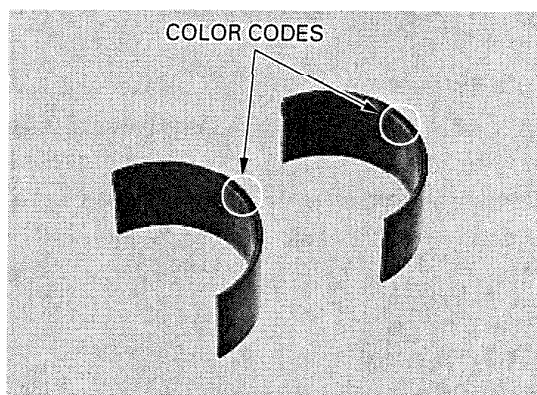
Clean the bearing outer surfaces, bearing cap and connecting rod.

Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.

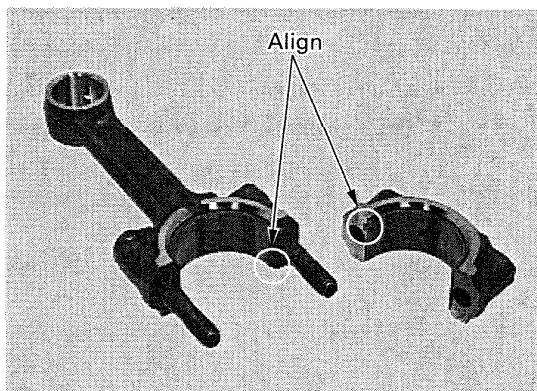
CRANK PIN O.D. CODE



COLOR CODES



Align



## PISTON/CYLINDER

### CAUTION:

*Be careful not damage main journal and crankpin bearing inserts.*

### NOTE:

Mark all the parts as you remove them to indicate the correct cylinder for reassembly.

## PISTON REMOVAL

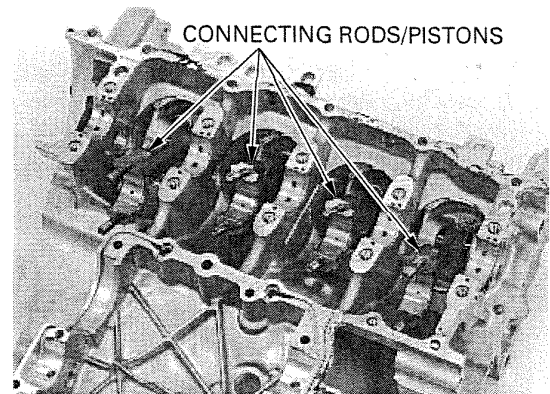
Remove the crankshaft (page 12-3).

## CRANKSHAFT/PISTON/CYLINDER

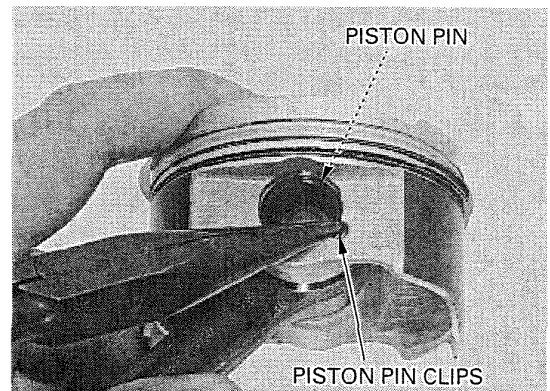
Push the connecting rods/pistons out through the top of the cylinder.

### CAUTION:

*Do not try to remove the connecting rod/piston assembly from the bottom of the cylinder; the assembly will be locked so that the oil ring expands in the gap between the cylinder liner and the upper crankcase.*



Remove the piston pin clips with the pliers. Push the piston pin out of the piston and connecting rod, and remove the piston.

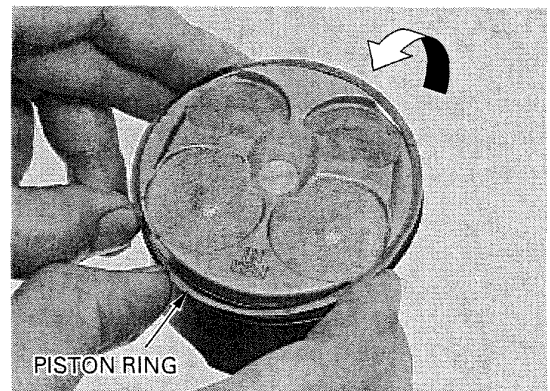


## PISTON RING REMOVAL

### CAUTION:

*Do not damage the piston ring by spreading the ends too far.*

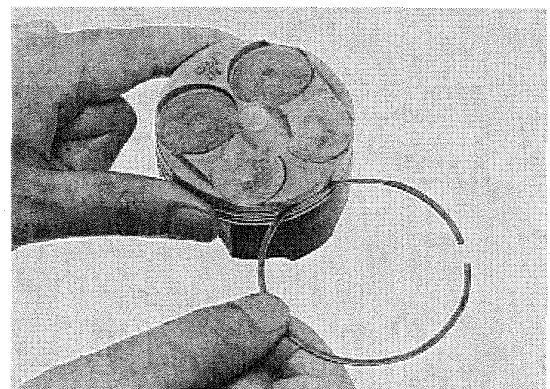
Spread each piston ring and remove it by lifting up at a point opposite the gap.



Clean carbon deposits from the piston.

### CAUTION:

*Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.*





## CRANKSHAFT/PISTON/CYLINDER

### PISTON INSPECTION

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

**SERVICE LIMITS: Top/Second:** 0.08 mm (0.003 in)

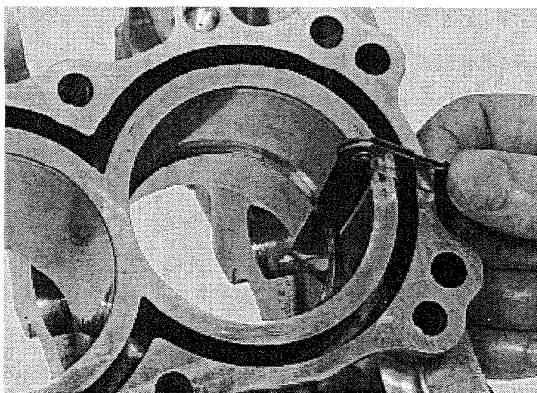


Insert each piston ring into the bottom of the cylinder squarely using the piston. Measure the ring end gap.

**SERVICE LIMITS: Top:** 0.4 mm (0.02 in)

**Second:** 0.5 mm (0.02 in)

**Oil (side rail):** 1.0 mm (0.04 in)



Measure the piston pin O.D. at piston and connecting rod sliding areas.

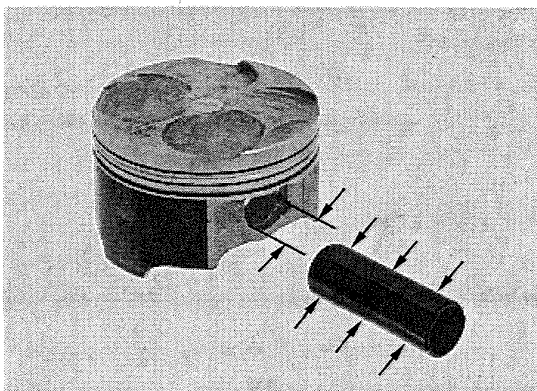
**SERVICE LIMIT:** 16.98 mm (0.669 in)

Measure the piston pin hole I.D.

**SERVICE LIMIT:** 17.02 mm (0.670 in)

Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT:** 0.04 mm (0.002 in)

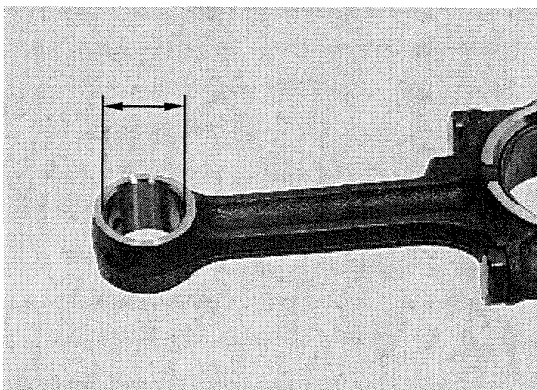


Measure the connecting rod small end I.D.

**SERVICE LIMIT:** 17.04 mm (0.671 in)

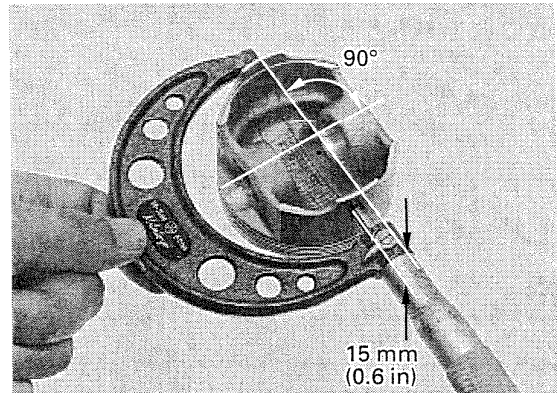
Calculate the connecting rod-to-piston pin clearance.

**SERVICE LIMIT:** 0.06 mm (0.002 in)



Measure the piston O.D. at a point 15 mm (0.6 in) from the bottom and 90° to the piston pin hole.

**SERVICE LIMIT:** 66.90 mm (2.634 in)



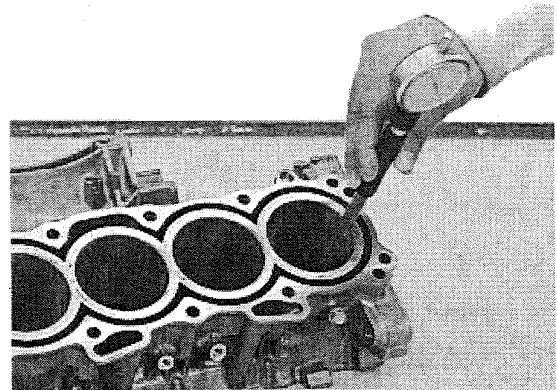
### CYLINDER INSPECTION

Inspect the cylinder wall for scratch or wear. Measure the cylinder I.D. at three levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT:** 67.10 mm (2.642 in)

Calculate the cylinder-to-piston clearance.

**SERVICE LIMIT:** 0.10 mm (0.004 in)

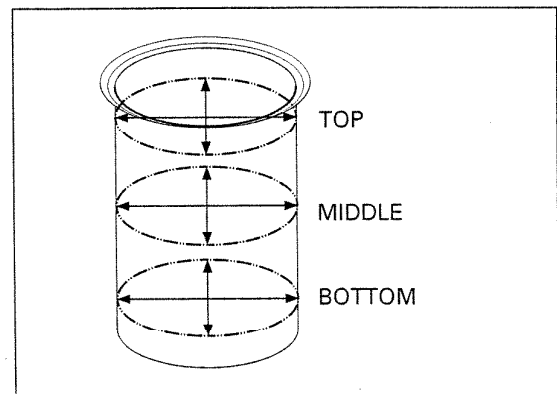


Calculate the cylinder taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.

**SERVICE LIMITS:** Taper: 0.10 mm (0.004 in)  
Out-of-round: 0.10 mm (0.004 in)

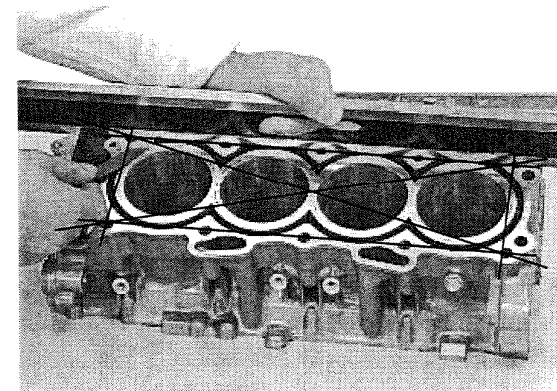
The cylinder must be rebored and an oversize piston (0.25 mm) fitted if the service limits are exceeded.

The cylinder must be rebored so that the clearance for an oversize piston is 0.015–0.050 mm (0.0006–0.0020 in).



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

**SERVICE LIMIT:** 0.10 mm (0.004 in)



## CRANKSHAFT/PISTON/CYLINDER

### PISTON RING INSTALLATION

#### CAUTION:

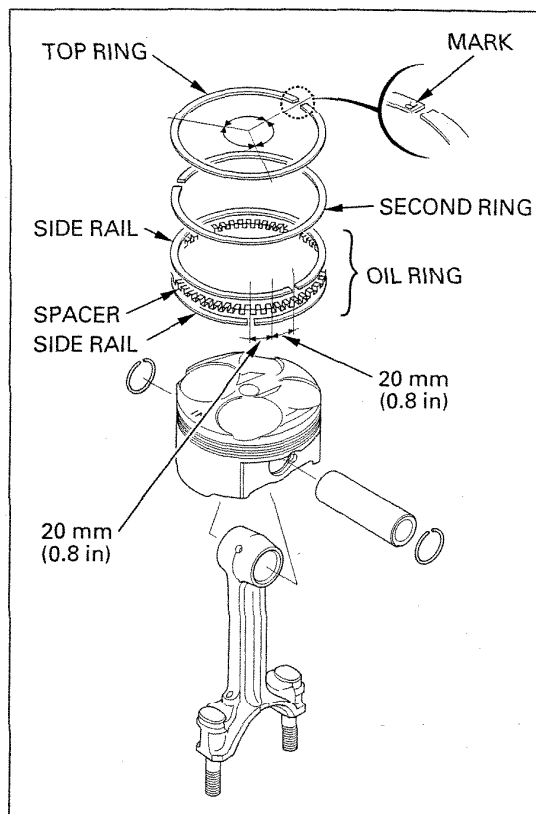
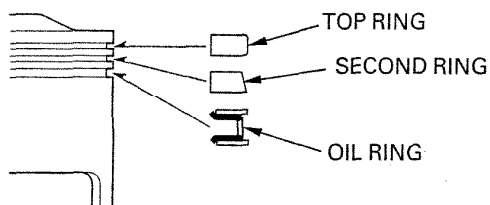
*Be careful not to damage the piston and rings during installation.*

Carefully install the piston rings into the piston ring grooves with the markings facing up.

#### NOTE:

- Do not confuse the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.

Stagger the piston ring end gaps 120° apart from each other.  
Stagger the side rail end gaps as shown.



### PISTON INSTALLATION

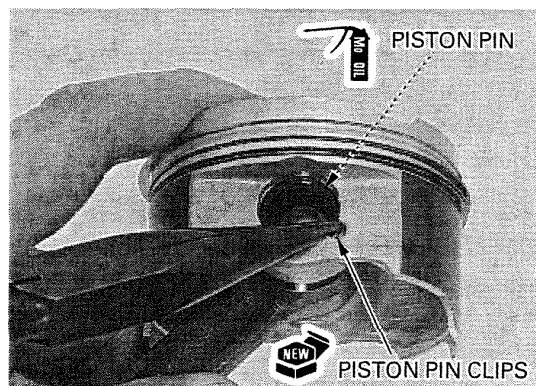
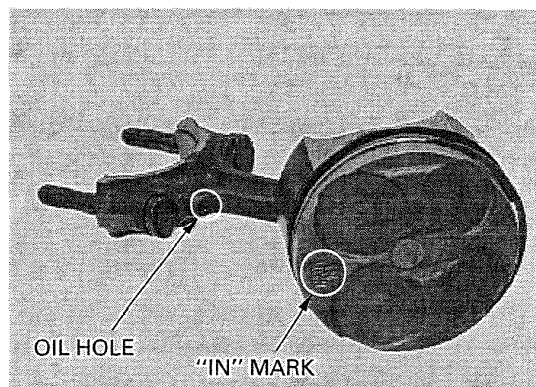
Apply molybdenum oil solution to the connecting rod small end inner surfaces and piston pin outer surfaces.

*Install the piston so that the "IN" mark facing the same direction as the oil hole in the connecting rod.*

Install the piston pin into the piston and connecting rod.  
Install new piston pin clips into the grooves of the piston pin hole.

#### NOTE:

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





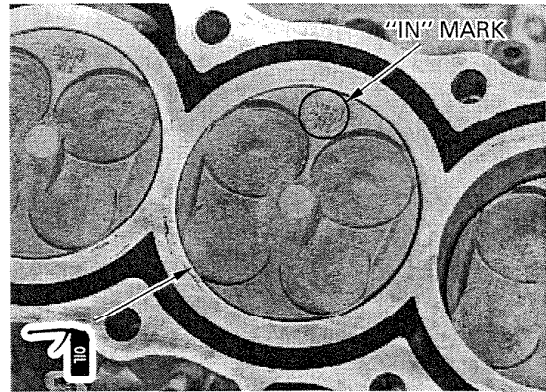
Apply engine oil to the cylinder wall, piston and piston rings.

**CAUTION:**

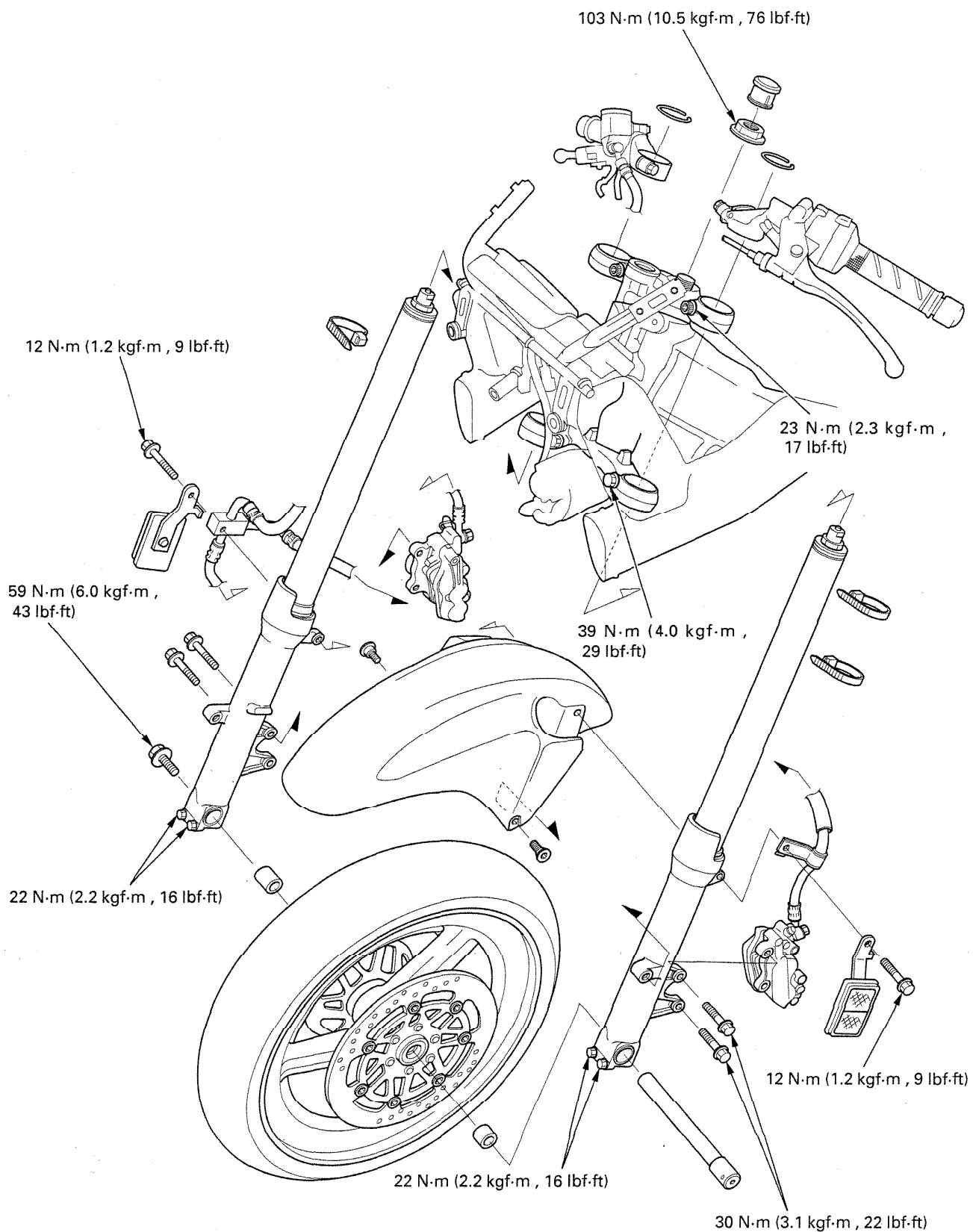
*Be careful not to damage the piston rings and the cylinder wall by the connecting rod.*

Install the connecting rod/piston from the top of the cylinder with the "IN" mark toward the intake side, using a commercially available piston ring compressor tool.

Install the crankshaft (page 12-5).



## FRONT WHEEL/SUSPENSION/STEERING



# 13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-6
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## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- Riding on damaged rims impairs safe operation of the vehicle.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

- A hoist or equivalent is required to support the motorcycle when servicing the front wheel, fork and steering stem.
- Refer to section 15 for brake system service.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	336 mm (13.2 in)	329.3 (12.96)
	Tube runout	—	0.20 (0.008)
	Recommended fluid	Pro-Honda Suspension Fluid SS-8	—
	Fluid level	118 mm (4.6 in)	—
	Fluid capacity	475 ± 2.5 cm <sup>3</sup> (16.1 ± 0.08 US oz, 16.7 ± 0.09 oz)	—
Steering head bearing preload		1.0–1.5 kgf (2.2–3.3 lbf)	—

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### TORQUE VALUES

Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC screw: replace with a new one
Front brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt: replace with a new one
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front fender bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Fork socket bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Fork cap	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork bottom bridge pinch bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Steering bearing adjustment nut	25 N·m (2.5 kgf·m, 18 lbf·ft)	Apply oil to the threads and seating surface
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Front brake hose clamp bolt (steering stem)	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front master cylinder mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt: replace with a new one

## FRONT WHEEL/SUSPENSION/STEERING

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### TOOLS

Bearing remover shaft	07746-0050100	└─ or equivalent commercially available in U.S.A.
Bearing remover head, 20 mm	07746-0050600	
Driver	07749-0010000	
Attachment, 42 × 47 mm	07746-0010300	
Pilot, 20 mm	07746-0040500	
Fork seal driver weight	07947-KA50100	
Fork seal driver attachment, 43 mm I. D.	07947-KA40200	
Steering stem socket	07916-3710101 or 07916-3710100	
Ball race remover set	07946-KM90001	└─ not available in U.S.A.
– Driver attachment A	07946-KM90100	
– Driver attachment B	07946-KM90200	
– Driver shaft assembly	07946-KM90300	
– Bearing remover A	07946-KM90401	
– Bearing remover B	07946-KM90500	
– Assembly base	07946-KM90600	
Main bearing driver attachment	07946-ME90200	└─ U.S.A. only
Fork seal driver weight	07947-KA50100	
Oil seal driver	07965-MA60000	
Installer shaft	07VMF-KZ30200	
Installer attachment A	07VMF-MAT0100	
Installer attachment B	07VMF-MAT0200	
Remover attachment A	07VMF-MAT0300	
Remover attachment B	07VMF-MAT0400	
Steering stem driver	07946-MB00000	

## TROUBLESHOOTING

### Hard steering

- Steering bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

### Steers one side or does not track straight

- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Wheel installed incorrectly
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

### Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty front tire
- Unbalanced front tire and wheel

### Front wheel turns hard

- Faulty front wheel bearings
- Bent front axle
- Front brake drag

### Soft suspension

- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

### Hard suspension

- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

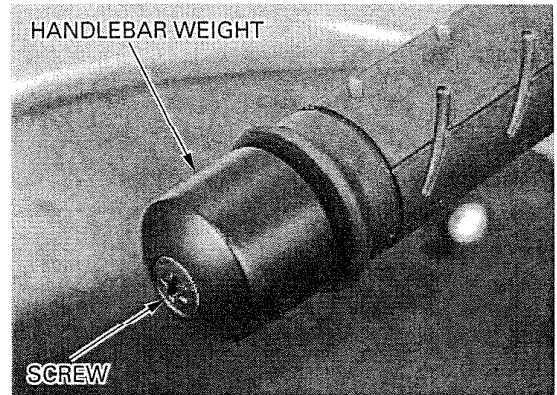
### Front suspension noise

- Insufficient fluid in fork
- Loose fork fasteners

## HANDLEBAR

### RIGHT HANDLEBAR REMOVAL

Hold the handlebar weight and remove the mounting screw and the weight.



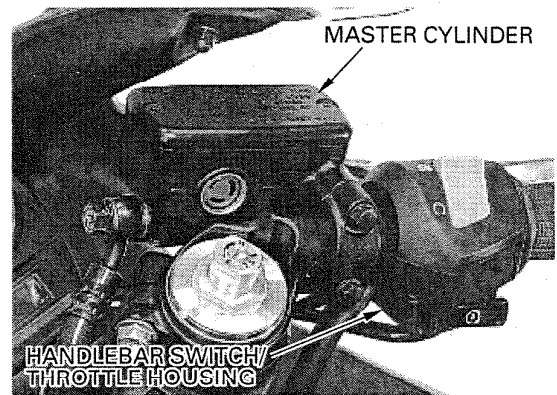
Disconnect the front brake light switch connectors.

**NOTE:**

Keep the brake master cylinder upright to prevent air from entering the hydraulic system.

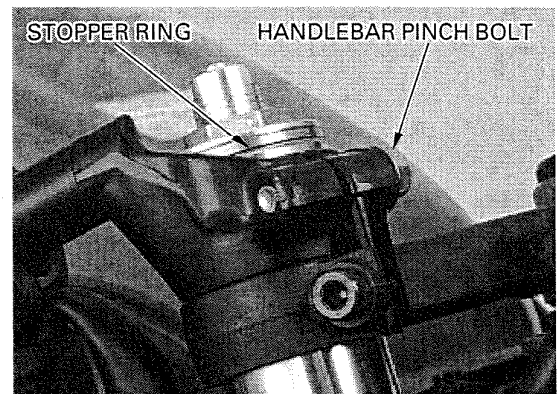
Remove the two bolts, holder and master cylinder from the handlebar.

Remove the two screws and handlebar switch/throttle housing.



Loosen the pinch bolt.

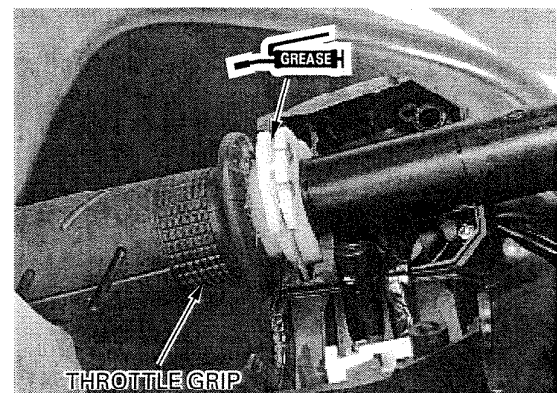
Remove the stopper ring and the handlebar from the fork.



Remove the throttle grip pipe from the handlebar.

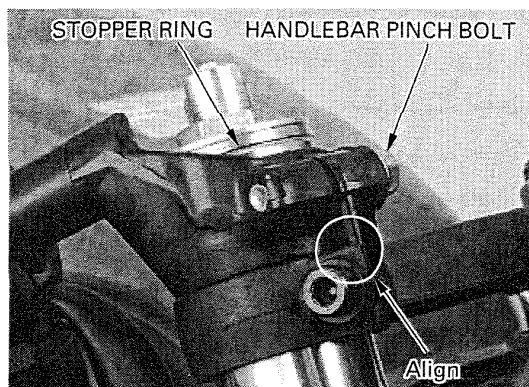
### RIGHT HANDLEBAR INSTALLATION

Apply grease to the throttle grip pipe flange and install the throttle grip pipe onto the right handlebar.

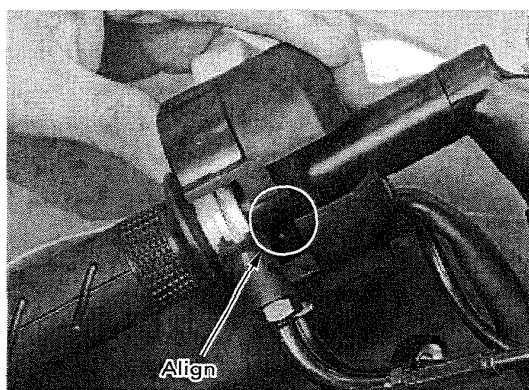


## FRONT WHEEL/SUSPENSION/STEERING

Install the handlebar onto the fork, aligning its boss with the groove in the fork top bridge. Install the stopper ring and tighten the handlebar pinch bolt.



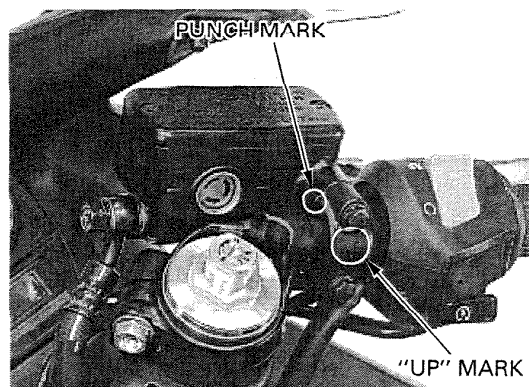
Install the right handlebar switch/throttle housing onto the handlebar, aligning its locating pin with the hole in the handlebar. Tighten the forward screw first, then the rear screw.



Install the front brake master cylinder and holder with the "UP" mark facing up. Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then the lower bolt.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

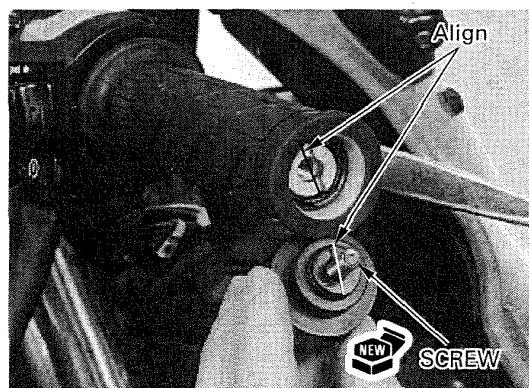
Connect the front brake light switch connectors.



Install the handlebar weight onto the inner weight, aligning the bosses and grooves each other. Install a new weight mounting screw and tighten it while holding the weight.

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

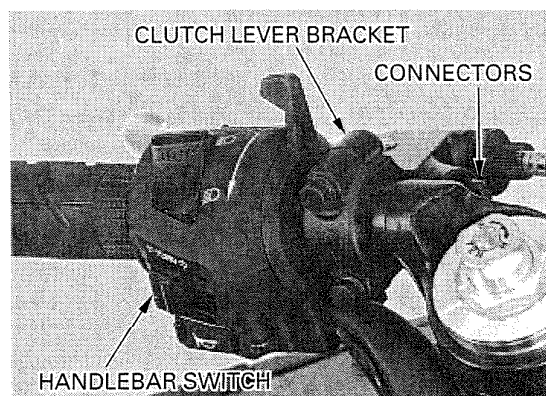
Check the throttle grip operation and free play (page 3-4).



### LEFT HANDLEBAR REMOVAL

Disconnect the clutch switch connectors.  
Remove the two bolts, holder and clutch lever bracket from the handlebar.

Remove the two screws and left handlebar switch housing. Disconnect the choke cable from the choke lever.



Hold the handlebar weight and remove the mounting screw and weight.

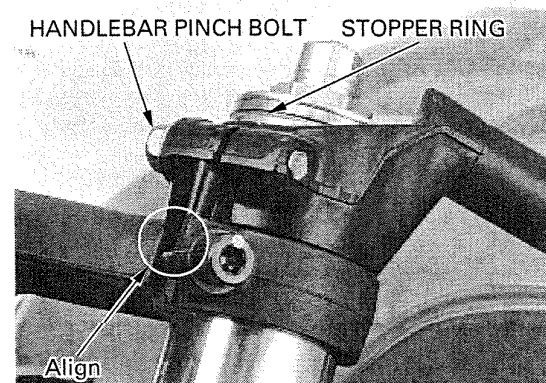
Remove the left handlebar grip and choke lever from the handlebar.



Loosen the pinch bolt.  
Remove the stopper ring and the handlebar from the fork.

### LEFT HANDLEBAR INSTALLATION

Install the handlebar onto the fork, aligning its boss with the groove in the fork top bridge.  
Install the stopper ring and tighten the handlebar pinch bolt.



Clean the inside surface of the left handlebar grip and the outside surface of the left handlebar.  
Apply Honda Bond A or equivalent to the inside surface of the left handlebar grip and to the outside surface of the left handlebar. Wait 3–5 minutes and install the choke lever and the grip.

Rotate the grip for even application of the adhesive.

#### NOTE:

Allow the adhesive to dry for an hour before using.

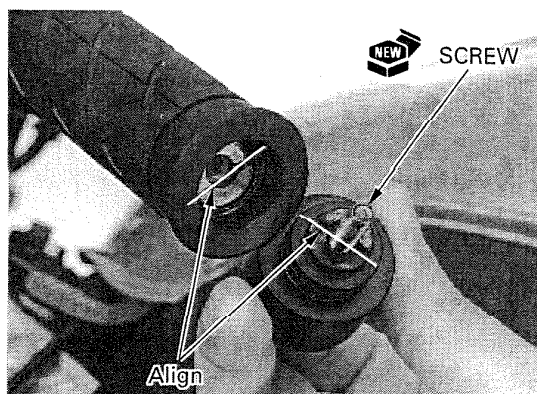




## FRONT WHEEL/SUSPENSION/STEERING

Install the handlebar weight onto the inner weight, aligning the bosses and grooves each other. Install a new weight mounting screw and tighten it while holding the weight.

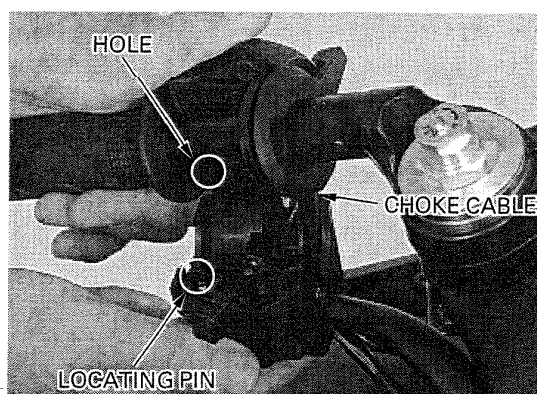
**TORQUE** : 10 N·m (1.0 kgf·m , 7 lbf·ft)



Connect the choke cable to the choke lever.

Install the left handlebar switch housing onto the handlebar, aligning its locating pin with the hole in the handlebar.

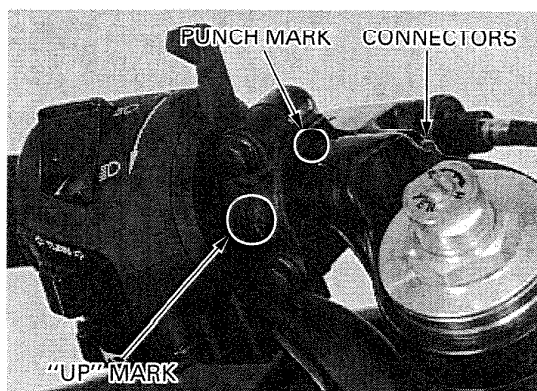
Tighten the forward screw first, then the rear screw.



Install the clutch lever bracket and bracket holder with the "UP" mark facing up.

Align the end of the clutch lever bracket with the punch mark on the handlebar, and tighten the upper bolt first, then the lower bolt.

Connect the clutch switch connectors.



## FRONT WHEEL

### REMOVAL

Support the motorcycle securely using a hoist or equivalent and raise the front wheel off the ground.

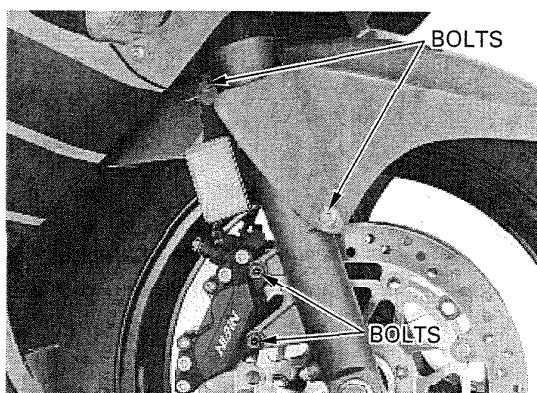
Remove the four bolts and the front fender. Remove the mounting bolts and front brake calipers.

#### CAUTION:

**Support the brake caliper so that it does not hang from the brake hose. Do not twist the brake hose.**

#### NOTE:

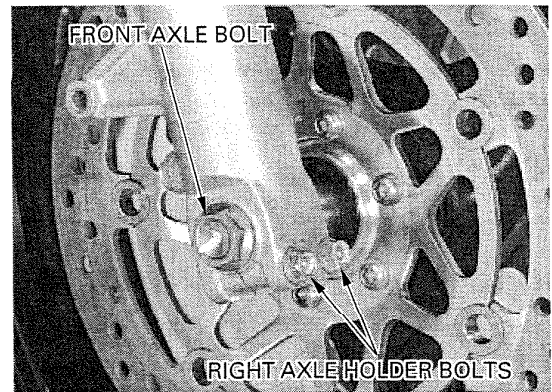
Do not operate the brake lever after removing the brake calipers.



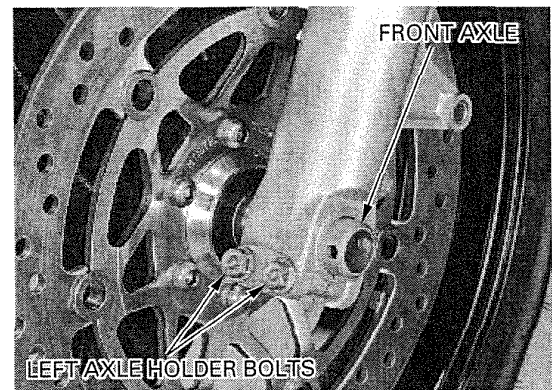


## FRONT WHEEL/SUSPENSION/STEERING

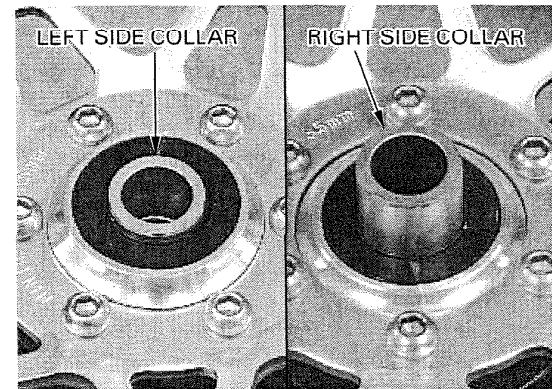
Loosen the right front axle holder bolts.  
Remove the front axle bolt.



Loosen the left front axle holder bolts.  
Remove the front axle and the front wheel.



Remove the side collars.

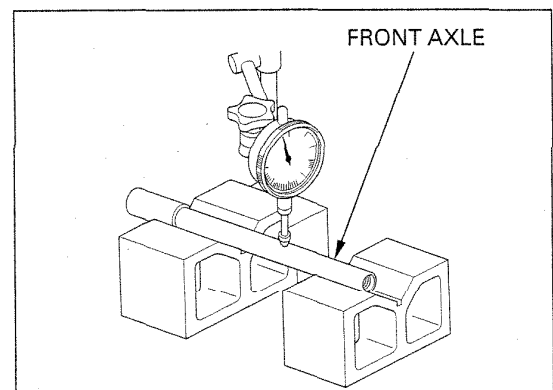


### INSPECTION

#### AXLE

Set the front axle in V-blocks.  
Turn the front axle and measure the runout using a dial indicator.  
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.2 mm (0.01 in)

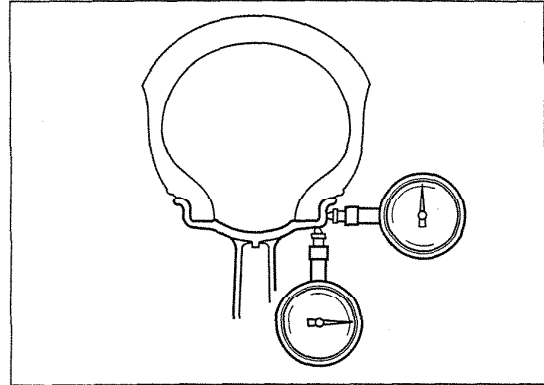


## FRONT WHEEL/SUSPENSION/STEERING

### WHEEL RIM

Check the rim runout by placing the wheel in a truing stand.  
Spin the wheel slowly and read the runout using a dial indicator.  
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS:** Radial: 2.0 mm (0.08 in)  
Axial: 2.0 mm (0.08 in)

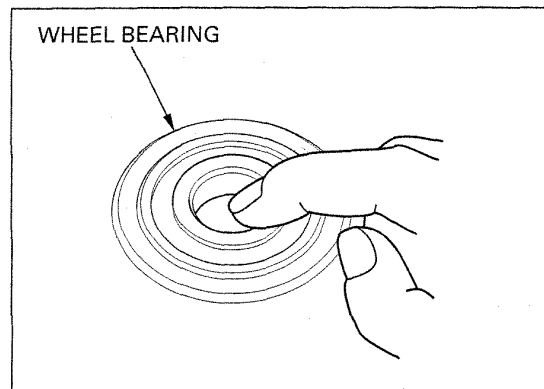


### WHEEL BEARING

Turn the inner race of each bearing with your finger.  
The bearings should turn smoothly and quietly.  
Also check that the bearing outer race fits tightly in the hub.

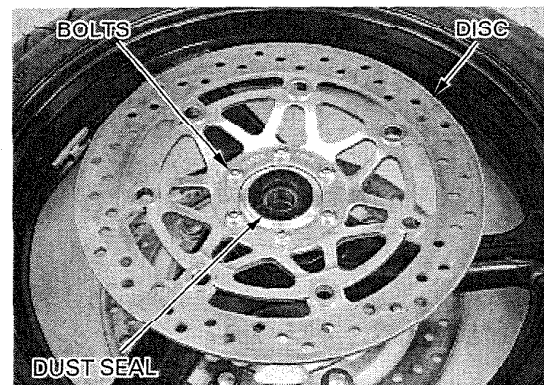
*Replace the wheel bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly and quietly, if they fit loosely in the hub.



### DISASSEMBLY

Remove the dust seals from the wheel hub.  
Remove the disc bolts and brake discs from the wheel hub.



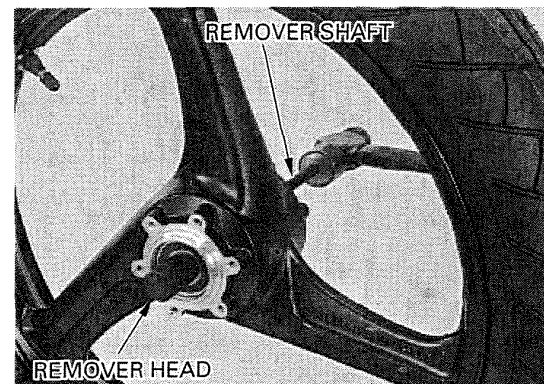
*Replace the wheel bearings in pairs.  
Do not reuse old bearings.*

Install the bearing remover head into the bearing.  
From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.

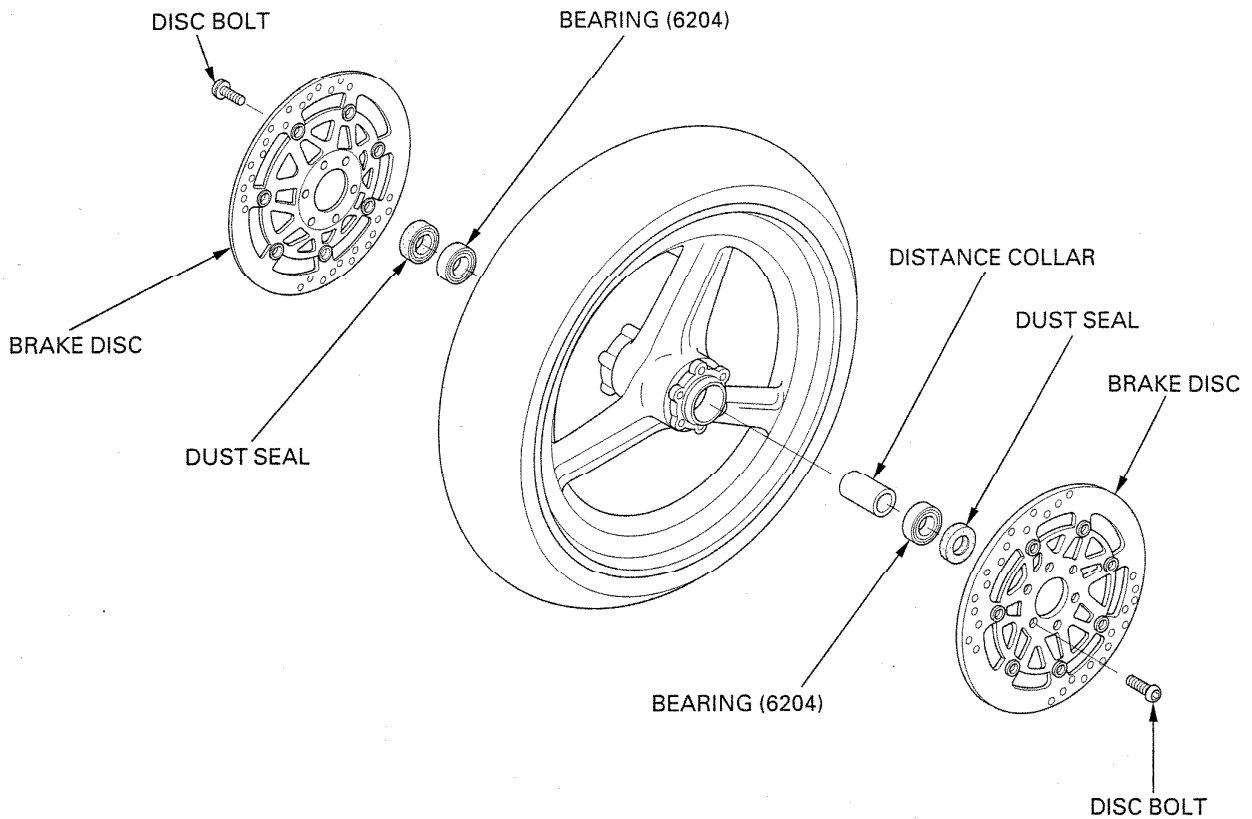
Remove the distance collar and drive out the other bearing.

#### TOOLS:

**Bearing remover shaft** 07746-0050100 or equivalent commercially available in U.S.A.  
**Bearing remover head, 20 mm** 07746-0050600 or equivalent commercially available in U.S.A.



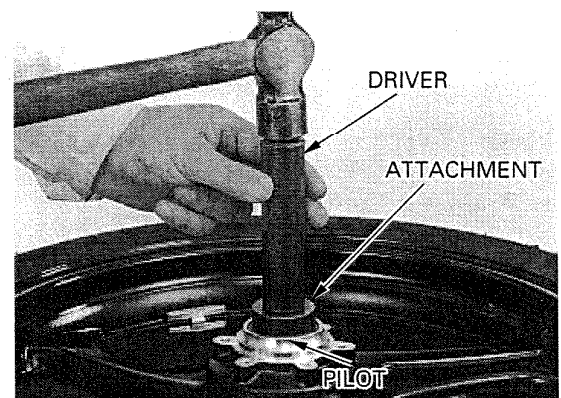
## ASSEMBLY



Drive in a new right bearing squarely with the marking side facing up until it is fully seated.  
Install the distance collar.  
Drive in a new left bearing squarely with the marking side facing up until it is fully seated.

### TOOLS:

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



### ⚠ WARNING

*Do not get grease on the brake disc or stopping power will be reduced.*

Install the brake discs with the arrow mark facing in the normal rotating direction.  
Install new disc bolts and tighten them in a criss-cross pattern in 2 or 3 steps.

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



## FRONT WHEEL/SUSPENSION/STEERING

Apply grease to new dust seal lips.  
Install the dust seals into the wheel hub.



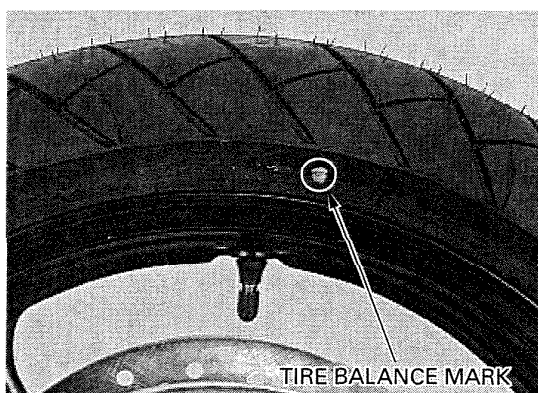
### WHEEL BALANCE

#### ▲WARNING

*Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.*

#### NOTE:

- Mount the tire with the arrow mark facing in the normal rotating direction.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

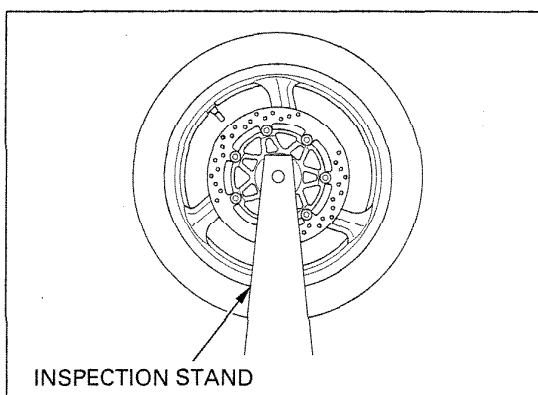


Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area.

If wheel is balanced, it will not stop consistently in the same position.



To balance the wheel, install balance weights on the lightest side of rim, the side opposite the chalk marks.

Add just enough weight so the wheel will no longer stop in the same position when it is spun.

Do not add more than 60 g (2.1 oz) to the wheel.

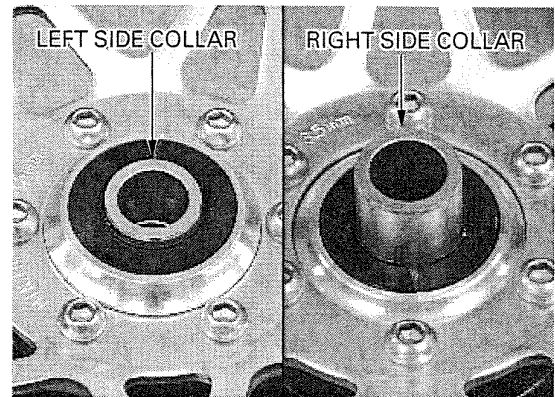


### INSTALLATION

Install the side collars.

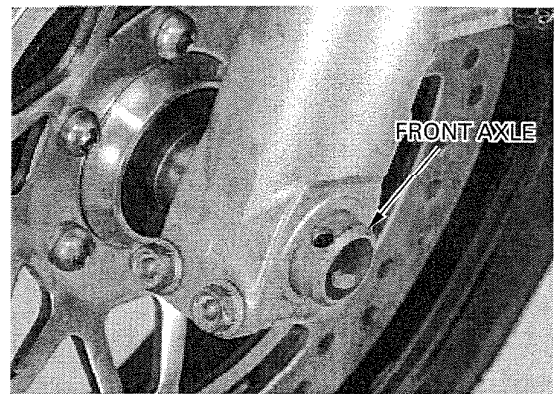
#### NOTE:

The right side collar is longer than the left side collar.



Install the front wheel between the fork legs.

Apply thin coat of grease to the front axle.  
Install the front axle from the left side.

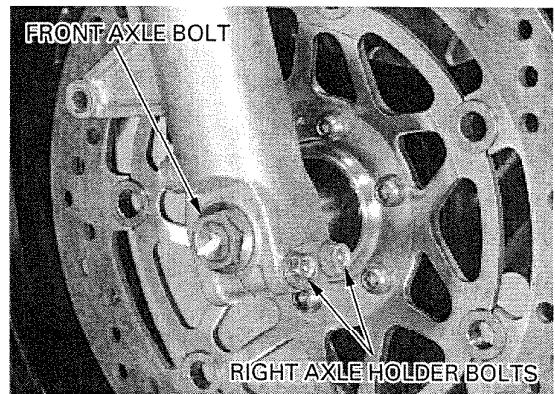


Install the front axle bolt and tighten it while holding the axle.

**TORQUE** : 59 N·m (6.0 kgf·m , 43 lbf·ft)

Tighten the right axle holder bolts.

**TORQUE** : 22 N·m (2.2 kgf·m , 16 lbf·ft)



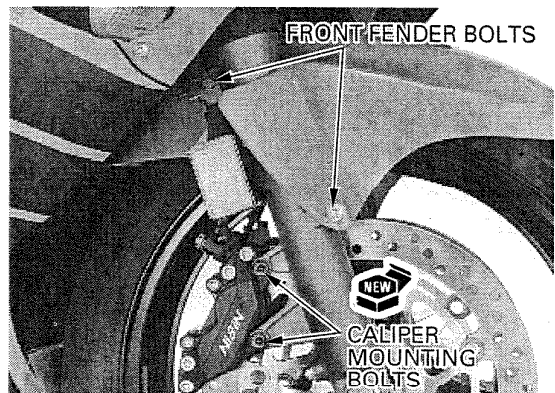
Install the brake calipers with new mounting bolts and tighten the bolts.

**TORQUE** : 30 N·m (3.1 kgf·m , 22 lbf·ft)

Install the front fender.

Install the four fender bolts with the brake hose clamp, 3-way joint and reflectors and tighten them.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)



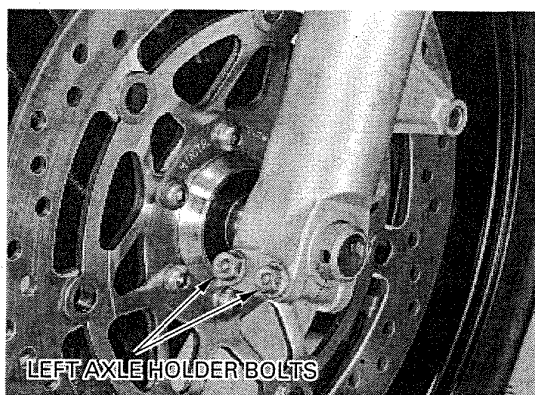
## FRONT WHEEL/SUSPENSION/STEERING

With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.



Tighten the left axle holder bolts.

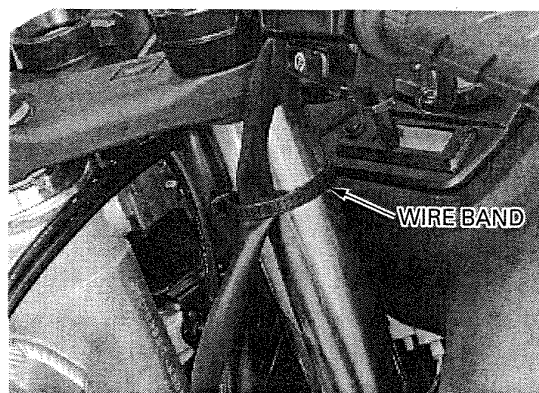
**TORQUE** : 22 N·m (2.2 kgf·m , 16 lbf·ft)



## FORK

### REMOVAL

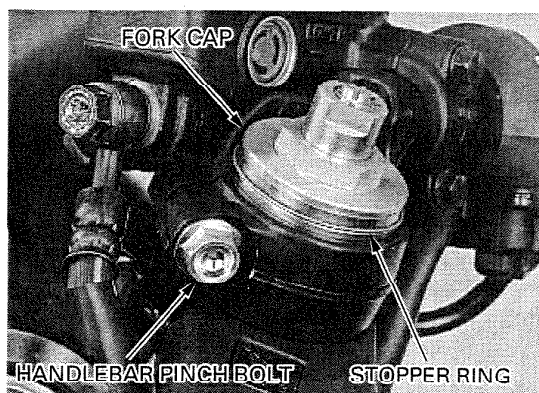
Remove the front wheel (page 13-6).  
Remove the wire band(s).



Loosen the handlebar pinch bolt and remove the stopper ring from the fork.

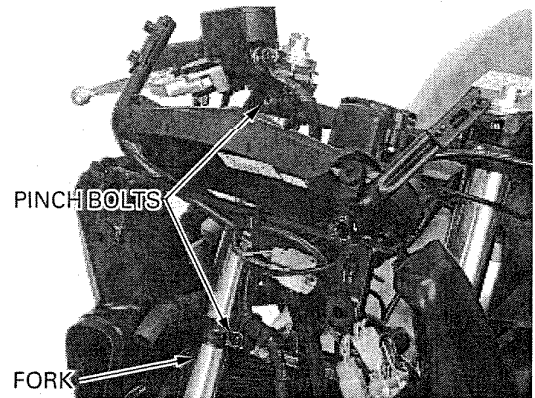
When the fork is ready to be disassembled, loosen the fork cap, but do not remove it yet.

Remove the handlebar assembly and secure it.



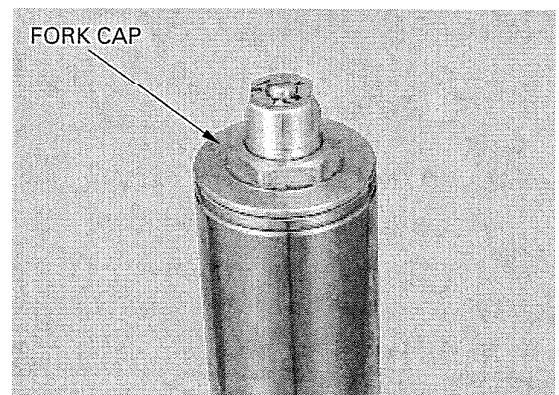


Loosen the fork top and bottom pinch bolts and remove the fork tube from the fork bridges.



### DISASSEMBLY

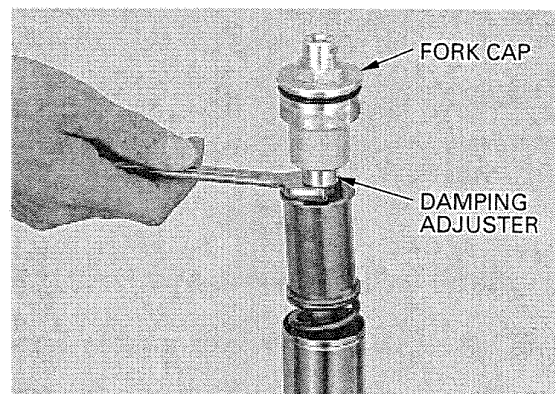
Remove the fork cap from the fork tube.



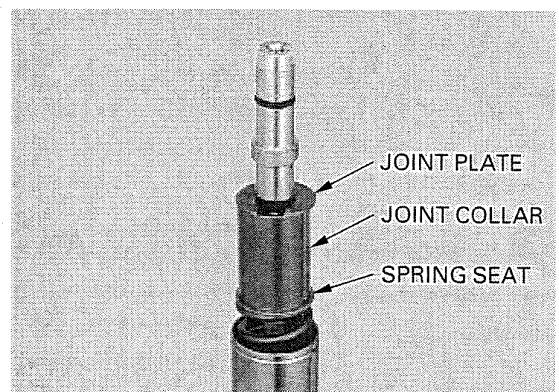
Hold the rebound damping adjuster and remove the fork cap from the damping adjuster. Remove the O-ring.

#### CAUTION:

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



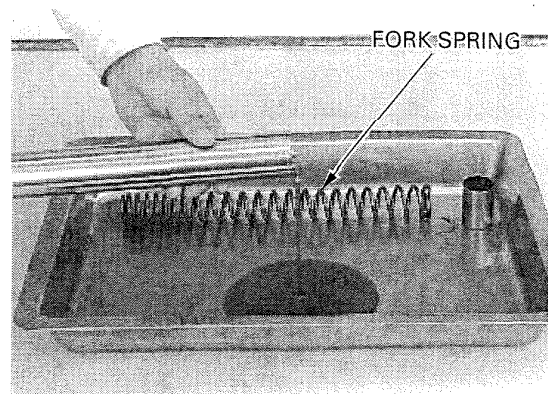
Remove the joint plate, joint collar and spring seat. Remove the O-ring.



## FRONT WHEEL/SUSPENSION/STEERING

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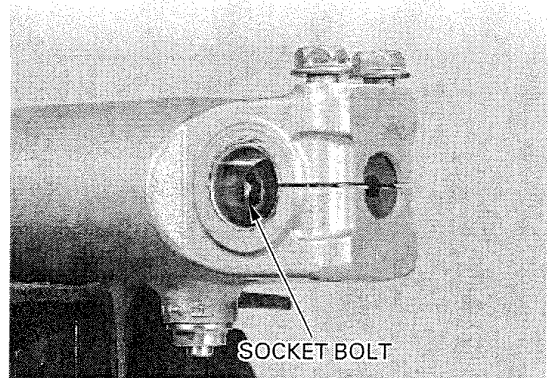
Remove the fork spring.  
Pour out the fork fluid by pumping the fork tube  
and the damper rod several times.



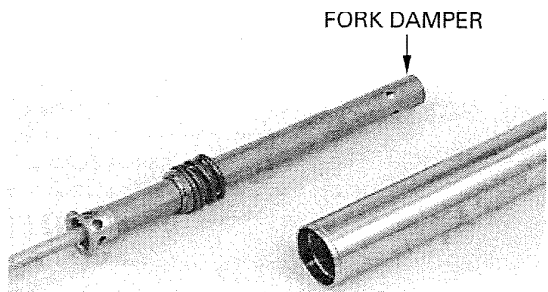
Hold the fork slider in a vise with a soft jaws or  
shop towel and remove the socket bolt.

### NOTE:

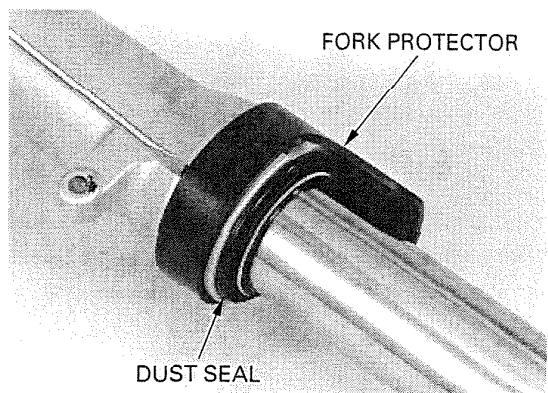
If the fork damper turns together with the socket  
bolt, temporarily install the fork spring, spring seat,  
joint collar and fork cap.



Remove the fork damper from the fork tube.



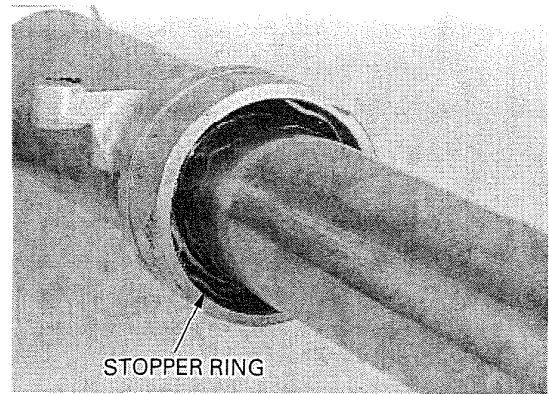
Remove the dust seal and the fork protector.



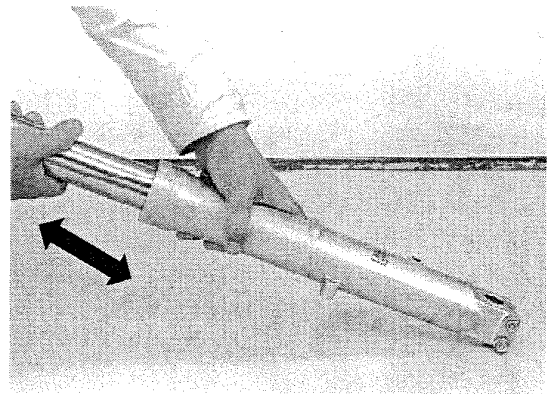


## FRONT WHEEL/SUSPENSION/STEERING

Remove the stopper ring being careful not to scratch the fork tube sliding surface.



Using quick successive motions, pull the fork tube out of the fork slider.



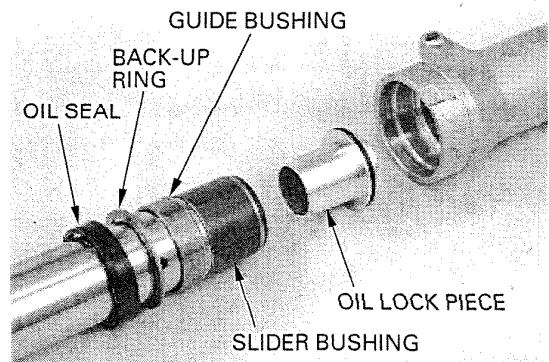
Remove the oil seal, back-up ring and guide bushing from the fork tube.

### NOTE:

Do not remove slider bushing unless it is necessary to replace it with a new one.

Carefully remove the slider bushing by prying the slit with a screwdriver until the bushing can be pulled off by hand.

Remove the oil lock piece from the fork slider.  
Remove the O-ring.

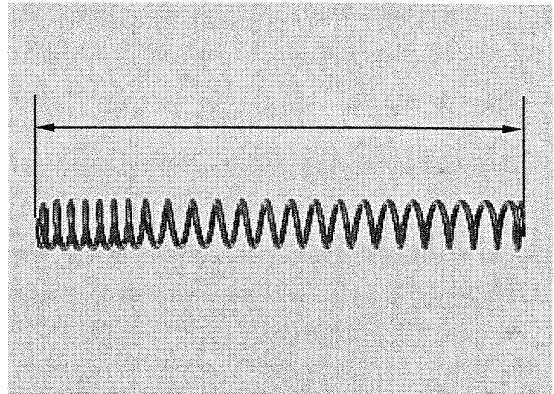


## FRONT WHEEL/SUSPENSION/STEERING

### INSPECTION

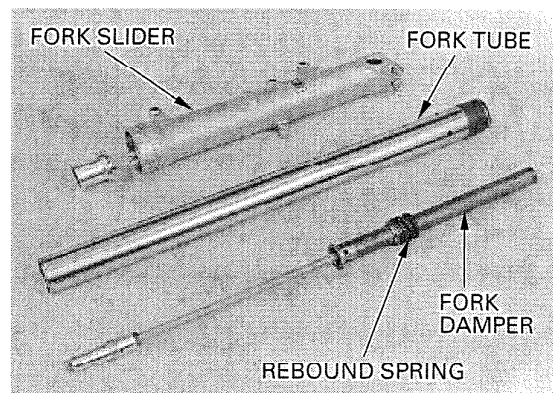
Measure the fork spring free length.

**SERVICE LIMIT:** 329.3 mm (12.96 in)



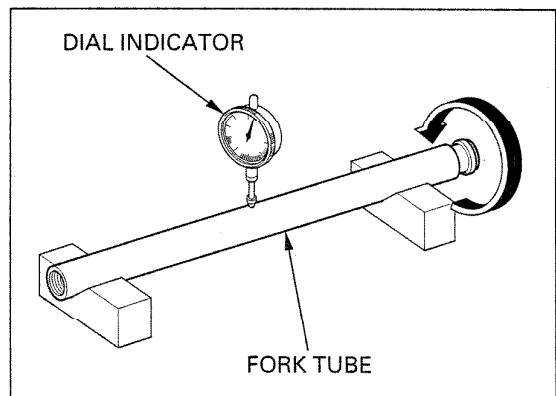
Check the fork tube, slider and damper piston for score marks, and excessive or abnormal wear. Check the rebound spring for fatigue or damage.

Replace the component if necessary.



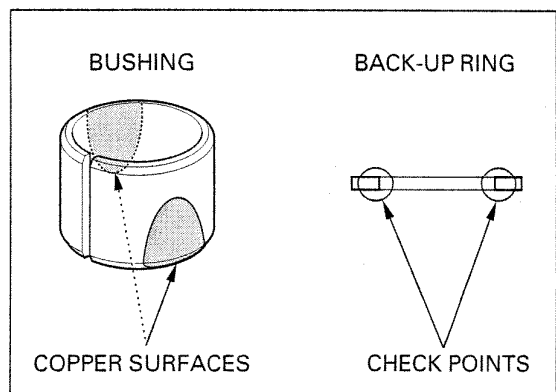
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.20 mm (0.008 in)



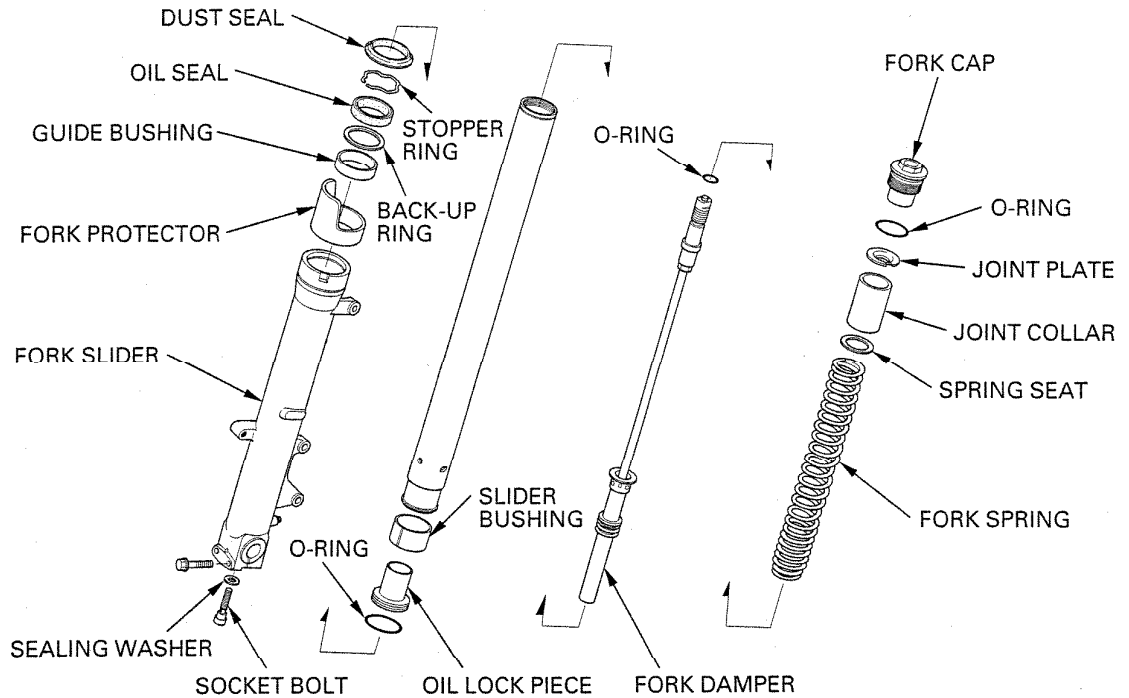
Visually inspect the slider and guide bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



## ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Install a new slider bushing if it has been removed.

### CAUTION:

- *Be careful not to damage the coating of the bushing.*
- *Do not open the bushing more than necessary.*

### NOTE:

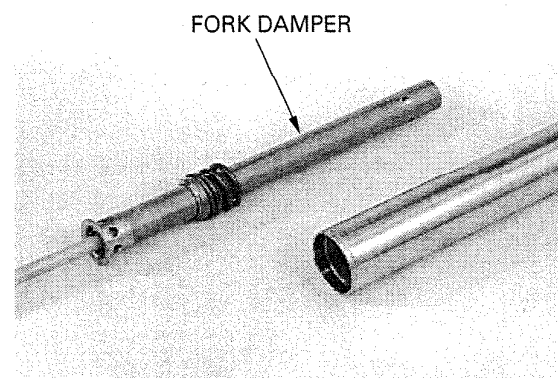
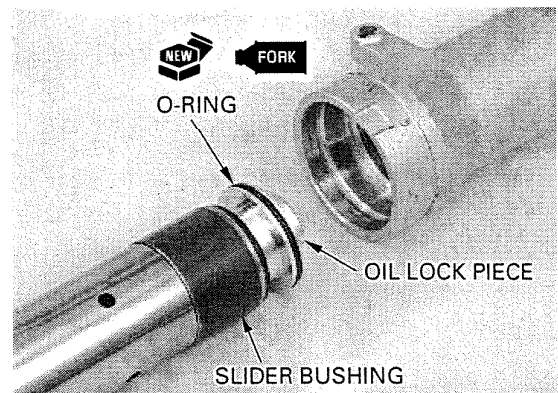
Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Coat new O-ring with fork fluid and install it into the groove in the oil lock piece.

Install the oil lock piece into the fork tube.

Install the fork tube into the fork slider.

Install the fork damper into the fork tube.



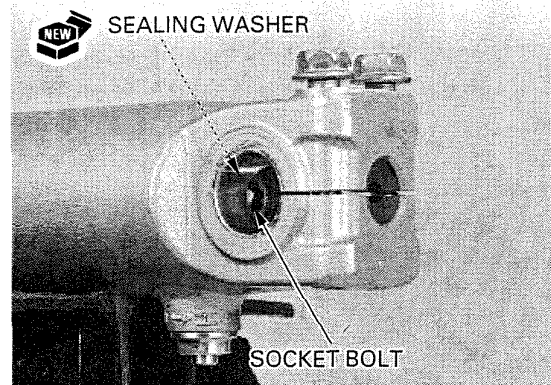
## FRONT WHEEL/SUSPENSION/STEERING

Hold the fork slider in a vise with a soft jaws or shop towel.  
Install the socket bolt with a new sealing washer and tighten it.

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

### NOTE:

If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring seat, joint collar and fork cap.



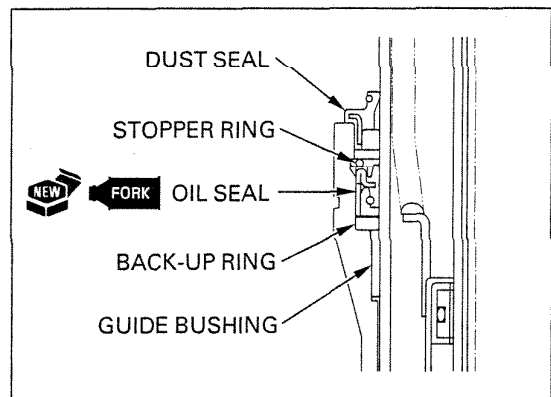
Place the guide bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top of the guide bushing.

Drive the bushing into place and remove the old bushing or equivalent tool.

Wrap vinyl tape around the fork tube top end to avoid damaging the oil seal lip.

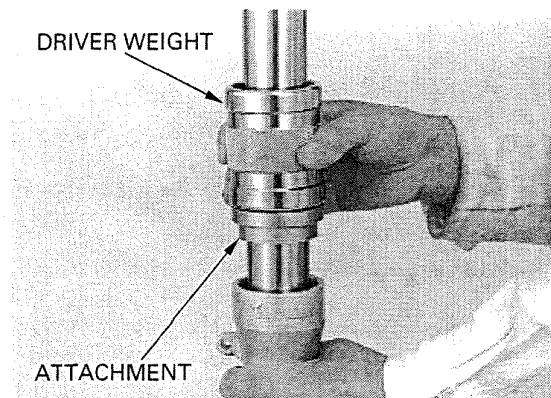
Coat a new oil seal with fork fluid and install it over the fork tube with the marked side facing up.

Drive the oil seal until the stopper ring groove is visible.

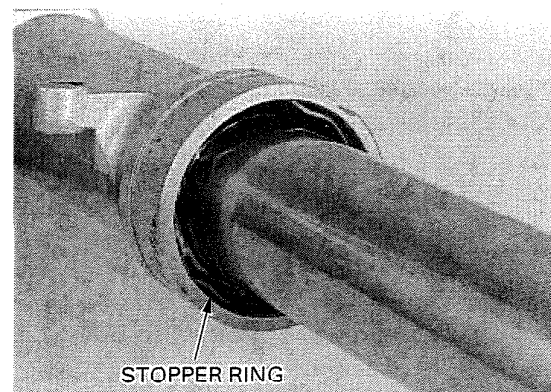


### TOOLS:

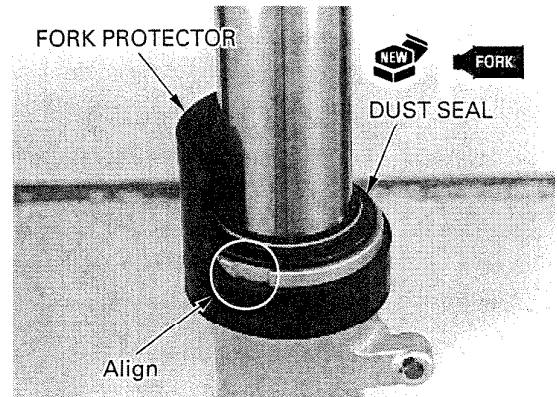
<b>Fork seal driver weight</b>	07947-KA50100
<b>Fork seal driver attachment,</b> 43 mm I. D.	07947-KA40200



Install the stopper ring into the groove in the fork slider.



Apply fork fluid to a new dust seal lip and install the dust seal into the fork slider.  
Install the fork protector over the fork slider by aligning the tab with the slider groove.



Pour the specified amount of recommended fork fluid in the fork tube.

## RECOMMENDED FORK FLUID:

Pro-Honda Suspension Fluid SS-8

## FORK FLUID CAPACITY:

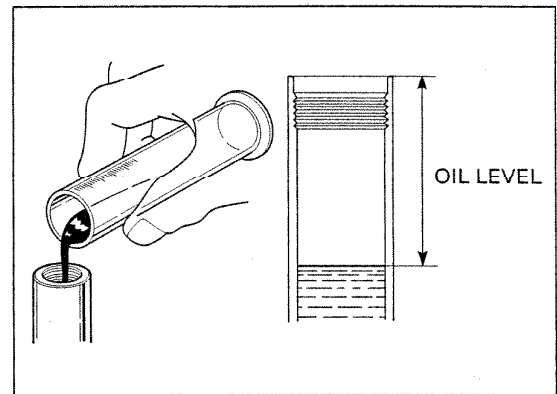
$475 \pm 2.5 \text{ cm}^3$  (16.1  $\pm$  0.08 US oz, 16.7  $\pm$  0.09 oz)

Pump the damper rod several times until the fork fluid flows out of the oil hole in the rebound damping adjuster.

Slowly pump the fork tube several times to remove trapped air.

Compress the fork tube fully.

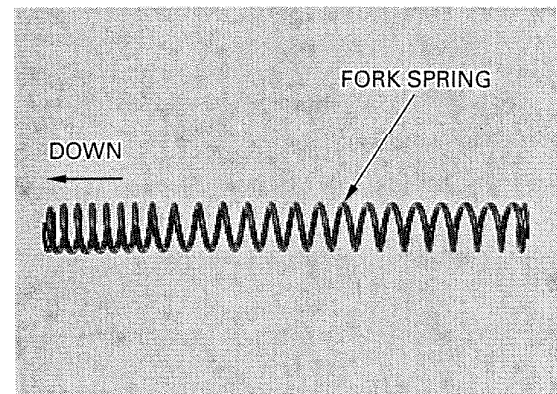
Measure the oil level from the top of the fork tube.



**OIL LEVEL:** 118 mm (4.6 in)

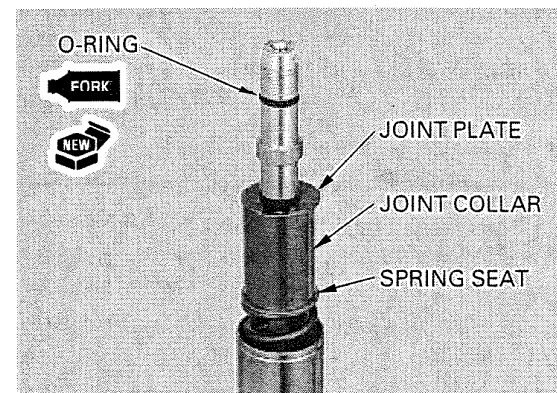
Pull up the damper rod fully.

Install the fork spring with the tightly wound end facing down.



Coat new O-ring with fork fluid and install it into the groove in the rebound damping adjuster.

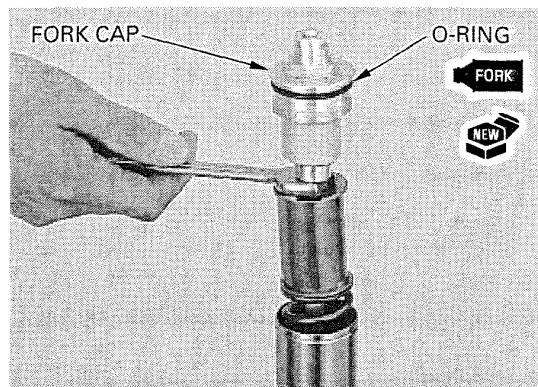
Install the spring seat, joint collar and joint plate.



## FRONT WHEEL/SUSPENSION/STEERING

Coat new O-ring with fork fluid and install it into the groove in the fork cap.  
Install the fork cap onto the rebound damping adjuster.

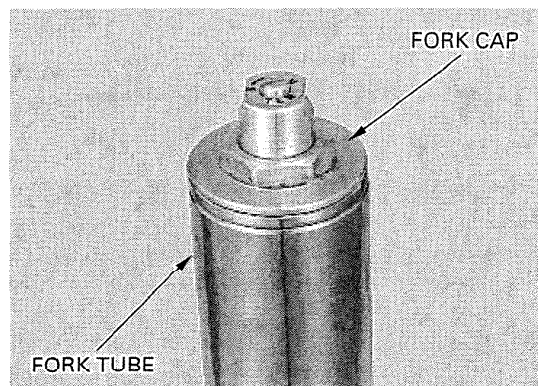
Hold the rebound damping adjuster and screw in the fork cap.



Install the fork cap into the fork tube.

### NOTE:

Tighten the fork cap after installing the fork tube into the fork bridges.

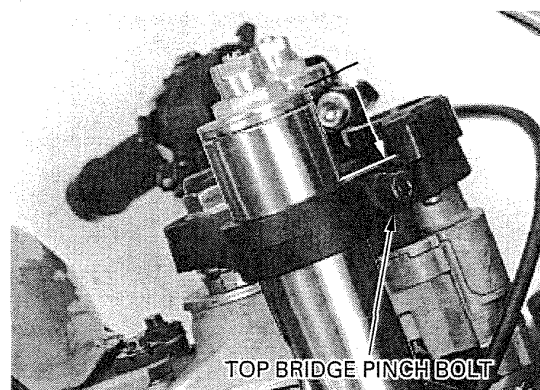


## INSTALLATION

*Route the cables, wire harnesses and hoses properly (page 1-18).*

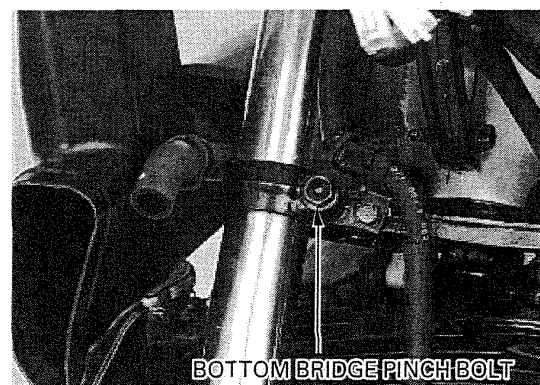
Install the fork tube into the fork bridges so that the height from the top bridge upper surface to the fork tube end is 33 mm (1.3 in).  
Tighten the fork top bridge pinch bolt.

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



Tighten the fork bottom bridge pinch bolt.

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





Tighten the fork cap to the specified torque if it was removed.

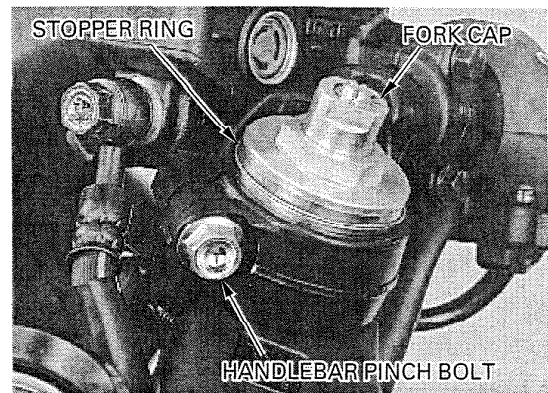
**TORQUE** : 23 N·m (2.3 kgf·m , 17 lbf·ft)

Install the handlebar.

Install the stopper ring.

Make sure that the handlebar boss is positioned in the fork top bridge groove.

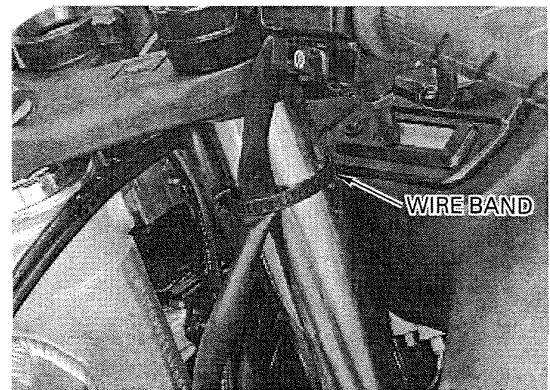
Tighten the handlebar pinch bolt.



*Right fork:* Secure the handlebar switch wire with the wire band.

*Left fork:* Secure the handlebar switch and horn wires with the wire bands (page 1-18).

Install the front wheel (page 13-11).



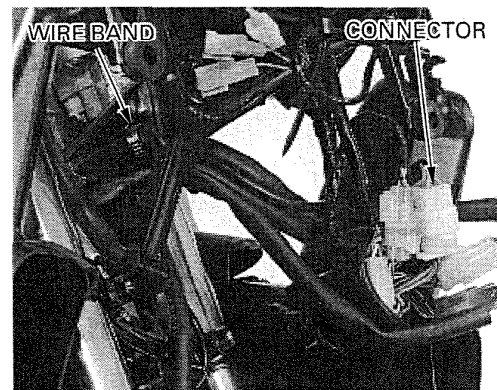
## STEERING STEM

### REMOVAL

Remove the front wheel (page 13-6).

Remove the left air intake duct (page 2-6).

Release the wire band and disconnect the ignition switch 4P (White) connector.

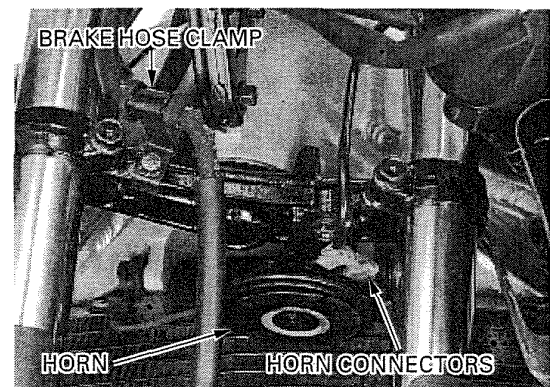


Remove the bolt and front brake hose clamp.

Disconnect the horn connectors.

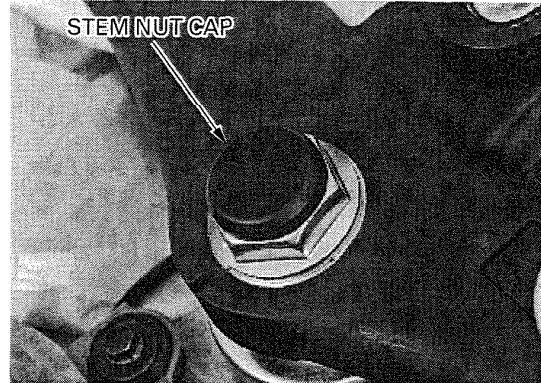
Remove the bolt and horn.

Remove the forks (page 13-12).



## FRONT WHEEL/SUSPENSION/STEERING

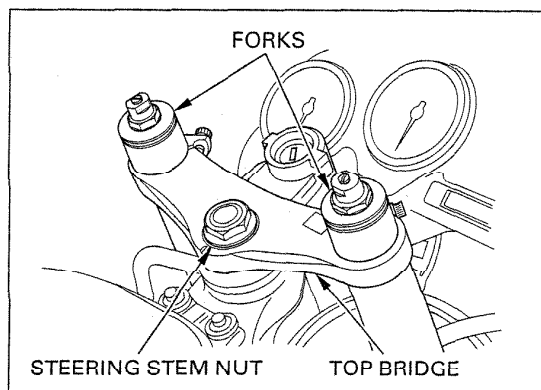
Remove the steering stem nut cap.



Temporarily install the forks into the fork bridges.

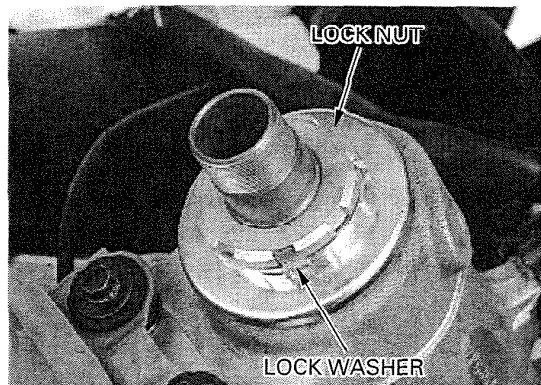
Loosen the steering stem nut.

Remove the forks, stem nut and fork top bridge.



Straighten the lock washer tabs.

Remove the steering bearing adjustment nut lock nut and lock washer.

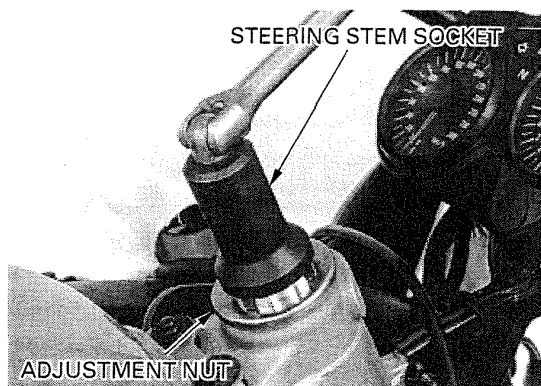


Remove the steering bearing adjustment nut using the special tool.

**TOOL:**

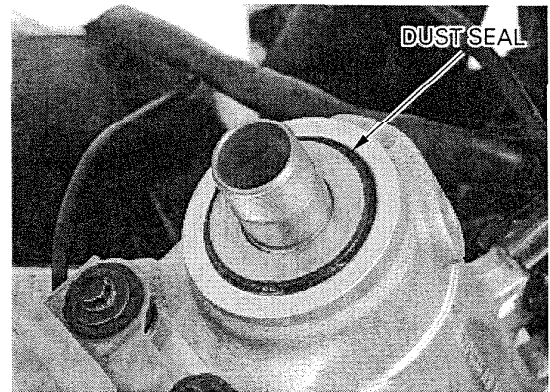
**Steering stem socket**

07916-3710101 or  
07916-3710100

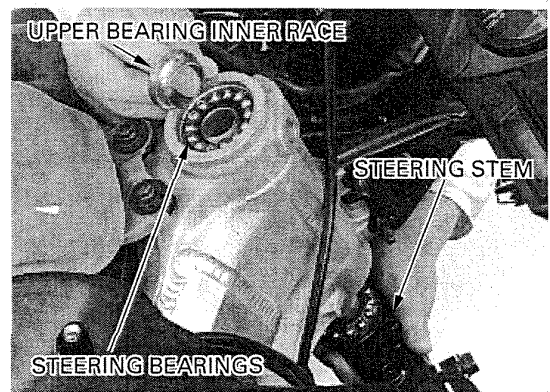




Remove the dust seal.



Remove the upper bearing inner race, steering stem, upper and lower steering bearings.



## STEERING BEARING REPLACEMENT

*Always replace the bearings and races as a set.*

**Except U.S.A.:**

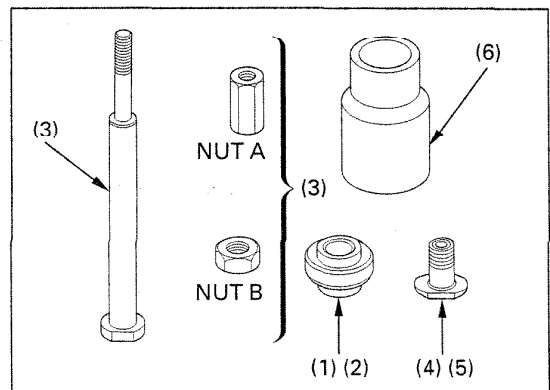
Replace the steering bearing outer races using the ball race remover set.

### TOOLS:

#### Ball race remover set

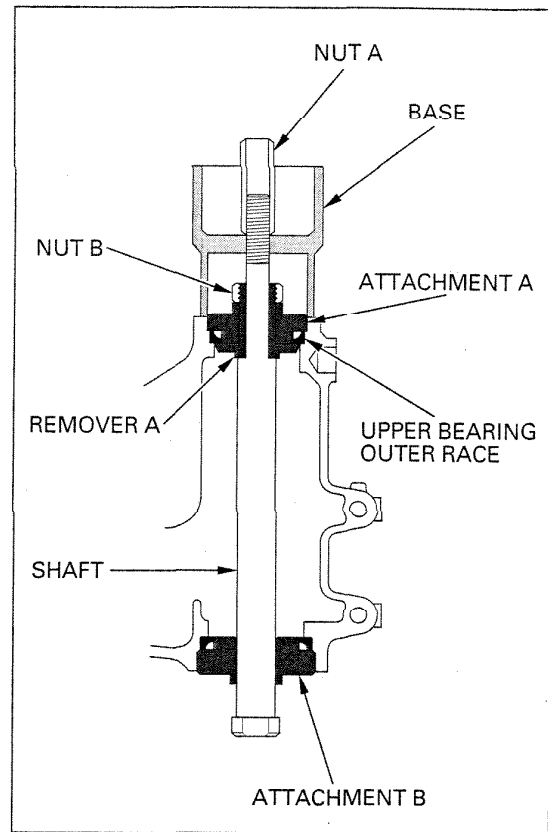
- Driver attachment A (1)
- Driver attachment B (2)
- Driver shaft assembly (3)
- Bearing remover A (4)
- Bearing remover B (5)
- Assembly base (6)

07946-KM90001  
07946-KM90100  
07946-KM90200  
07946-KM90300  
07946-KM90401  
07946-KM90500  
07946-KM90600

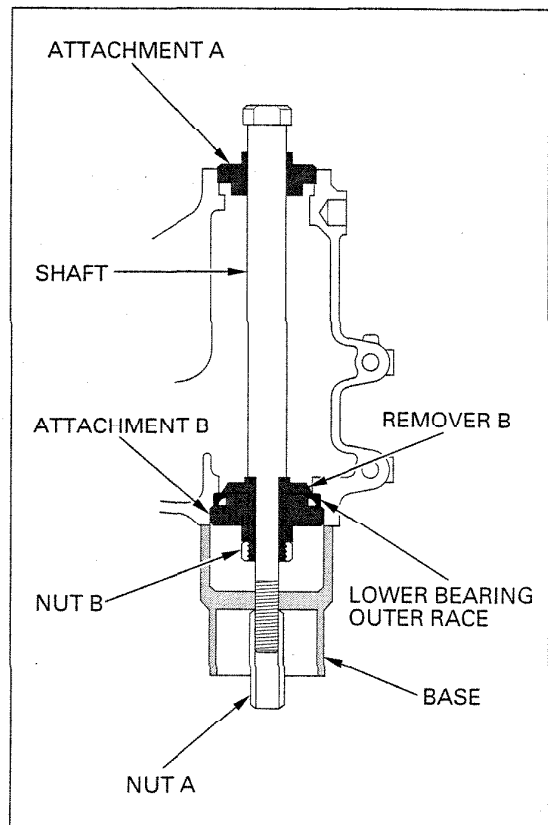


## FRONT WHEEL/SUSPENSION/STEERING

*Note the installation direction of the assembly base.* Install the ball race remover into the steering head pipe as shown.  
Align bearing remover A with the groove in the steering head.  
Lightly tighten nut B.  
While holding the driver shaft, turn nut A gradually to remove the upper bearing outer race.

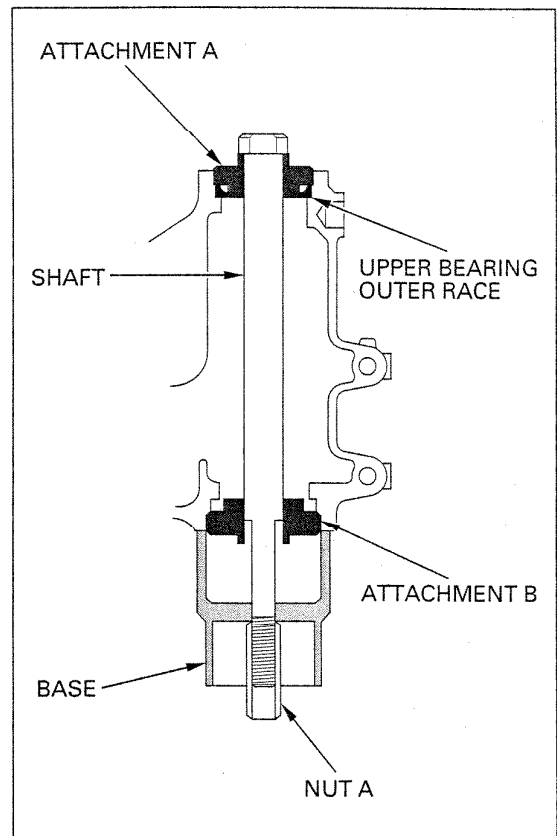


*Note the installation direction of the assembly base.* Install the ball race remover into the steering head pipe as shown.  
Align bearing remover B with the groove in the steering head.  
Lightly tighten nut B.  
While holding the driver shaft, turn nut A gradually to remove the lower bearing outer race.



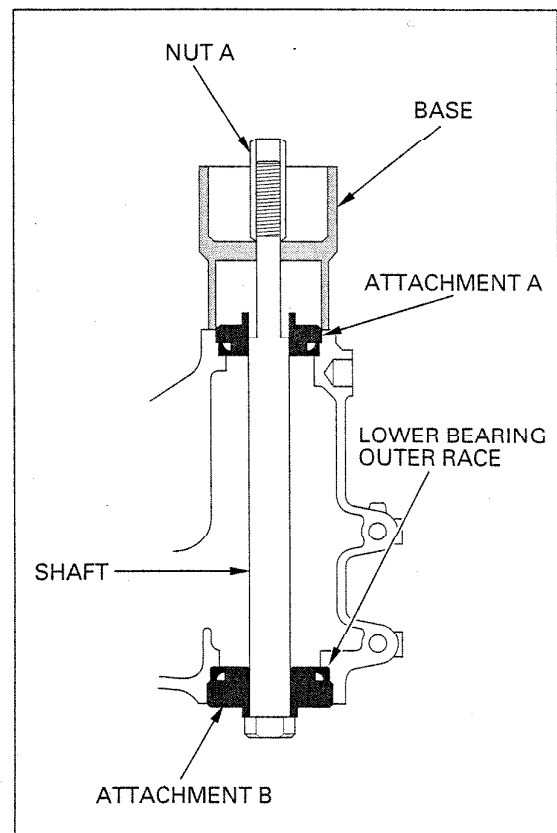
Install a new upper bearing outer race and the ball race remover as shown.

While holding the driver shaft, turn nut A gradually until the groove in driver attachment A aligns with the upper end of the steering head. This will allow you to install the upper bearing outer race.



Install a new lower bearing outer race and the ball race remover as shown.

While holding the driver shaft, turn nut A gradually until the groove in driver attachment B aligns with the lower end of the steering head. This will allow you to install the lower bearing outer race.



## FRONT WHEEL/SUSPENSION/STEERING

*Always replace the bearings and races as a set.*

### U.S.A. only:

Replace the steering bearing outer races using the special tools listed below.

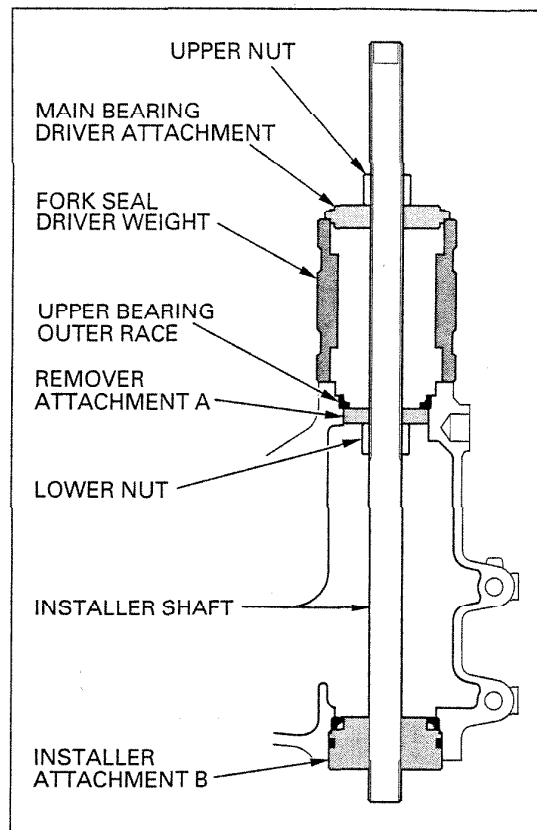
### TOOLS:

Main bearing driver attachment	07946-ME90200
Fork seal driver weight	07947-KA50100
Oil seal driver	07965-MA60000
Installer shaft	07VMF-KZ30200
Installer attachment A	07VMF-MAT0100
Installer attachment B	07VMF-MAT0200
Remover attachment A	07VMF-MAT0300
Remover attachment B	07VMF-MAT0400

Install the special tools into the steering head pipe as shown.

Align remover attachment A with the groove in the steering head.

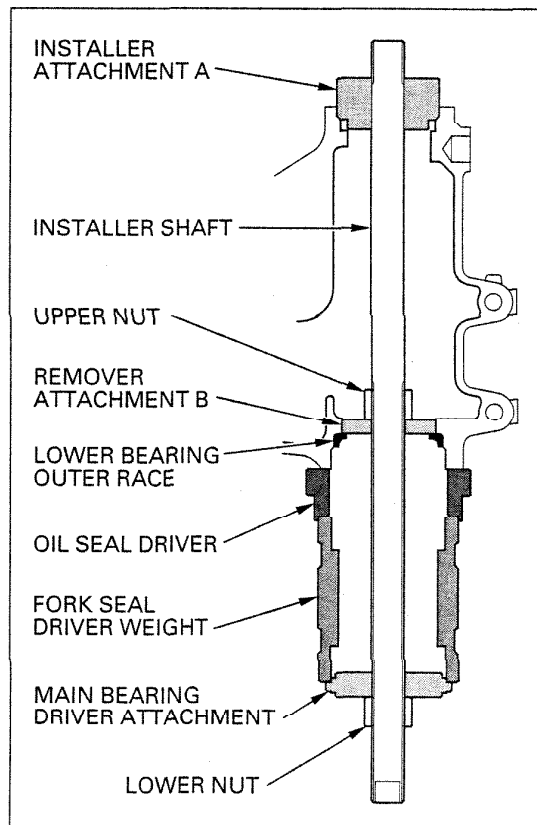
While holding the installer shaft with the wrench, turn the upper nut gradually to remove the upper bearing outer race.



Install the special tools into the steering head pipe as shown.

Align remover attachment B with the groove in the steering head.

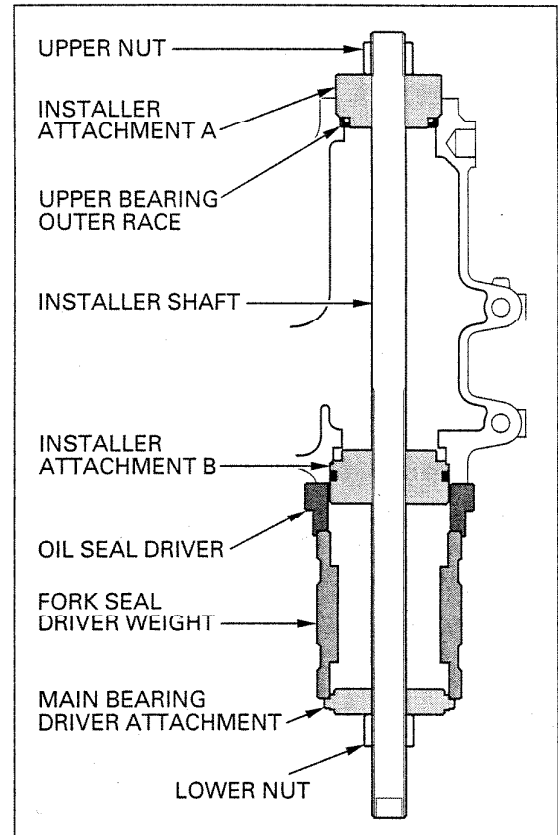
While holding the installer shaft with the wrench, turn the lower nut gradually to remove the lower bearing outer race.



## FRONT WHEEL/SUSPENSION/STEERING

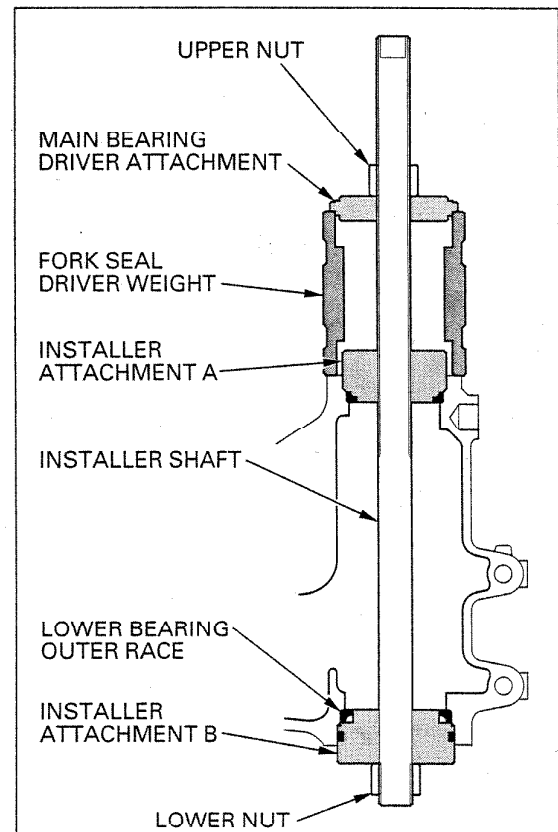
Install a new upper bearing outer race and the special tools as shown.

While holding the installer shaft with the wrench, turn the lower nut gradually until the groove in installer attachment A aligns with the upper end of the steering head. This will allow you to install the upper bearing outer race.



Install a new lower bearing outer race and the special tools as shown.

While holding the installer shaft with the wrench, turn the upper nut gradually until the groove in installer attachment B aligns with the lower end of the steering head. This will allow you to install the lower bearing outer race.

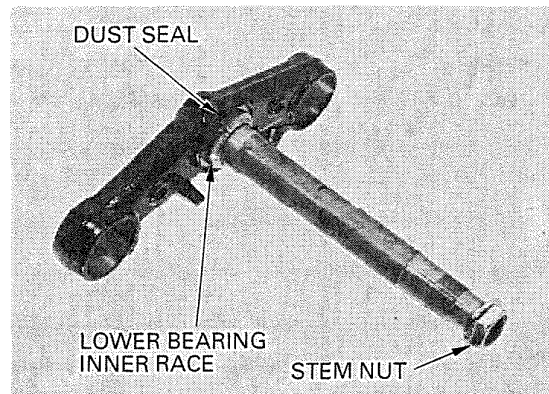


## FRONT WHEEL/SUSPENSION/STEERING

Install the stem nut onto the stem to prevent the threads from being damage when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.

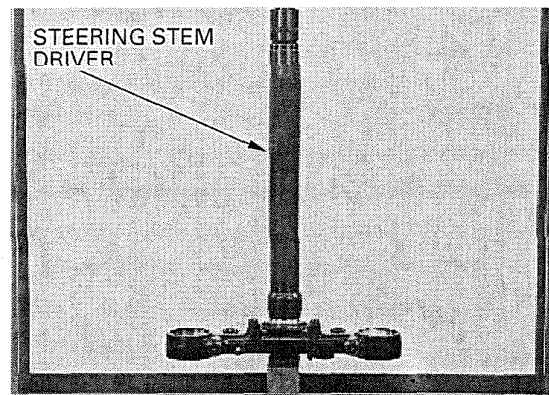


Apply grease to a new dust seal lip and install it to the steering stem.

Press a new lower bearing inner race onto the steering stem using the special tool.

### TOOL:

**Steering stem driver** 07946-MB00000



## INSTALLATION

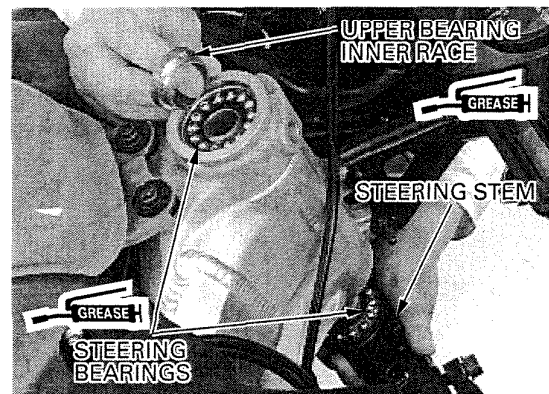
*Route the cables, wires and hose properly (page 1-18).*

Apply grease to the steering bearings and bearing races.

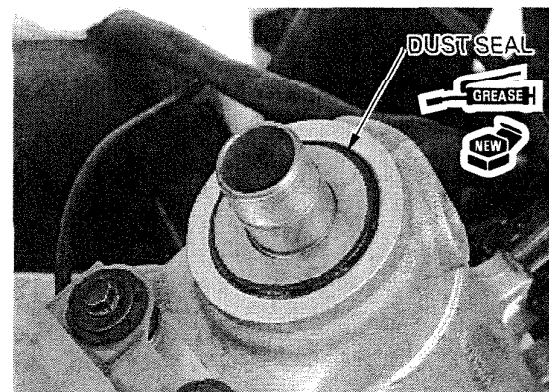
Install the lower bearing onto the steering stem.

Install the steering stem into the steering head pipe.

Install the upper bearing and inner race.



Apply grease to a new dust seal lip and install it.



Apply oil to the steering bearing adjustment nut threads.

Install and tighten the steering stem adjustment nut.

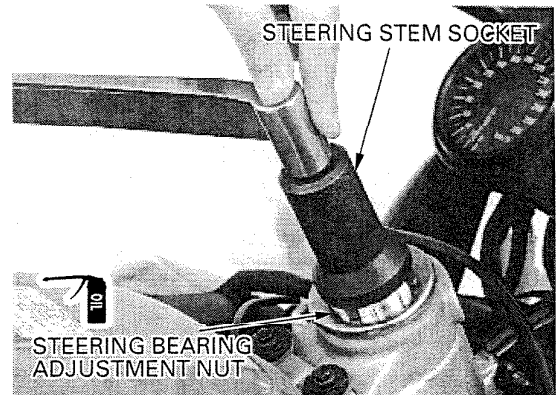
**TOOL:**

**Steering stem socket** 07916-3710101 or  
07916-3710100

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

Turn the steering stem right and left, lock-to-lock at least five times to seat the bearings.

Retighten the steering stem adjustment nut to the same torque.

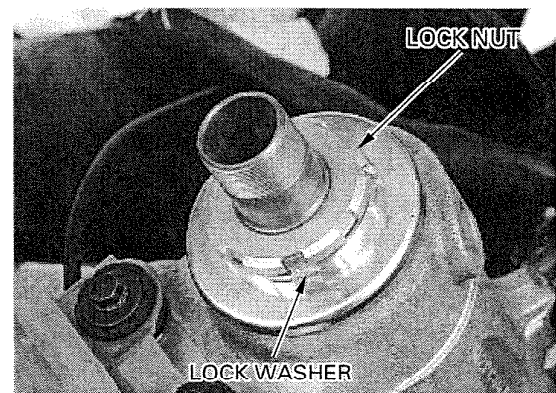


Install a new lock washer and bend the two opposite tabs down into the grooves in the adjustment nut.

Install and finger tighten the lock nut all the way.

Hold the steering adjustment nut and further tighten the lock nut, within 90°, to align its grooves with the tabs of the lock washer.

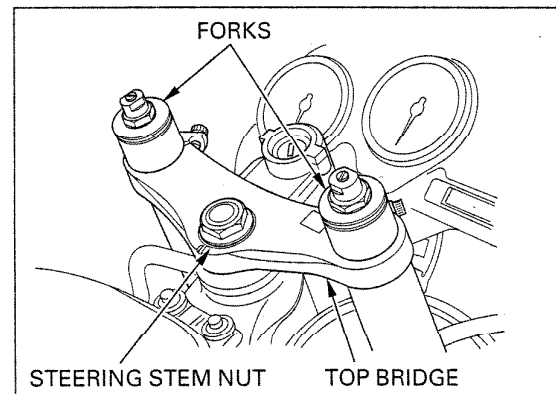
Bend up the lock washer tabs into the grooves of the lock nut.



Install the fork top bridge and steering stem nut. Temporarily install the forks into the fork bridges. Tighten the steering stem nut.

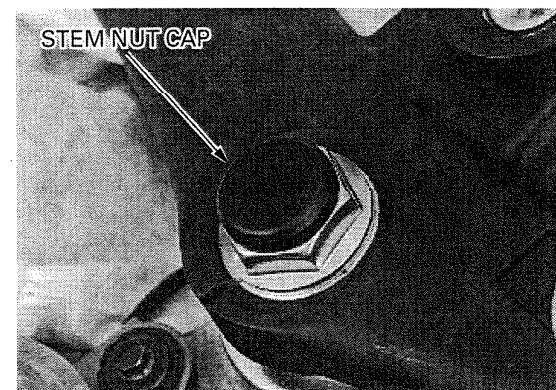
**TORQUE** : 103 N·m (10.5 kgf·m , 76 lbf·ft)

Make sure that the steering stem moves smoothly, without play or binding.



Install the steering stem nut cap.

Install the forks properly (page 13-20).



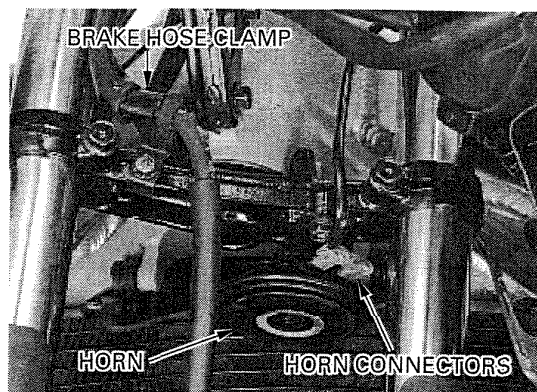


## FRONT WHEEL/SUSPENSION/STEERING

Install the front brake hose clamp and tighten the bolt.

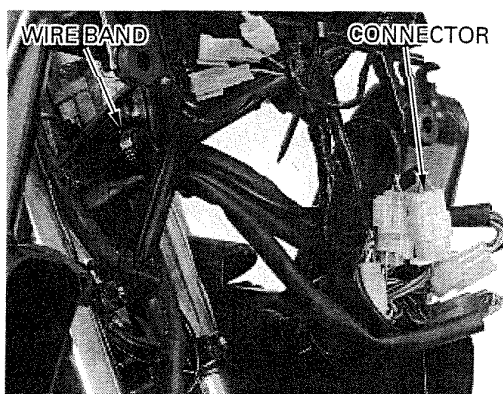
**TORQUE** : 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the horn and tighten the bolt.  
Connect the horn connectors.



Connect the ignition switch 4P (White) connector and secure the wires with the band (page 1-18).

Install the front wheel (page 13-11).  
Install the air intake duct (page 2-6).



### STEERING BEARING PRELOAD

Remove the front fairing (page 2-5).

Support the motorcycle securely using safety stands or a hoist and raise the front wheel off the ground.

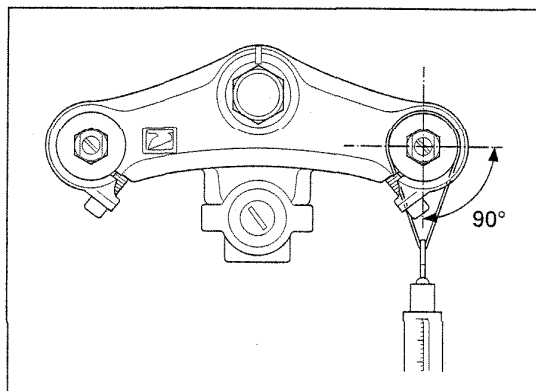
Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

Make sure that there is no cable, wire harness or hose interference.

Pull the spring scale keeping it right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.



#### STEERING BEARING PRELOAD:

1.0–1.5 kgf (2.2–3.3 lbf)

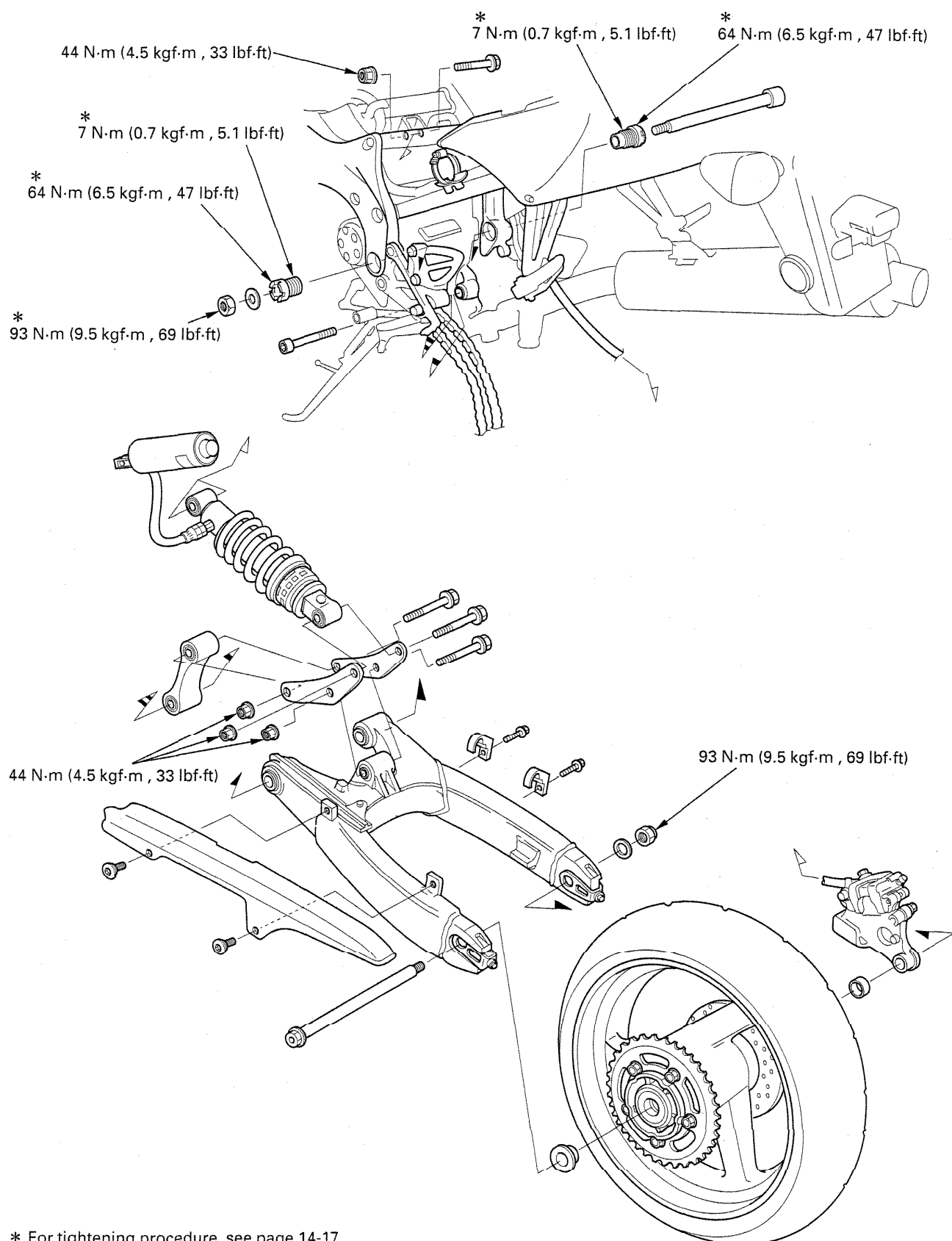
If the readings do not fall within the limits, readjust the steering bearing adjustment.

Install the front fairing (page 2-5).

---

## MEMO

## REAR WHEEL/SUSPENSION



\* For tightening procedure, see page 14-17

# 14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-9
TROUBLESHOOTING	14-2	SUSPENSION LINKAGE	14-11
REAR WHEEL	14-3	SWINGARM	14-13

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- *Riding on damaged rims impairs safe operation of the vehicle.*
- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*
- *The shock absorber contains nitrogen gas under high pressure. Do not allow fire or heat near the shock absorber.*
- *Before disposal of the shock absorber, release the nitrogen.*
- *The damper unit is filled with nitrogen gas under high pressure, do not try to disassemble.*

- A hoist or equivalent is required to support the motorcycle when servicing the rear wheel and suspension.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- 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.
- When installing the swingarm, be sure to tighten the swingarm pivot fasteners to the specified torque in the specified sequence. If you mistake the tightening torque or sequence, loosen all pivot fasteners, then tighten them again to the specified torque in the correct sequence.
- Refer to section 15 for brake system service.

## SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		_____	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	_____
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	_____
Axle runout		_____	0.2 (0.01)
Wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Wheel balance weight		_____	60 g (2.1 oz)max.
Drive chain slack		25 – 35 (1 – 1 3/8)	_____

## TORQUE VALUES

Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Final driven sprocket nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Shock absorber mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock arm-to-swingarm nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock arm-to-shock link nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock link-to-bracket nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Drive chain slider bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	ALOC bolt: replace with a new one
Swingarm pivot adjusting bolt	7 N·m (0.7 kgf·m, 5.1 lbf·ft)	page 14-17
Swingarm pivot lock nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut

## REAR WHEEL/SUSPENSION

---

### TOOLS

Bearing remover shaft	07746-0050100	┐ or equivalent commercially available in U.S.A.
Bearing remover head, 20 mm	07746-0050600	
Driver	07749-0010000	
Attachment, 22 × 24 mm	07746-0010800	
Attachment, 28 × 30 mm	07946-1870100	
Attachment, 32 × 35 mm	07746-0010100	
Attachment, 37 × 40 mm	07746-0010200	
Attachment, 42 × 47 mm	07746-0010300	
Attachment, 52 × 55 mm	07746-0010400	
Pilot, 17 mm	07746-0040400	
Pilot, 20 mm	07746-0040500	
Pilot, 28 mm	07746-0041100	
Driver attachment handle	07949-3710001	
Bearing remover set	07LMC-KV30100	
Lock nut wrench	07908-4690003 or 07908-4690002	
Driver shaft	07946-MJ00100	
Driver head	07946-MJ00200	
Needle bearing remover	07HMC-MR70100	

### TROUBLESHOOTING

#### Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

#### Hard suspension

- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Incorrect swingarm pivot fasteners tightening
- Tire pressure too high

#### Rear wheel wobbling

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

#### Rear wheel turns hard

- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

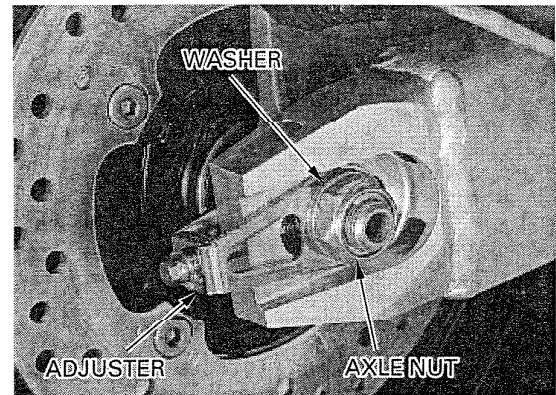
#### Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

## REAR WHEEL

### REMOVAL

Raise the rear wheel off the ground and support the motorcycle securely with a hoist or equivalent. Loosen the drive chain adjusters and rear axle nut. Remove the axle nut and washer.

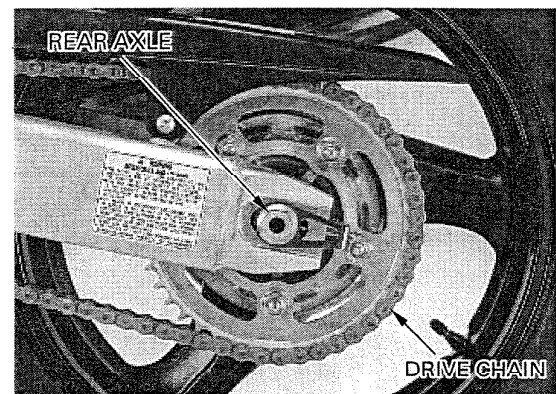


Push the rear wheel forward and derail the drive chain from the final driven sprocket.

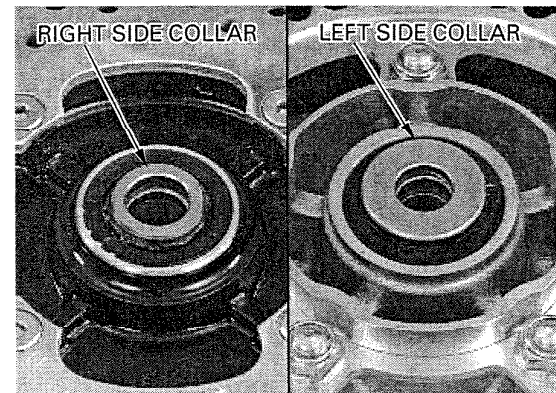
Remove the rear axle and the rear wheel.

### NOTE:

Do not operate the brake pedal after removing the rear wheel.



Remove the side collars.

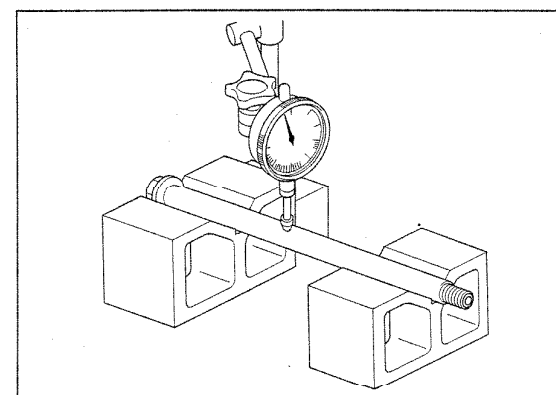


### INSPECTION

#### AXLE

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.2 mm (0.01 in)



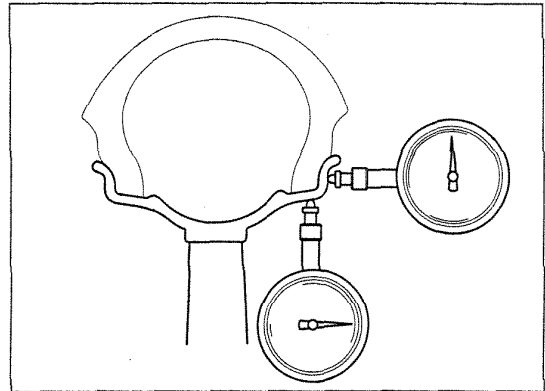
## REAR WHEEL/SUSPENSION

### WHEEL

Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS: RADIAL:** 2.0 mm (0.08 in)  
**AXIAL:** 2.0 mm (0.08 in)

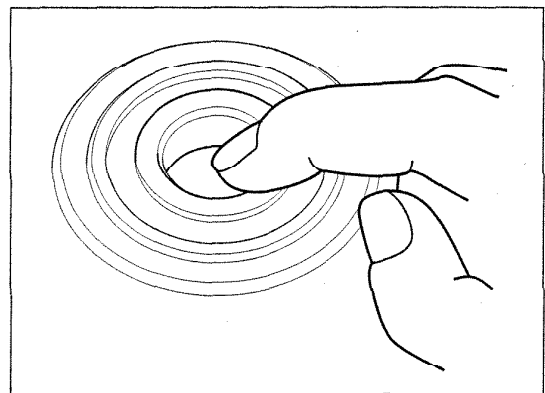


### WHEEL BEARING

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

*Replace the wheel bearings in pairs.*

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.

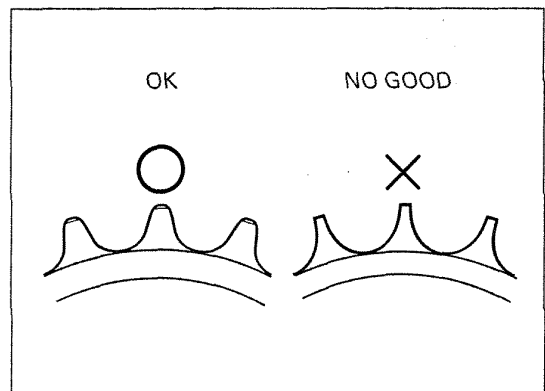


### DRIVEN SPROCKET

Check the condition of the driven sprocket teeth. Replace the sprocket if worn or damaged.

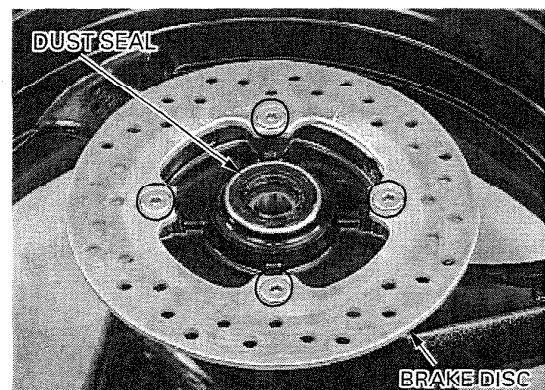
#### NOTE:

- If the driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition, or the replacement chain or sprocket will wear rapidly.



### DISASSEMBLY

Remove the right dust seal.  
Remove the bolts and brake disc.

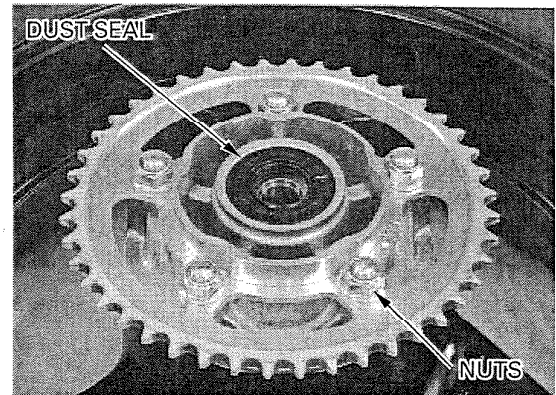




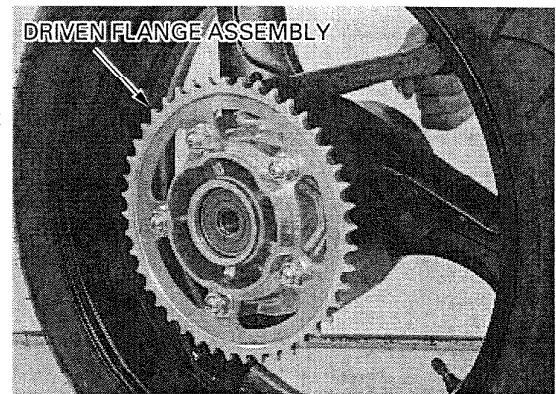
Remove the left dust seal.

**NOTE:**

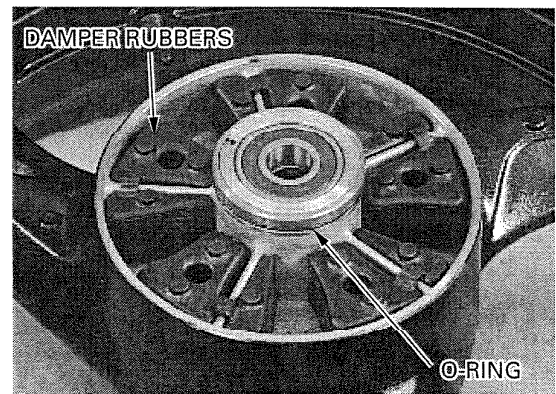
If you will replace the final driven sprocket, loosen the driven sprocket nuts.



Remove the final driven flange assembly from the left wheel hub.



Remove the damper rubbers and O-ring.



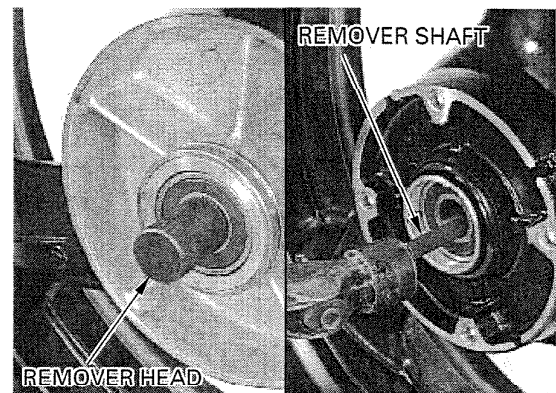
*Replace the wheel bearings in pairs. Do not reuse old bearings.*

Install the bearing remover head into the bearing. From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

**TOOLS:**

**Bearing remover shaft** 07746-0050100 or equivalent commercially available in U.S.A.

**Bearing remover head, 20 mm** 07746-0050600 or equivalent commercially available in U.S.A.



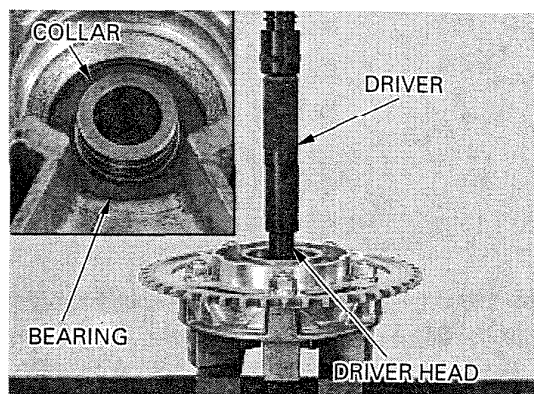
## REAR WHEEL/SUSPENSION

Press the driven flange collar out of the driven flange bearing.

### TOOLS:

Driver	07749-0010000
Driver head	07946-MJ00200

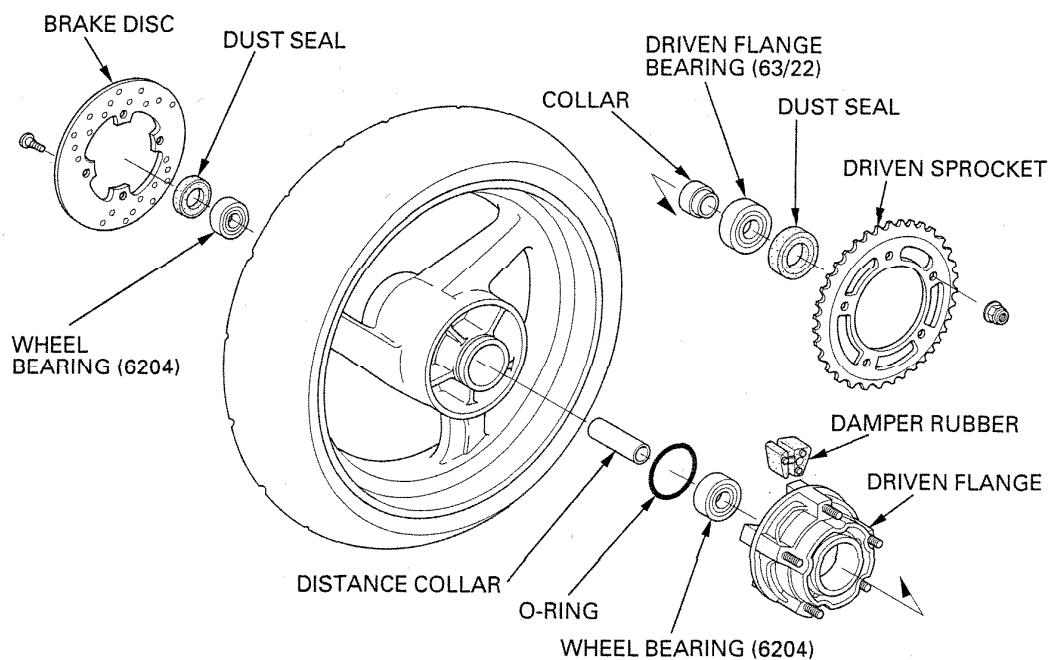
Remove the driven flange bearing.



## ASSEMBLY

### NOTE:

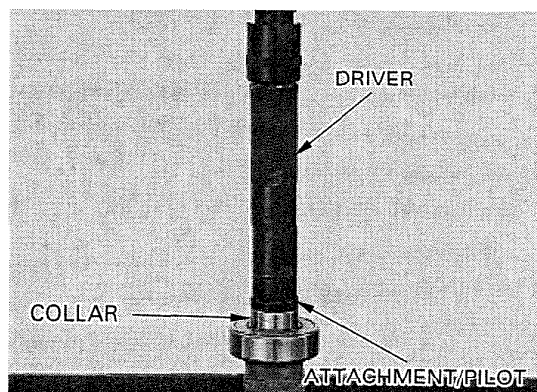
Refer to page 13-10 for wheel balance.



Press the driven flange collar in a new driven flange bearing until it is fully seated.

### TOOLS:

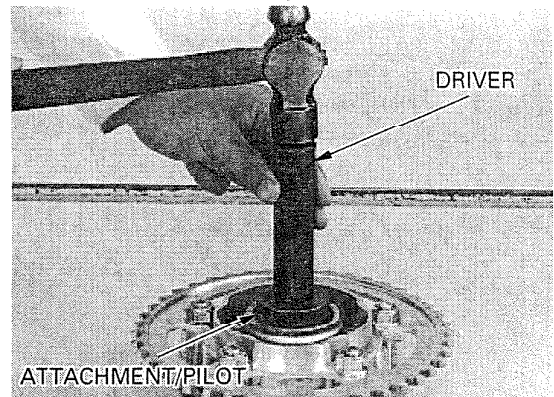
Driver	07749-0010000
Attachment, 28 × 30 mm	07946-1870100
Pilot, 20 mm	07746-0040500



Drive in the driven flange bearing squarely with the marking side facing up until it is fully seated.

**TOOLS:**

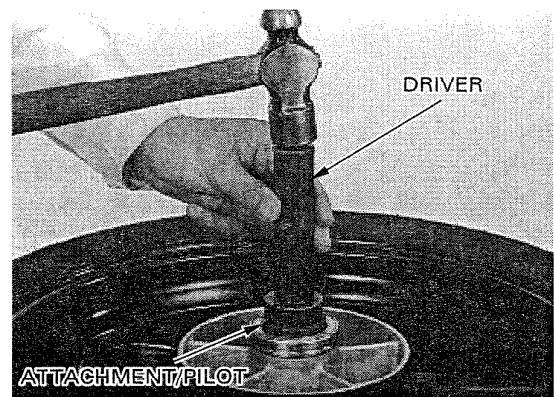
<b>Driver</b>	07749-0010000
<b>Attachment, 52 × 55 mm</b>	07746-0010400
<b>Pilot, 20 mm</b>	07746-0040500



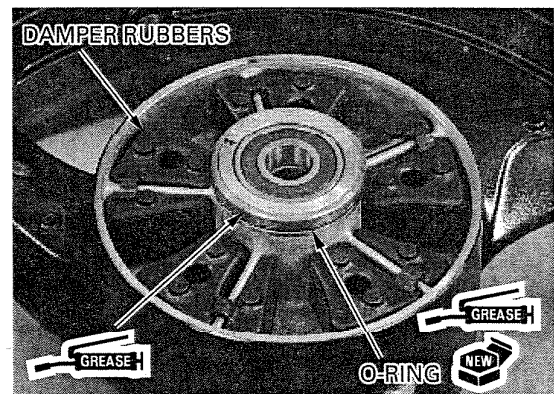
Drive in a new right bearing squarely with the marking side facing up until it is fully seated.  
Install the distance collar.  
Drive in a new left bearing squarely with the marking side facing up until it is fully seated.

**TOOLS:**

<b>Driver</b>	07749-0010000
<b>Attachment, 42 × 47 mm</b>	07746-0010300
<b>Pilot, 20 mm</b>	07746-0040500



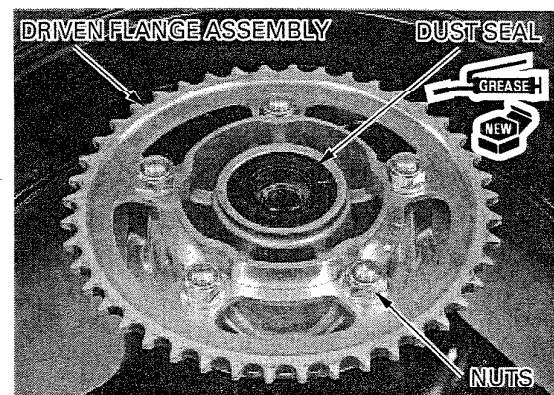
Install the damper rubbers into the left wheel hub.  
Coat a new O-ring with grease and install it into the hub groove.  
Apply grease to the mating surface of the wheel hub (side surface) and final driven flange.



Install the driven flange assembly into the left wheel hub.  
When the driven sprocket is replaced, install a new sprocket and tighten the nuts.

**TORQUE** : 88 N·m (9.0 kgf·m , 65 lbf·ft)

Apply grease to a new dust seal lip and install it until it is flush with the driven flange.

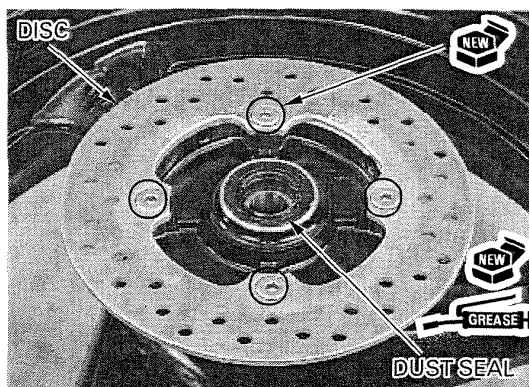


## REAR WHEEL/SUSPENSION

Install the brake disc onto the right wheel hub.  
Install new disc bolts and tighten them in a criss-cross pattern in 2 or 3 steps.

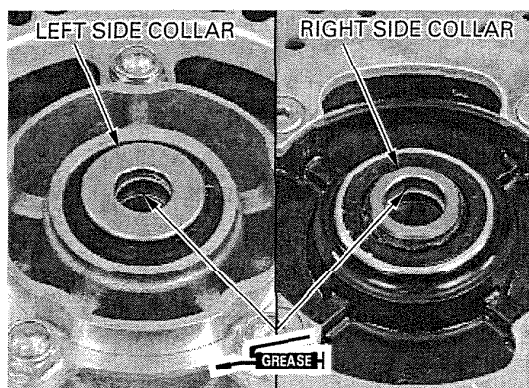
**TORQUE :** 42 N·m (4.3 kgf·m , 31 lbf·ft)

Apply grease to a new dust seal lip and install it until it is flush with the hub.

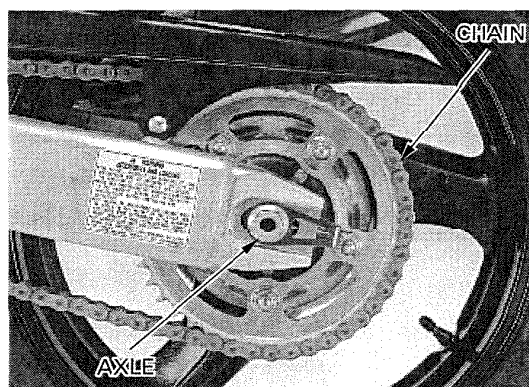


## INSTALLATION

Apply grease to the groove in the side collar inner surface.  
Install the side collars.

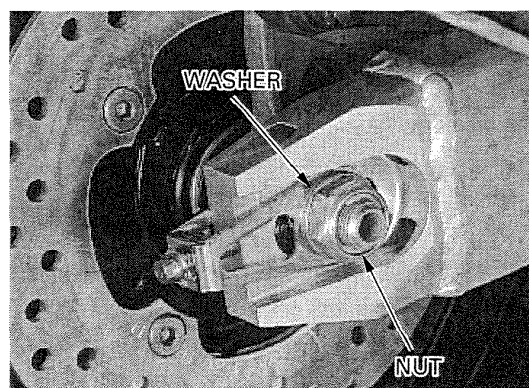


Make sure that the rear brake caliper is in position.  
Place the rear wheel in the swingarm and install the drive chain over the driven sprocket.  
Insert the rear axle from the left side through the swingarm, wheel and caliper bracket.



Install the washer and axle nut.

Adjust the drive chain slack (page 3-16).



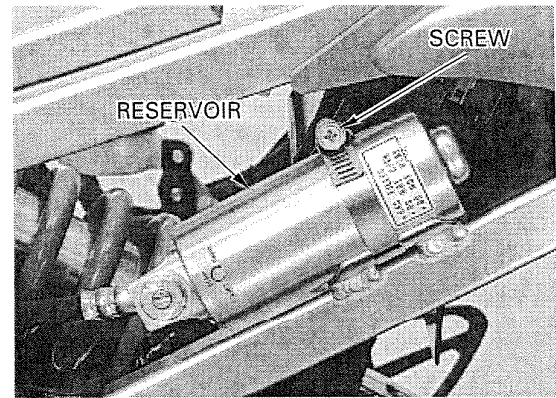
## SHOCK ABSORBER

### REMOVAL

Support the motorcycle securely with a hoist or equivalent.

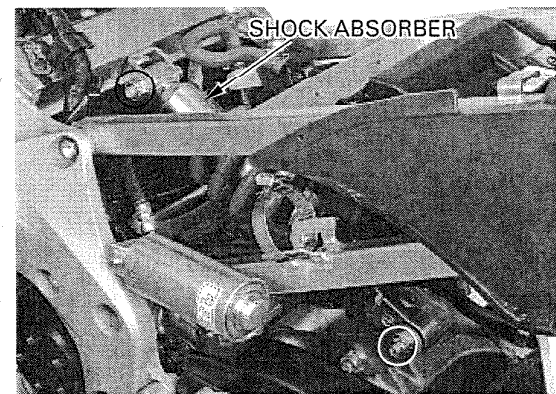
Remove the fuel tank (page 2-3).

Loosen the reservoir band screw and remove the shock absorber reservoir from the frame.



Support the swingarm securely.

Remove the shock absorber mounting nuts and bolts, and the shock absorber.



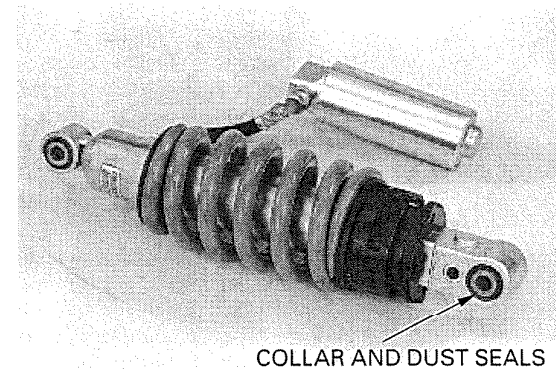
### INSPECTION

Check the damper unit, reservoir hose and reservoir for leakage or other damage.

Check the upper joint bushing for wear or damage. Replace the shock absorber assembly if necessary.

Remove the lower joint pivot collar.

Check the needle bearing, pivot collar and dust seals for wear or damage.



### NEEDLE BEARING REPLACEMENT

Remove the dust seals.

*Set the lower joint in a hydraulic press with the rebound damping adjuster facing up when pressing in and out the bearing.*

Press the needle bearing out of the lower joint using the special tools.

#### TOOLS:

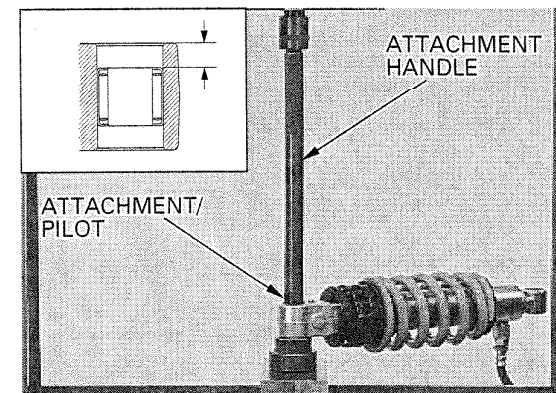
**Driver attachment handle** 07949-3710001

**Attachment, 22 × 24 mm** 07746-0010800

**Pilot, 17 mm** 07746-0040400

*Press in the bearing with the marking side facing up.*

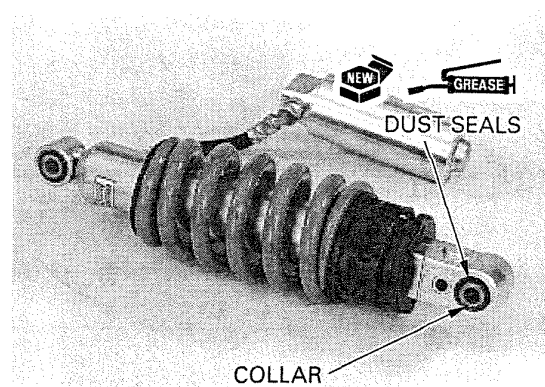
Apply grease to the needle rollers of a new bearing. Carefully press the needle bearing in the lower joint until the depth from the lower joint outer surface is 7.8–8.2 mm (0.31–0.32 in), using the same tools.





## REAR WHEEL/SUSPENSION

Apply grease to new dust seal lips and install them until they are flush with the lower joint.  
Install the pivot collar.



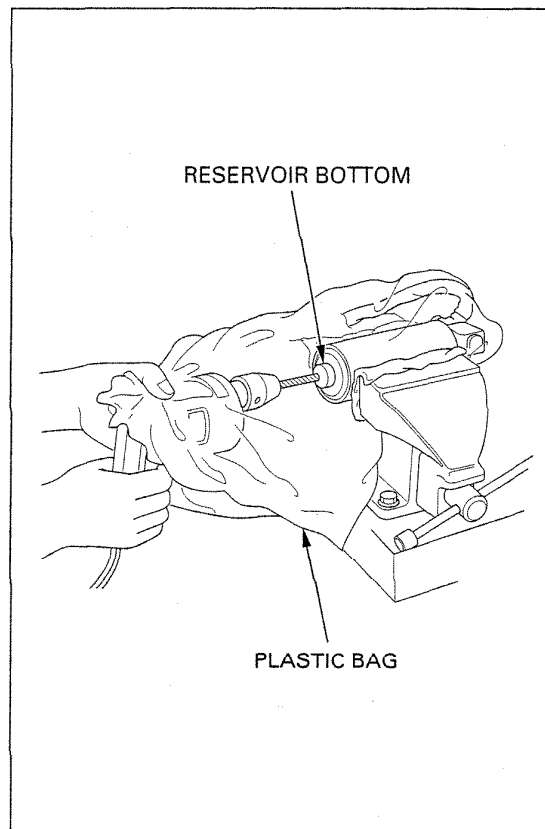
### SHOCK ABSORBER DISPOSAL

Center punch the center of the reservoir bottom to mark the drilling point.

Wrap the shock absorber inside a plastic bag and support the reservoir in a vise as shown.  
Through the open end of the bag, insert a drill motor with a sharp 2–3 mm (5/64 – 1/8 in) drill bit.

#### ▲WARNING

- *Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the reservoir, leading to explosion and severe personal injury.*
- *The shock absorber contains nitrogen gas and oil under high pressure. Do not drill the side of the reservoir or the damper case, or you may drill into the oil chamber (bladder); oil escaping under high pressure may cause serious personal injury.*
- *Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.*



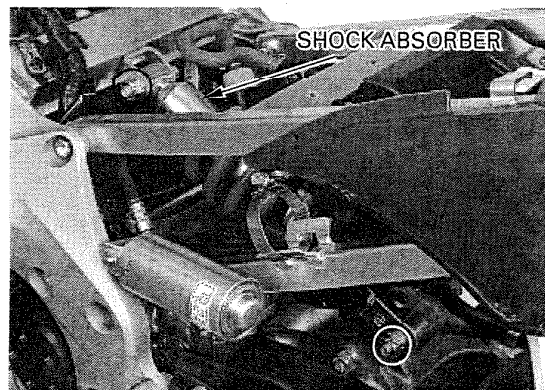
Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from the getting caught in the bit when you start.

### INSTALLATION

Install the shock absorber in the frame and shock arm with the rebound damping adjuster facing to the right.  
Install the upper and lower mounting bolts from the right side.

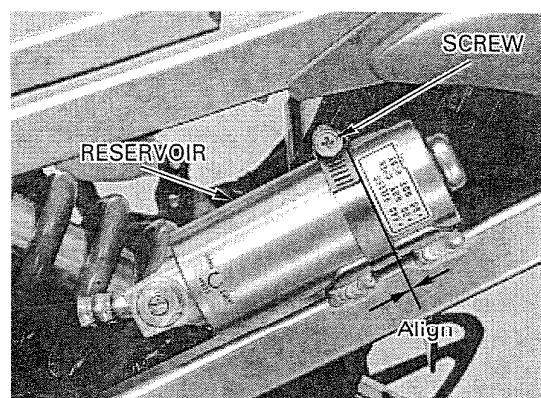
Install the mounting nuts and tighten them.

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



Install the reservoir into the reservoir band by aligning the label edge with the band and tighten the band screw securely.

Install the fuel tank (page 2-3).



## SUSPENSION LINKAGE

### REMOVAL

Support the motorcycle securely with a hoist or equivalent.

Remove the following:

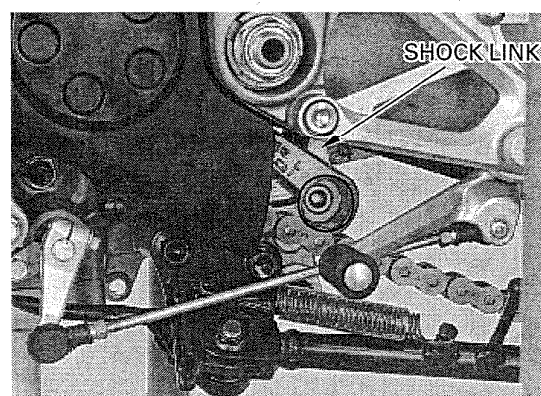
- shock absorber lower mounting nut and bolt
- shock arm-to-swing arm nut and bolt
- shock arm-to-shock link nut and bolt
- shock arm plates



- shock link-to-bracket nut and bolt
- shock link.

### NOTE:

If the shock link can not be removed, loosen the shock link bracket nuts to get the clearance between the shock link and brackets (page 7-5).

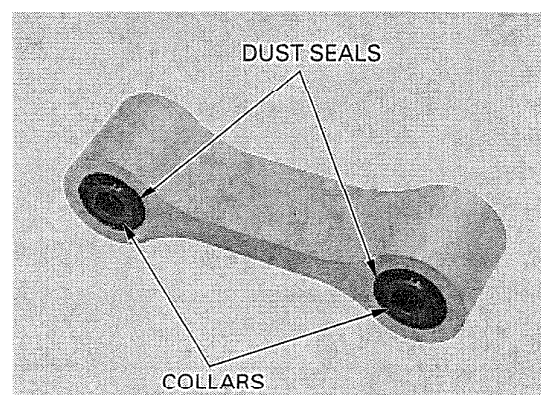


### INSPECTION

Remove the pivot collars.  
Check the needle bearings, pivot collars and dust seals for wear or damage.  
Check the shock arm plates for deformation or damage.

### SHOCK LINK PIVOT BEARING REPLACEMENT

Remove the dust seals.



## REAR WHEEL/SUSPENSION

Press the needle bearing out of the shock link pivot using the special tools.

### TOOLS:

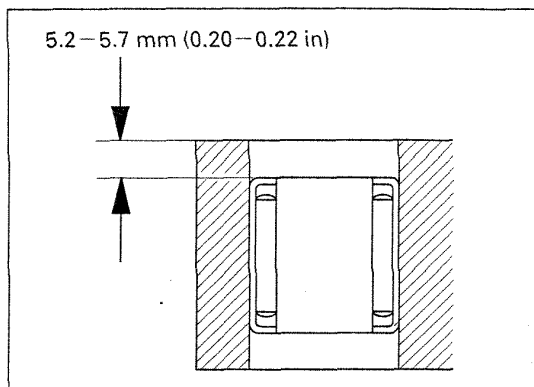
**Driver attachment handle** 07949-3710001

**Attachment, 22 × 24 mm** 07746-0010800

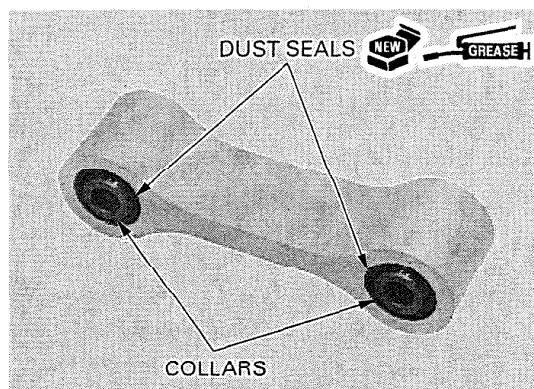
**Pilot, 17 mm** 07746-0040400

*Press in the bearing with the marking side facing up.*

Apply grease to the needle rollers of a new bearing. Carefully press the needle bearing in the link pivot until the depth from the shock link outer surface is 5.2–5.7 mm (0.20–0.22 in), using the same tools.

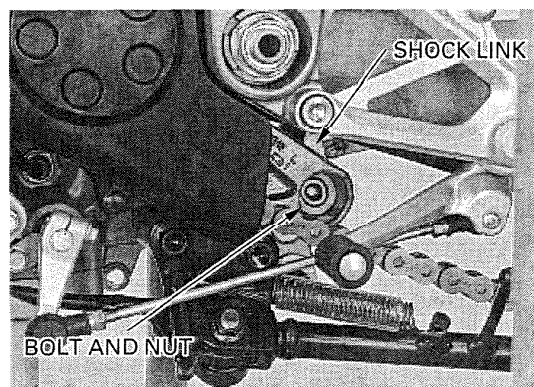


Apply grease to new dust seal lips and install them into the shock link pivots until they are seated. Install the pivot collars.



## INSTALLATION

Install the shock link into the link brackets and the bolt from the left side. Install the nut.

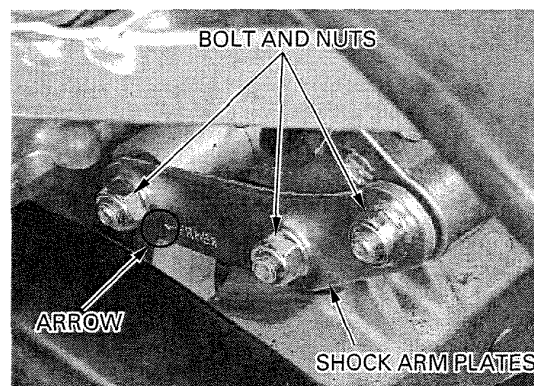


Install the shock arm plates with the arrow facing the left and front side and the bolts from the right side. Install the nuts.

Tighten the link bracket nuts if they were loosened (page 7-8).

Tighten the all suspension linkage nuts.

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





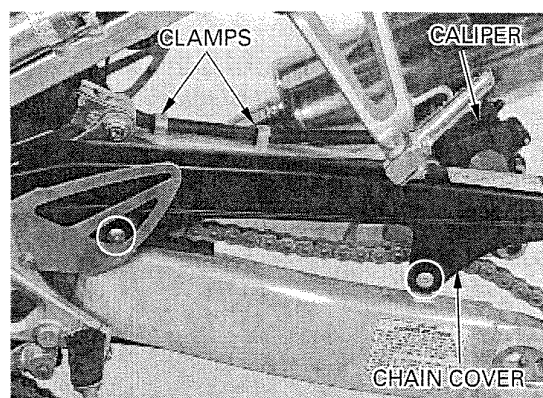
## SWINGARM

### REMOVAL

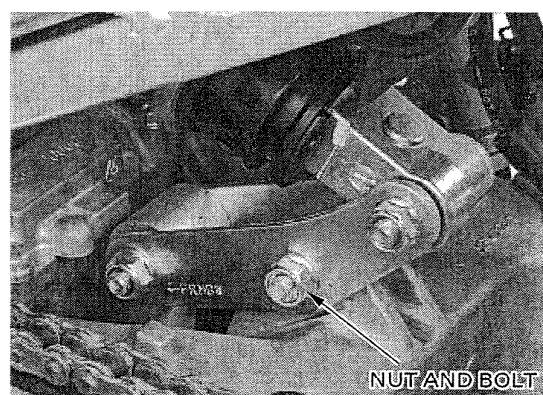
Remove the rear wheel (page 14-3).

Remove the two bolts and drive chain cover.

Remove the bolts and brake hose clamps.  
Remove the rear brake caliper/bracket assembly from the swingarm.



Support the swingarm securely.  
Remove the shock arm-to-swingarm nut and bolt.

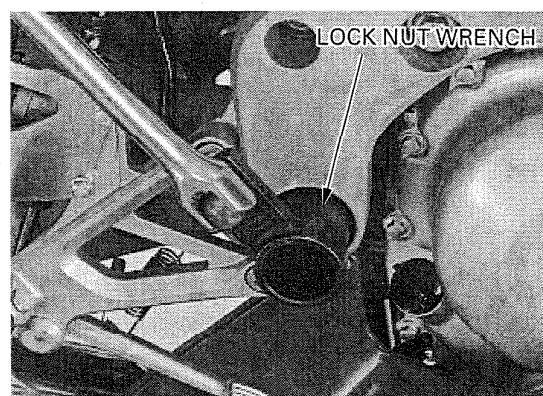


Loosen the left and right pivot lock nuts.

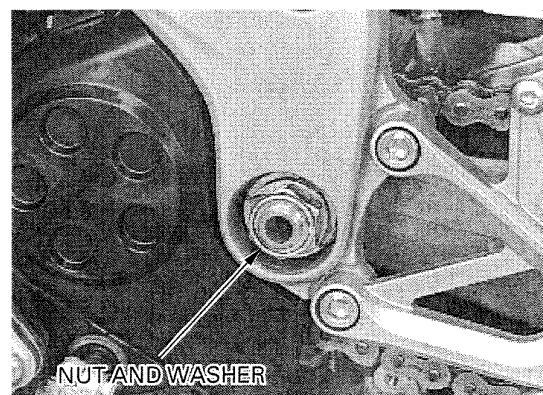
### TOOL:

Lock nut wrench

07908-4690003 or  
07908-4690002



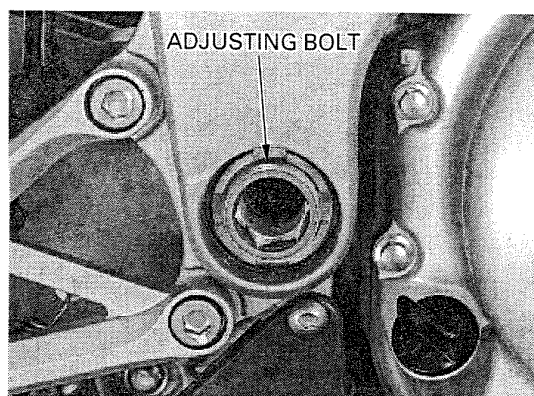
Remove the swingarm pivot nut and washer.  
Remove the pivot bolt.



## REAR WHEEL/SUSPENSION

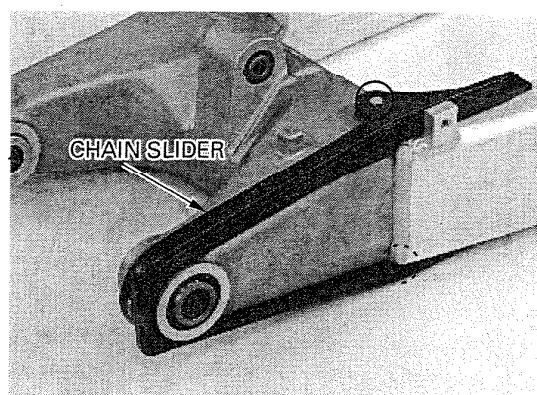
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Loosen the pivot adjusting bolts and remove the swingarm.

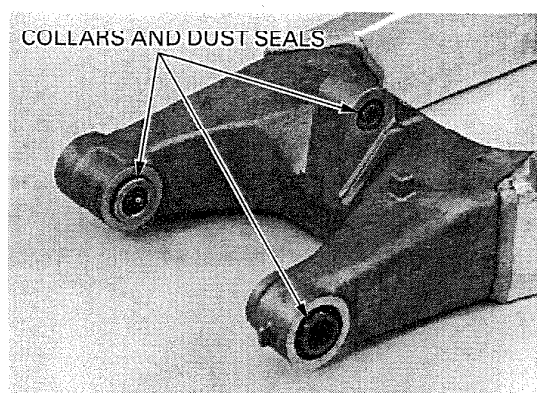


### DISASSEMBLY

Remove the two bolts and drive chain slider if necessary.

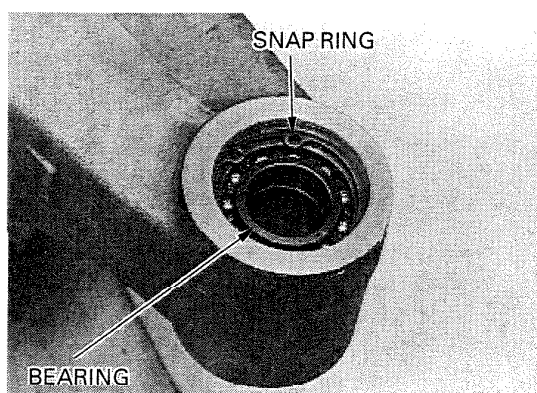


Remove the pivot collars and dust seals.



### PIVOT BEARING REPLACEMENT

Remove the snap ring.  
Drive ball bearings and distance collar out of the right pivot.



Press the needle bearing out of the left pivot using the special tools.

## TOOLS:

**Driver shaft** 07946-MJ00100  
**Needle bearing remover** 07HMC-MR70100

Pack new ball bearing cavities with grease.  
 Press the inner bearing into the right pivot with the marking side facing up until it is fully seated, using the special tools.

## TOOLS:

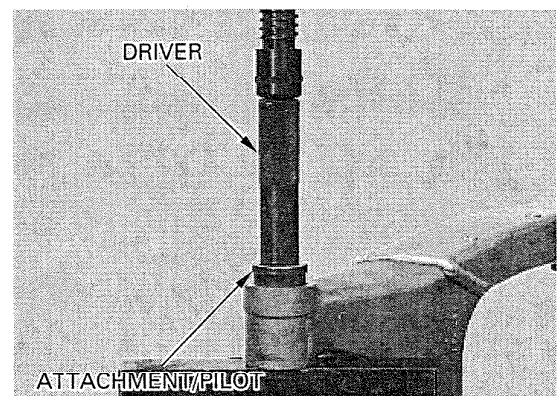
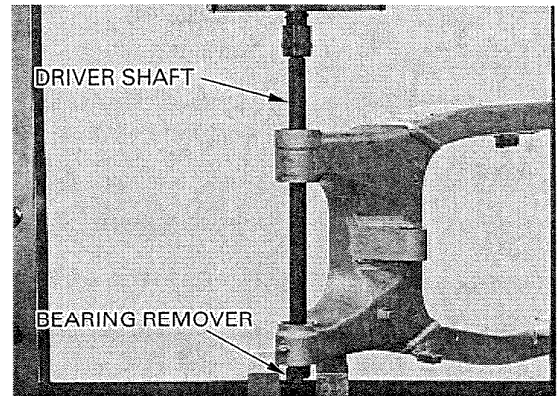
**Driver** 07749-0010000  
**Attachment, 32 × 35 mm** 07746-0010100  
**Pilot, 20 mm** 07746-0040500

Install the distance collar.  
 Press the outer bearing into the right pivot with the marking side facing up until it is seated, using the special tools.

## TOOLS:

**Driver** 07749-0010000  
**Attachment, 37 × 40 mm** 07746-0010200  
**Pilot, 20 mm** 07746-0040500

Install the snap ring.

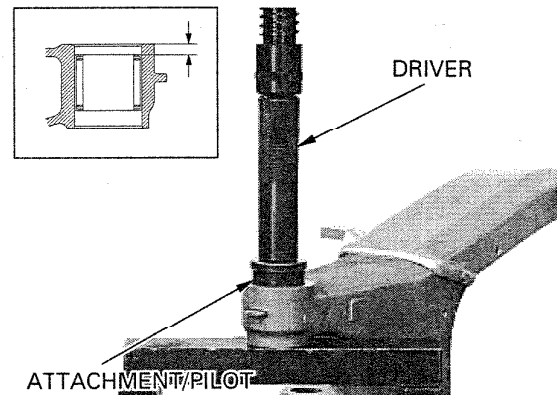


*Press in the bearing with the marking side facing up.*

Apply grease to the needle rollers of a new bearing. Carefully press the needle bearing into the left pivot until the depth from the swingarm outer surface is 5–6 mm (0.20–0.24 in), using the special tools.

## TOOLS:

**Driver** 07749-0010000  
**Attachment, 37 × 40 mm** 07746-0010200  
**Pilot, 28 mm** 07746-0041100



## SHOCK ARM BEARING REPLACEMENT

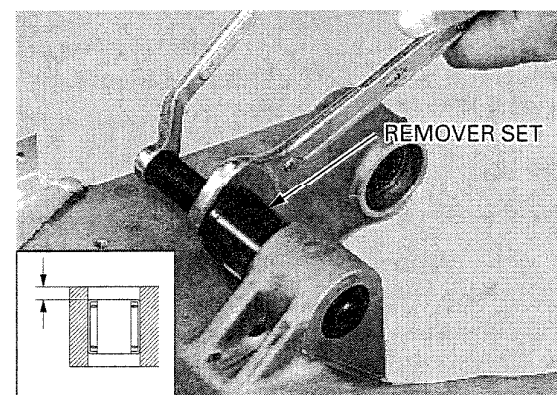
Draw the needle bearing out of the swingarm using the special tool.

## TOOL:

**Bearing remover set** 07LMC-KV30100

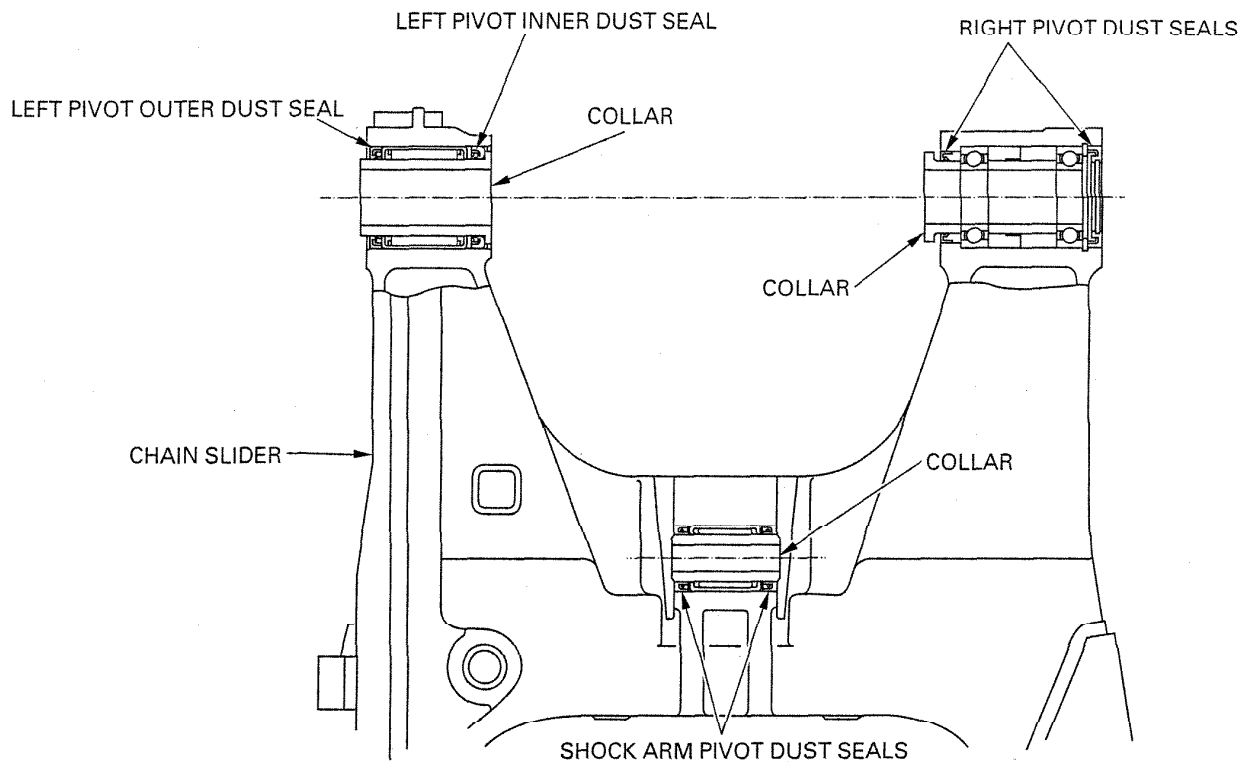
*Draw in the bearing with the marking side facing the flange of the special tool.*

Apply grease to the needle rollers of a new bearing. Install the needle bearing into pivot until the depth from the swingarm outer surface is 5.5–6.0 mm (0.22–0.24 in), using the same tool.



## REAR WHEEL/SUSPENSION

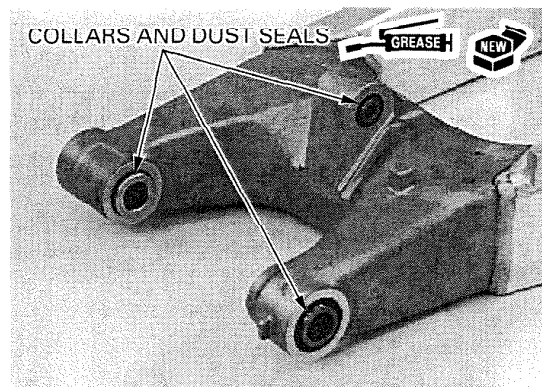
### ASSEMBLY



Apply grease to new dust seal lips and install them as follows:

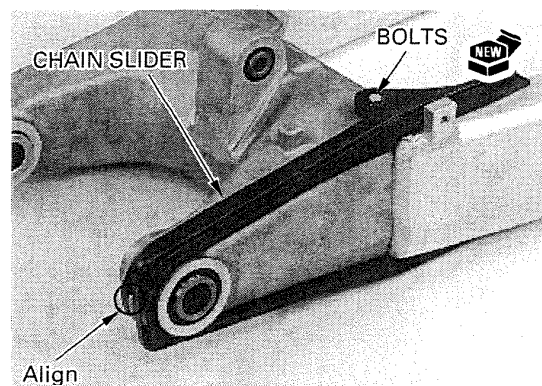
- shock arm pivot and swingarm right pivot seals until they are flush with swingarm outer surface
- left pivot outer dust seal until it is seated onto bearing
- left pivot inner dust seal until depth from swingarm outer surface is 4 mm (0.2 in).

Install the pivot collars as shown.



Install the drive chain slider if removed, aligning the hole with the boss of the swingarm. Install new slider bolts and tighten them.

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



## INSTALLATION

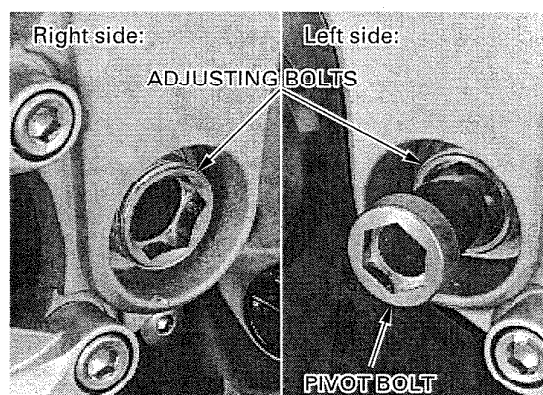
NOTE:

When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 14-1 "SERVICE INFORMATION".

**CAUTION:**

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

1. Install the left and right adjusting bolts so that they do not project out of the frame inner surface.
2. Obtain a spare pivot bolt (P/N 52101-MBW-000) for this model or use a 20 mm (0.8 in) O.D. shaft. Set the swingarm into the frame and the shock arm plates and temporarily insert the spare pivot bolt or 20 mm O.D. shaft from the left side to support the swingarm.  
Be sure that the swingarm is properly aligned.

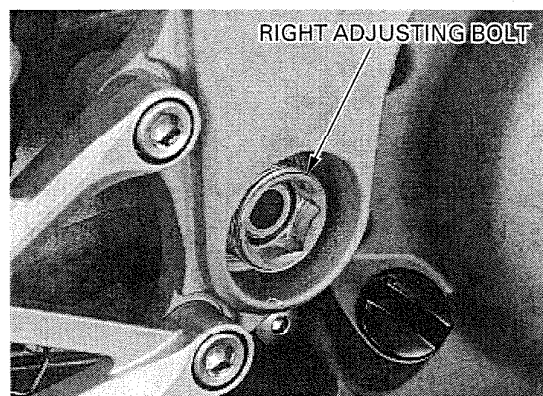


3. Tighten the right adjusting bolt.

**TORQUE : 12 N·m (1.2 kgf·m , 9 lbf·ft)**

Loosen the right adjusting bolt and retighten it to the specified torque.

**TORQUE : 7 N·m (0.7 kgf·m , 5.1 lbf·ft)**

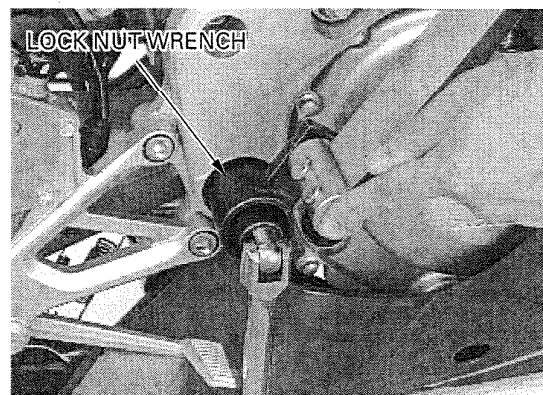


4. Install the right lock nut.  
Hold the right adjusting bolt and tighten the right lock nut.

**TOOL:**

**Lock nut wrench** 07908-4690003 or  
07908-4690002

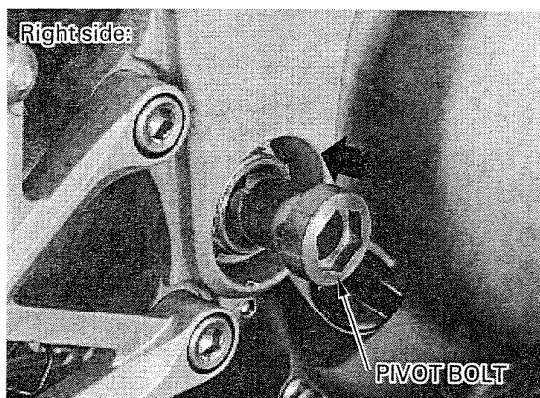
**TORQUE: Actual:** 64 N·m (6.5 kgf·m , 47 lbf·ft)  
**Indicated:** 58 N·m (5.9 kgf·m , 43 lbf·ft)





## REAR WHEEL/SUSPENSION

5. Insert the other pivot bolt from the right side gradually pushing the left side pivot bolt out from the left side.

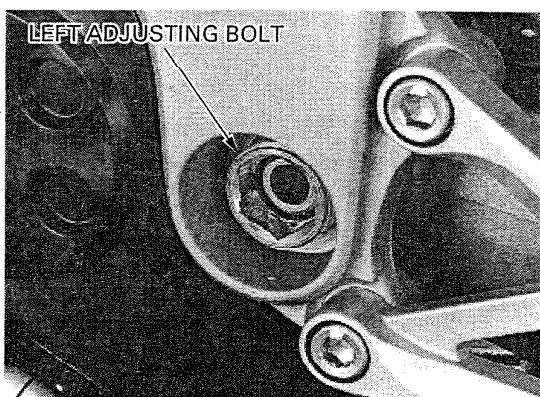


6. Tighten the left adjusting bolt.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Loosen the left adjusting bolt and retighten it to the specified torque.

**TORQUE** : 7 N·m (0.7 kgf·m , 5.1 lbf·ft)



7. Install the left lock nut.

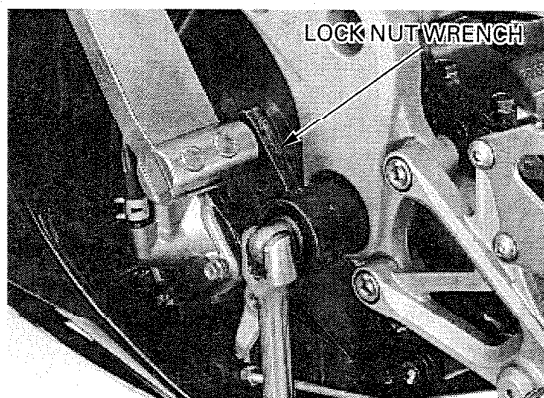
Hold the left adjusting bolt and tighten the left lock nut.

**TOOL:**

**Lock nut wrench**

07908-4690003 or  
07908-4690002

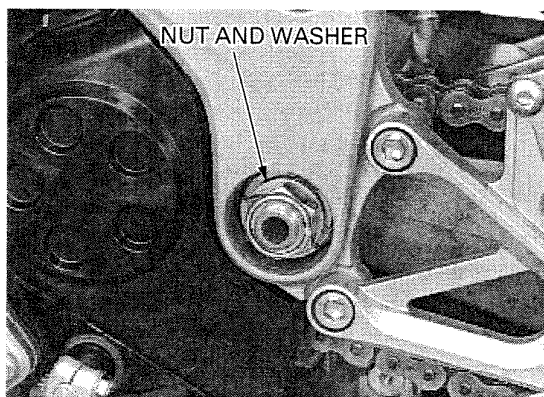
**TORQUE: Actual:** 64 N·m (6.5 kgf·m , 47 lbf·ft)  
**Indicated:** 58 N·m (5.9 kgf·m , 43 lbf·ft)



8. Push in the pivot bolt until it is seated.

Install the pivot nut with the washer and tighten it.

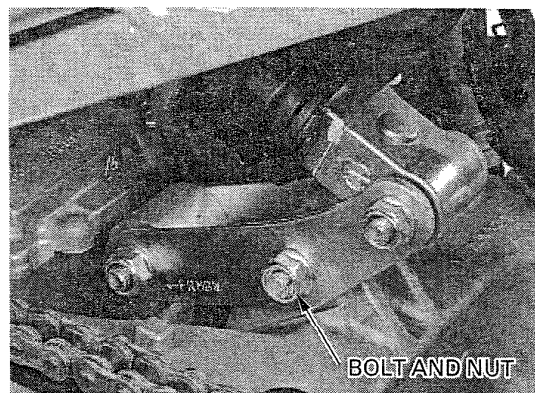
**TORQUE** : 93 N·m (9.5 kgf·m , 69 lbf·ft)



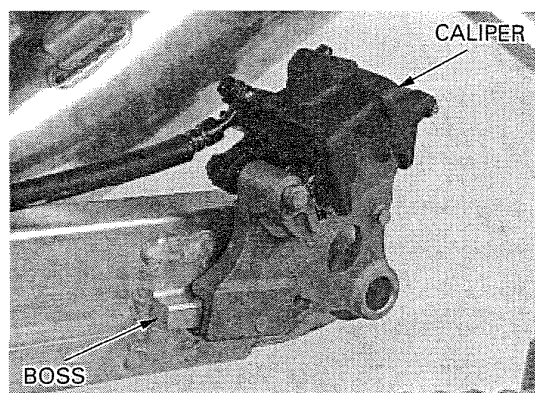
## REAR WHEEL/SUSPENSION

Install the shock arm-to-swingarm bolt and nut.  
Tighten the nut.

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

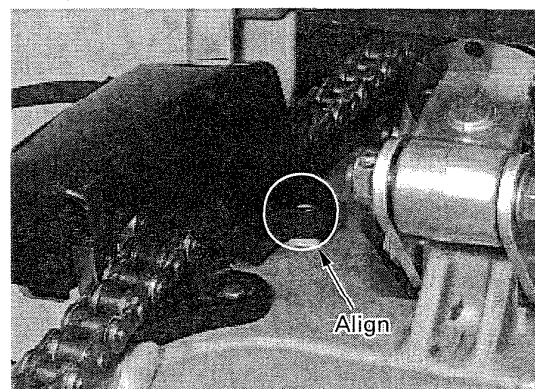
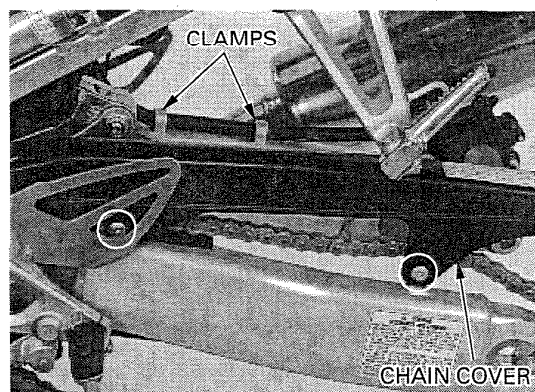


Install the brake caliper/bracket assembly onto the boss of the swingarm.



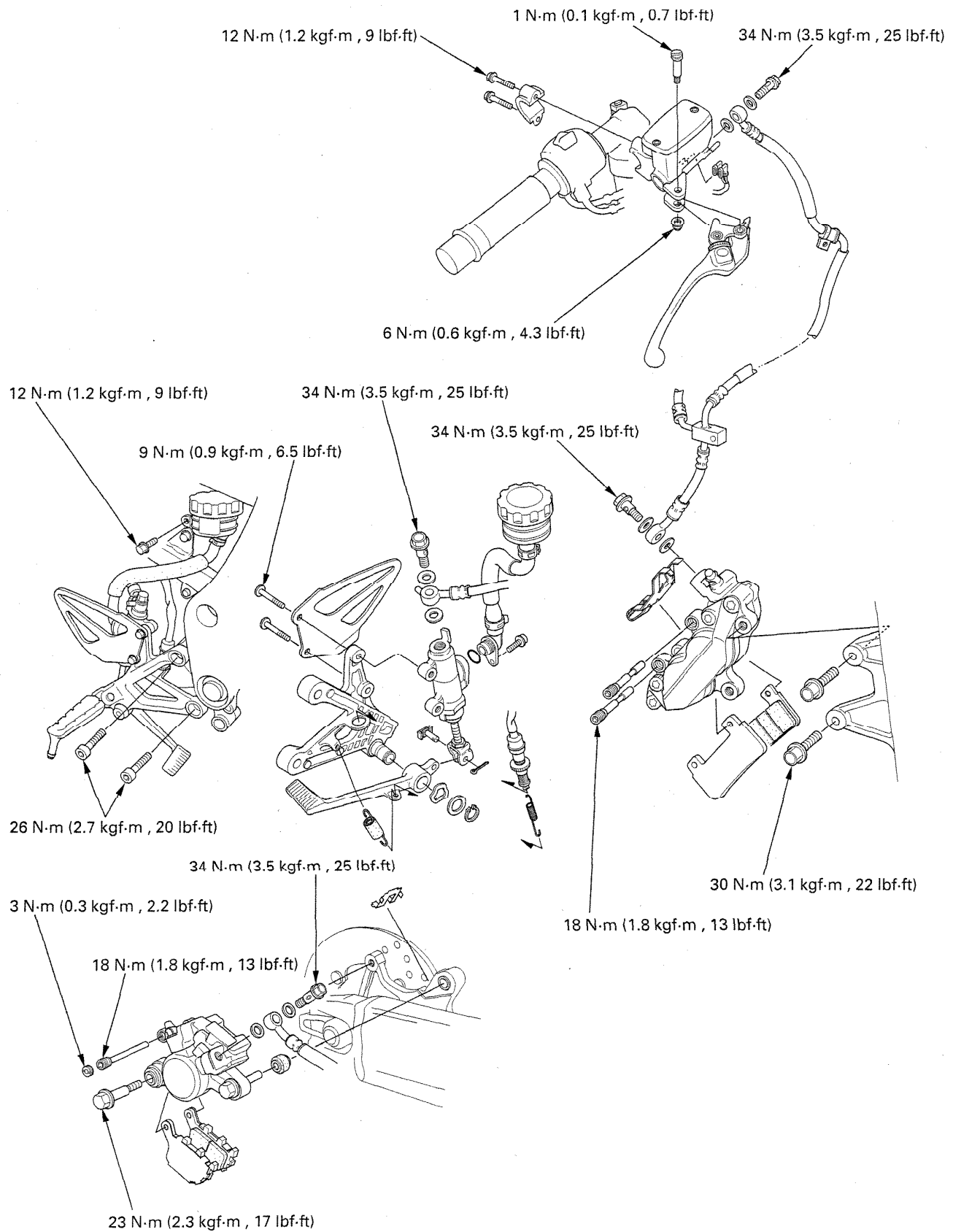
Install the brake hose clamps with the bolts.  
Install the chain cover by aligning the hole with the boss of the swingarm, and tighten the two bolts.

Install the rear wheel (page 14-8).





## HYDRAULIC BRAKE



# 15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-1	FRONT MASTER CYLINDER	15-8
TROUBLESHOOTING	15-2	REAR MASTER CYLINDER/ BRAKE PEDAL	15-12
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-3	FRONT BRAKE CALIPER	15-16
BRAKE PAD/DISC	15-5	REAR BRAKE CALIPER	15-19

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

*A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the motorcycle.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.4–4.6 (0.17–0.18)	3.5 (0.14)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)
	Master piston O.D.	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)
	Caliper cylinder I.D.	A 33.96–34.01 (1.337–1.339)	34.02 (1.339)
		B 32.030–32.080 (1.2610–1.2630)	32.09 (1.263)
	Caliper piston O.D.	A 33.895–33.928 (1.3344–1.3357)	33.87 (1.333)
		B 31.965–31.998 (1.2585–1.2598)	31.94 (1.257)
Rear	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.8–5.2 (0.19–0.20)	4.0 (0.16)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)
	Master piston O.D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.	38.18–38.23 (1.503–1.505)	38.24 (1.506)
	Caliper piston O.D.	38.098–38.148 (1.4999–1.5019)	38.09 (1.500)

## HYDRAULIC BRAKE

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### TORQUE VALUES

Brake caliper bleed valve	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Pad pin	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Pad pin plug	3 N·m (0.3 kgf·m , 2.2 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Front brake lever pivot bolt	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Front brake lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Front brake light switch screw	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Front brake caliper assembly bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Rear master cylinder joint nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Rear master cylinder mounting bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Rear brake caliper bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Front master cylinder reservoir cap screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Front master cylinder mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m , 22 lbf·ft)	ALOC bolt: replace with a new one
Rear brake reservoir mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Driver footpeg bracket bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)	

### TOOLS

Snap ring pliers	07914-SA50001
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## TROUBLESHOOTING

#### Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Bent brake lever/pedal

#### Brake lever/pedal hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever/pedal

#### Brake drag

- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

## BRAKE FLUID REPLACEMENT/ AIR BLEEDING

### ▲WARNING

*A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

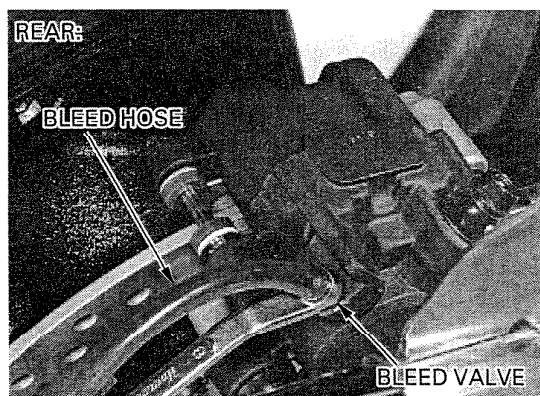
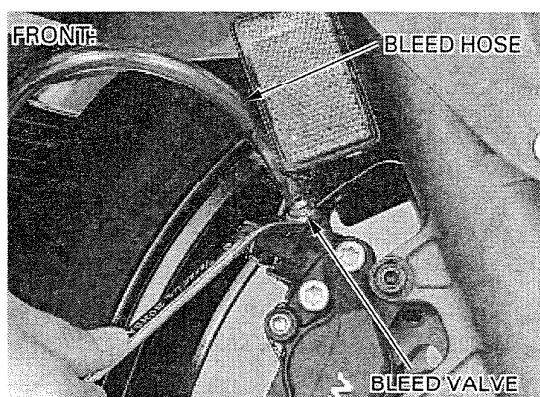
### CAUTION:

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.

### BRAKE FLUID DRAINING

Remove the reservoir cap, set plate and diaphragm (page 3-20 for front, page 3-21 for rear).

Connect the bleed hose to the bleed valve. Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve.



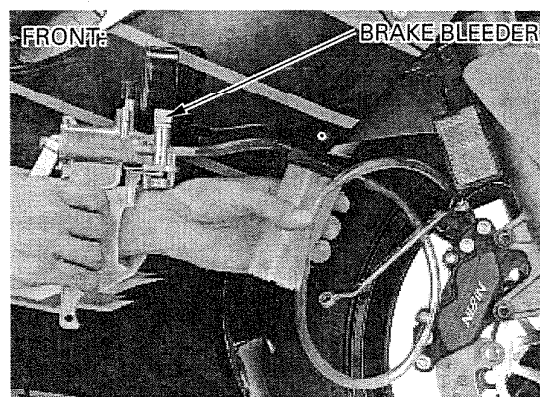
### BRAKE FLUID FILLING/BLEEDING

Close the bleed valve. Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve. Pump the brake bleeder and loosen the bleed valve. Add brake fluid when the fluid level in the reservoir is low.

### NOTE:

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



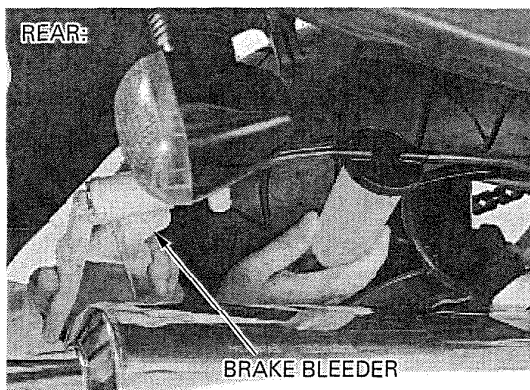
## HYDRAULIC BRAKE

Repeat the previous procedures until air bubbles do not appear in the plastic hose.

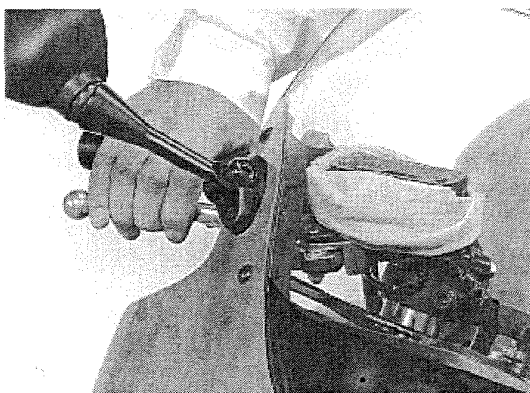
### NOTE:

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever or pedal. If it still feels spongy, bleed the system again.



If a brake bleeder is not available, use the following procedure:  
Pump up the system pressure with the brake lever or pedal until lever or pedal resistance is felt.

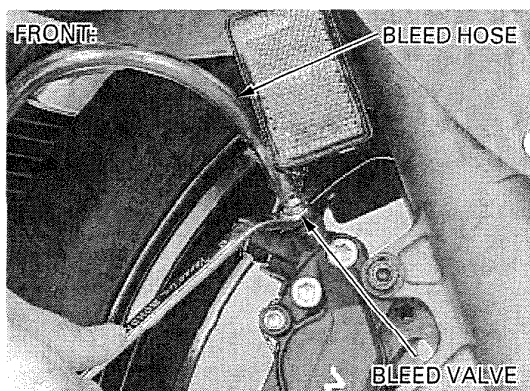


Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever or depress the brake pedal, open the bleed valve 1/2 turn and then close it.

### NOTE:

Do not release the brake lever or pedal until the bleed valve has been closed.



2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

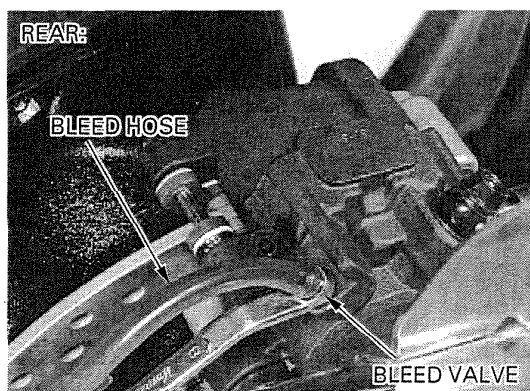
Repeat the steps 1 and 2 until air bubbles do not appear in the bleed hose.

Tighten the bleed valve.

**TORQUE** : 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap (page 3-20 for front, page 3-21 for rear).

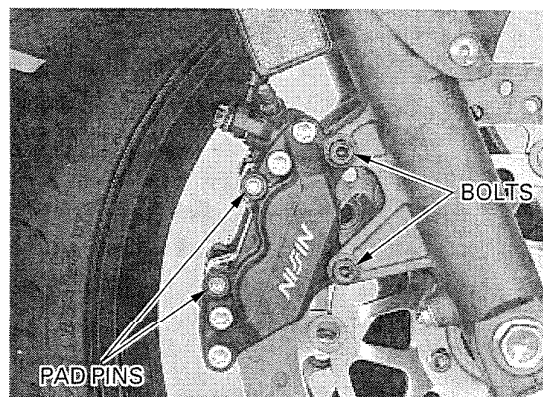


## BRAKE PAD/DISC

### FRONT BRAKE PAD REPLACEMENT

*Always replace the brake pads in pairs to ensure even disc pressure.*

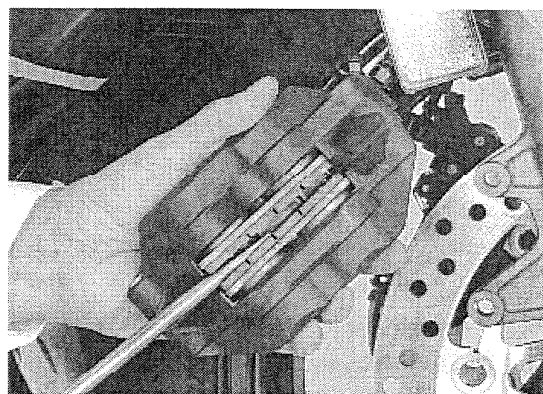
Loosen the pad pins.  
Remove the bolts and brake caliper.



Push the caliper pistons all the way in to allow installation of new brake pads.

#### NOTE:

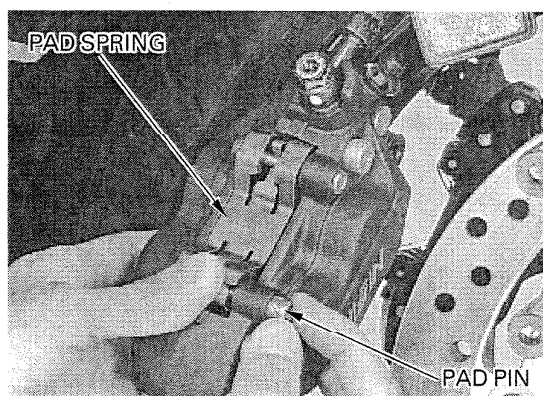
Check the brake fluid level in the brake reservoir as this operation causes the level to rise.



Remove the pad pins while pushing in the pad spring, then remove the pad spring and brake pads.

Install new brake pads and the pad spring with the arrow facing up.

Install the pad pin while pushing in the pad spring.



Install the front brake caliper so the disc is positioned between the pads, being careful not to damage the pads.

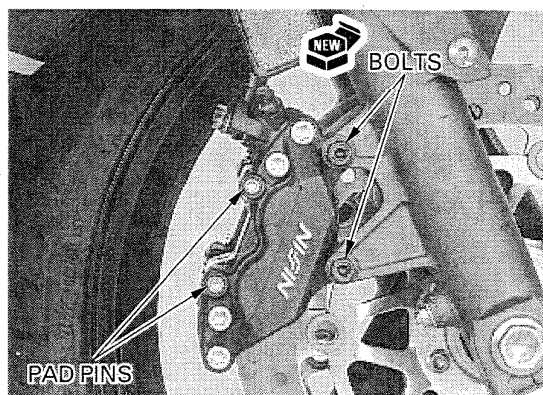
Install and tighten new mounting bolts.

**TORQUE** : 30 N·m (3.1 kgf·m , 22 lbf·ft)

Tighten the pad pins.

**TORQUE** : 18 N·m (1.8 kgf·m , 13 lbf·ft)

Operate the brake lever to seat the caliper pistons against the pads.





## HYDRAULIC BRAKE

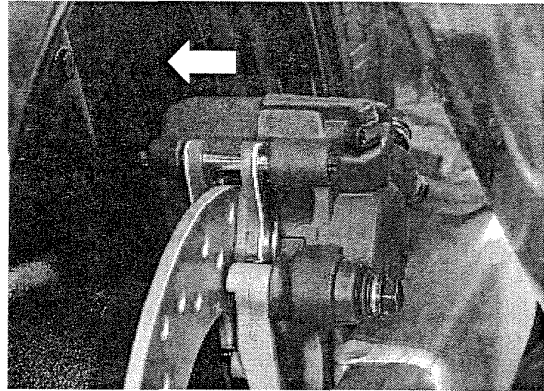
### REAR BRAKE PAD REPLACEMENT

*Always replace the brake pads in pairs to ensure even disc pressure.*

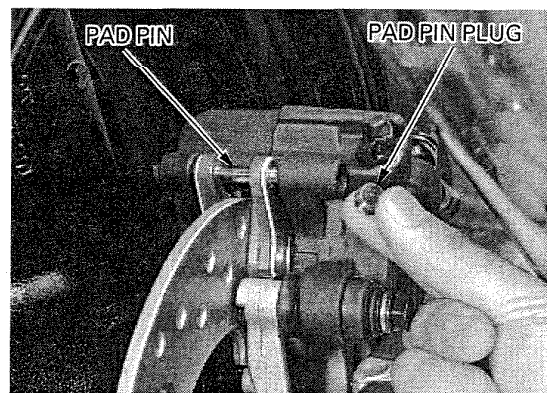
Push the caliper piston all the way in to allow installation of new brake pads.

**NOTE:**

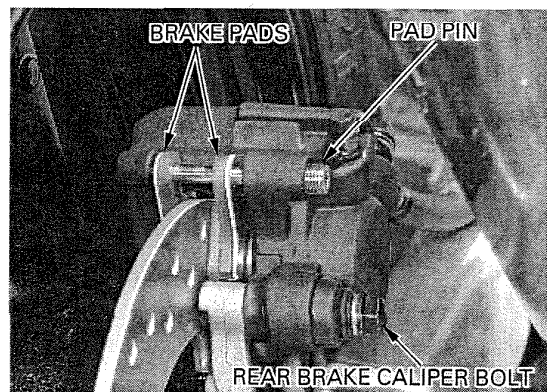
Check the brake fluid level in the brake reservoir as this operation causes the level to rise.



Remove the pad pin plug and loosen the pad pin.

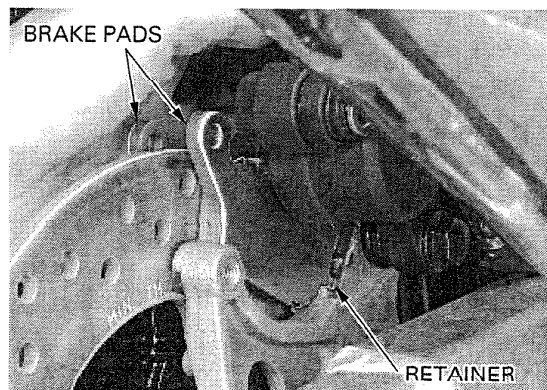


Remove the rear brake caliper bolt. Pivot the caliper up, and remove the pad pin and brake pads.



*Be careful not to lose the pad spring.*

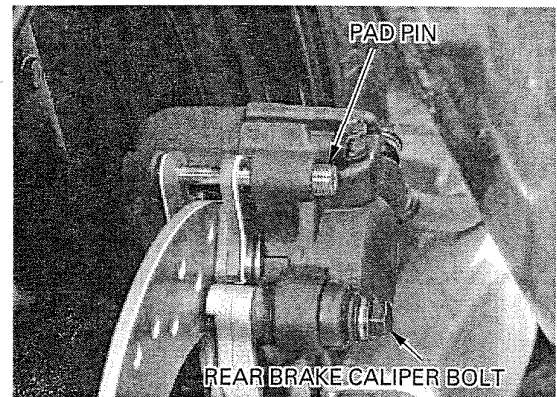
Install new brake pads so that their ends are positioned on the retainer on the caliper bracket as shown.





Lower the caliper and install the pad pin.  
Install and tighten the rear brake caliper bolt.

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



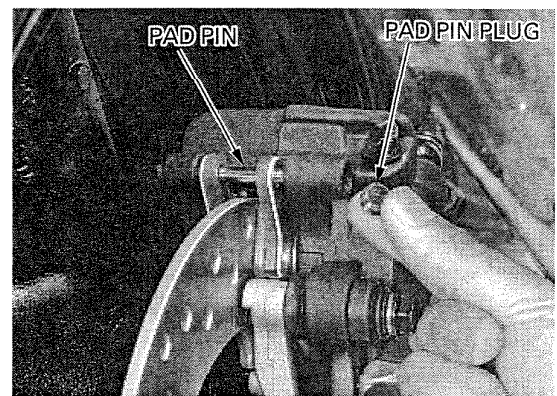
Tighten the pad pin.

**TORQUE** : 18 N·m (1.8 kgf·m , 13 lbf·ft)

Install and tighten the pad pin plug.

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

Operate the brake pedal to seat the caliper piston against the pads.

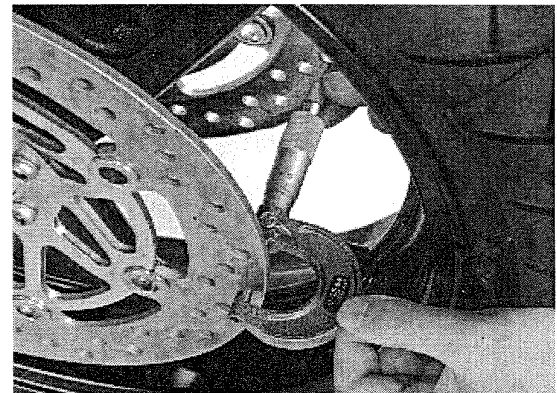


### BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

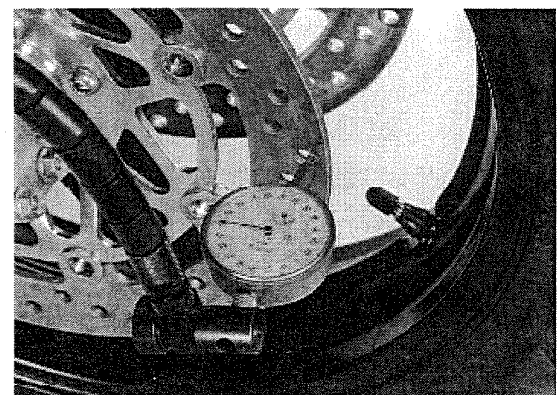
**SERVICE LIMITS:** Front: 3.5 mm (0.14 in)  
Rear: 4.0 mm (0.16 in)



Measure the brake disc warpage with a dial indicator.

**SERVICE LIMIT:** 0.30 mm (0.012 in)

Check the wheel bearing for excessive play, if the warpage exceeds the service limit.  
Replace the brake disc if the wheel bearings are normal.



## HYDRAULIC BRAKE

### FRONT MASTER CYLINDER

#### CAUTION:

- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

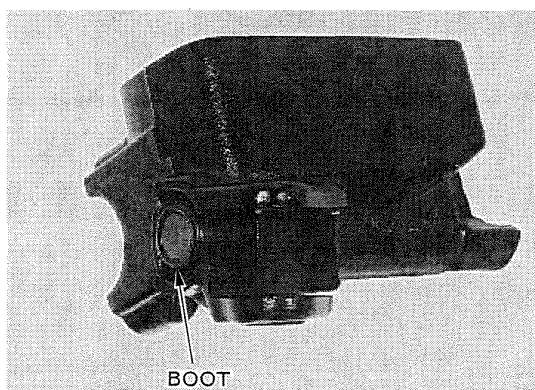
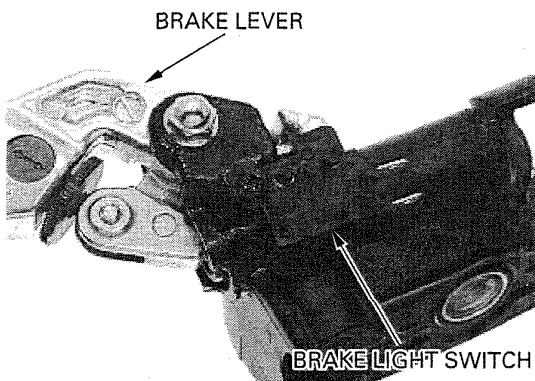
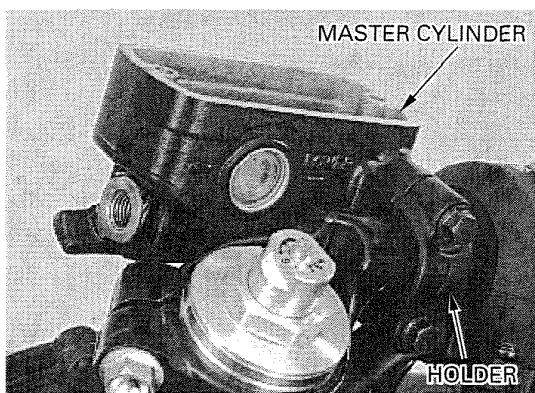
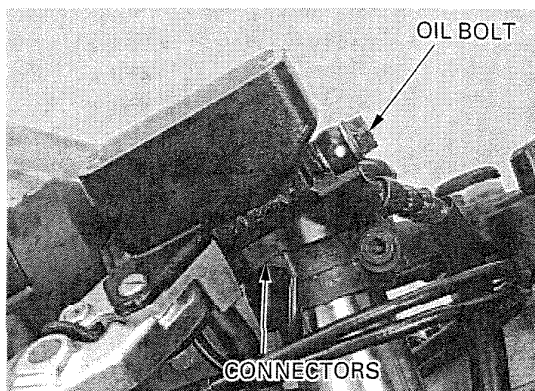
#### DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 15-3).

Disconnect the front brake light switch connectors. Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers. Remove the master cylinder holder bolts, holder and the master cylinder.

Remove the pivot nut, bolt and brake lever assembly.  
Remove the screw and front brake light switch.

Remove the piston boot from the master piston and master cylinder.

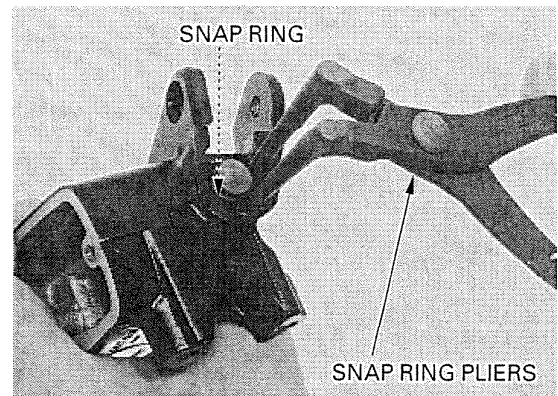


Remove the snap ring using the special tool.

**TOOL:**

Snap ring pliers

07914-SA50001

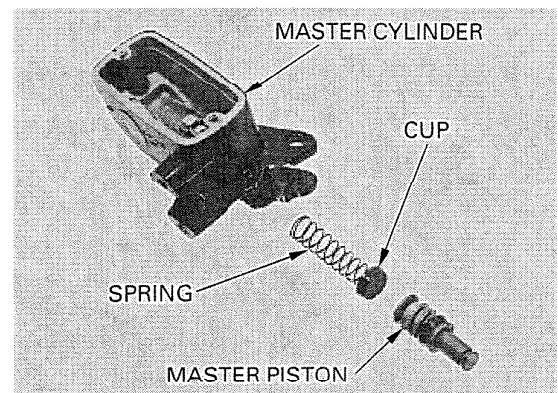


Remove the master piston, cup and spring from the master cylinder.

Clean the master cylinder and master piston with clean brake fluid.

**INSPECTION**

Check the cups for wear, deterioration or damage.  
Check the spring for damage.



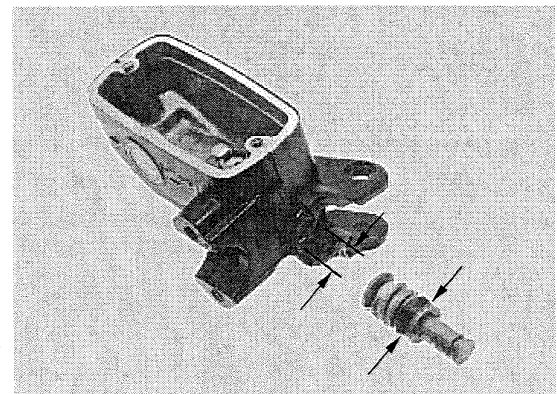
Check the master cylinder and piston for scoring, scratches or damage.

Measure the master cylinder I.D.

**SERVICE LIMIT:** 15.925 mm (0.6270 in)

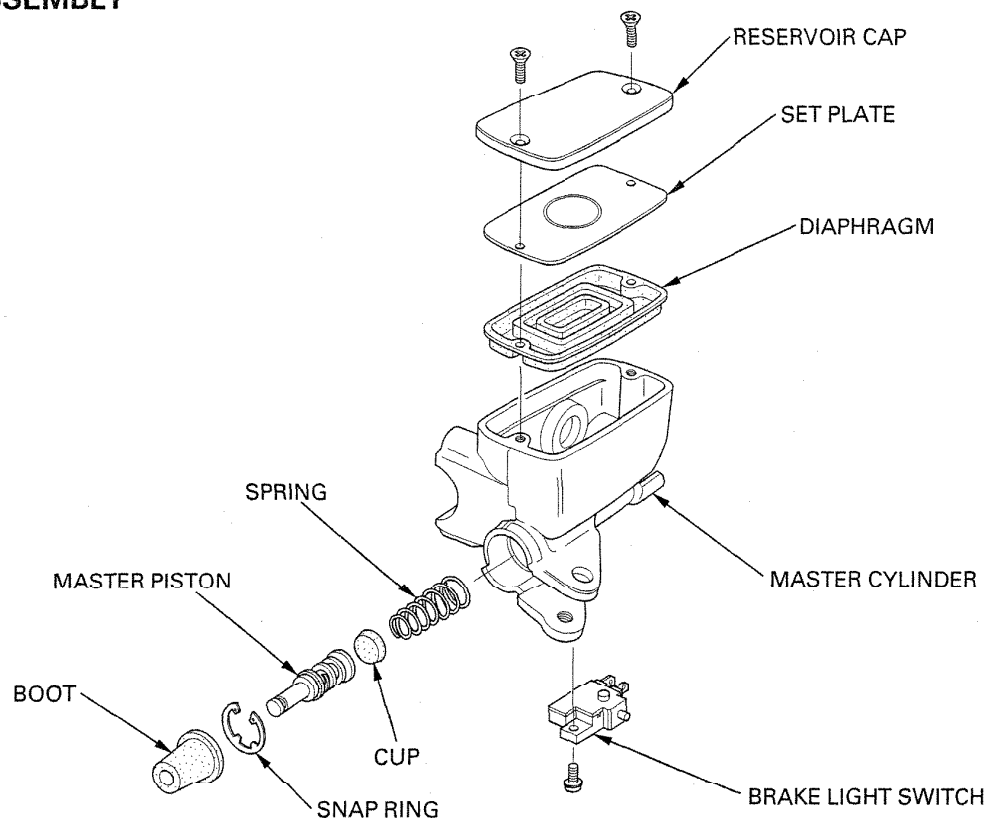
Measure the master piston O.D.

**SERVICE LIMIT:** 15.815 mm (0.6226 in)



## HYDRAULIC BRAKE

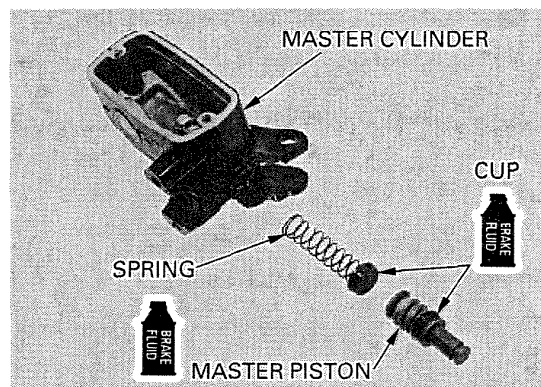
### ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.  
Install the spring, cup and master piston into the master cylinder.

#### CAUTION:

*Do not allow the piston cup lips to turn inside out.*



Install the snap ring into the groove in the master cylinder, using the special tool.

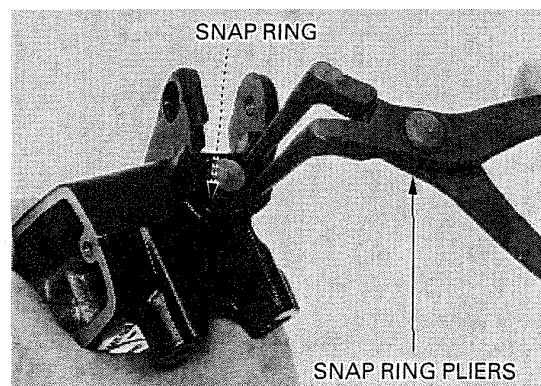
#### TOOL:

Snap ring pliers

07914-SA50001

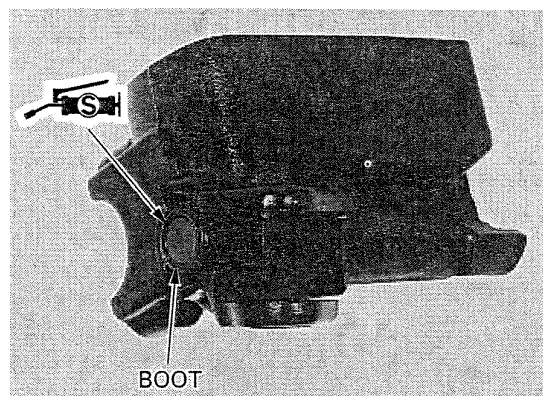
#### CAUTION:

*Be certain the snap ring is firmly seated in the groove.*



Install the boot onto the piston and into the master cylinder.

Apply silicone grease to the brake lever contacting area of the master piston.



Apply silicone grease to the pivot bolt sliding surface.

Install the brake lever assembly and pivot bolt. Tighten the pivot bolt.

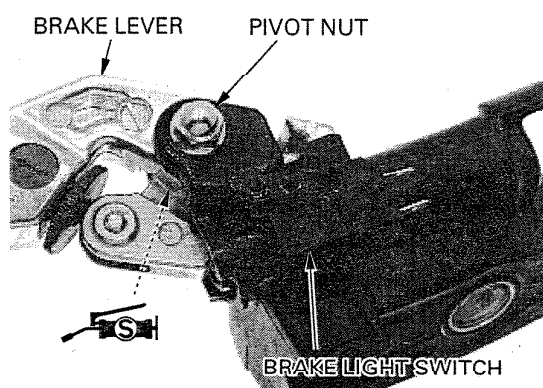
**TORQUE** : 1 N·m (0.1 kgf·m , 0.7 lbf·ft)

Install and tighten the pivot nut.

**TORQUE** : 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Install the front brake light switch with the screw.

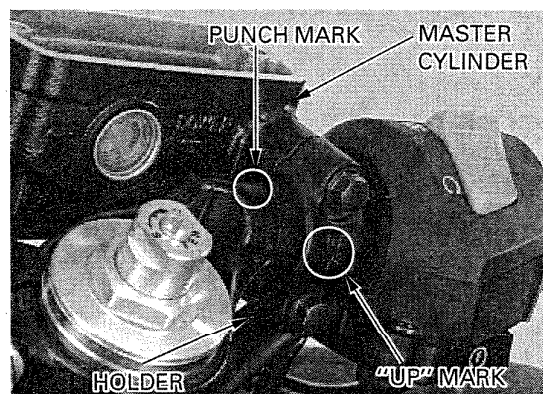
**TORQUE** : 1 N·m (0.1 kgf·m , 0.7 lbf·ft)



Install the master cylinder and holder with the "UP" mark facing up.

Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)



Connect the brake hose to the master cylinder with the oil bolt and new sealing washers and tighten the oil bolt.

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

Connect the front brake light switch connectors.

Fill and bleed the front hydraulic system (page 15-3).





### REAR MASTER CYLINDER/ BRAKE PEDAL

#### CAUTION:

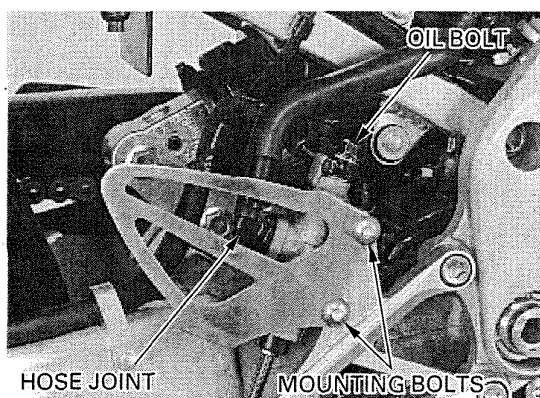
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

#### DISASSEMBLY

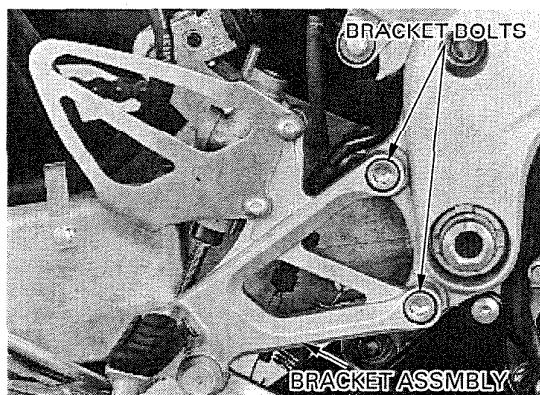
Drain the brake fluid from the rear brake hydraulic system (page 15-3).

Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers. Remove the screw and reservoir hose joint from the master cylinder. Remove the O-ring.

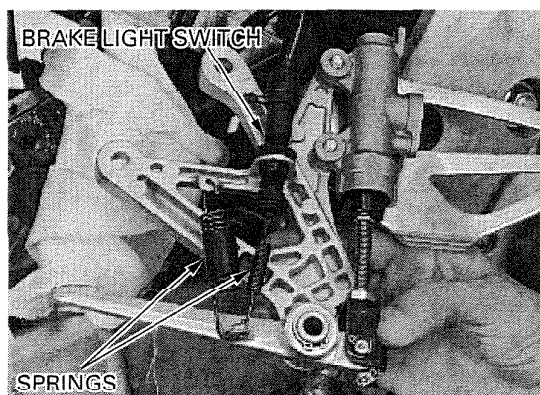
Loosen the master cylinder mounting bolts.



Remove the footpeg bracket bolts and footpeg bracket assembly.



Remove the rear brake light switch spring and brake pedal return spring. Remove the brake light switch from the footpeg bracket.

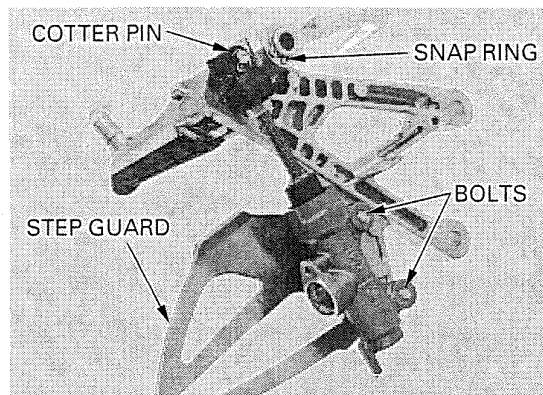


Remove the master cylinder mounting bolts and step guard.

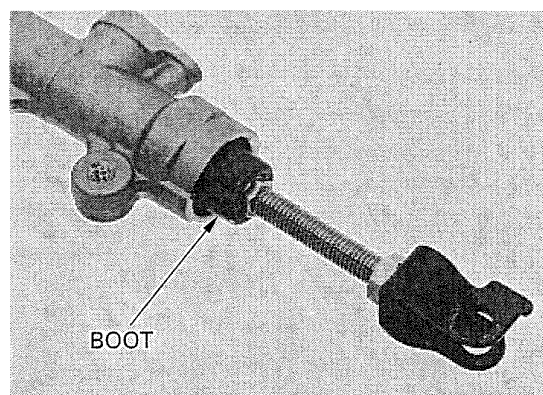
Remove the snap ring, washers and brake pedal from the footpeg bracket.

Remove the cotter pin from the joint pin.

Remove the joint pin and master cylinder from the brake pedal.



Remove the boot from the master cylinder.

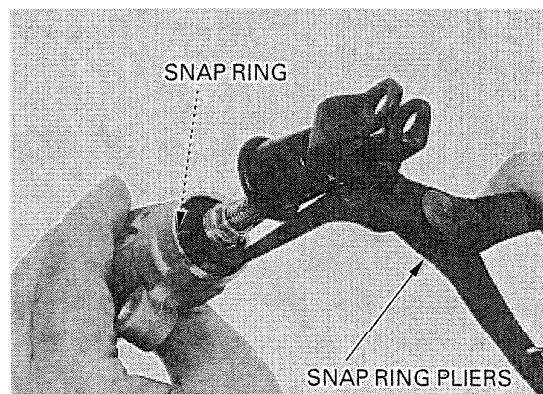


Remove the snap ring using the special tool.

**TOOL:**

Snap ring pliers

07914-SA50001



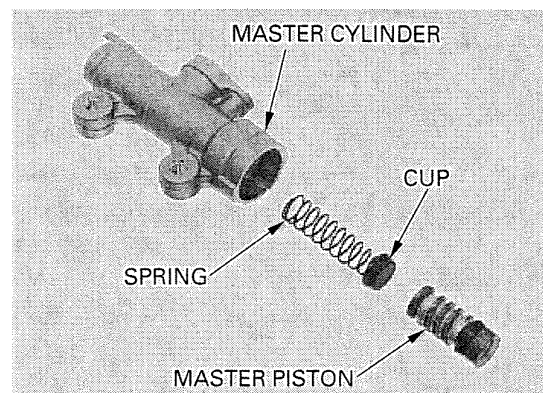
Remove the master piston, cup and spring.

Clean the master cylinder and master piston in clean brake fluid.

**INSPECTION**

Check the cups for wear, deterioration or damage.

Check the spring for damage.





## HYDRAULIC BRAKE

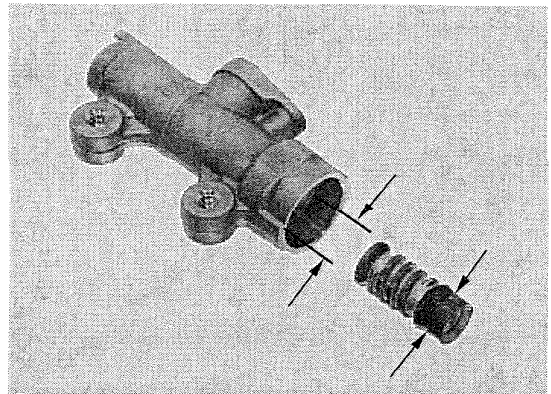
Check the master cylinder and piston for scoring or damage.

Measure the master cylinder I.D.

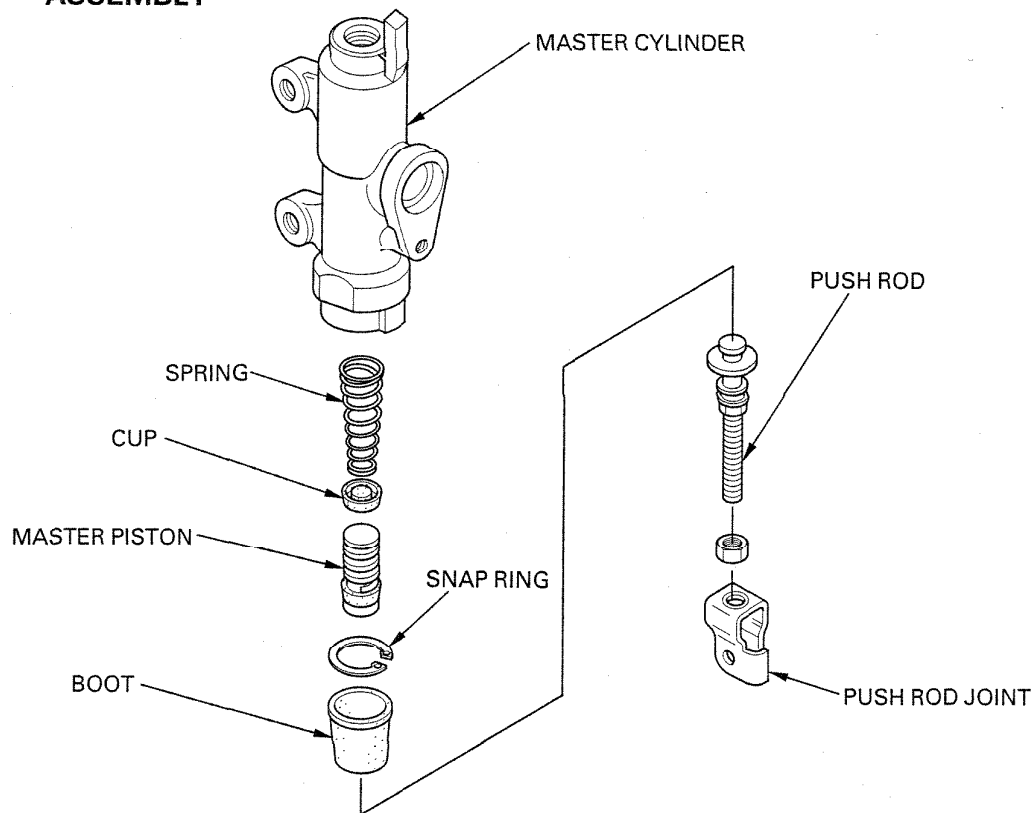
**SERVICE LIMIT:** 14.055 mm (0.5533 in)

Measure the master piston O.D.

**SERVICE LIMIT:** 13.945 mm (0.5490 in)



### ASSEMBLY

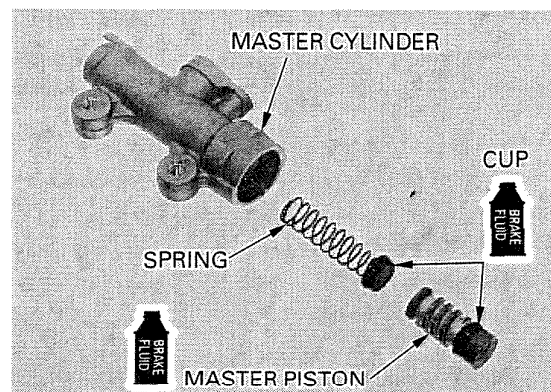


Coat the master piston and piston cups with clean brake fluid.  
Install the spring, cup and master piston into the master cylinder.

#### CAUTION:

***Do not allow the piston cup lips to turn inside out.***

Apply silicone grease to the push rod contacting area of the master piston.



Install the push rod into the master cylinder.  
Install the snap ring into the groove in the master cylinder, using the special tool.

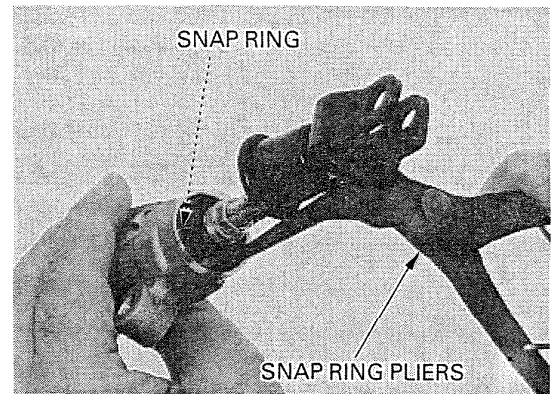
**TOOL:**

Snap ring pliers

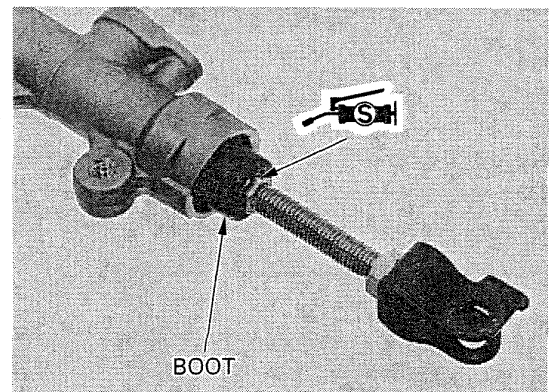
07914-SA50001

**CAUTION:**

*Be certain the snap ring is firmly seated in the groove.*

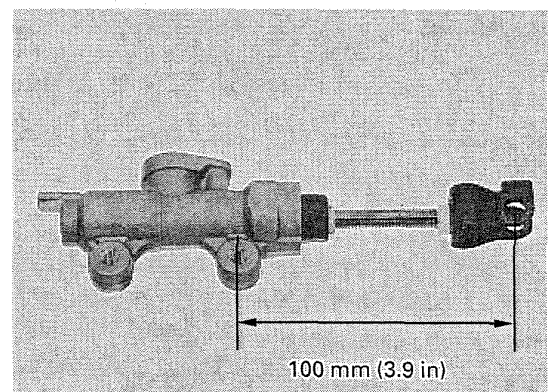


Apply silicone grease to the boot groove in the push rod and install the piston boot into the master cylinder and the groove in the push rod.



If the push rod joint is reinstalled, adjust the push rod length so that the distance from the center of the master cylinder lower mounting hole to the center of the joint pin hole is 100 mm (3.9 in). After adjustment, tighten the joint nut.

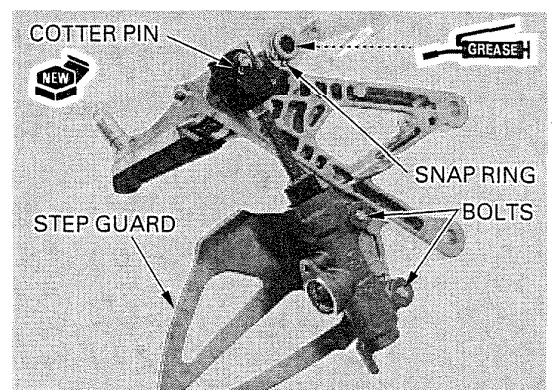
**TORQUE** : 18 N·m (1.8 kgf·m , 13 lbf·ft)



Connect the master cylinder push rod joint to the brake pedal with the joint pin and a new cotter pin.

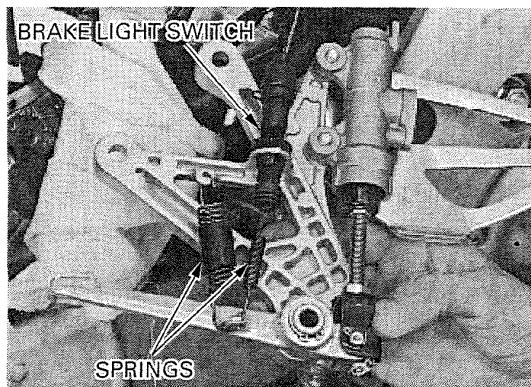
Apply grease to the brake pedal pivot.  
Install the brake pedal onto the pivot shaft.  
Install the wave washer, plain washer and snap ring onto the pivot shaft.

Install the master cylinder with the mounting bolts and step guard.



## HYDRAULIC BRAKE

Connect the pedal return spring as shown.  
Install the rear brake light switch into the footpeg bracket and connect the rear brake light switch spring.

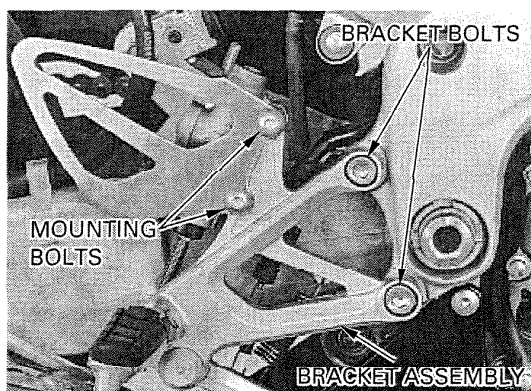


Install the footpeg bracket assembly onto the frame and tighten the bracket bolts.

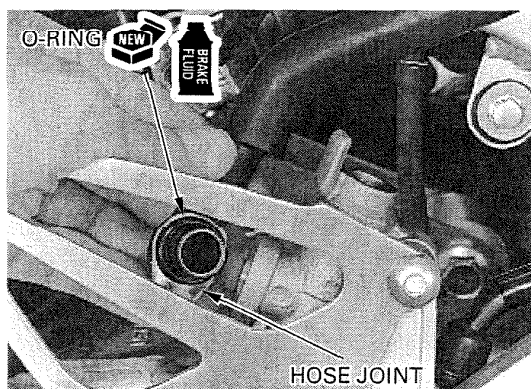
**TORQUE** : 26 N·m (2.7 kgf·m , 20 lbf·ft)

Tighten the master cylinder mounting bolts.

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



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

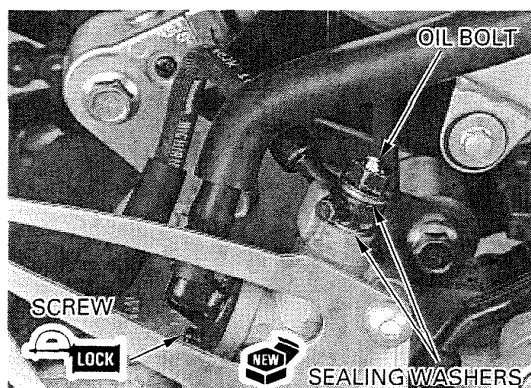


Apply locking agent to the hose joint screw.  
Install the screw and tighten it.

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers, and tighten the oil bolt.

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

Fill and bleed the rear brake hydraulic system (page 15-3).



## FRONT BRAKE CALIPER

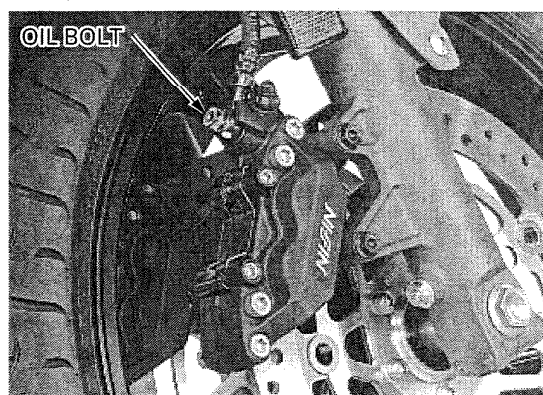
### CAUTION:

*Avoid spilling fluid on painted, plastic or rubber parts.  
Place a rag over these parts whenever the system is serviced.*

### DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 15-3).

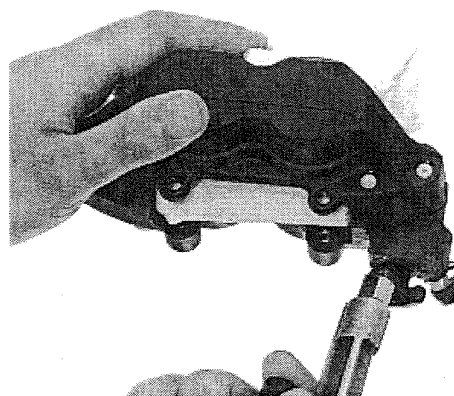
Disconnect the brake hose from the front brake caliper by removing the oil bolt and sealing washers. Remove the brake pads (page 15-5).



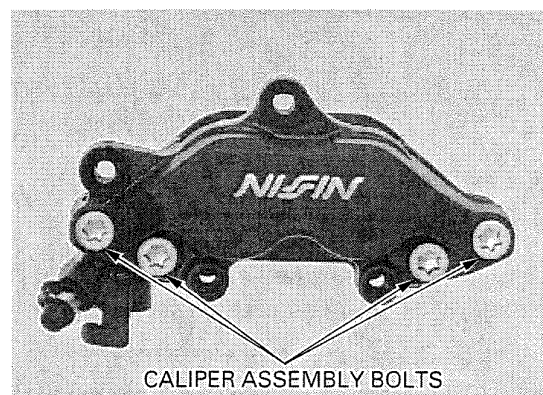
Install a corrugated cardboard or soft wood sheet between the pistons.  
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

### ⚠WARNING

*Do not use high pressure air or bring the nozzle too close to the inlet.*



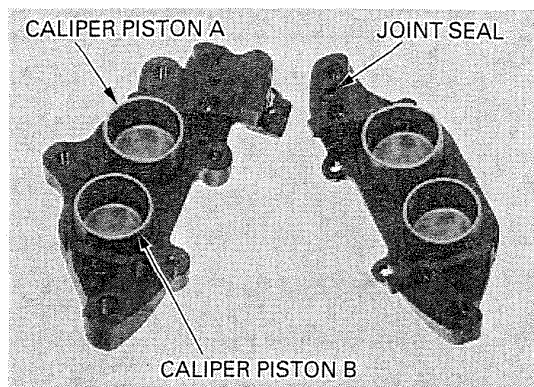
Remove the four caliper assembly bolts and separate the caliper body halves.



## HYDRAULIC BRAKE

Remove the following:

- joint seal
- caliper piston A
- caliper piston B

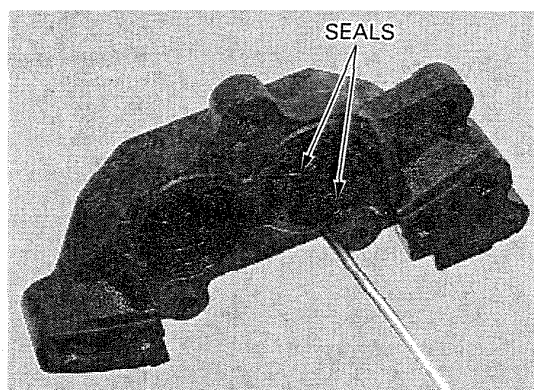


Push the dust seals and piston seals in and lift them out.

### CAUTION:

***Be careful not to damage the piston sliding surface.***

Clean the seal grooves, caliper cylinders and piston with clean brake fluid.



## INSPECTION

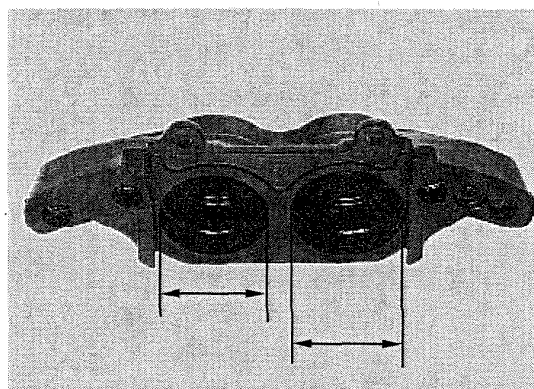
Check the caliper cylinders and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

### SERVICE LIMITS:

**Cylinder A:** 34.02 mm (1.339 in)

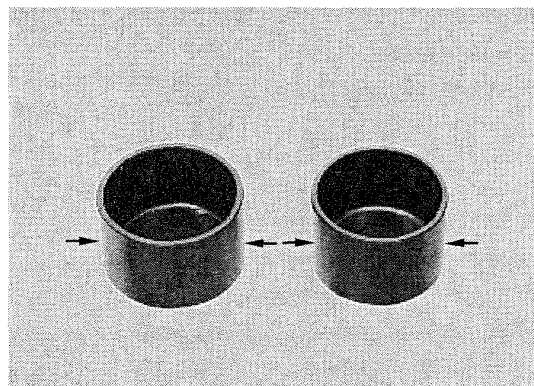
**Cylinder B:** 32.09 mm (1.263 in)



Measure the caliper piston O.D.

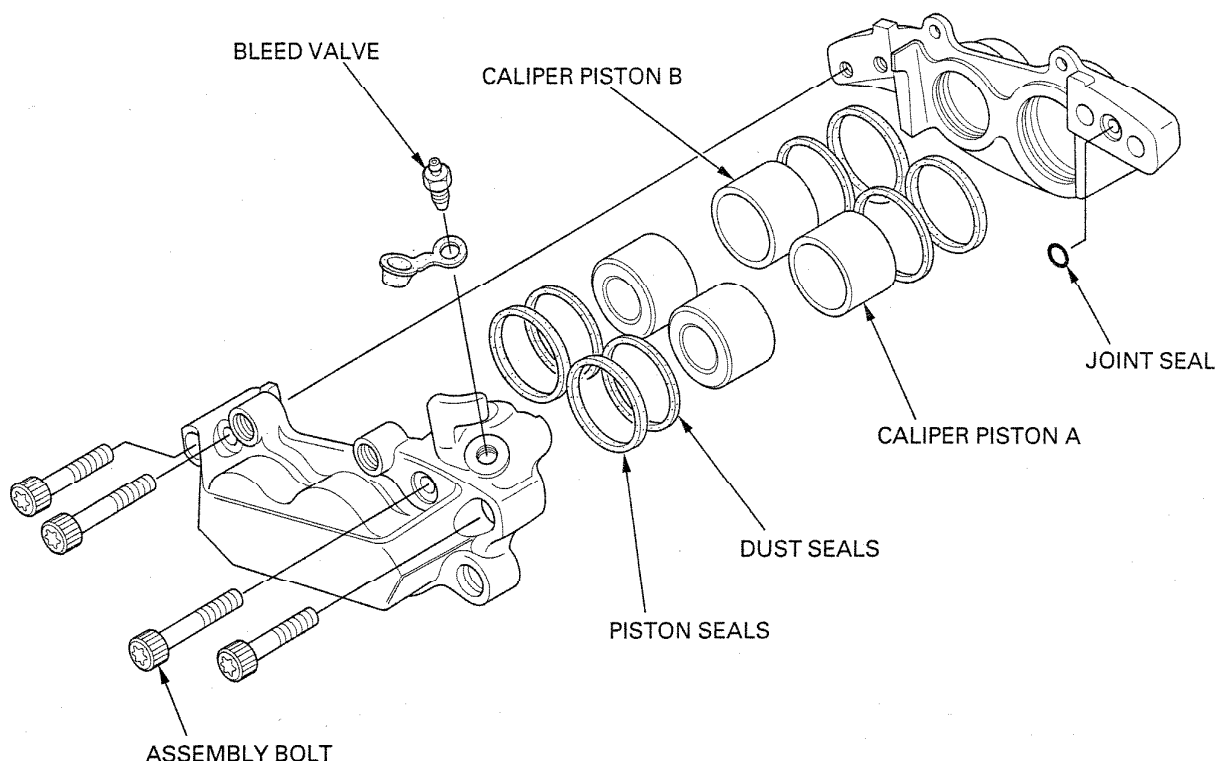
**SERVICE LIMITS: Piston A:** 33.87 mm (1.333 in)

**Piston B:** 31.94 mm (1.257 in)



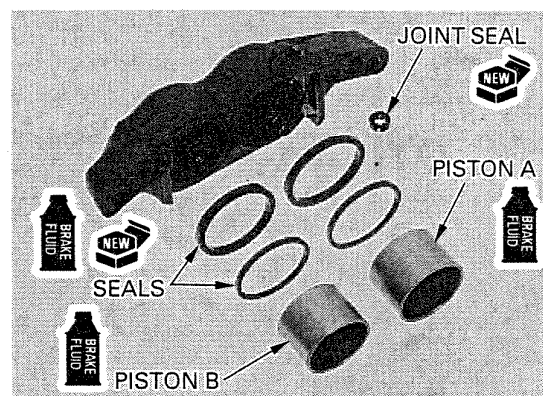


## ASSEMBLY



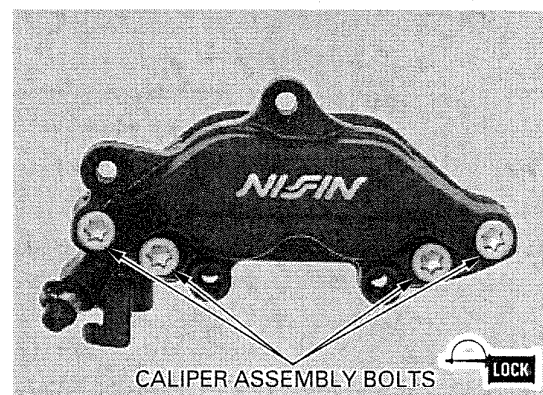
Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper. Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

Install a new joint seal into the fluid passage groove in the caliper body.



Assemble the caliper body halves.  
Apply locking agent to the caliper assembly bolt threads.  
Install and tighten the assembly bolts.

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



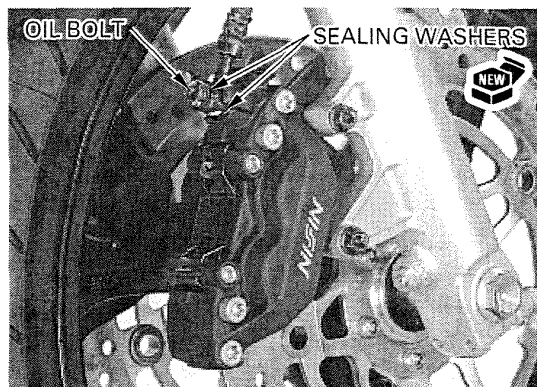
## HYDRAULIC BRAKE

Install the brake pads (page 15-5).

Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

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

Fill and bleed the front brake hydraulic system (page 15-3).



## REAR BRAKE CALIPER

### CAUTION:

*Avoid spilling fluid on painted, plastic or rubber parts.*

*Place a rag over these parts whenever the system is serviced.*

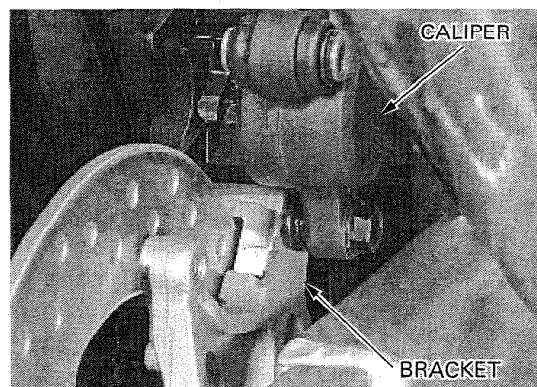
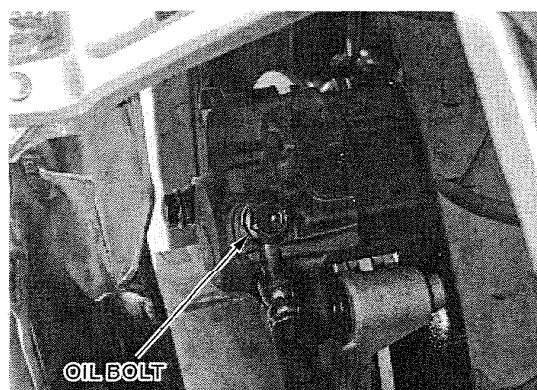
### DISASSEMBLY

Drain the brake fluid from the rear brake hydraulic system (page 15-3).

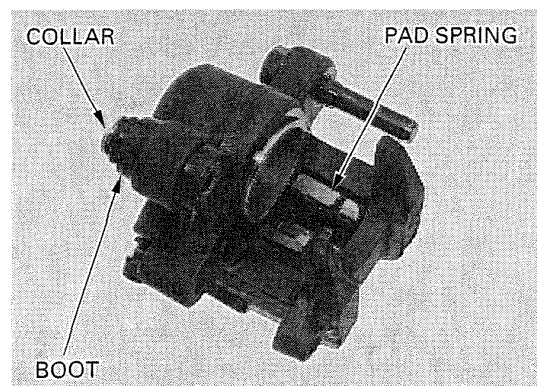
Disconnect the brake hose from the rear brake caliper by removing the oil bolt and sealing washers.

Remove the rear brake pads (page 15-6).

Remove the rear brake caliper from the bracket.



Remove the pad spring, collar and boot from the caliper body.

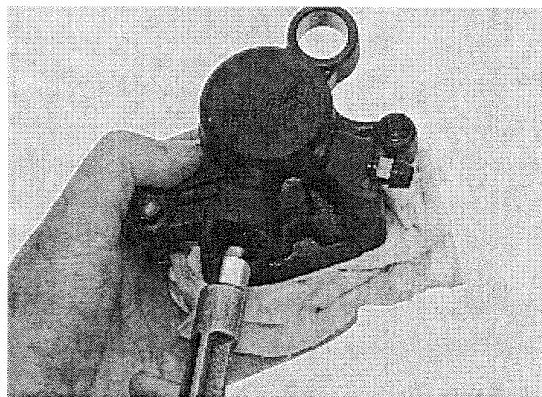




Place a shop towel over the piston.  
Position the caliper body with the piston down and  
apply small squirts of air pressure to the fluid inlet  
to remove the piston.

### **▲WARNING**

*Do not use high pressure air or bring the nozzle  
too close to the inlet.*



Push the dust seal and piston seal in and lift them  
out.

### **CAUTION:**

*Be careful not to damage the piston sliding surface.*

Clean the seal grooves, caliper cylinder and piston  
with clean brake fluid.



## INSPECTION

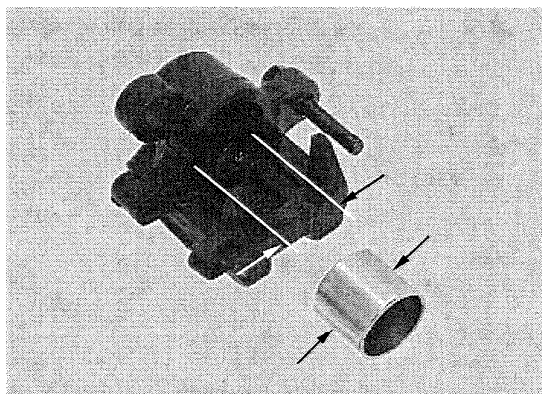
Check the caliper cylinder and piston for scoring,  
scratches or damage.

Measure the caliper cylinder I.D.

**SERVICE LIMIT:** 38.24 mm (1.506 in)

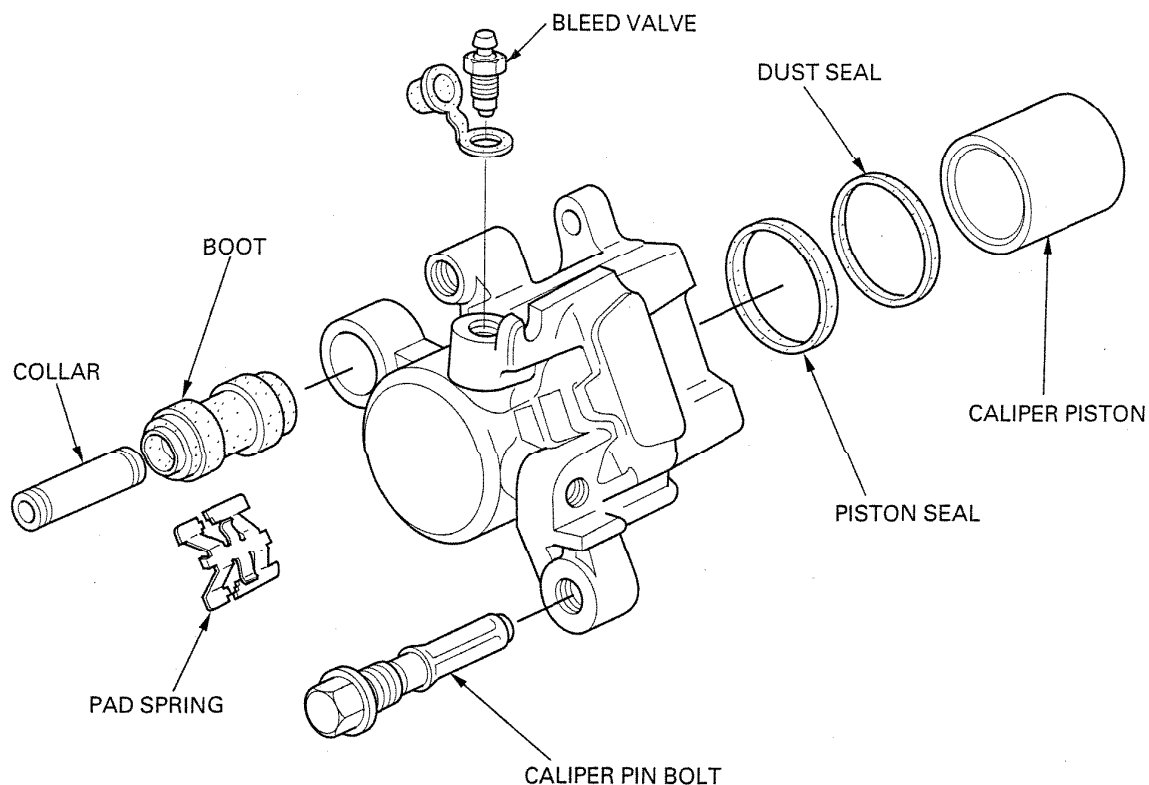
Measure the caliper piston O.D.

**SERVICE LIMIT:** 38.09 mm (1.500 in)

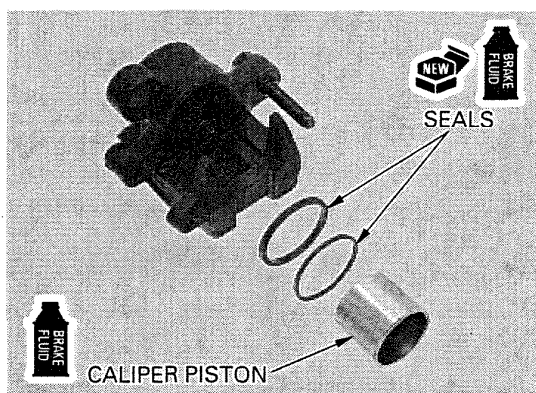


## HYDRAULIC BRAKE

### ASSEMBLY



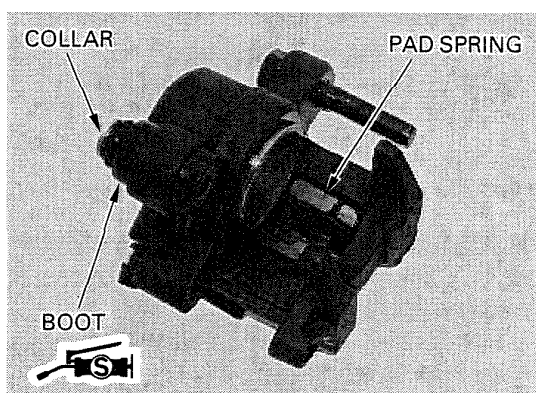
Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper. Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the pads.



Install the pad spring onto the caliper body as shown.

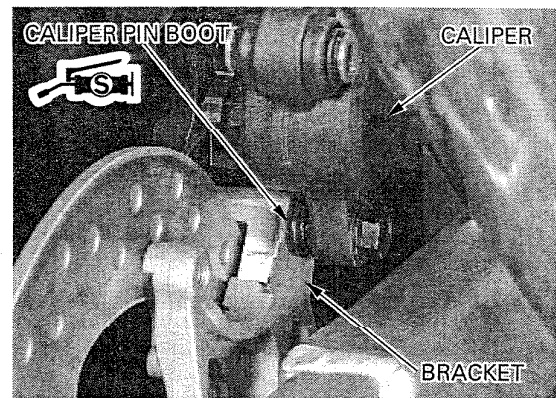
Check the caliper boot and replace it if it is hard, deteriorated or damaged.

Apply silicone grease to the inside of the boot. Install the boot and collar into the caliper.



Check the caliper pin boot and replace it if it is hard, deteriorated or damaged.  
Apply silicone grease to the inside of the boot and install the caliper onto the bracket.

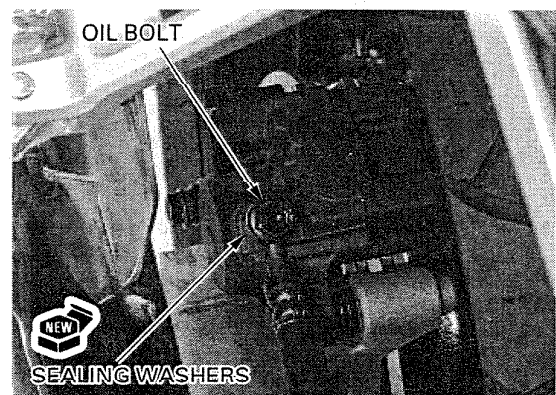
Install the rear brake pads (page 15-6).



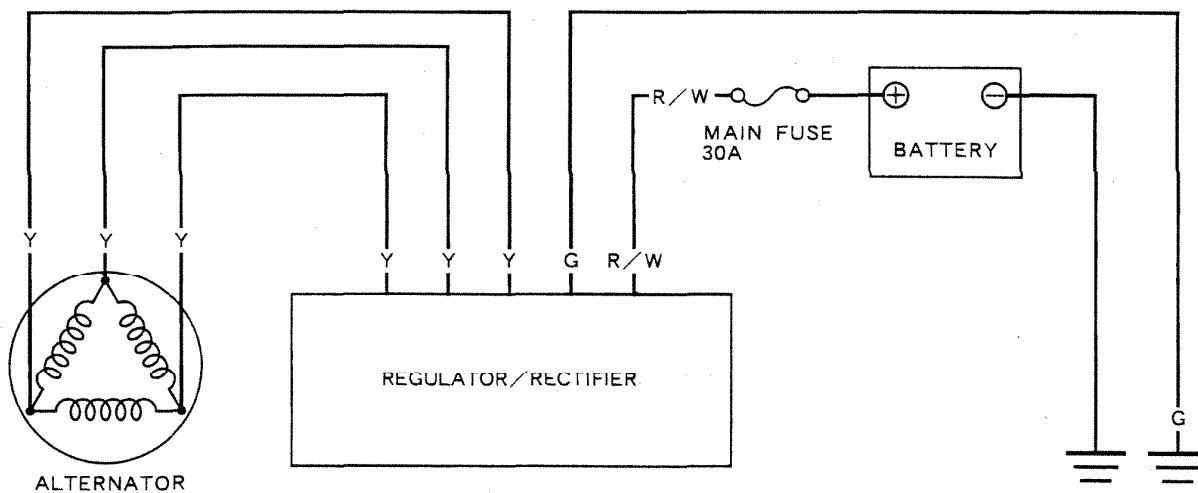
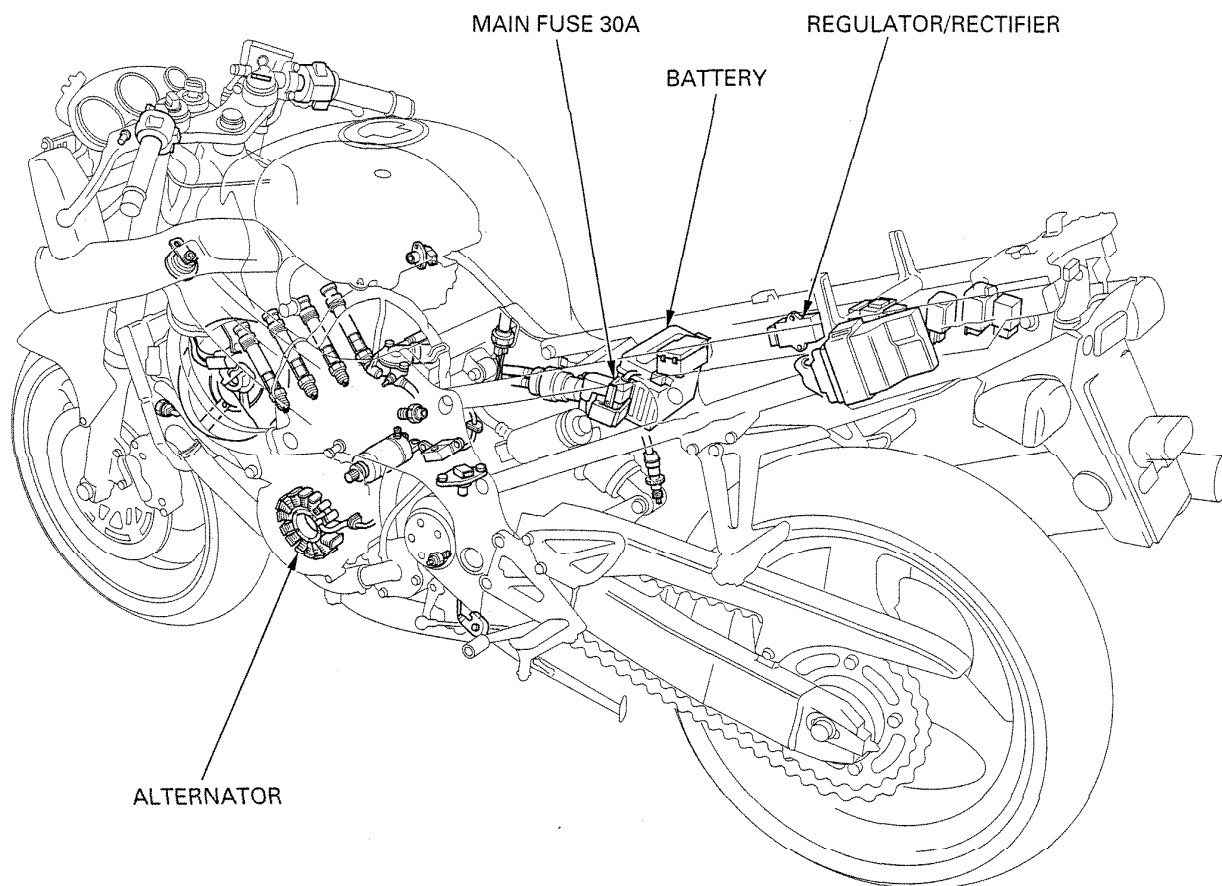
Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

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

Fill and bleed the rear brake hydraulic system (page 15-3).



## CHARGING SYSTEM



Y : Yellow  
 G : Green  
 R : Red  
 W : White

# 16. CHARGING SYSTEM

SERVICE INFORMATION	16-1	CHARGING SYSTEM INSPECTION	16-5
TROUBLESHOOTING	16-3	ALTERNATOR CHARGING COIL	16-6
BATTERY	16-4	REGULATOR/RECTIFIER	16-7

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. **KEEP OUT OF REACH OF CHILDREN.**

- Always turn off the ignition switch before disconnecting any electrical component.

#### CAUTION:

*Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery

#### NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

16

#### CAUTION:

*The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.*

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- For alternator service, refer to section 10.

## CHARGING SYSTEM

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- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - Use only the electrolyte that comes with the battery.
  - Use all of the electrolyte.
  - Seal the battery properly.
  - Never open the seals again.

### BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester for details about the battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

**Recommended battery tester**      BM-210-AH, BM-210, or BATTERY MATE or equivalent

### CAUTION:

*For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.*

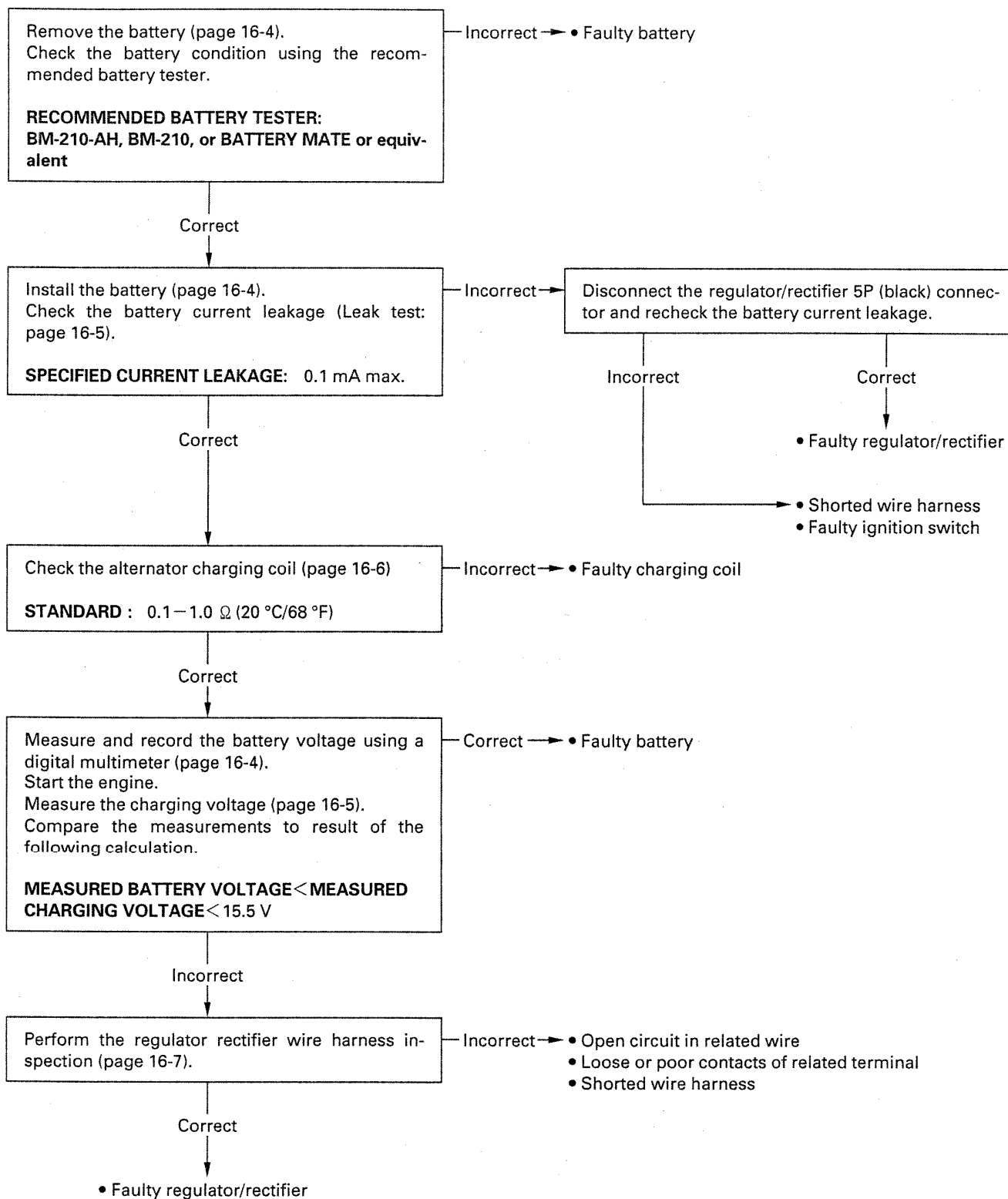
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## SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 8 AH
	Current leakage		0.1 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A × 5 – 10 h
		Quick	4.0 A × 1.0 h
Alternator	Capacity		343 W/5,000 min <sup>-1</sup> (rpm)
	Charging coil resistance (20 °C/68 °F)		0.1 – 1.0 Ω

## TROUBLESHOOTING

Battery is damaged or weak





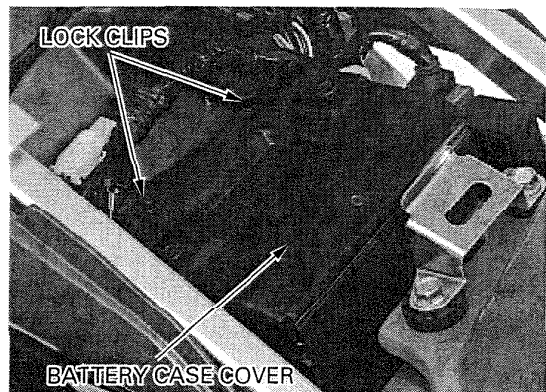
## CHARGING SYSTEM

### BATTERY

#### REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Open the battery case cover by releasing the two lock clips.



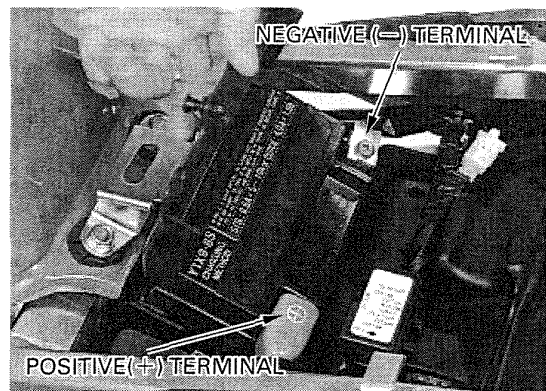
With the ignition switch OFF, disconnect the negative (-) cable first, then disconnect the positive (+) cable.

Remove the battery from the battery case.

Install the battery in the reverse order of removal.

#### NOTE:

- Connect the positive (+) cable first, then connect the negative (-) cable.
- After connecting the battery cables, coat the terminals with grease.



#### VOLTAGE INSPECTION

Open the battery case cover.

Measure the battery voltage using a commercially available digital multimeter.

#### VOLTAGE (20 °C/68 °F):

Fully charged: 13.0–13.2 V

Under charged: Below 12.3 V



#### BATTERY CHARGING

##### ⚠ WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- Turn the power ON/OFF at the charger, not at the battery terminals.

Remove the battery.

Connect the charger positive (+) cable to the battery positive (+) terminal.  
Connect the charger negative (-) cable to the battery negative (-) terminal.

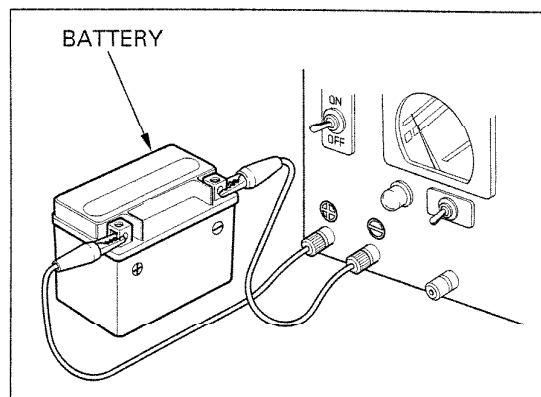
**CHARGING CURRENT/TIME:**

**Standard:**  $0.9\text{ A} \times 5-10\text{ h}$

**Quick:**  $4.0\text{ A} \times 1.0\text{ h}$

**CAUTION:**

- *Quick charging should only be done in an emergency; slow charging is preferred.*
- *For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.*



## CHARGING SYSTEM INSPECTION

Open the battery case cover (page 16-4).

**CURRENT LEAKAGE TEST**

Turn the ignition switch OFF, and disconnect the negative (-) cable from the battery.

Connect the ammeter (+) probe to the negative (-) cable and the ammeter (-) probe to the battery (-) terminal.

With the ignition switch OFF, check for current leakage.

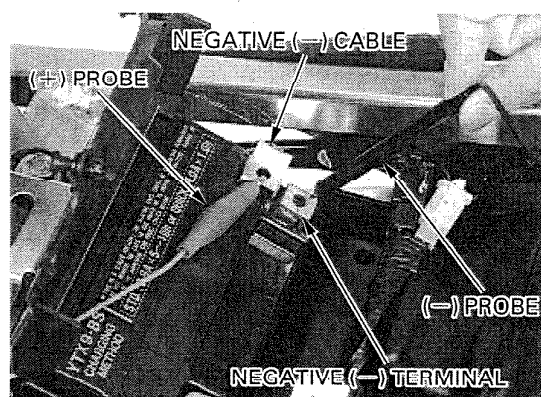
**NOTE:**

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

**SPECIFIED CURRENT LEAKAGE:** 0.1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

**CHARGING VOLTAGE INSPECTION****▲WARNING**

*When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*

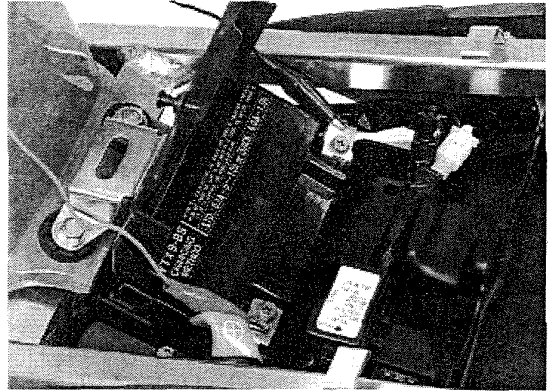
## CHARGING SYSTEM

*Be sure that the battery is in good condition before performing this test.*

Start the engine and warm it up to the operating temperature; stop the engine.  
Connect the multimeter between the positive and negative terminals of the battery.

### CAUTION:

- *To prevent short, make absolutely certain which are the positive and negative terminals or cable.*
- *Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*



With the headlight on Hi beam, restart the engine.  
Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

### STANDARD:

Measured battery voltage (page 16-4) < Measured charging voltage (see above) < 15.5 V

## ALTERNATOR CHARGING COIL

### INSPECTION

Remove the left side fairing (page 2-4).

Disconnect the alternator 3P (white) connector.

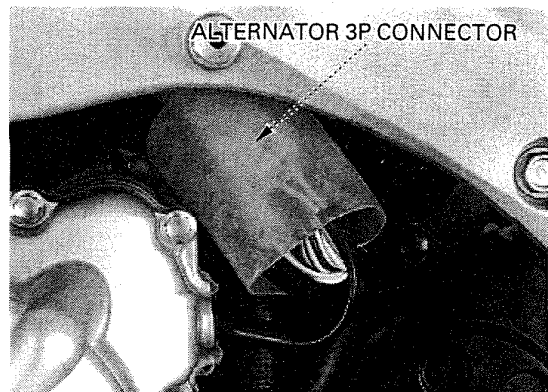
Measure the resistance between the wire terminals of the alternator side connector.

**STANDARD:** 0.1—1.0  $\Omega$  (20 °C/ 68 °F)

Check for continuity between each wire terminal of the alternator side connector and ground.  
There should not be continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

Refer to section 10 for alternator stator replacement.



### REGULATOR/RECTIFIER

#### WIRE HARNESS INSPECTION

Remove the seat cowl (page 2-2).

Disconnect the regulator/rectifier 5P (black) connector.  
Check the connector for loose contacts or corroded terminals.

#### BATTERY LINE

Measure the voltage between the red/white wire terminal and ground.  
There should be battery voltage at all times.

#### GROUND LINE

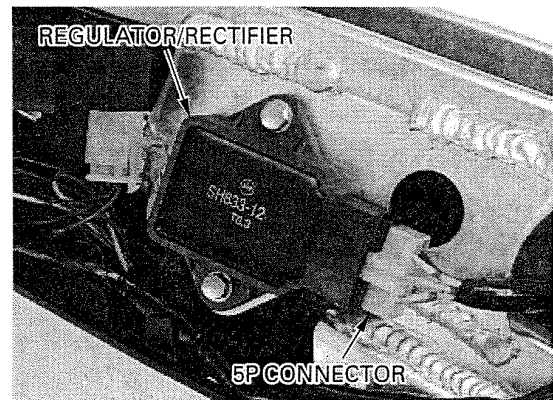
Check the continuity between the green wire terminal and ground.  
There should be continuity at all times.

#### CHARGING COIL LINE

Measure the resistance between the yellow wire terminals.

**STANDARD:** 0.1—1.0  $\Omega$  (20 °C/68 °F)

Check for continuity between each yellow wire terminal and ground.  
There should not be continuity.



IGNITION SWITCH

ENGINE STOP SWITCH

THROTTLE SENSOR

MAIN FUSE 30A

BATTERY

FUSE 10A

IGNITION CONTROL MODULE (ICM)

DIRECT IGNITION COIL

SPARK PLUG

IGNITION PULSE GENERATOR

NEUTRAL SWITCH

SIDE STAND SWITCH

Bl: Black  
Bu: Blue

Bl: Black  
Bu: Blue  
G: Green  
Lg: Light green  
R: Red  
W: White  
Y: Yellow



# 17. IGNITION SYSTEM

SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-7
TROUBLESHOOTING	17-3	IGNITION TIMING	17-7
IGNITION SYSTEM INSPECTION	17-4	THROTTLE SENSOR	17-7

## SERVICE INFORMATION

### GENERAL

#### **▲WARNING**

*When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.*

#### CAUTION:

*Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- The transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ignition control module (ICM) varies ignition timing according to the engine speed. The throttle sensor signals the ICM to compensate the ignition timing according to the throttle opening.
- The ICM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ICM. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plugs.
- The direct ignition coil that the ignition coil and spark plug cap are integrated, is adopted on this motorcycle.
- Use the spark plugs of the correct heat range. Using a spark plug of an incorrect heat range can damage the engine.
- The California type's spark plug is equipped with platinum type electrodes. Do not use spark plugs other than specified (California type only).
- For spark plug inspection and direct ignition coil removal/installation, see section 3.
- See section 19 for following components:
  - Ignition switch
  - Engine stop switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

## IGNITION SYSTEM

---

### SPECIFICATION

ITEM		SPECIFICATIONS
Spark plug	49 state/Canada type	CR9EH-9 (NGK), U27FER-9 (DENSO)
	California type	CR9EHVX-9 (NGK)
Spark plug gap		0.80—0.90 mm (0.031—0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		10° BTDC at idle
Throttle sensor	Resistance (20 °C/68 °F)	4—6 k $\Omega$
	Input voltage	4.7—5.3 V

### TORQUE VALUE

Timing hole cap 18 N·m (1.8 kgf·m, 13 lbf·ft) Apply grease to the threads

### TOOL

Peak voltage tester (U.S.A. only) or

Peak voltage adaptor

07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)



## TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose direct ignition coil connections
  - Water got into the direct ignition coil (ignition coil secondary voltage leak)
- If there is no spark at any cylinder, temporarily exchange the direct ignition coil with another good one and perform the spark test. If there is spark, the exchanged direct ignition coil is faulty.
- “Initial voltage” of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (when the engine is not cranking by the starter motor).

## NO SPARK AT SPARK PLUGS

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch ON and engine stop switch at RUN. (Other electrical components are normal.)	1. Faulty engine stop switch. 2. An open circuit in black/white wire between the direct ignition coil and engine stop switch. 3. Loose or poor connection of the ignition coil primary wire terminal, or an open circuit in primary coil. (Check at the ignition control module (ICM) connector.) 4. Faulty ICM when the initial voltage is normal while disconnecting ICM connector.
	Initial voltage is normal, but it drops down to 2–4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Battery is undercharged. (Large voltage drops when the engine is started.) 3. No voltage between the black (+) and ground (–) of the ICM connector, or loose or poorly connected ICM. 4. Poor connection or open circuit in green (ground) wire of the ICM. 5. Loose or poor connections, or open circuit in blue/black, yellow/white, red/blue and red/yellow between the direct ignition coils and ICM. 6. Faulty side stand switch or neutral switch. 7. An open circuit or loose connection in No. 6 related circuit wires. <ul style="list-style-type: none"> <li>• Side stand switch line: green/white wire</li> <li>• Neutral switch line: light green wire</li> </ul> 8. Faulty ignition pulse generator. (Measure peak voltage.) 9. Faulty ICM (when above No. 1 thru. 8 are normal).
	Initial voltage is normal, but no peak voltage exists while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ICM (when above No. 1 and 2 are normal).
	Initial voltage is normal, but peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ICM (when above No. 1 thru. 3 are normal).
	Initial voltage and peak voltage are normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty direct ignition coil(s).
Ignition pulse generator	Peak voltage is lower than the standard value.	1. The multimeter impedance is too low; below 10 M $\Omega$ /DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (when above No. 1 thru. 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

## IGNITION SYSTEM

### IGNITION SYSTEM INSPECTION

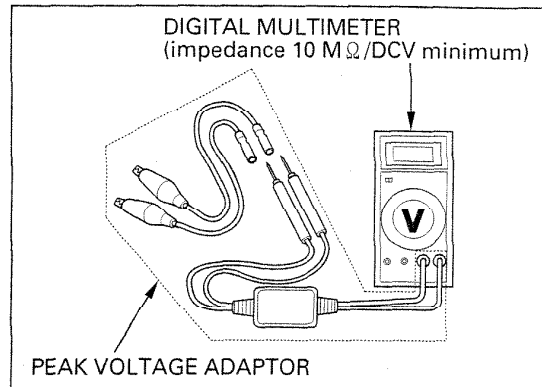
#### NOTE:

- If no spark jumps at the plugs, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum).
- The display value differs depending upon the internal impedance of the multimeter.

Connect the peak voltage adaptor to the digital multimeter, or use the peak voltage tester.

#### TOOLS:

**Peak voltage tester (U.S.A. only) or**  
**Peak voltage adaptor** 07HGJ-0020100  
**with commercially available digital multimeter**  
**(impedance 10 M $\Omega$ /DCV minimum)**



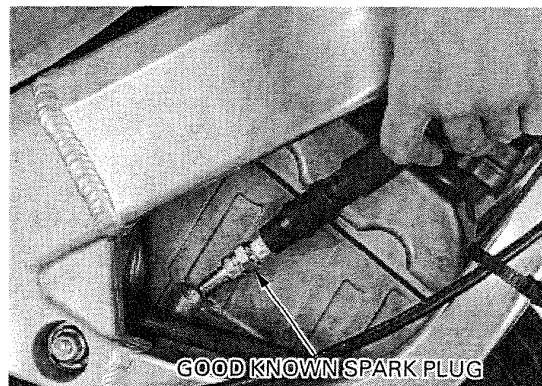
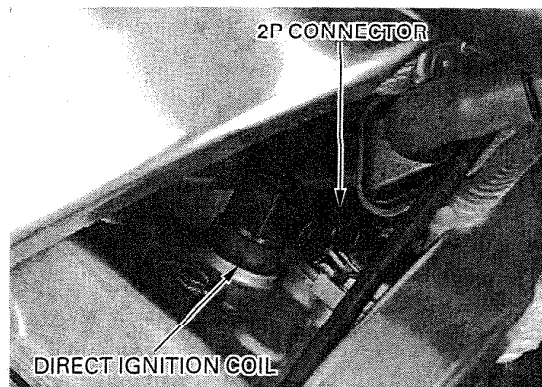
### IGNITION PRIMARY PEAK VOLTAGE

#### NOTE:

- Check all system connections before this inspection. Poor connected connectors can cause incorrect readings.
- Check the cylinder compression at each cylinder and check that the spark plugs are installed correctly in each cylinder.

Disconnect the direct ignition coils from the spark plugs (page 3-6).  
Connect the 2P connectors to the direct ignition coils.

Connect good known spark plugs to the direct ignition coils and ground the spark plugs to the cylinder head as done in a spark test.



With the 6P (black) connector connected, connect the peak voltage adaptor or tester probes to the ignition coil primary wire terminal and ground.

## TOOLS:

**Peak voltage tester (U.S.A. only) or**  
**Peak voltage adaptor** 07HGJ-0020100  
**with commercially available digital multimeter**  
**(impedance 10 M $\Omega$  /DCV minimum)**

## CONNECTION:

- # 1 ignition coil: Blue/black wire terminal (+)-to-Ground (-)
- # 2 ignition coil: Yellow/white wire terminal (+)-to-Ground (-)
- # 3 ignition coil: Red/blue wire terminal (+)-to-Ground (-)
- # 4 ignition coil: Red/yellow wire terminal (+)-to-Ground (-)

Turn the ignition switch ON and engine stop switch to RUN.

Check for the initial battery voltage.

If battery voltage is not present, follow the checks described in the troubleshooting on page 17-3.

Shift the transmission into neutral.

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

**PEAK VOLTAGE:** 100 V minimum

## ▲WARNING

*Avoid touching the spark plugs and tester probes to prevent electric shock.*

## NOTE:

Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.

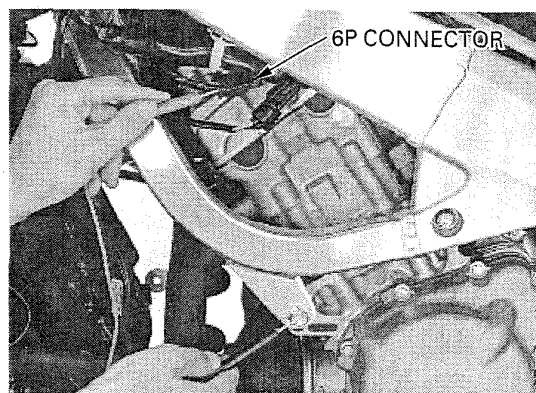
## IGNITION PULSE GENERATOR PEAK VOLTAGE

## NOTE:

Check cylinder compression at each cylinder and check that the spark plugs are installed correctly in the cylinders.

Remove the seat cowl (page 2-2).

Disconnect the ignition control module (ICM) connector.



## IGNITION SYSTEM

Connect the peak voltage adaptor or tester probes to the connector terminals of the wire harness side.

### TOOLS:

**Peak voltage tester (U.S.A. only) or  
Peak voltage adaptor** 07HGJ-0020100  
with commercially available digital multimeter  
(impedance 10 M $\Omega$  /DCV minimum)

### CONNECTION:

Yellow wire terminal (+)-to-White/  
yellow wire terminal (-)

Turn the ignition switch ON and engine stop switch to RUN.

Shift the transmission into neutral.

Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

**PEAK VOLTAGE:** 0.7 V minimum

If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the pulse generator connector.

Remove the right side fairing (page 2-4).

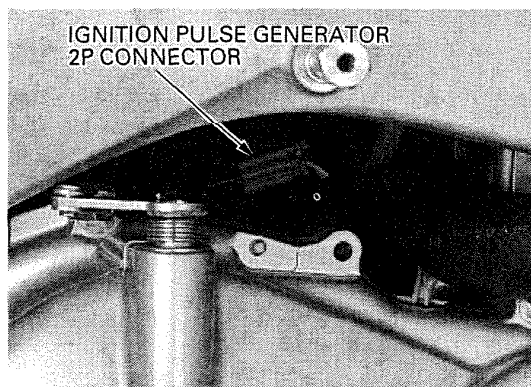
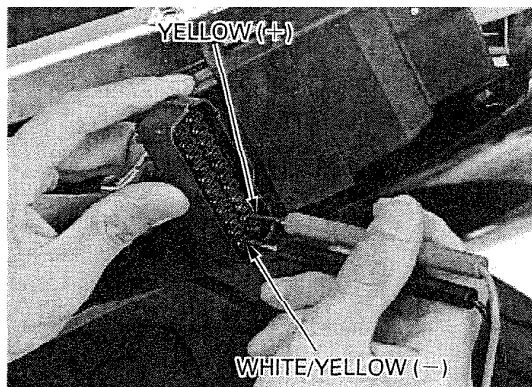
Disconnect the clutch cable (page 9-3).

Disconnect the ignition pulse generator 2P (red) connector and connect the peak voltage adaptor or tester probes to the connector terminals of the ignition pulse generator side.

In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open or short circuit, or loose connection.
- If both peak voltages are lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.



## IGNITION PULSE GENERATOR

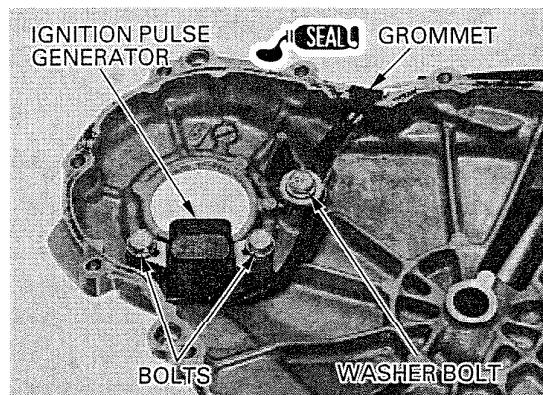
### REPLACEMENT

Remove the right crankcase cover (page 9-3).

Remove the wire setting washer bolt.  
Remove the two bolts and ignition pulse generator.

Apply sealant to the grommet seating surfaces.  
Install a new ignition pulse generator and the grommet into the cover groove properly.  
Tighten the bolts securely.

Install the right crankcase cover (page 9-14).



## IGNITION TIMING

Remove the right side fairing (page 2-4).

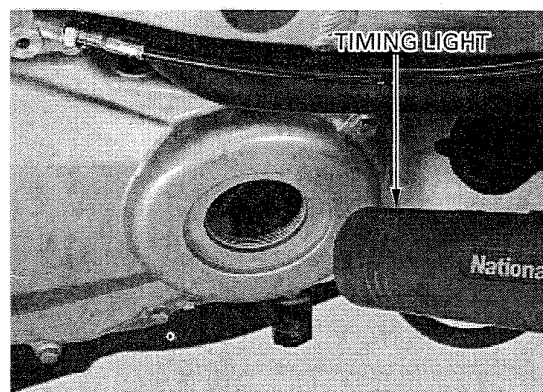
Start the engine and warm it up to operating temperature.

Stop the engine and remove the timing hole cap.

*Read the instructions for timing light operation.*

Connect the timing light to the #1 or #4 direct ignition coil wire (black/white).

Start the engine, let it idle and check the ignition timing.



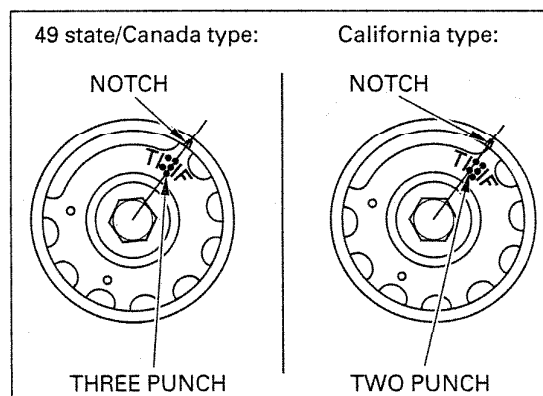
The ignition timing is correct if the F mark on the ignition pulse generator rotor aligns with the index notch on the right crankcase cover at idle as shown.

Coat a new O-ring with grease and install it onto the timing hole cap.

Apply grease to the timing hole cap threads.  
Install and tighten the timing hole cap.

**TORQUE** : 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the right side fairing (page 2-4).



## THROTTLE SENSOR

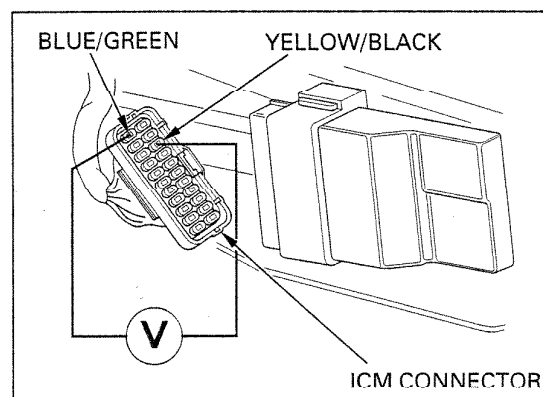
### SYSTEM INSPECTION

Remove the seat cowl (page 2-2).

Disconnect the ignition control module (ICM) connector.

Measure the resistance between the yellow/black and blue/green wire terminals of the wire harness side connector.

**STANDARD**: 4 – 6 k $\Omega$  (20 °C/68 °F)



## IGNITION SYSTEM

Check that the resistance between the yellow/blue and blue/green wire terminals of the ICM connector varies with the throttle position while operating the throttle grip.

**Fully open — Fully closed position: Resistance decreases**

**Fully closed — Fully open position: Resistance increases**

If the correct measurements cannot be obtained, raise the fuel tank (page 2-3), disconnect the throttle sensor 3P connector and perform the same inspections at the sensor terminals.

- If the measurement at the ICM is abnormal and the one at the throttle sensor is normal, check for open or short circuit, or loose or poor connections in the wire harness.
- If both measurements are abnormal, replace the throttle sensor.

Connect the ICM connector.

Turn the ignition switch ON.

Measure the input voltage between the yellow/black (+) and blue/green (–) wire terminals of the wire harness side throttle sensor connector.

**STANDARD: 4.7 – 5.3 V**

If the input voltage is abnormal, or if there is no input voltage, check for open or short circuit in the wire harness, or loose or poor ICM connector contact.

### REPLACEMENT

Remove the carburetor assembly from the cylinder head intake ports (page 5-15).

Disconnect the throttle sensor connector.

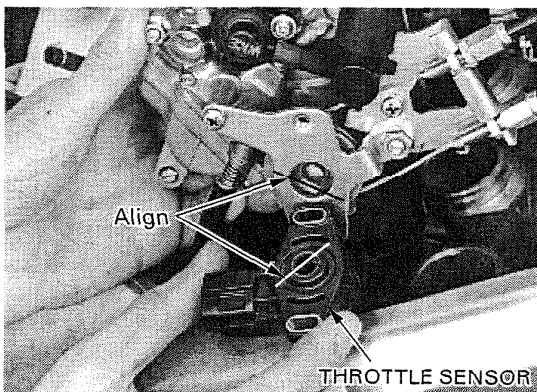
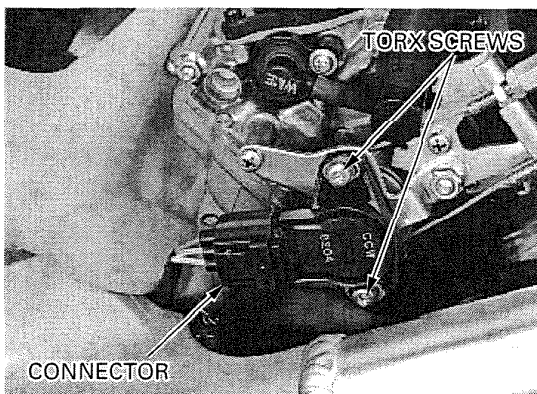
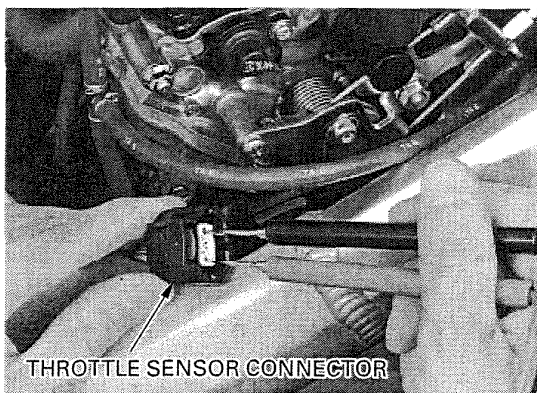
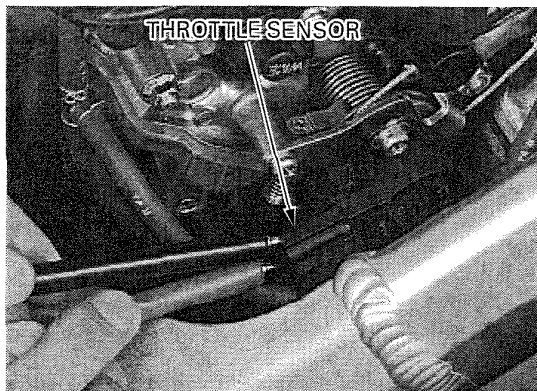
Remove the two torx screws and the throttle sensor.

Install the throttle sensor by aligning the tabs of the sensor with the flat of the shaft as shown.

Apply locking agent to the torx screw threads and loosely install the screws.

#### CAUTION:

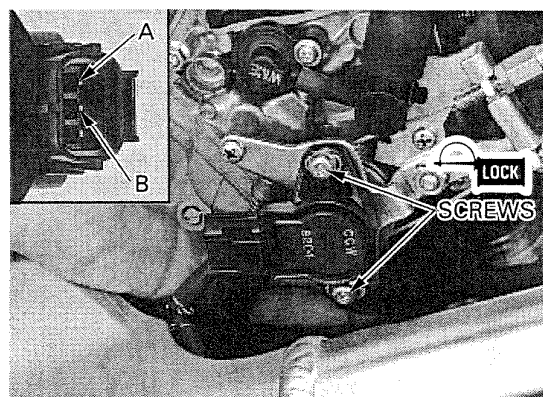
***Install the throttle sensor properly. Improper installation can cause damage to the throttle sensor.***



Adjust the throttle sensor position so that the resistance between terminals A and B is 490–510  $\Omega$ , and tighten the torx screws.

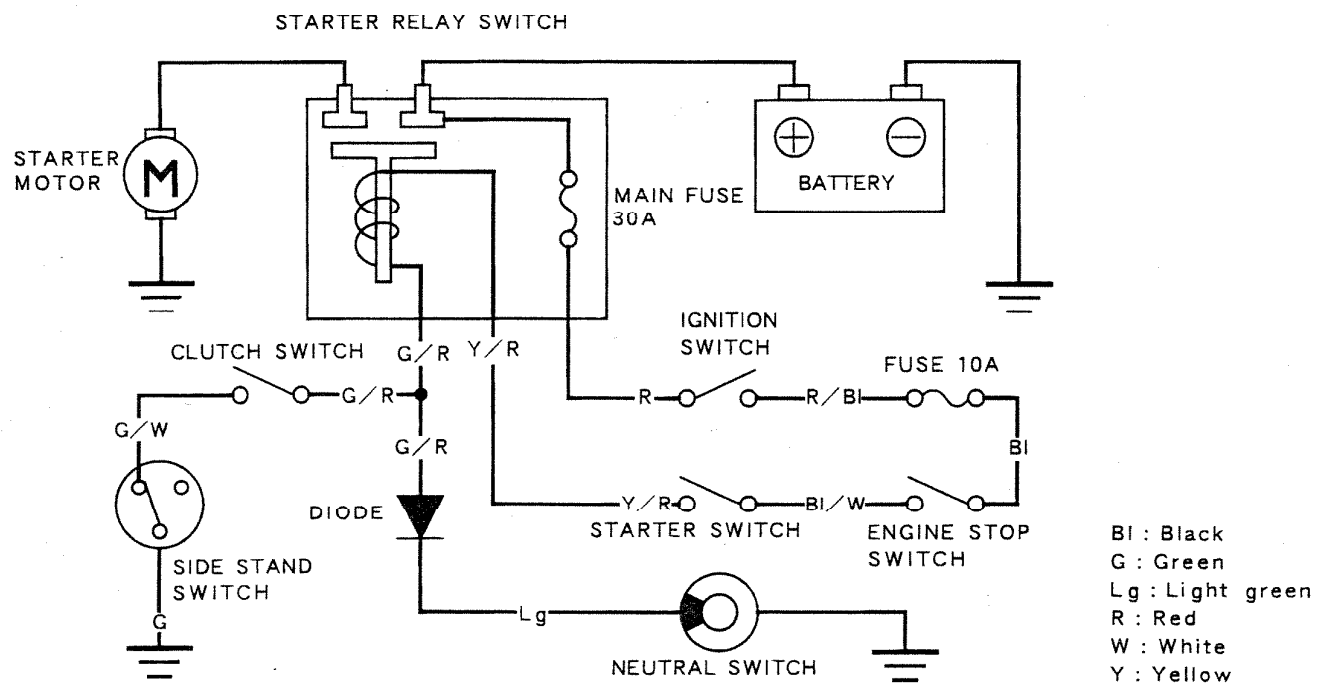
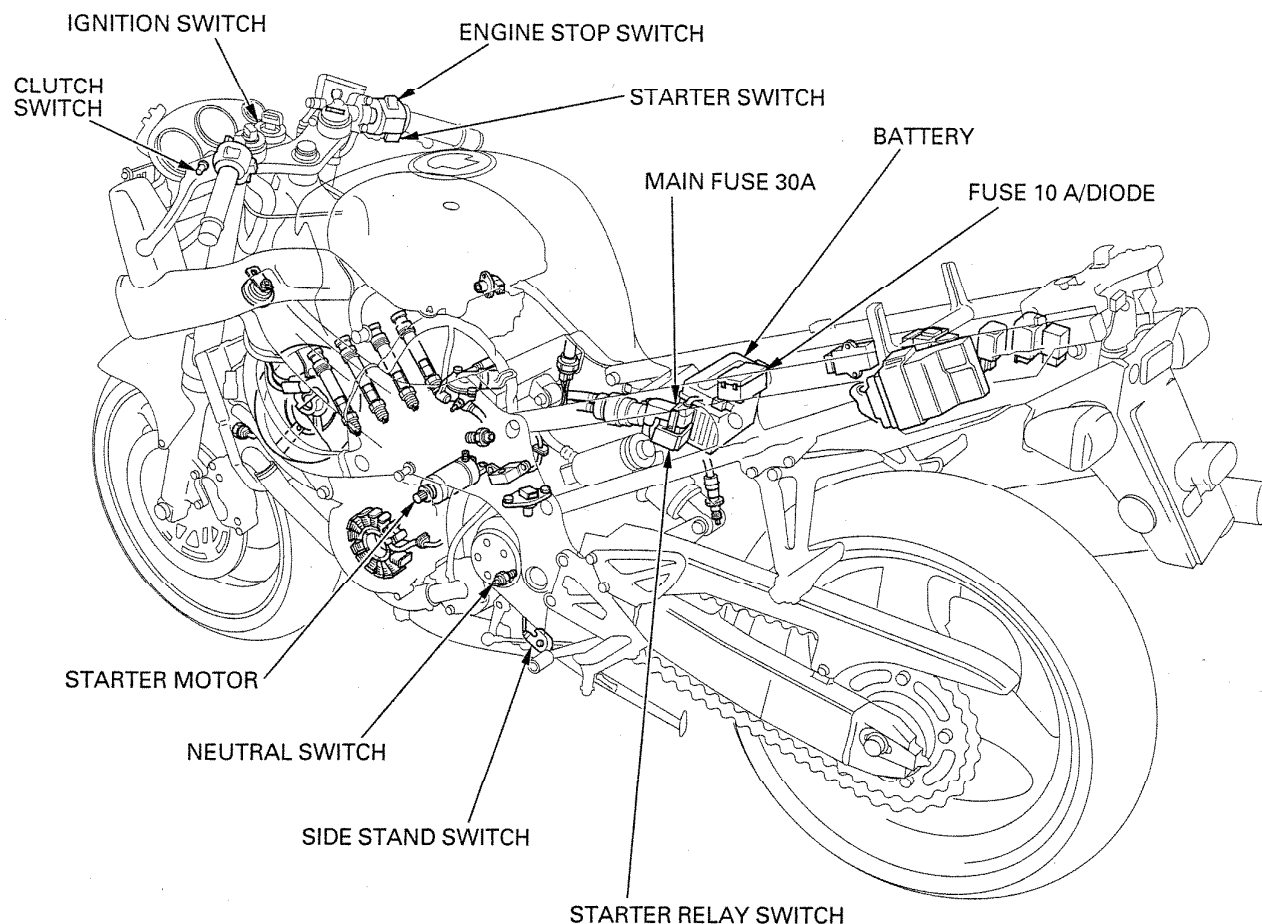
Connect the throttle sensor connector.

Install the removed parts in the reverse order of removal.





## ELECTRIC STARTER



# 18. ELECTRIC STARTER

SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	CLUTCH DIODE	18-11
STARTER MOTOR	18-4		

## SERVICE INFORMATION

### GENERAL

#### ⚠WARNING

*Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.*

- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 10 for starter clutch servicing.
- See section 19 for following components:
  - Ignition switch
  - Engine stop switch
  - Starter switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

### SPECIFICATIONS

Unit: mm (in)

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

### TORQUE VALUE

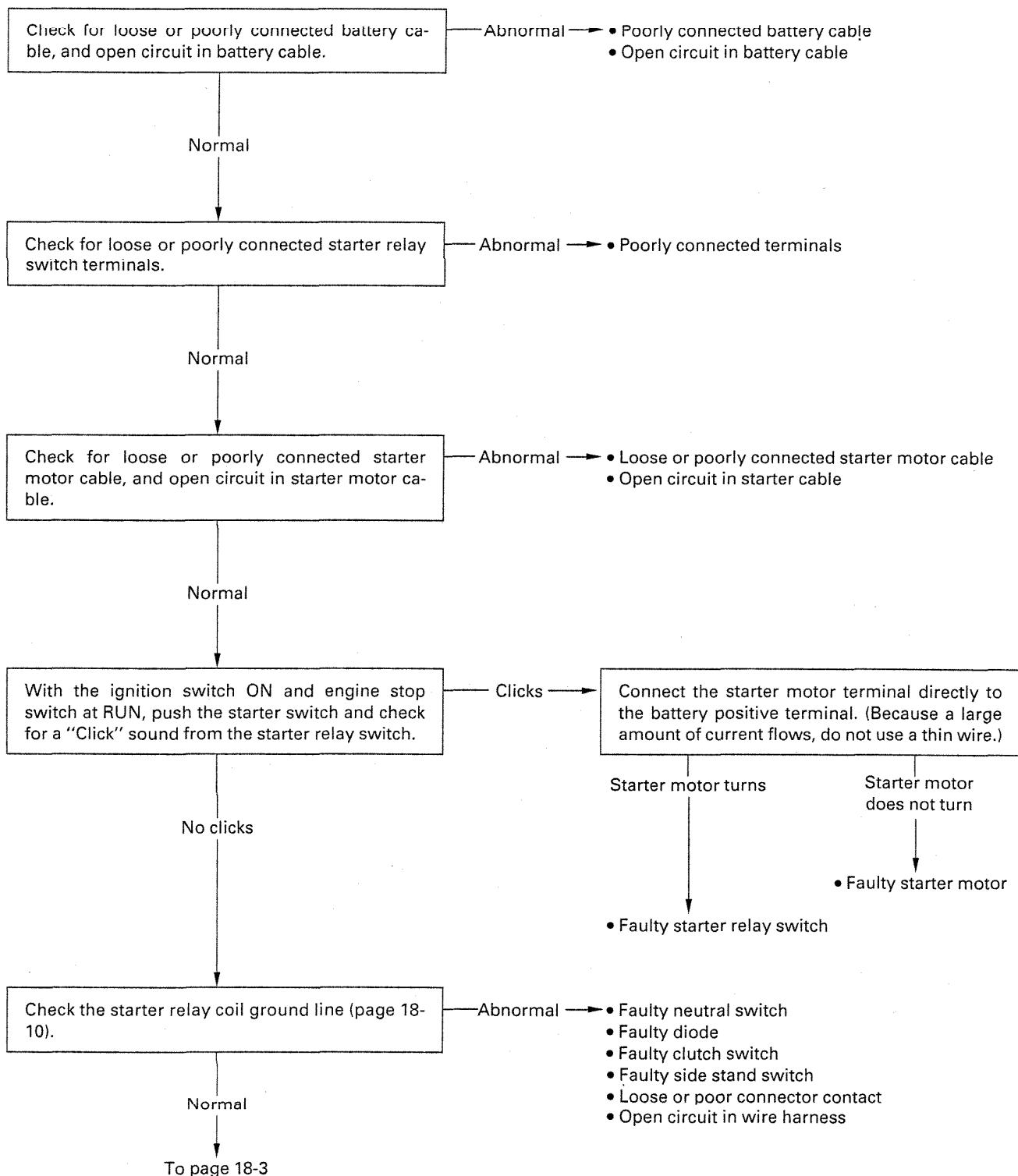
Starter motor terminal nut      10 N·m (1.0 kgf·m, 7 lbf·ft)

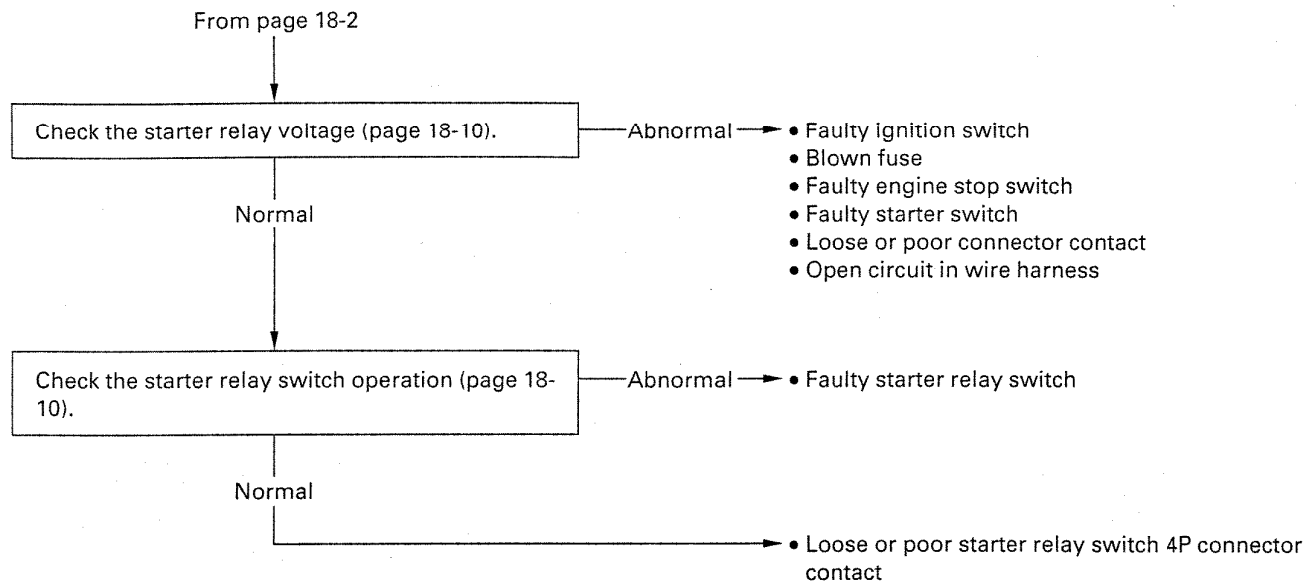
## ELECTRIC STARTER

### TROUBLESHOOTING

#### Starter motor will not turn

- Check for a blown main fuse (30 A) or sub-fuse (10 A).
- Check that the battery is fully charged and in good condition.





## **Starter motor turns slowly**

- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

## **Starter motor turns, but engine does not turn**

- Faulty starter clutch (section 10)

## **Starter relay switch “clicks”, but engine does not turn over**

- Crankshaft does not turn due to engine problem
- Faulty starter clutch (section 10)
- Faulty starter reduction gear (section 10)

## ELECTRIC STARTER

### STARTER MOTOR

#### REMOVAL

##### **⚠ WARNING**

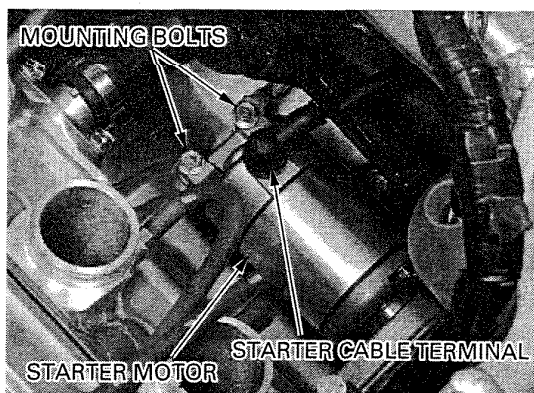
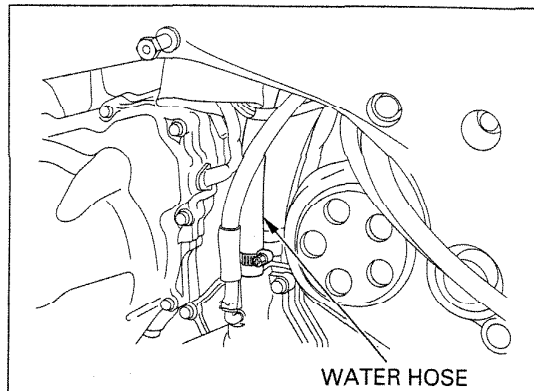
*Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.*

Remove the fuel tank (page 2-3).

Drain the coolant from the system by removing the drain bolt on the water pump (page 6-5).  
Disconnect the water hose from the water pump.

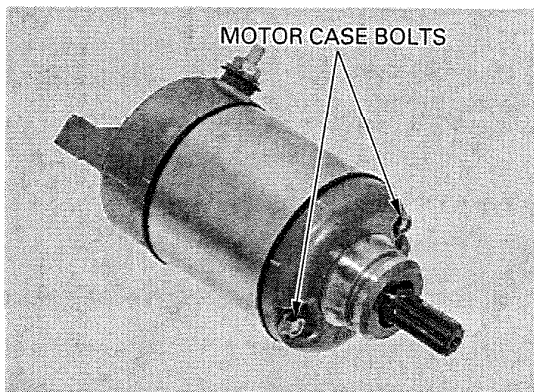
Remove the rubber cap, terminal nut and starter motor cable.  
Pull the water hose aside.  
Remove the two mounting bolts and the starter motor from the crankcase.

Remove the O-ring from the starter motor.



#### DISASSEMBLY

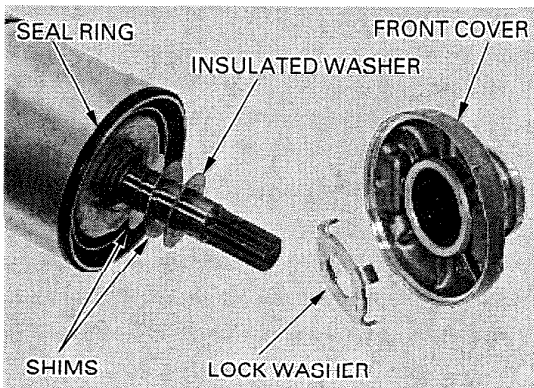
Remove the starter motor case bolts.  
Remove the O-rings from starter motor case bolts.



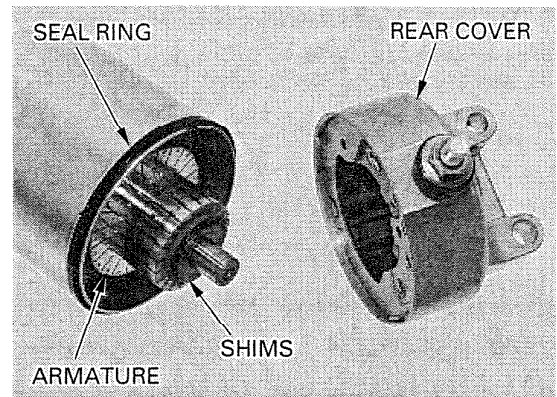
*Record the location and number of shims.*

Remove the following:

- front cover
- seal ring
- lock washer
- insulated washer
- shims

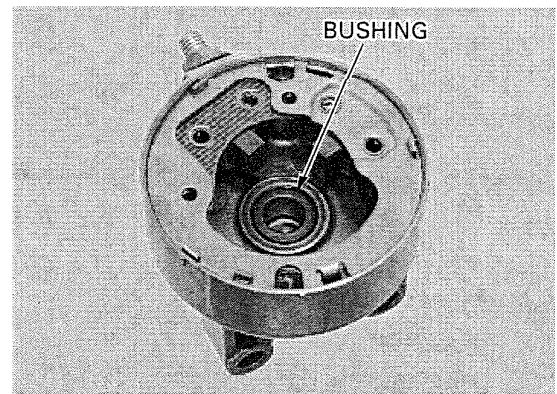


- rear cover
- seal ring
- shims
- armature

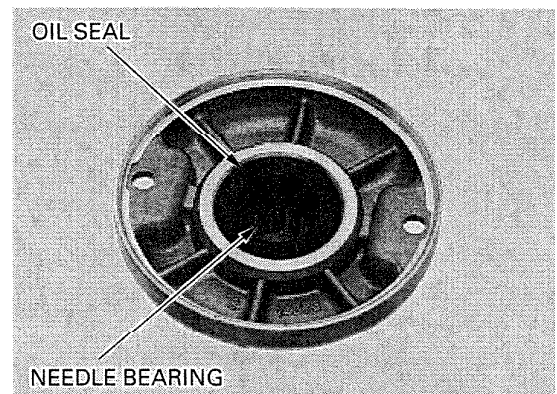


### INSPECTION

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



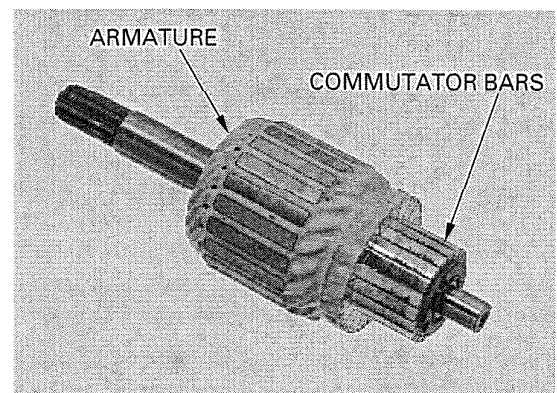
Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.



Check the commutator bars of the armature for discoloration.

#### NOTE:

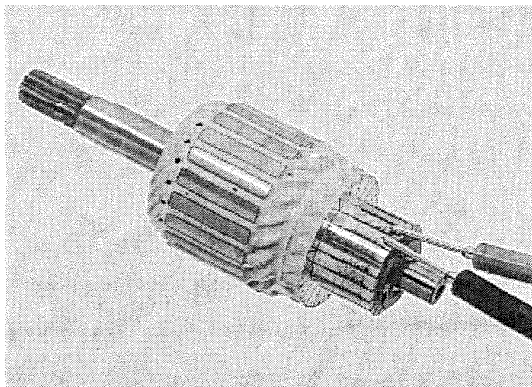
Do not use emery or sand paper on the commutator.



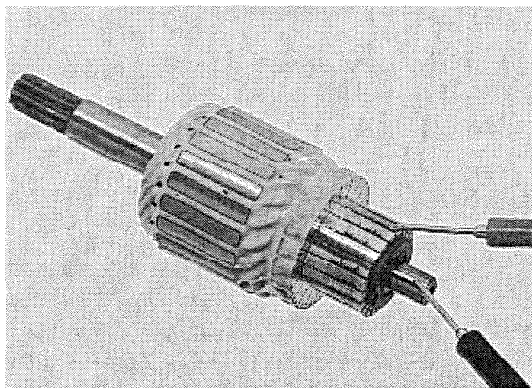
## ELECTRIC STARTER

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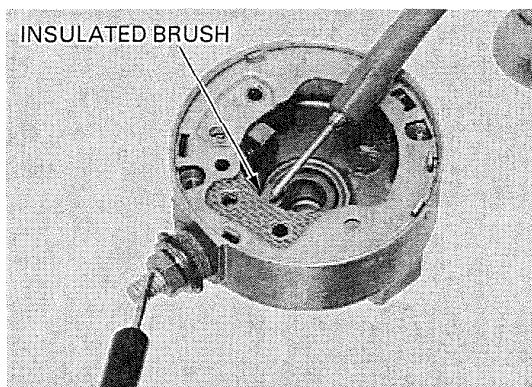
Check for continuity between pairs of commutator bars.  
There should be continuity.



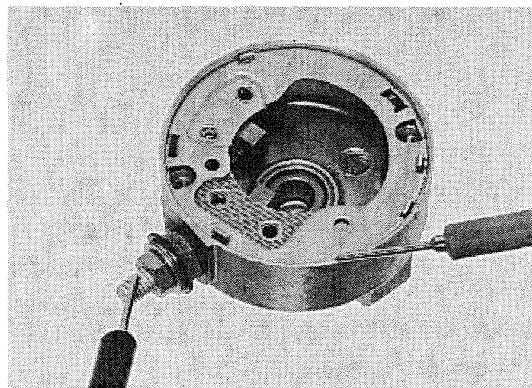
Check for continuity between each commutator bar and the armature shaft.  
There should be no continuity.



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



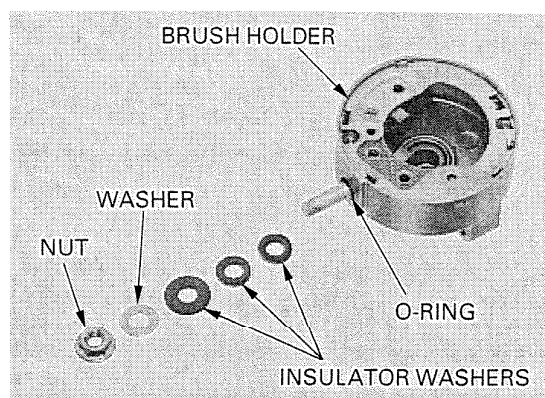
Check for continuity between the cable terminal and motor case.  
There should be no continuity.





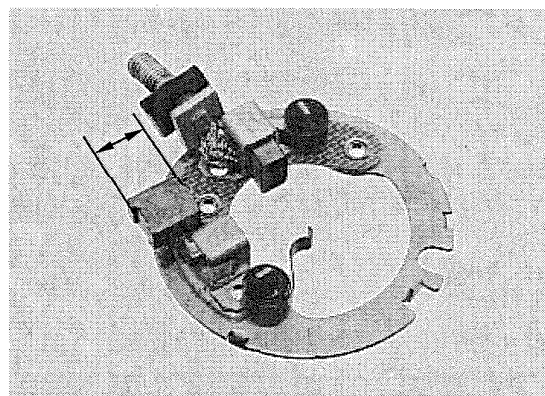
Remove the following:

- nut
- washer
- insulator washers
- O-ring
- brush holder
- brushes

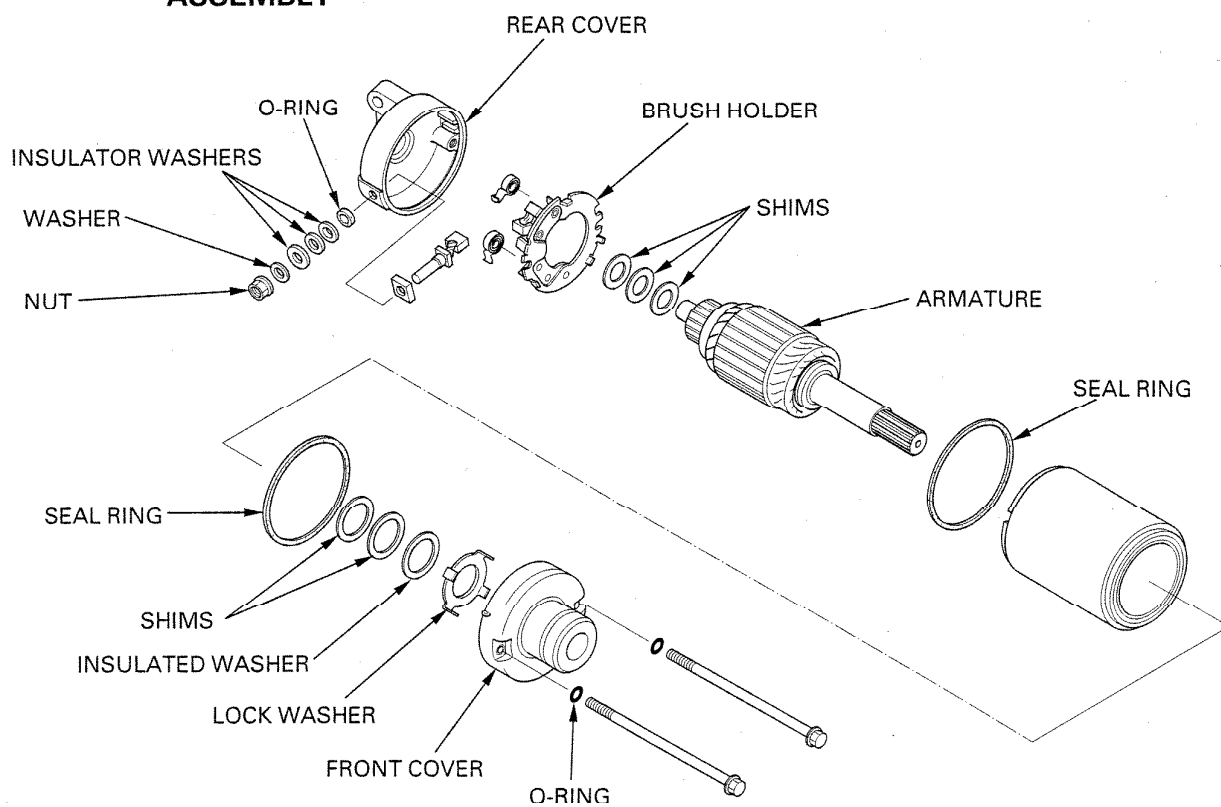


Measure the brush length.

**SERVICE LIMIT:** 6.5 mm (0.26 in)



## ASSEMBLY

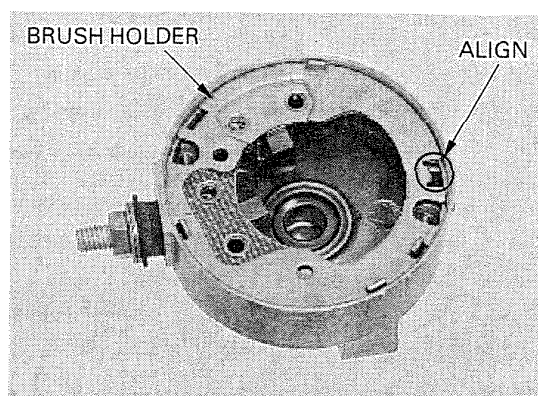


## ELECTRIC STARTER

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

Install the following:

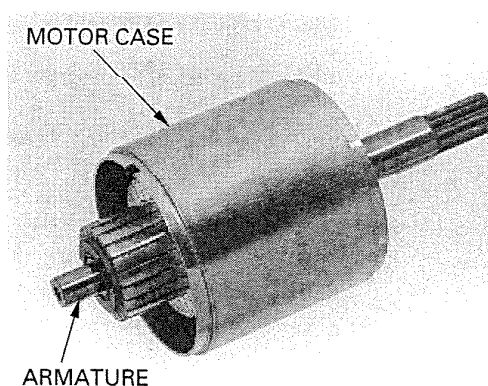
- new O-ring
- insulator washers
- washer
- nut



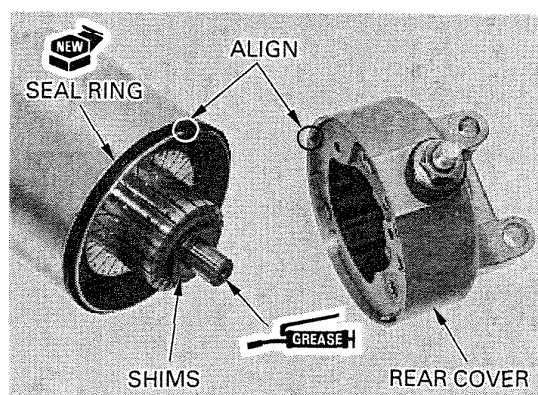
Install the armature in the motor case.  
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

### CAUTION:

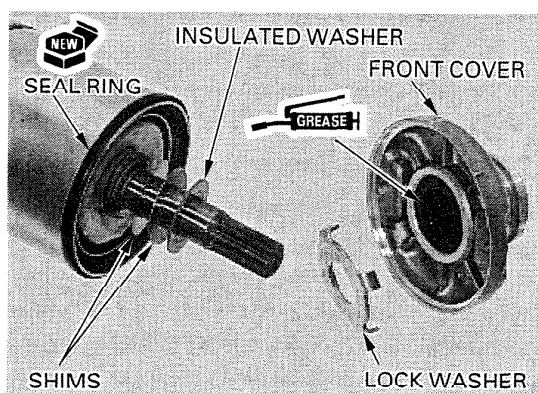
*The coil may be damaged if the magnet pulls the armature against the case.*



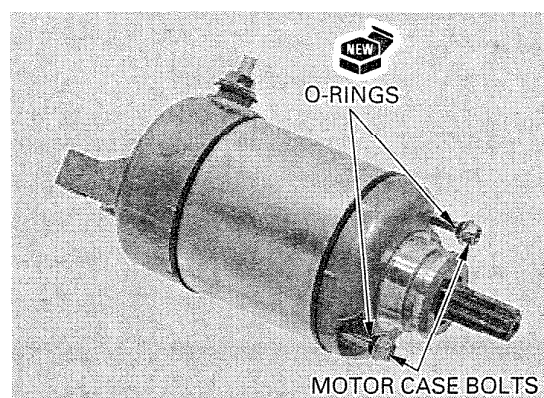
Install the same number of shims in the same locations as noted during disassembly.  
Install a new seal ring onto the motor case.  
Apply thin coat of grease to the armature shaft end.  
Install the rear cover, while pushing in the brushes into the brush holder and aligning the brush holder tab with the motor case groove.



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

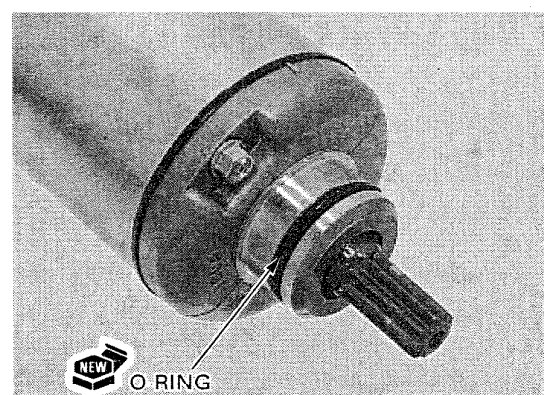


Install new O-rings onto the motor case bolts.  
Install and tighten the motor case bolts.



### INSTALLATION

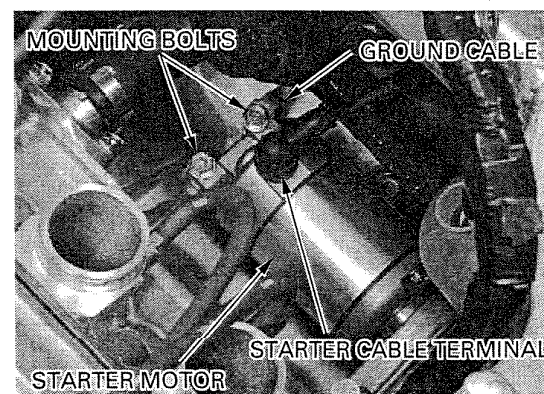
Coat a new O-ring with oil and install it into the starter motor groove.



Install the starter motor into the crankcase.  
Install the ground cable and mounting bolts, and  
tighten the bolts securely.  
Connect the starter motor cable.  
Install and tighten the terminal nut.

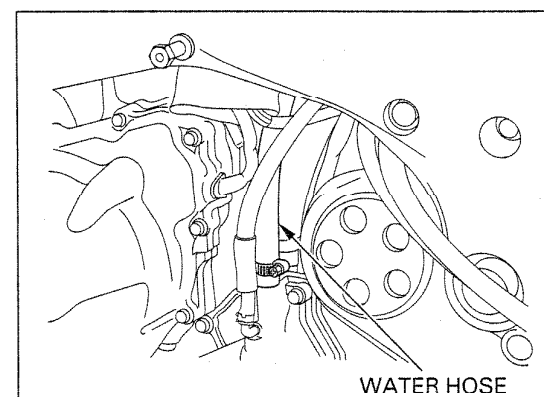
**TORQUE** : 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the rubber cap securely.



Connect the water hose to the water pump.  
Install the fuel tank (page 2-3).

Fill and bleed the cooling system (page 6-4).



## ELECTRIC STARTER

### STARTER RELAY SWITCH

#### INSPECTION

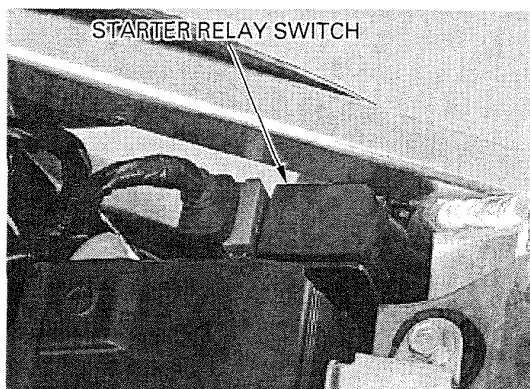
Remove the seat (page 2-2).

Shift the transmission into neutral.  
Turn the ignition switch ON and engine stop switch to RUN.

Push the starter switch.

The coil is normal if the starter relay switch clicks.

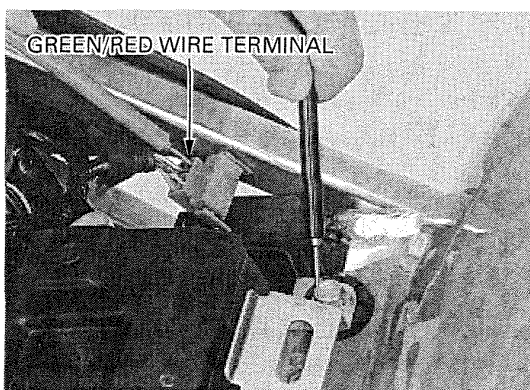
If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.



#### GROUND LINE

Disconnect the starter relay switch 4P connector.  
Check for continuity between the green/red wire (ground line) terminal and ground.

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



#### STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.  
Shift the transmission into neutral.  
Measure the voltage between the yellow/red wire terminal (+) and ground (-).

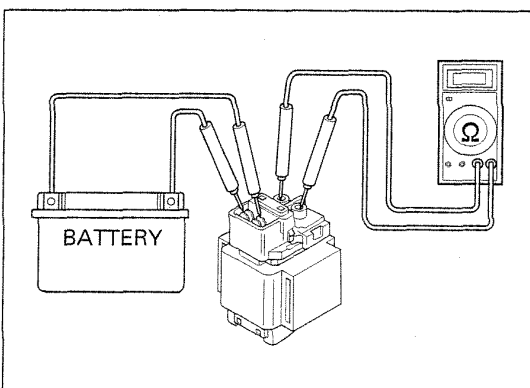
If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch at RUN, it is normal.



#### OPERATION CHECK

Disconnect the starter relay switch 4P connector and cables.  
Connect a fully charged 12 V battery positive wire to the relay switch yellow/red wire terminal and negative wire to the green/red wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.

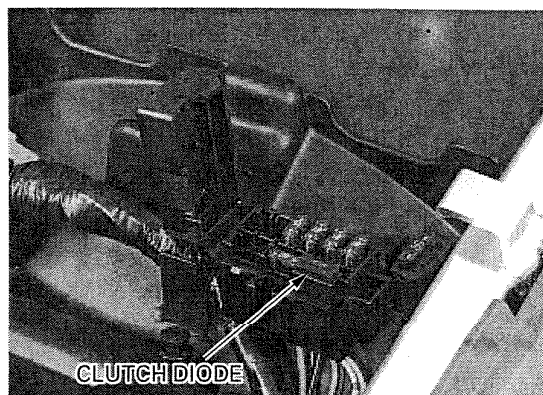


## CLUTCH DIODE

### INSPECTION

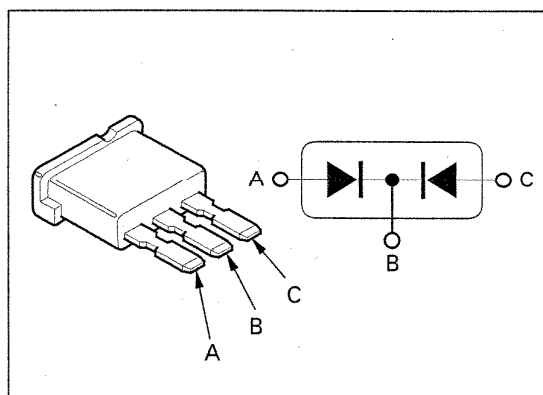
Remove the seat (page 2-2).

Open the fuse box cover and remove the clutch diode.



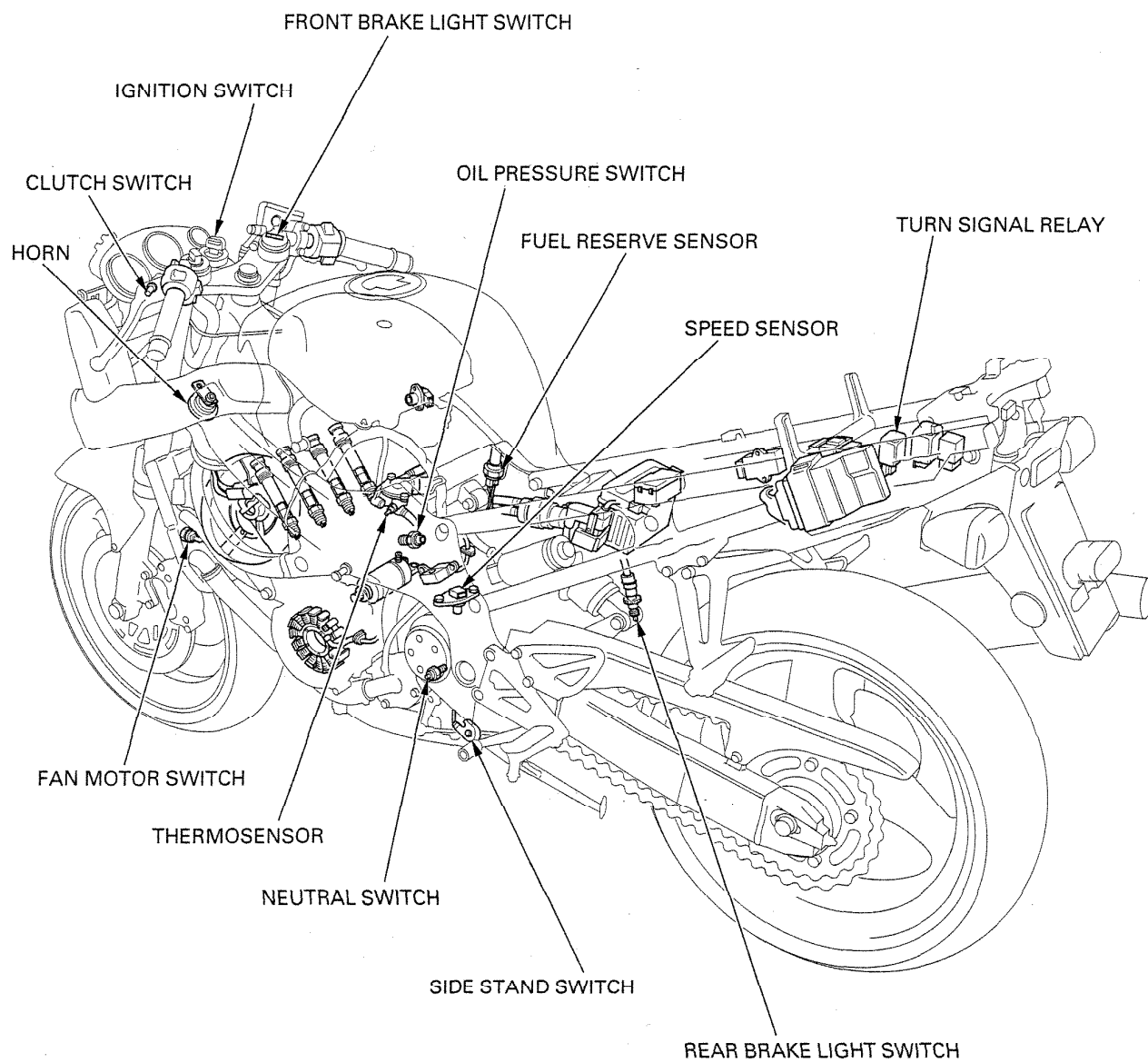
Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

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



## LIGHTS/METERS/SWITCHES

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# 19. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION	19-1	OIL PRESSURE INDICATOR	19-12
HEADLIGHT	19-3	IGNITION SWITCH	19-12
TURN SIGNAL LIGHT	19-3	HANDLEBAR SWITCHES	19-13
BRAKE/TAILLIGHT	19-4	BRAKE LIGHT SWITCH	19-14
LICENSE LIGHT	19-5	CLUTCH SWITCH	19-15
COMBINATION METER	19-6	NEUTRAL SWITCH	19-15
SPEEDOMETER/SPEED SENSOR	19-8	SIDE STAND SWITCH	19-15
TACHOMETER	19-9	LOW FUEL INDICATOR/ FUEL RESERVE SENSOR	19-16
COOLANT TEMPERATURE GAUGE/ THERMOSENSOR	19-9	HORN	19-17
COOLING FAN MOTOR SWITCH	19-11	TURN SIGNAL RELAY	19-18

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- *A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.*
- *Use an electric heating element to heat the water/coolant mixture for the thermosensor inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.*

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes used are indicated 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



## LIGHTS/METERS/SWITCHES

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12V – 60/55W
	Brake/taillight	12V – 21/5W × 2
	License light	12V – 4CP
	Front turn signal/running light	12V – 32/3CP (23/8W) × 2
	Rear turn signal light	12V – 32CP (23W) × 2
	Instrument light	12V – 1.1W × 3
	Turn signal indicator	12V – 1.1W × 2
	High beam indicator	12V – 1.1W
	Neutral indicator	12V – 1.1W
	Oil pressure indicator	12V – 1.1W
	Low fuel indicator	LED
Fuse	Main fuse	30A
	Sub-fuse	10A × 4
Thermosensor resistance	At 80°C (176°F)	47–57 Ω
	At 120°C (248°F)	14–18 Ω
Fan motor switch	Starts to close (ON)	98–102 °C (208–216 °F)
	Stops to open (OFF)	93–97 °C (199–207 °F)

### TORQUE VALUES

Thermosensor	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply sealant to the threads
Fan motor switch	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Ignition switch mounting bolt	25 N·m (2.5 kgf·m , 18 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Side stand switch bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Fuel reserve sensor	23 N·m (2.3 kgf·m , 17 lbf·ft)	

## HEADLIGHT

### BULB REPLACEMENT

#### ⚠ WARNING

*A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.*

Disconnect the headlight connector.  
Remove the dust cover.

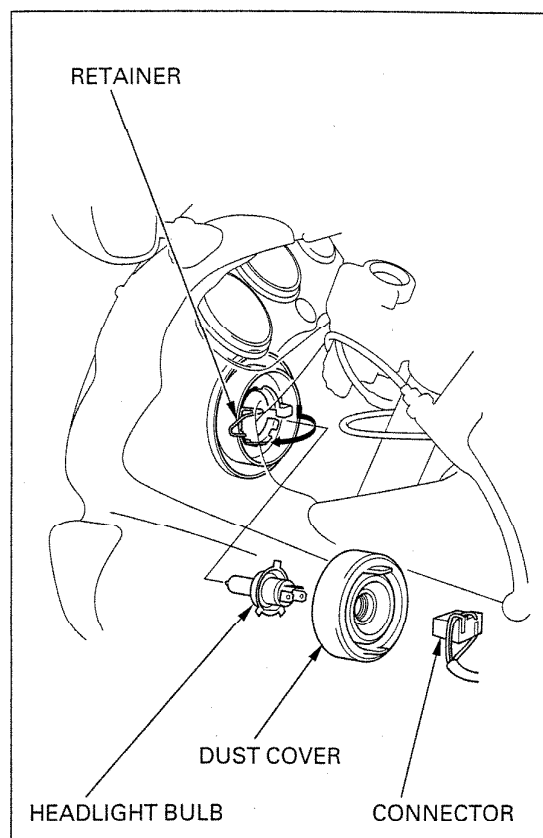
Unhook the bulb retainer and replace the headlight bulb.

#### CAUTION:

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

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

Install the removed parts in the reverse order of removal.



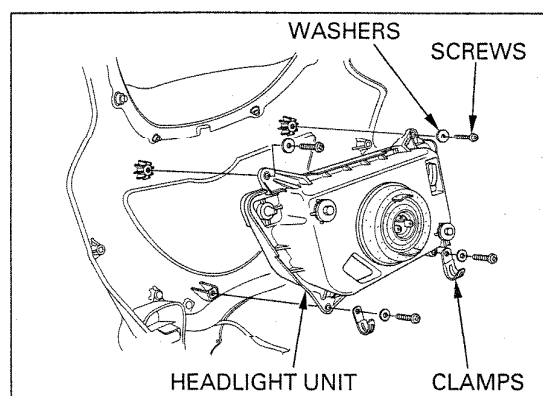
### REMOVAL/INSTALLATION

Remove the front fairing (page 2-5).

Remove the four screws, washers, two clamps and the headlight unit.

*Route the wires and hose properly (page 1-18).*

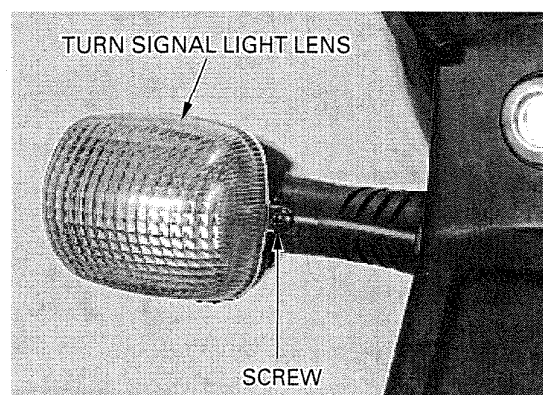
Install the headlight unit in the reverse order of removal.



## TURN SIGNAL LIGHT

### BULB REPLACEMENT

Remove the screw and turn signal light lens.

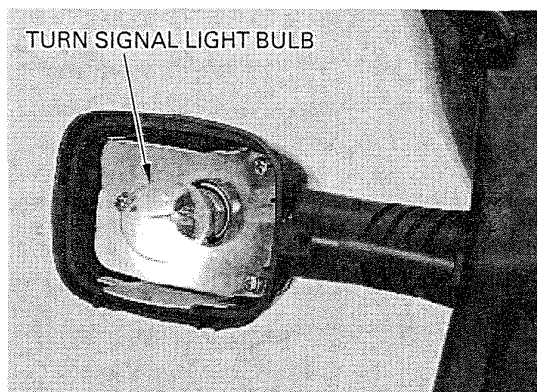


## LIGHTS/METERS/SWITCHES

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

Make sure that the lens gasket is installed in position and is in good condition, and replace it with new one if necessary.

Install the lens, aligning the slot with the tab of the turn signal light, and tighten the screw.



### REMOVAL/INSTALLATION

Front: Remove the instrument panels (page 2-5).

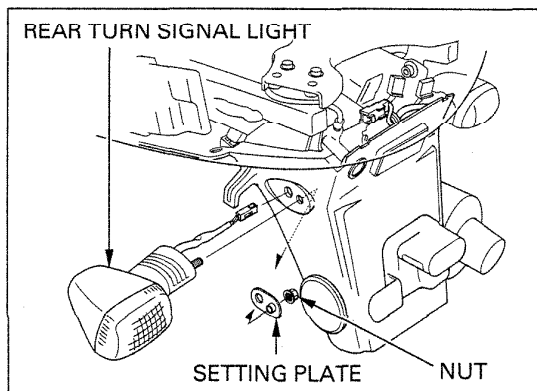
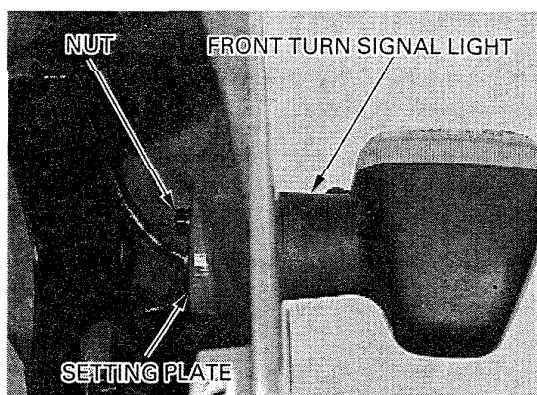
Rear: Remove the seat (page 2-2).

Disconnect the turn signal light connectors.  
Remove the nut, setting plate and the turn signal light.

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

#### NOTE:

Route the turn signal light wire properly (page 1-18).

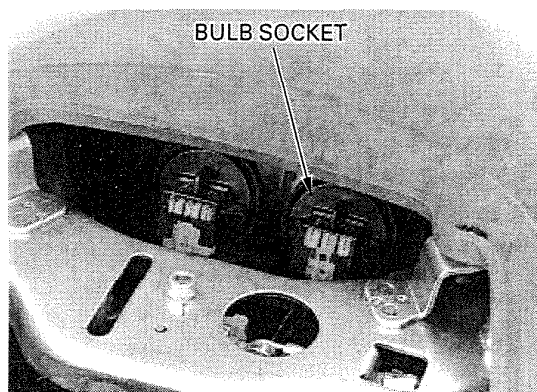


## BRAKE/TAILLIGHT

### BULB REPLACEMENT

Remove the seat (page 2-2).

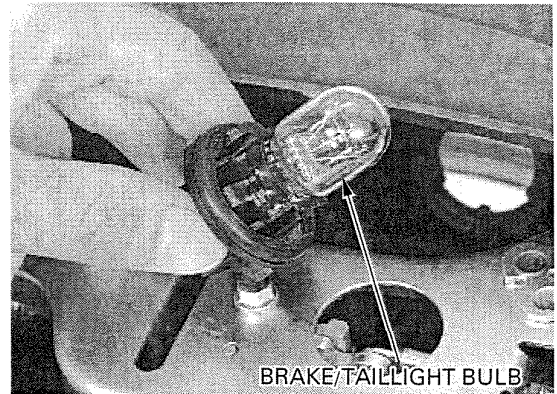
Turn the socket counterclockwise and remove it from the brake/taillight.



Pull the brake/taillight bulb out of the socket and replace it with a new one.

Install the socket by turning it clockwise.

Install the seat (page 2-2).

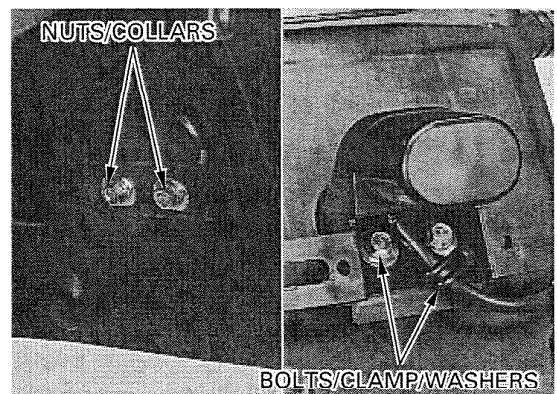


## LICENSE LIGHT

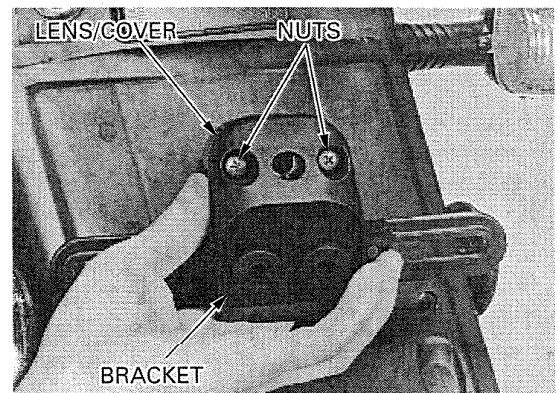
### BULB REPLACEMENT

Remove the following:

- two nuts and collars
- bolts, wire clamp and washers
- number plate bracket from the rear fender



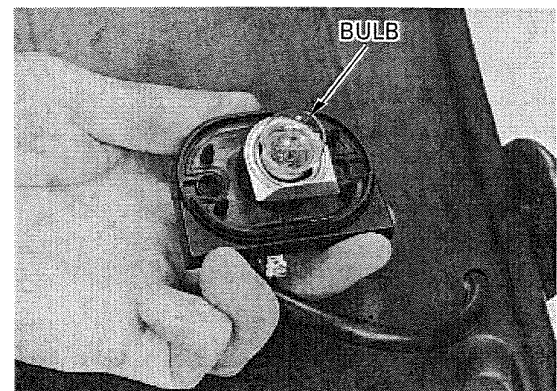
- two nuts
- lens, lens cover and license light base from the number plate bracket



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

Make sure that the seal rubber is installed in position and is in good condition, and replace it with new one if necessary.

Install the removed parts in the reverse order of removal.

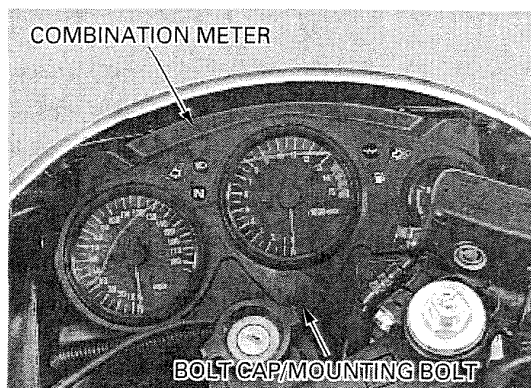


### COMBINATION METER

#### BULB REPLACEMENT

Remove the instrument panels (page 2-5).

Remove the bolt cap and meter mounting bolt.  
Remove the combination meter from the fairing stay by sliding it downward.

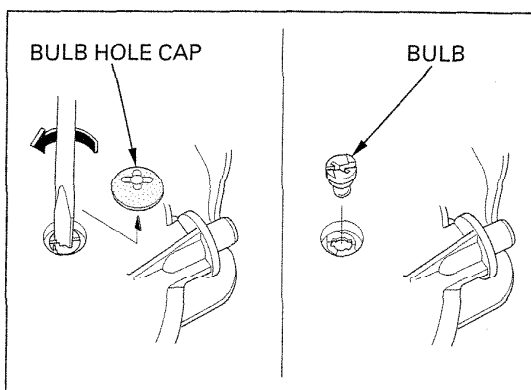


Remove the bulb hole cap from the meter lower case.

*The combination meter may be damaged if the bulb is removed or installed while the ignition switch is ON.*

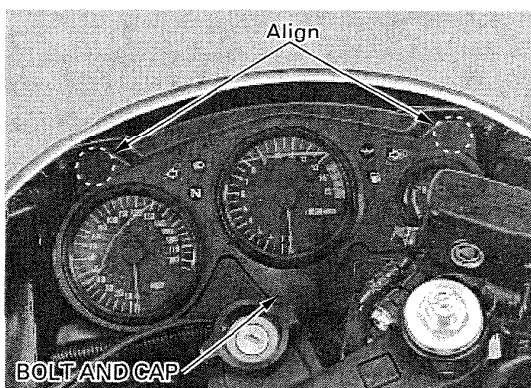
Remove the bulb from the printed circuit board by turning it 45° counterclockwise.

Install a new bulb and turn it clockwise to lock it.  
Install the bulb hole cap.



Install the combination meter by aligning the two bosses with the grommets of the fairing stay.  
Install the mounting bolt and bolt cap.

Install the instrument panels (page 2-5).

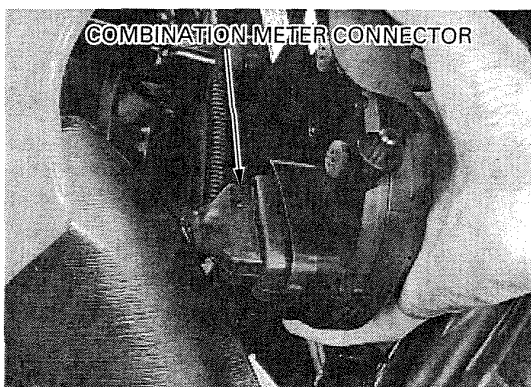


#### REMOVAL/INSTALLATION

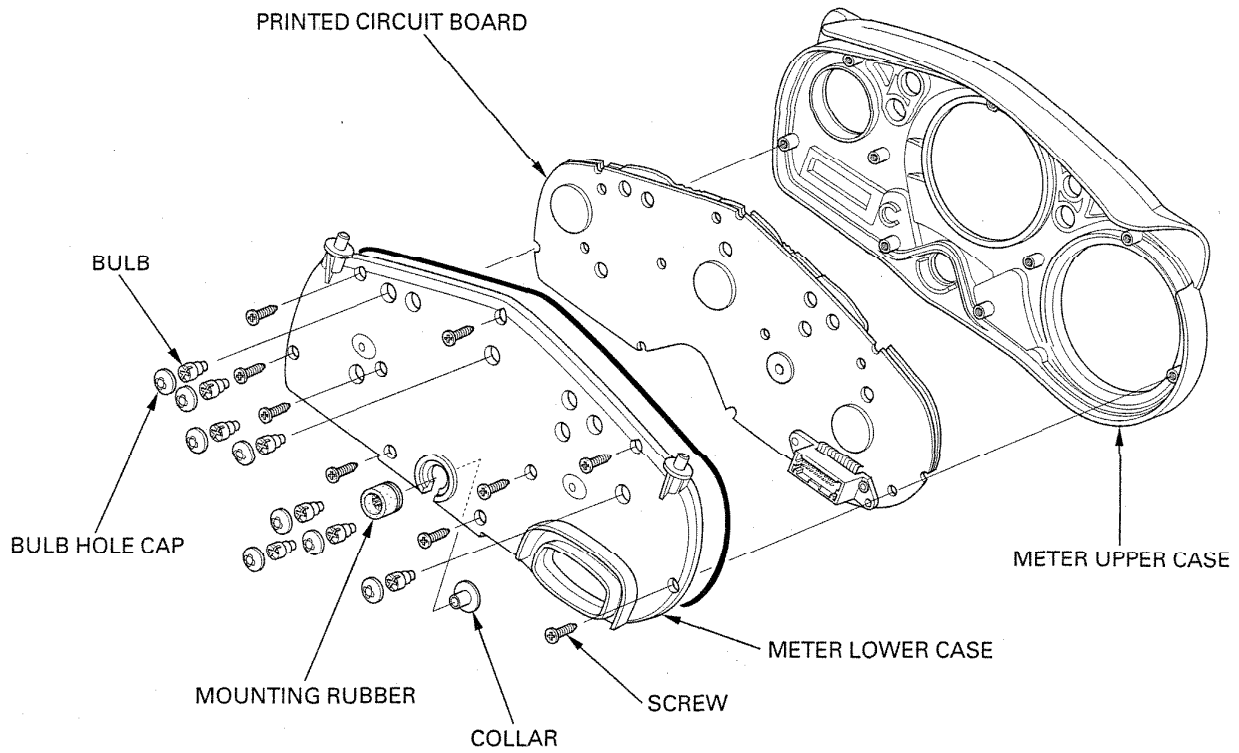
Remove the combination meter from the fairing stay (see above).

Disconnect the connector and remove the combination meter.

Install the combination meter in the reverse order of removal.



## DISASSEMBLY/ASSEMBLY

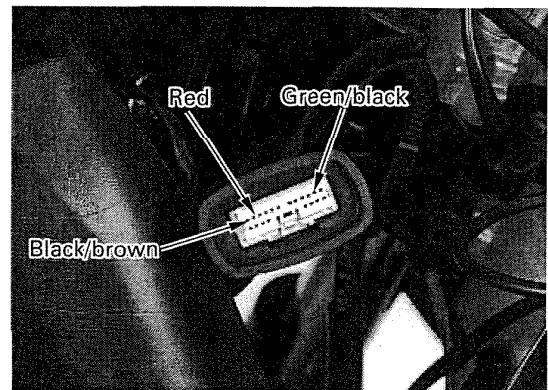


## POWER/GROUND LINE INSPECTION

Remove the combination meter (page 19-6).  
Check the following at the wire harness side connector of the combination meter.

### POWER INPUT LINE

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



### BACK-UP VOLTAGE LINE

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

### SENSOR GROUND LINE

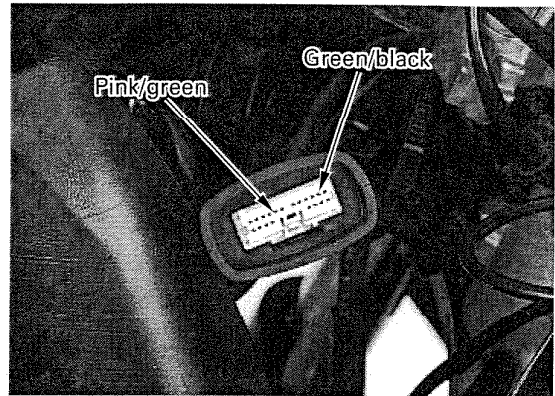
Check for continuity between the Green/black wire terminal and ground.  
There should be continuity at all times.  
If there is no continuity, check for open circuit in Green/black wire.

## SPEEDOMETER/SPEED SENSOR

### SYSTEM INSPECTION

Check that the tachometer and coolant temperature gauge function properly.

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



- If pulse voltage appears, replace the printed 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 speed sensor.

### SPEED SENSOR INSPECTION

Raise the fuel tank (page 2-3).

Turn the ignition switch ON and measure the voltage between the Black (+) and Green (–) wire terminals of the speed sensor 3P connector with the connector connected.

There should be battery voltage.

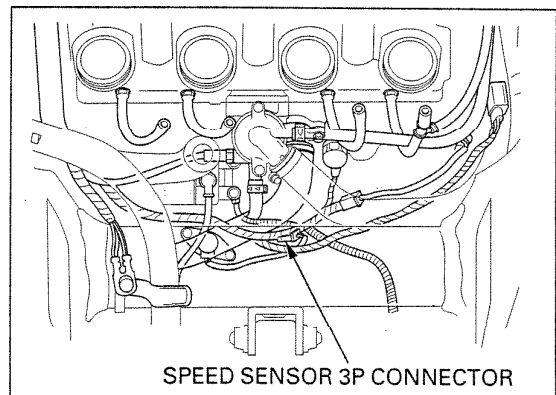
If there is no voltage, check for open circuit in related wires.

Shift the transmission in neutral and turn the ignition switch ON.

Measure the voltage between the Pink (+) and Green (–) wire terminal of the sensor connector with the connector connected.

Slowly turn the rear wheel by hand.

There should be 0 to 5 V pulse voltage.





## TACHOMETER

### SYSTEM INSPECTION

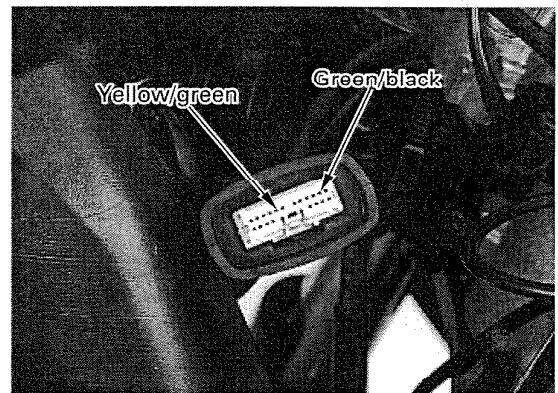
Check that the speedometer and coolant temperature gauge function properly.

- If they do not function, perform the power/ground line inspection of the combination meter (page 19-7).
- If they function, disconnect the combination meter connector (page 19-6) and turn the ignition switch ON.

Measure the voltage between the Yellow/green (+) and Green/black (–) wire terminals of the wire harness side connector.

There should be battery voltage.

- If there is battery voltage, replace the printed circuit board.
- If there is no voltage, check for open or short circuit in Yellow/green wire.



## COOLANT TEMPERATURE GAUGE/THERMOSENSOR

### SYSTEM INSPECTION

Check that the speedometer and tachometer function properly.

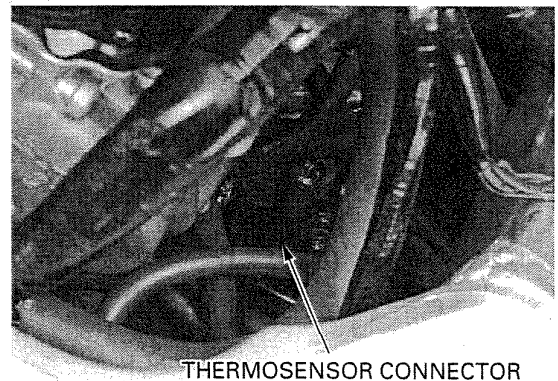
- If they do not function, perform the power/ground line inspection of the combination meter (page 19-7).
- If they function, raise the fuel tank (page 2-3), disconnect the thermosensor wire connector and ground it with a jumper wire.

Turn the ignition switch ON and check the coolant temperature gauge needle. The needle should move to "H".

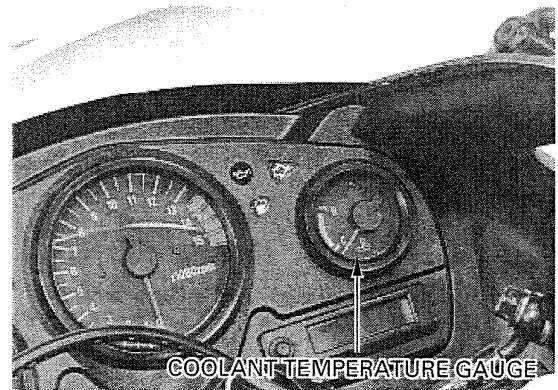
#### CAUTION:

**Immediately turn the ignition switch OFF when the needle moves to "H" (hot) to prevent the gauge from being damaged.**

- If the needle moves, check the thermosensor.
  - If the needle does not move, check for open circuit in Green/blue wire.
- If the Green/blue wire is OK, replace the printed circuit board.



THERMOSENSOR CONNECTOR



COOLANT TEMPERATURE GAUGE

### THERMOSENSOR INSPECTION

#### ▲WARNING

*Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.*

Remove the carburetor assembly (page 5-15).

Disconnect the thermosensor connector and remove the thermosensor.

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

#### NOTE:

- Soak the thermosensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or thermosensor touch the pan.

Temperature	80 °C (176 °F)	120 °C (248 °F)
Resistance	47 – 57 $\Omega$	14 – 18 $\Omega$

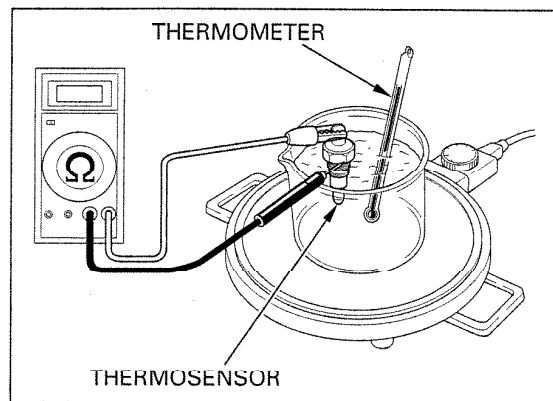
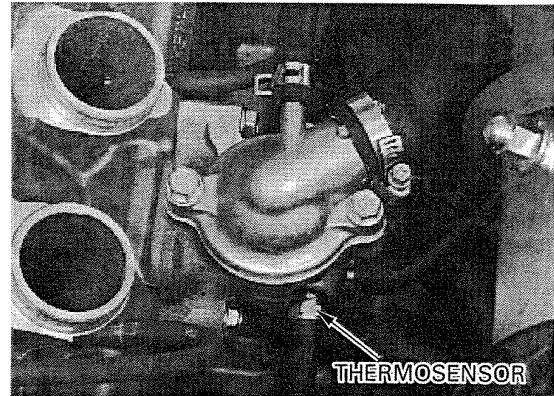
Replace the thermosensor if it is out of specifications by more than 10 % at any temperature listed.

Apply sealant to the thermosensor threads. Do not apply sealant to the sensor head.  
Install and tighten the thermosensor.

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

Connect the thermosensor connector.

Install the carburetor assembly (page 5-30).  
Fill and bleed the cooling system (page 6-4).



## COOLING FAN MOTOR SWITCH

Remove the left side fairing (page 2-4).

### INSPECTION

#### Fan motor does not stop

Turn the ignition switch OFF, disconnect the connector from the fan motor switch and turn the ignition switch ON again.

- If the fan motor does not stop, check for short circuit between the fan motor and switch.
- If the fan motor stops, replace the fan motor switch.

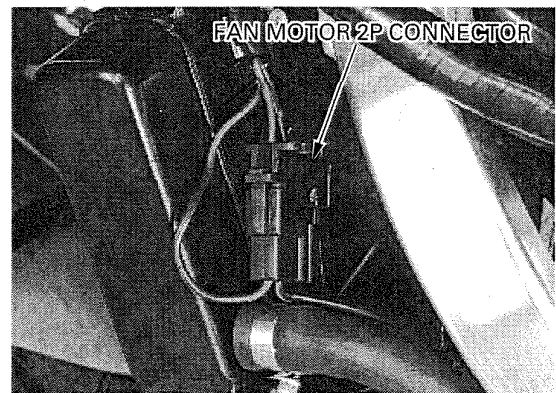
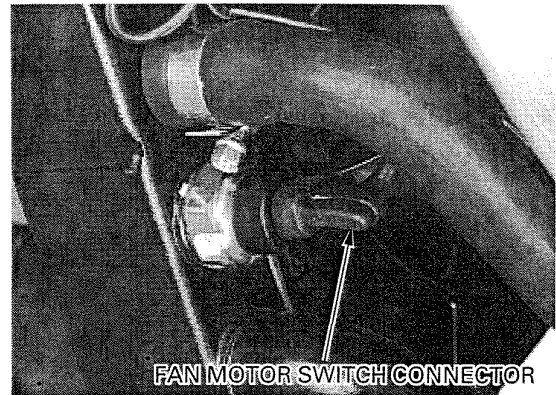
#### Fan motor does not start

Before testing, check for a blown fan motor fuse. Warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector with a jumper wire.

Turn the ignition switch ON and check the fan motor.

- If the motor starts, check the connection at the fan motor switch terminal. If it is OK, replace the fan motor switch.
  - If the fan motor does not start, measure the voltage between the Black/blue (+) and Green (-) wire terminals at the fan motor 2P connector. There should be battery voltage.
- If there is battery voltage, replace the fan motor.  
—If there is no voltage, check for open circuit in Black/blue and Green wires.



### REMOVAL/INSTALLATION

Drain the coolant (page 6-5).

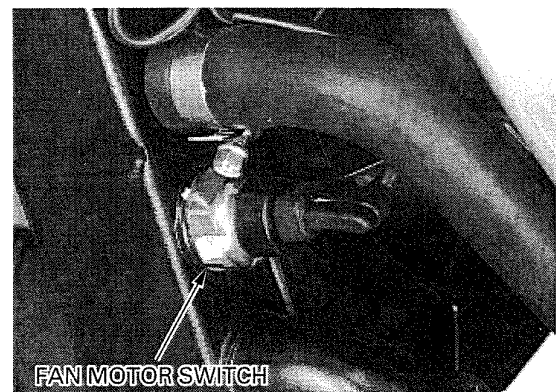
Disconnect the fan motor switch connector and remove the switch.

Install a new O-ring onto the fan motor switch. Install and tighten the fan motor switch.

**TORQUE** : 18 N·m (1.8 kgf·m , 13 lbf·ft)

Connect the fan motor switch connector.

Fill and bleed the cooling system (page 6-4).



## OIL PRESSURE INDICATOR

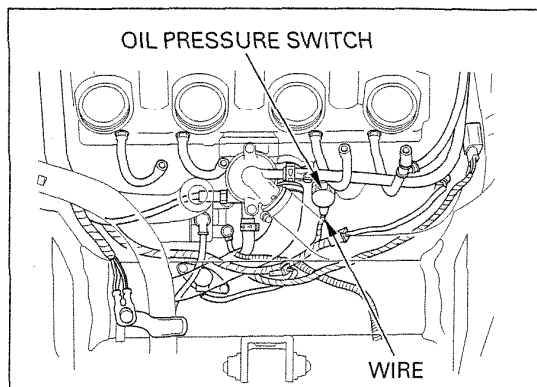
### INSPECTION

**Indicator does not come on with the ignition switch turned ON**

Remove the fuel tank (page 2-3).

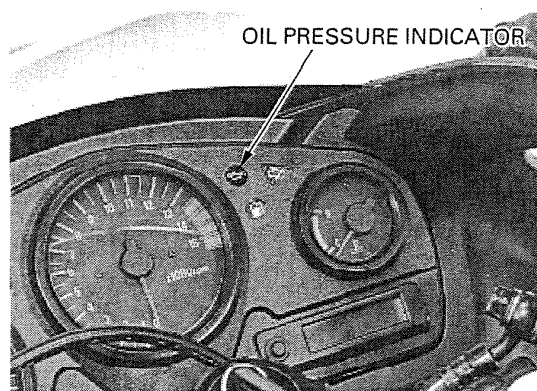
Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw.

Ground the wire terminal to the engine with a jumper wire.



Turn the ignition switch ON and check the oil pressure indicator.

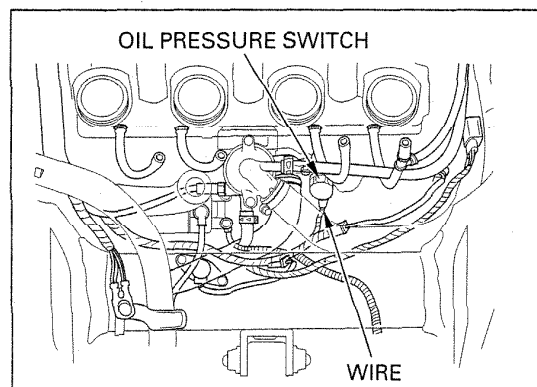
- If the indicator comes on, replace the oil pressure switch (page 4-3).
- If the indicator does not come on, check for open circuit in Bu/R wire.



**Indicator stays on while the engine is running**

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw. Check for continuity between the wire terminal and ground.

- If there is continuity, check for short circuit in Bu/R wire.
  - If there is no continuity, check the oil pressure (page 4-3).
- If the oil pressure is normal, replace the oil pressure switch (page 4-3).

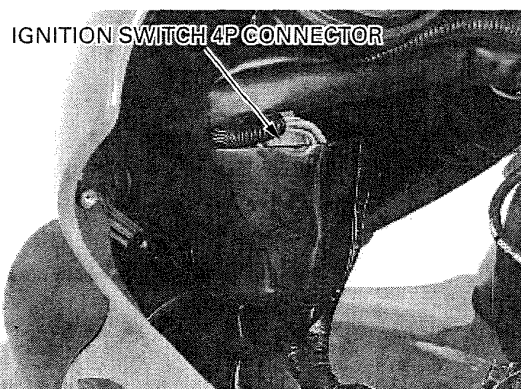


## IGNITION SWITCH

### INSPECTION

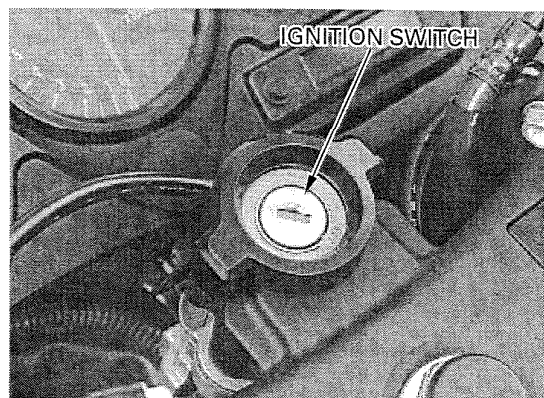
Remove the left air intake duct (page 2-6).

Disconnect the ignition switch 4P (white) connector.



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

Color Position	R	R/BI	Bu/O
ON	○	○	○
OFF			
LOCK			



## REMOVAL/INSTALLATION

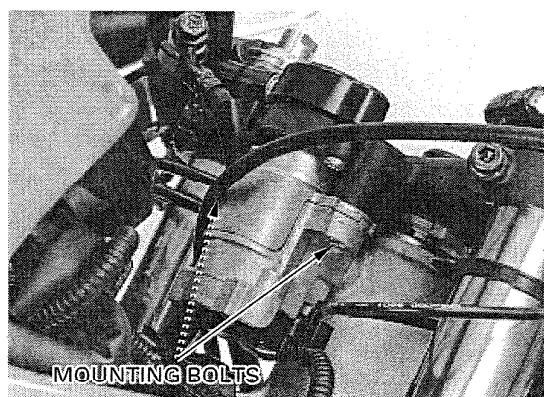
Disconnect the ignition switch 4P (white) connector (page 19-12).

Remove the two mounting bolts (T40) and the ignition switch.

Install the ignition switch and tighten the mounting bolts.

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

Install the removed parts in the reverse order.



## HANDLEBAR SWITCHES

Remove the left air intake duct (page 2-6).

Disconnect the right handlebar switch 3P and 4P (Red) connectors and left handlebar switch 13P connector.

Check for continuity between the connector terminals in each switch position.

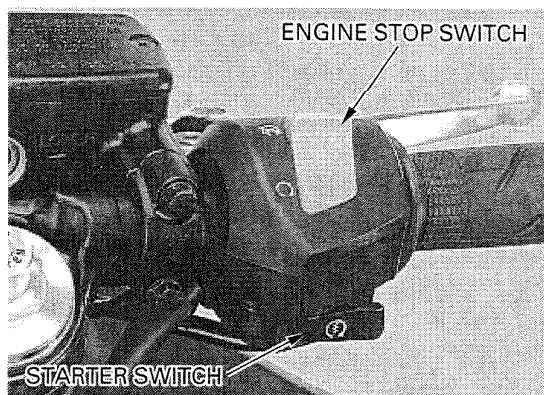
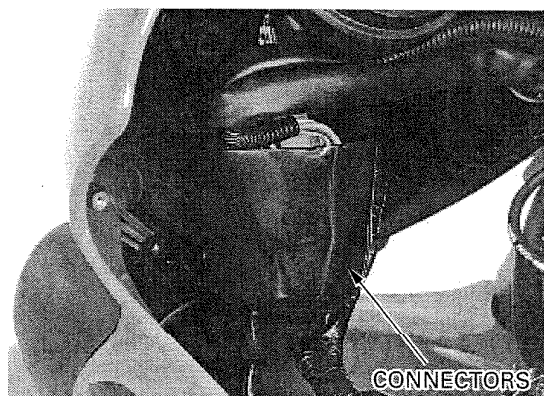
Continuity should exist between the color coded wires as follows:

### ENGINE STOP SWITCH

Color Position	BI/Y	BI/W
OFF		
RUN	○	○

### STARTER SWITCH

Color Position	Y/R	BI/W	BI/R	Bu/W
FREE			○	○
PUSH	○	○		



## LIGHTS/METERS/SWITCHES

### TURN SIGNAL SWITCH

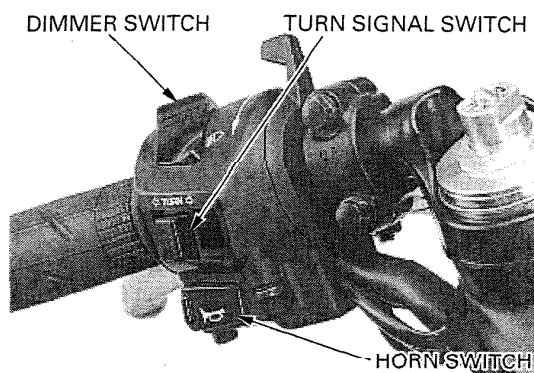
Color \ Position	Gr	Lb	O	Bl/Br	O/W	Lb/W
←	○	○	○	○	○	○
N	○	○	○	○	○	○
→	○	○	○	○	○	○

### DIMMER SWITCH

Color \ Position	Bu	Bu/W	W
Hi	○	○	○
(N)	○	○	○
Lo	○	○	○

### HORN SWITCH

Color \ Position	Bl/Br	Lg
FREE	○	○
PUSH	○	○

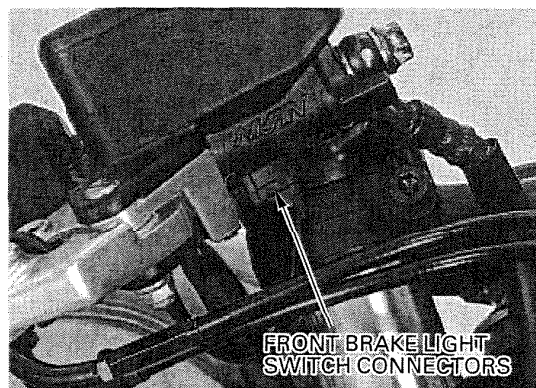


## BRAKE LIGHT SWITCH

### FRONT

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

There should be continuity with the front brake lever squeezed and no continuity with the lever released.

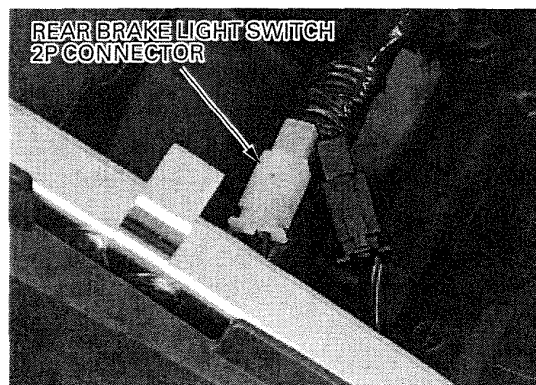


### REAR

Remove the seat (page 2-2).

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

There should be continuity with the rear brake pedal depressed and no continuity with the pedal released.

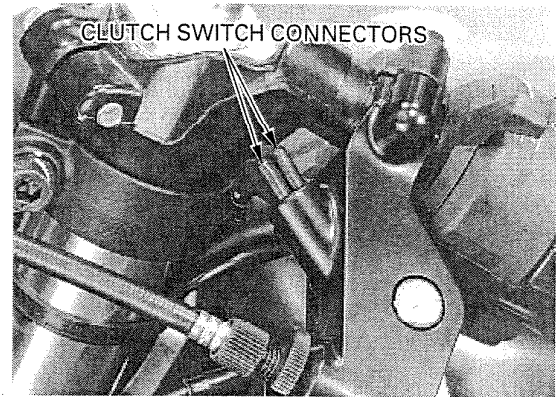




## CLUTCH SWITCH

Disconnect the clutch switch wire connectors and check for continuity between the switch terminals.

There should be continuity with the clutch lever squeezed and no continuity with the lever released.



## NEUTRAL SWITCH

### INSPECTION

Disconnect the neutral switch wire connector. Check for continuity between the switch terminal and engine ground.

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

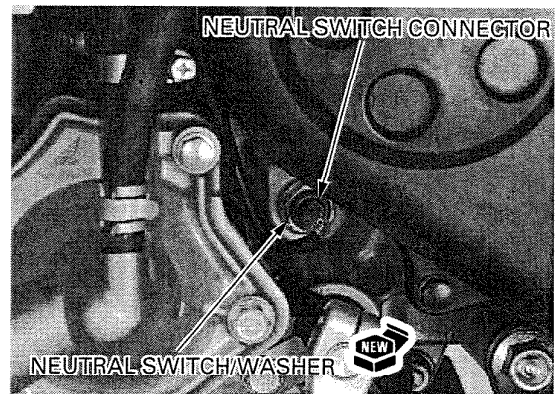
### REMOVAL/INSTALLATION

Disconnect the neutral switch wire connector. Remove the neutral switch from the crankcase.

Install the neutral switch with a new sealing washer and tighten it.

**TORQUE** : 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the neutral switch wire connector.



## SIDE STAND SWITCH

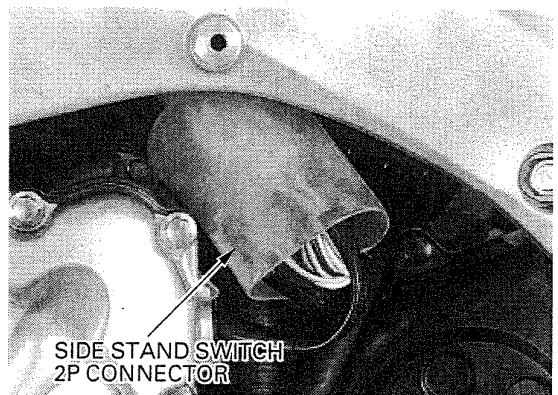
Remove the left side fairing (page 2-2).

### INSPECTION

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

Check for continuity between the connector terminals.

There should be continuity with the side stand retracted and no continuity with the side stand lowered.





### REMOVAL/INSTALLATION

Disconnect the side stand switch 2P (green) connector.  
Remove the side stand switch bolt and the switch.

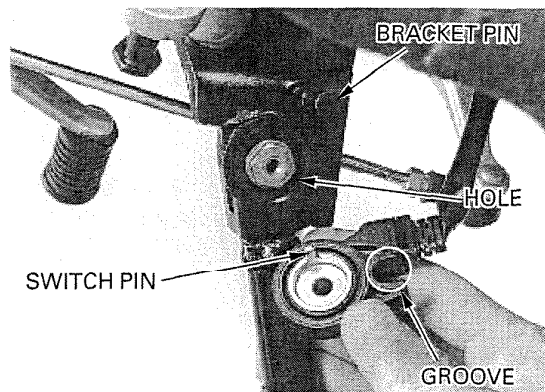
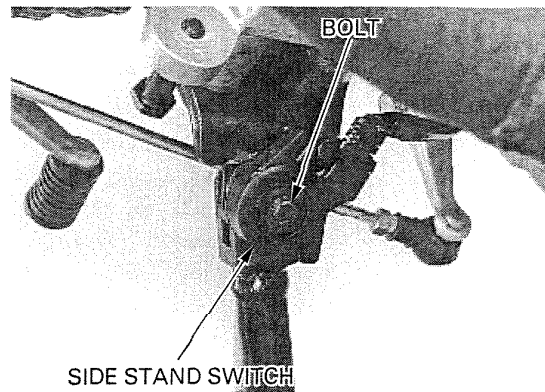
Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the bracket pin.  
Install the side stand switch bolt and tighten it.

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

Install the removed parts in the reverse order.

#### NOTE:

Route the side stand switch wire properly (page 1-18).



## LOW FUEL INDICATOR/FUEL RESERVE SENSOR

### INSPECTION

Raise the fuel tank (page 2-3).

#### Low fuel indicator does not go off

Disconnect the Brown/black wire connector from the fuel reserve sensor.  
Turn the ignition switch ON and check the low fuel indicator.

- If the indicator does not come on, replace the fuel reserve sensor.
- If the indicator comes on, check for short circuit in Brown/black wire.

#### Low fuel indicator does not come on

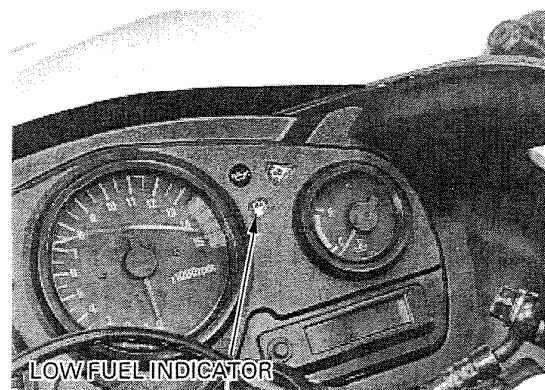
Check that the speedometer, tachometer and coolant temperature gauge function properly.

- If they do not function, perform the power/ground line inspection of the combination meter (page 19-7).
- If they function, disconnect the fuel reserve sensor connectors and short the connector terminals with a jumper wire.

Turn the ignition switch ON and check the low fuel indicator.

- If the indicator comes on, replace the fuel reserve sensor.
- If the indicator does not come on, check for an open circuit in Brown/black and Green/black wires.

If they are OK, replace the printed circuit board (page 19-7).



## REMOVAL/INSTALLATION

### ⚠ WARNING

*Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.*

Remove the fuel tank (page 2-3).

Remove the fuel reserve sensor from the fuel tank.

Install a new O-ring into the sensor groove properly and install the reserve sensor, and tighten it.

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

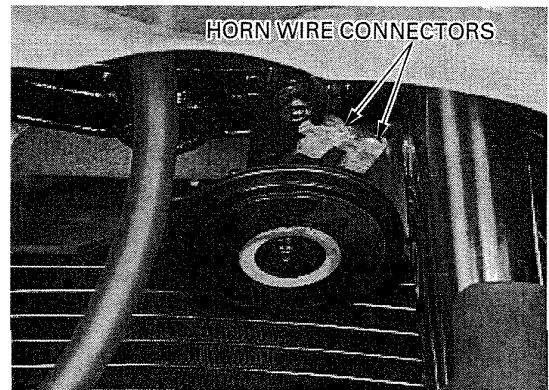
Check for leakage from the reserve sensor.  
Install the fuel tank (page 2-3).



## HORN

Disconnect the wire connectors from the horn.  
Connect a 12 V battery to the horn terminals.

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



## TURN SIGNAL RELAY

**Turn signal light does not blink**  
Remove the seat cowl (page 2-2).

Disconnect the turn signal relay connector.  
Connect the Black/brown and Gray wire terminals of the wire harness side connector with a jumper wire.

Turn the ignition switch ON and check the turn signal light by operating the turn signal switch.

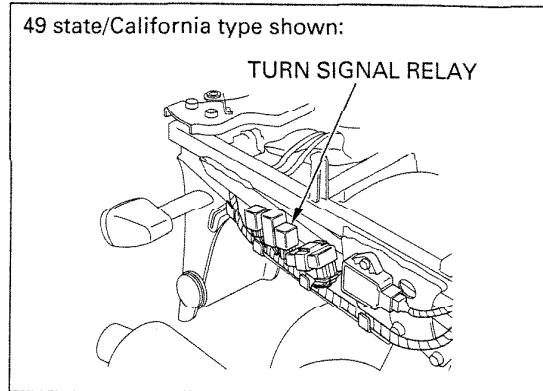
- If the light does not come on, check for open circuit in Black/brown and Gray wires.
- If the light comes on, check for continuity between the Green wire terminal and body ground.

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

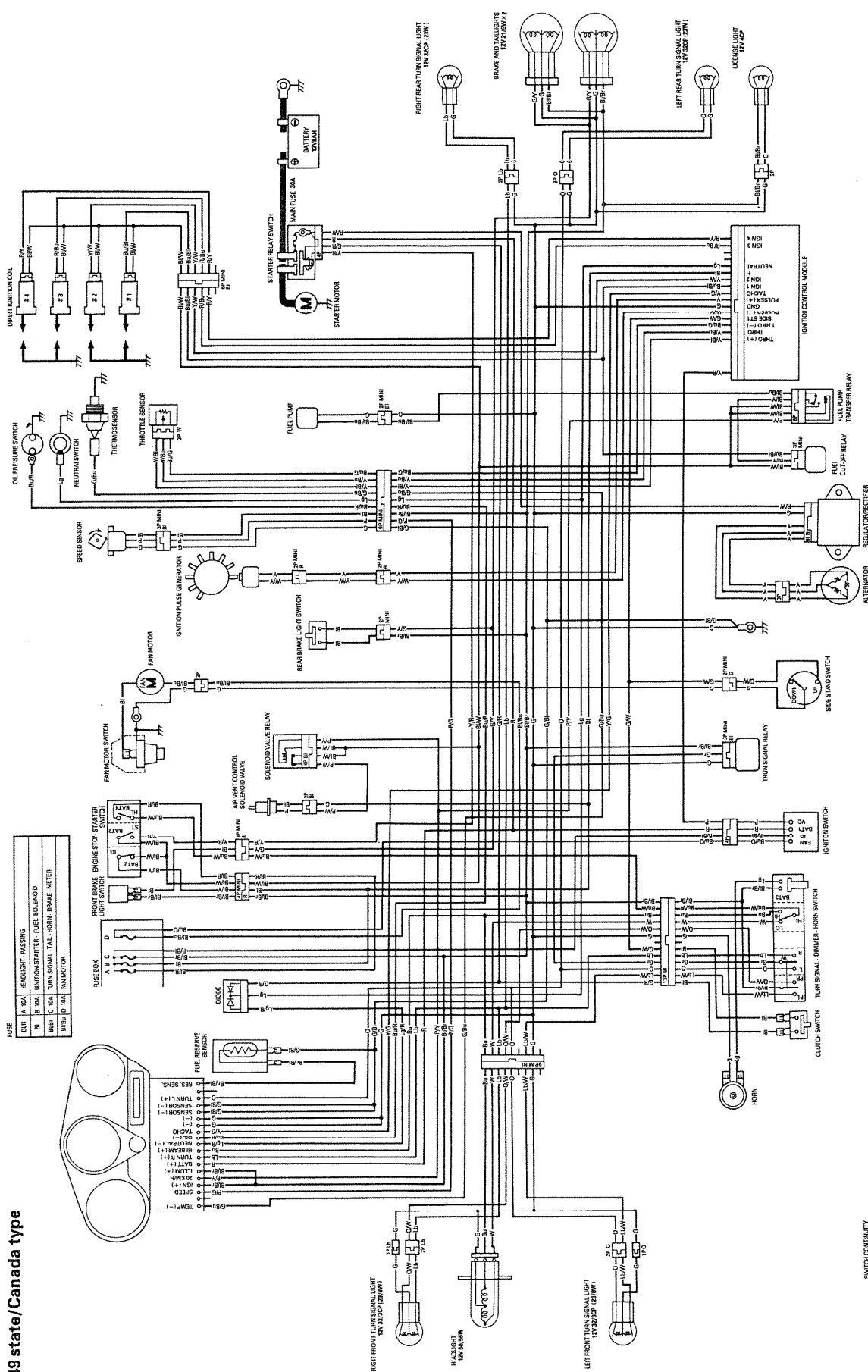
— If there is continuity, check the connector terminals for loose or poor contact.

If the connector terminals are OK, replace the turn signal relay.

49 state/California type shown:



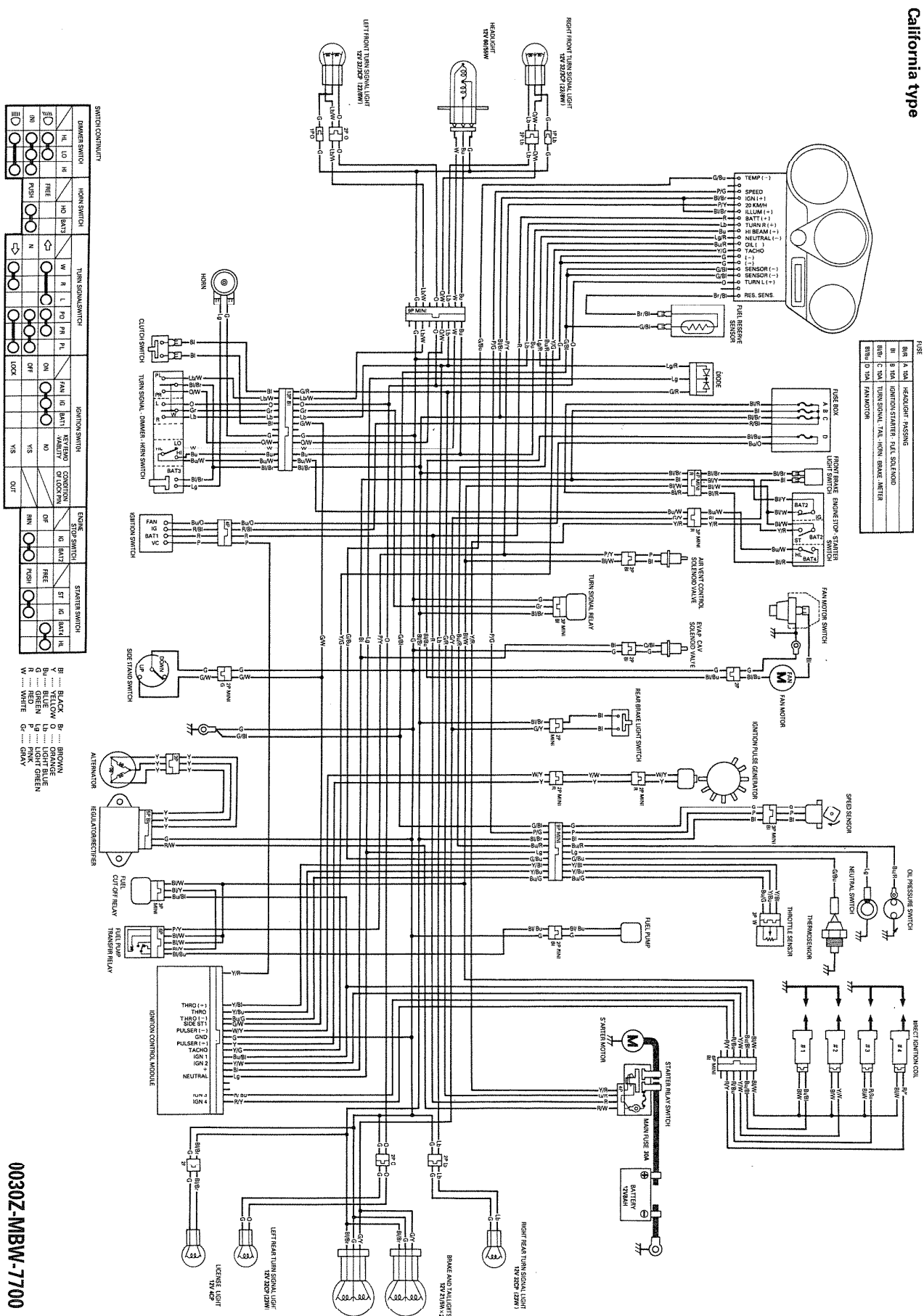
**49 state/Canada type**



0030Z-MBW-6700

## WIRING DIAGRAM

## California type



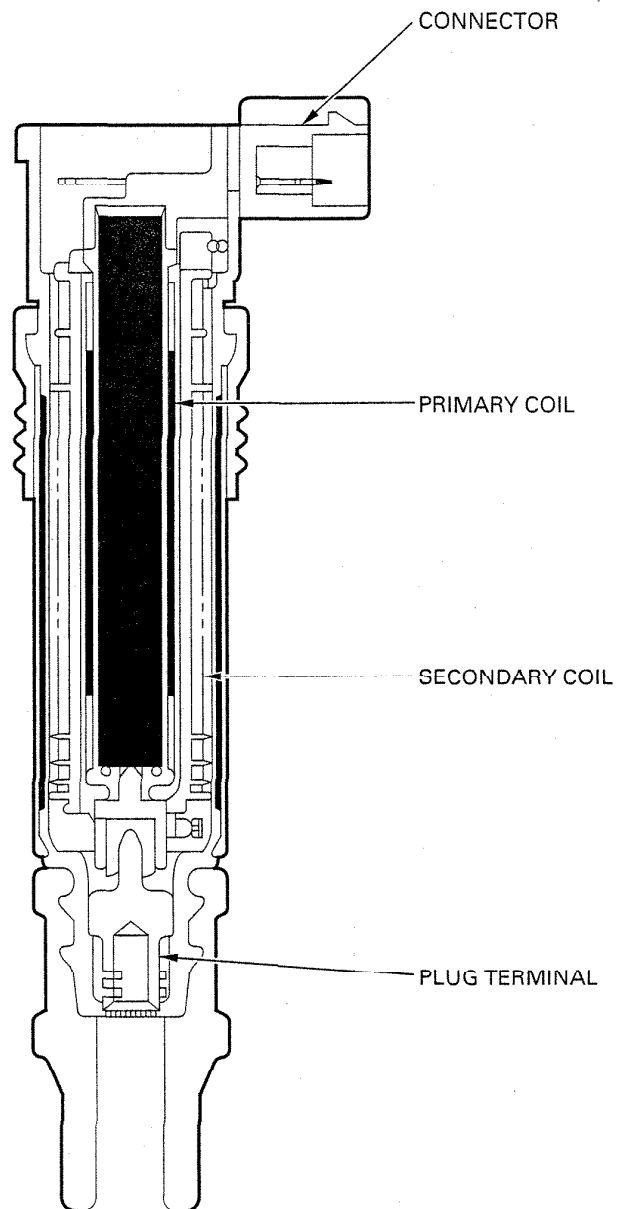
# 21. TECHNICAL FEATURE

## COIL-INTEGRATED SPARK PLUG CAP (DIRECT IGNITION COIL)

21-1

### COIL-INTEGRATED SPARK PLUG CAP (DIRECT IGNITION COIL)

The direct ignition coil is the spark plug cap with the built-in ignition coil. The spark plug wire is omitted, and the light weight and compact size ignition device is accomplished by the direct ignition coil.



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**MEMO**

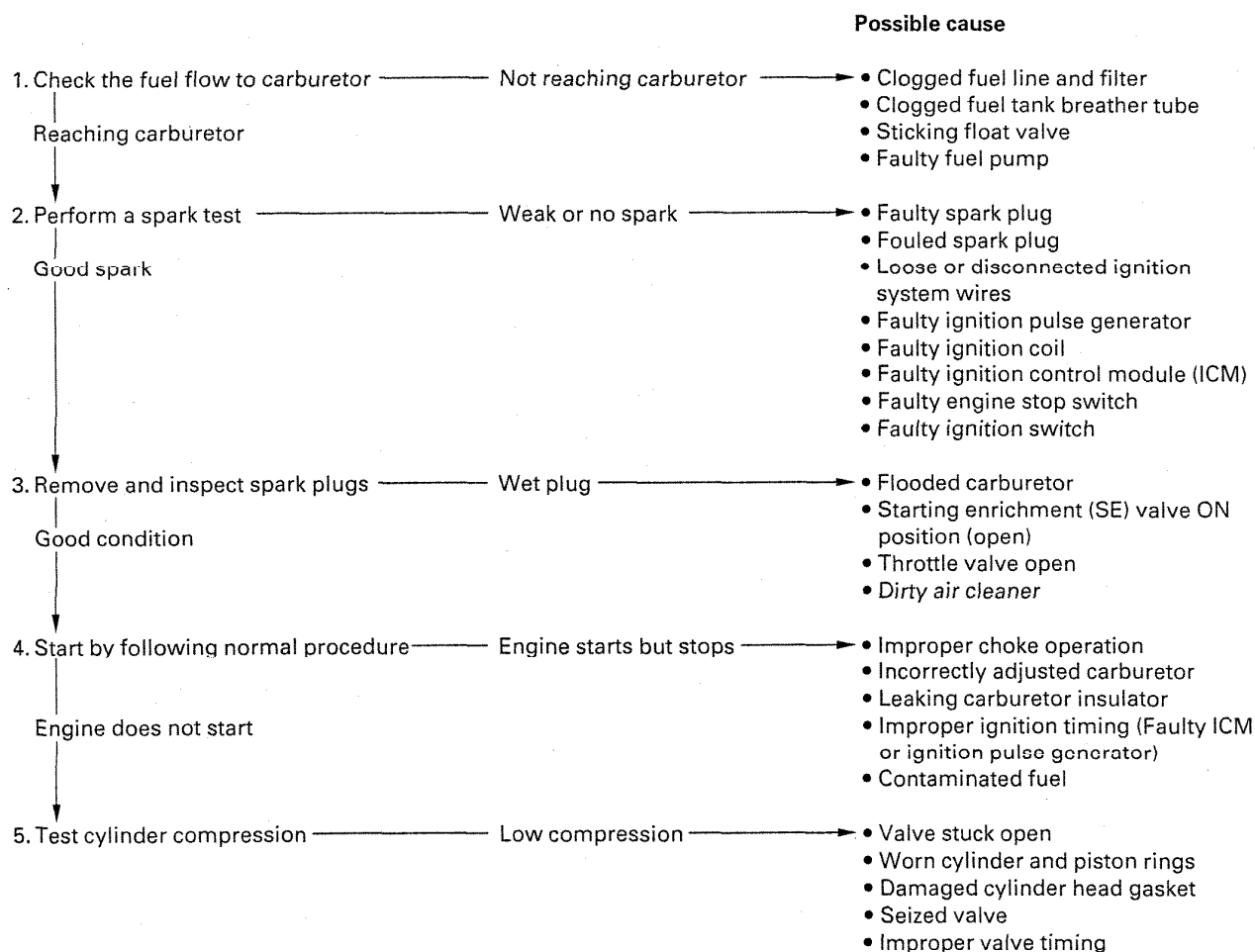
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# 22. TROUBLESHOOTING

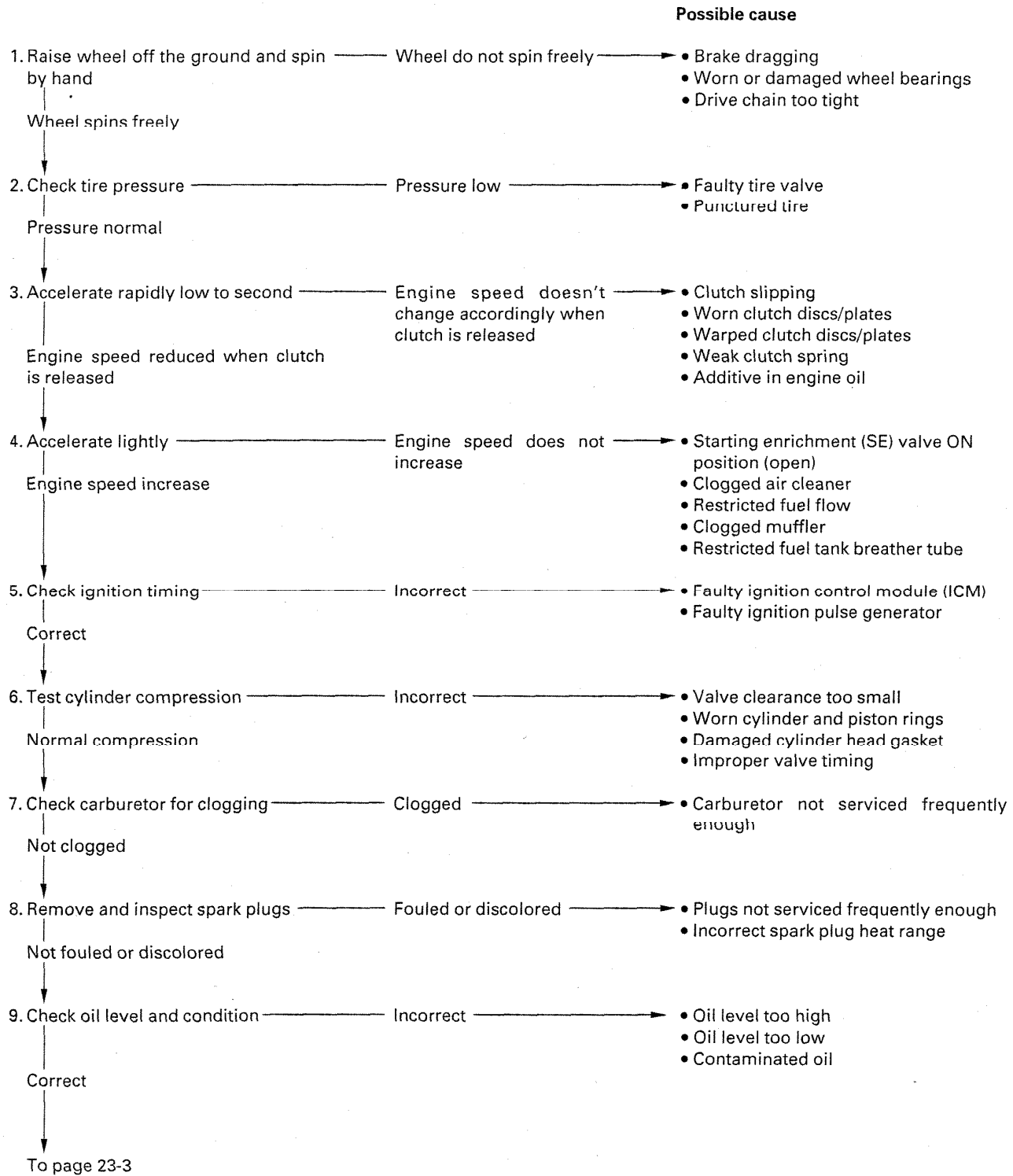
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POOR PERFORMANCE AT LOW AND IDLE SPEED	22-3		

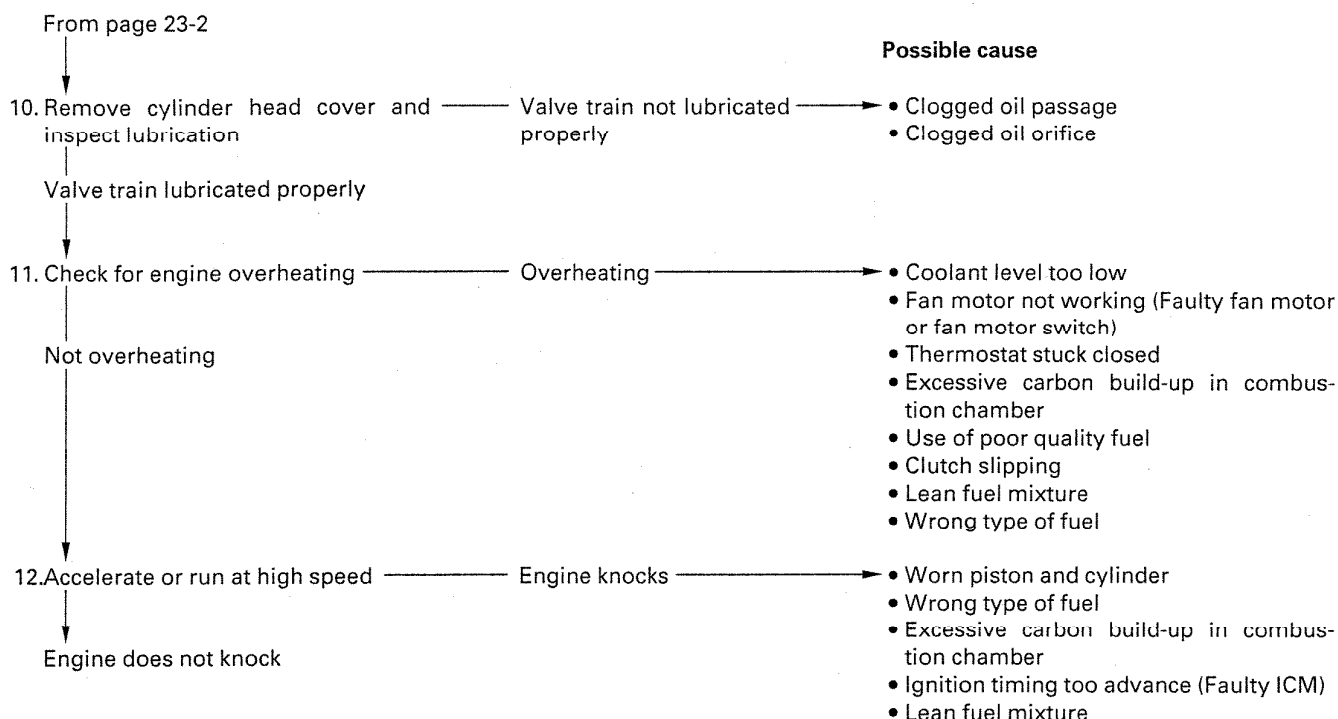
## ENGINE DOES NOT START OR IS HARD TO START



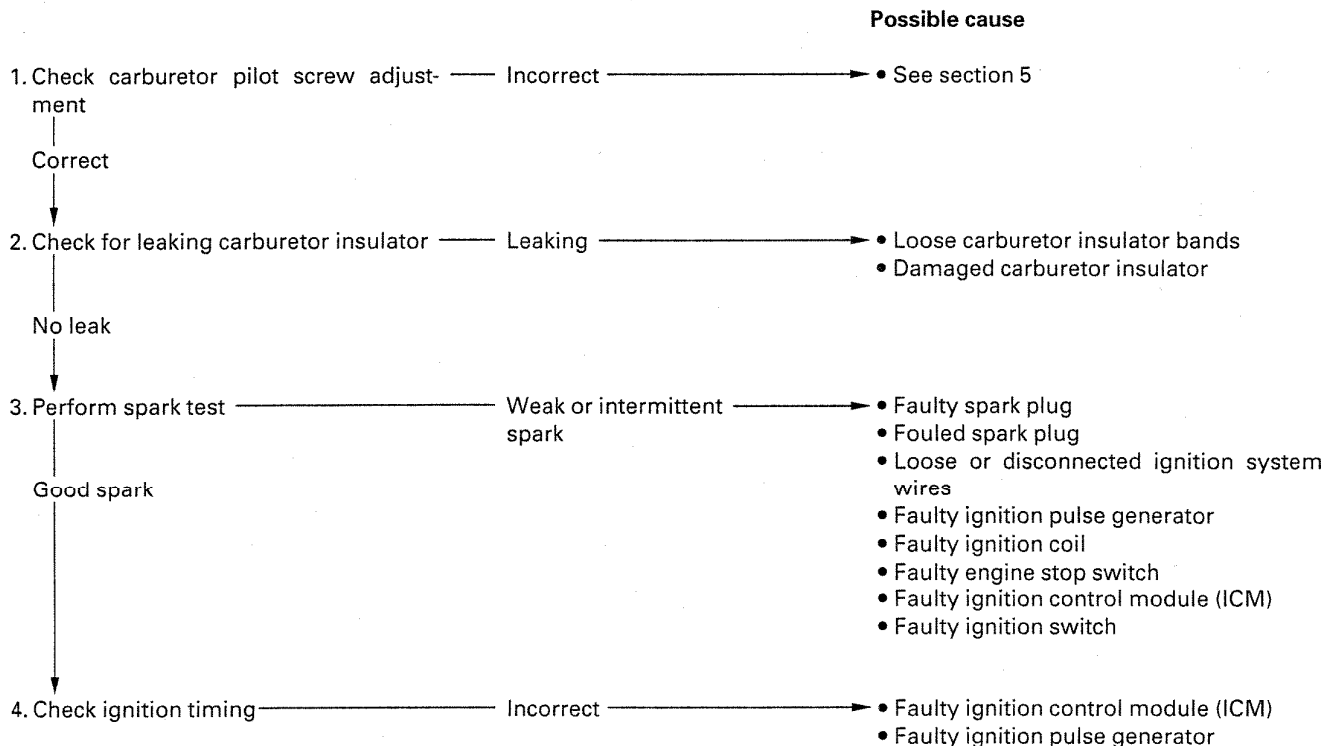
## TROUBLESHOOTING

### ENGINE LACKS POWER



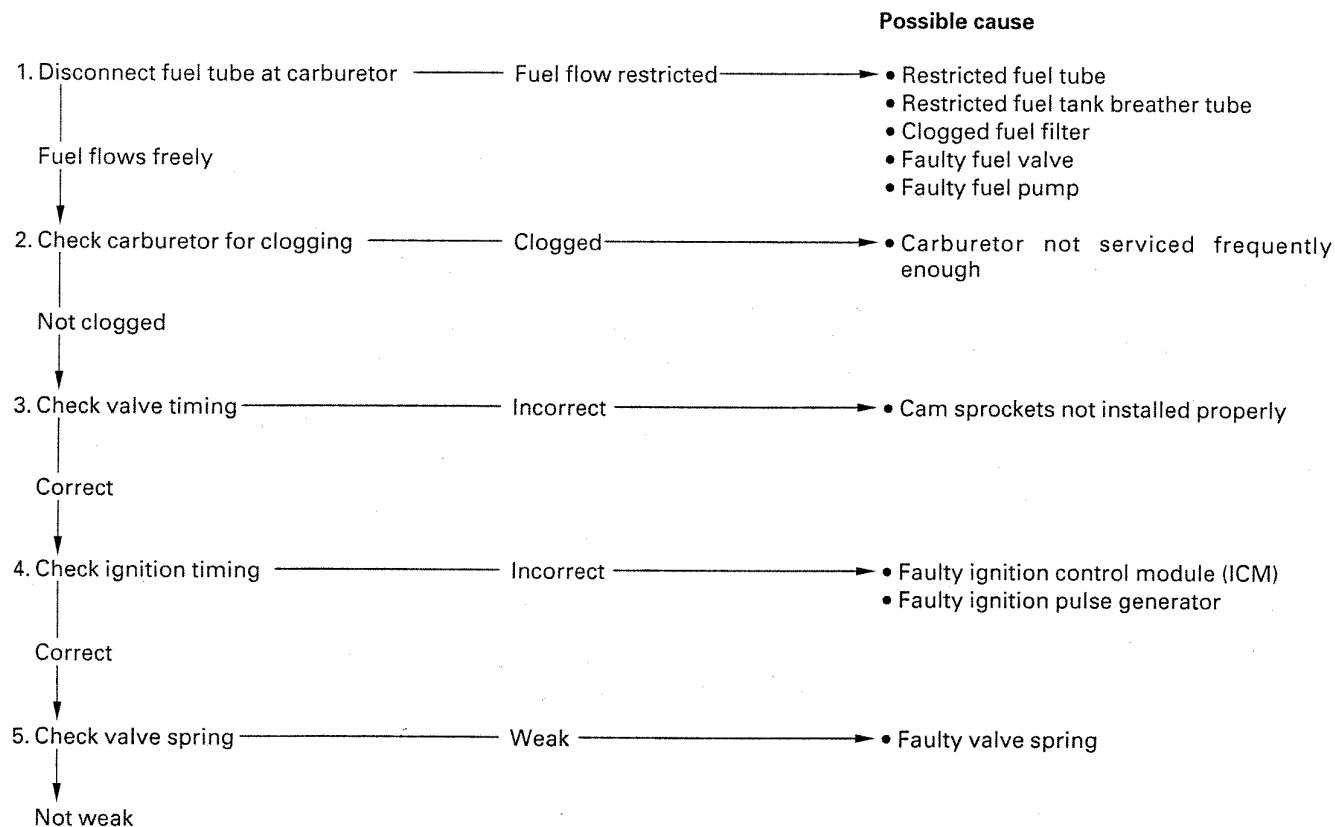


## POOR PERFORMANCE AT LOW AND IDLE SPEED

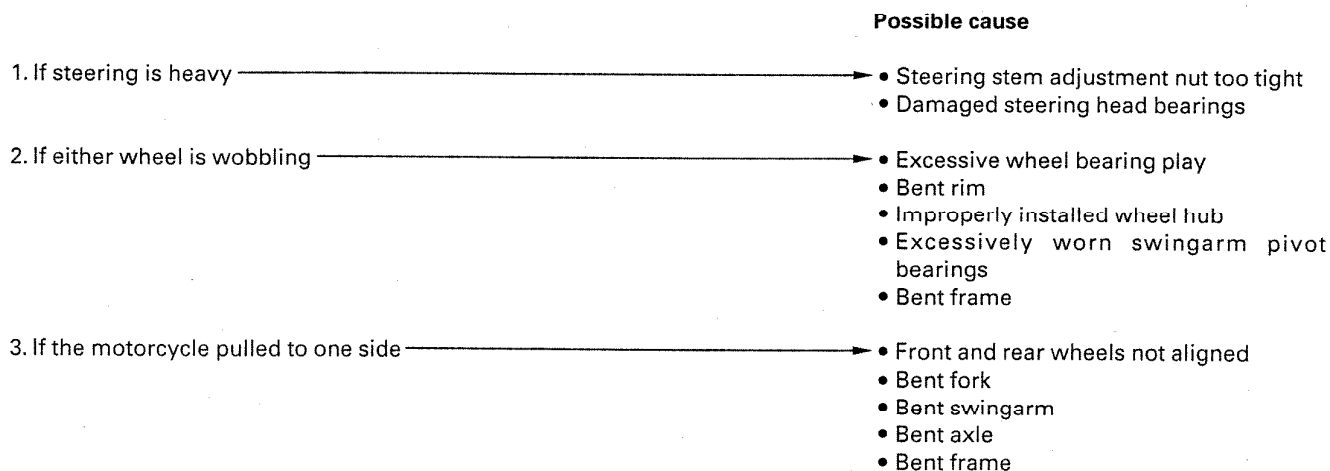


## TROUBLESHOOTING

### POOR PERFORMANCE AT HIGH SPEED



### POOR HANDLING



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